Bull Escala EPC 2450 c/s

using
Oracle8i™ Enterprise Edition (64-bit)
IBM Websphere Application Server Enterprise Edition Version 3.0

TPC Benchmark™ C

Full Disclosure Report

Submitted For Review

May 28, 2001

(upgrade to TPC-C rev.5.0)

Original submission November 7, 2000

Special Notices

The following terms used in this publication are trademarks of the BULL company in the United States and/or other countries:

BULL
Escala

The following terms used in this publication are trademarks of the IBM company in the United States and/or other countries:

AIX
IBM
RISC System/6000
eServer pSeries
TX series, Encina**,**Websphere

The following terms used in this publication are trademarks of other companies as follows:

TPC Benchmark	Trademark of the Transaction Processing Performance Council
ORACLE, SQL*DBA, SQL*Loader	Trademark of Oracle, Inc.
Oracle8,SQL*Net and SQL*Plus	Trademark of Oracle, Inc.

First Edition November 7, 2000

The information contained in this document has not been submitted to any formal test and is distributed on an AS IS basis without any warranty either expressed or implied. The use of this information or the implementation of any of these techniques is a customer's responsibility and depends on the customer's ability to evaluate and integrate them into the customer's operational environment. While each item has been reviewed by BULL for accuracy in a specific situation, there is no guarantee that the same or similar results will be obtained elsewhere. Customers attempting to adapt these techniques to their own environment do so at their own risk.

It is possible that this material may contain references to, or information about, BULL products (machines and programs), programming, or services that are not announced in your country. Such references or information must not be construed to mean that BULL intends to announce such products, programming, or services in your country.

All performance data contained in this publication was obtained in a controlled environment, and therefore the results which may be obtained in other operating environments may vary significantly. Users of this document should verify the applicable date in their specific environment.

Request for additional copies of this document should be sent to the following address:

BULL S.A.
J.F. Lemerre
B.P.208 - 1 rue de Provence - 38 432 Echirolles - France
FAX Number 33 4 7629 78 62

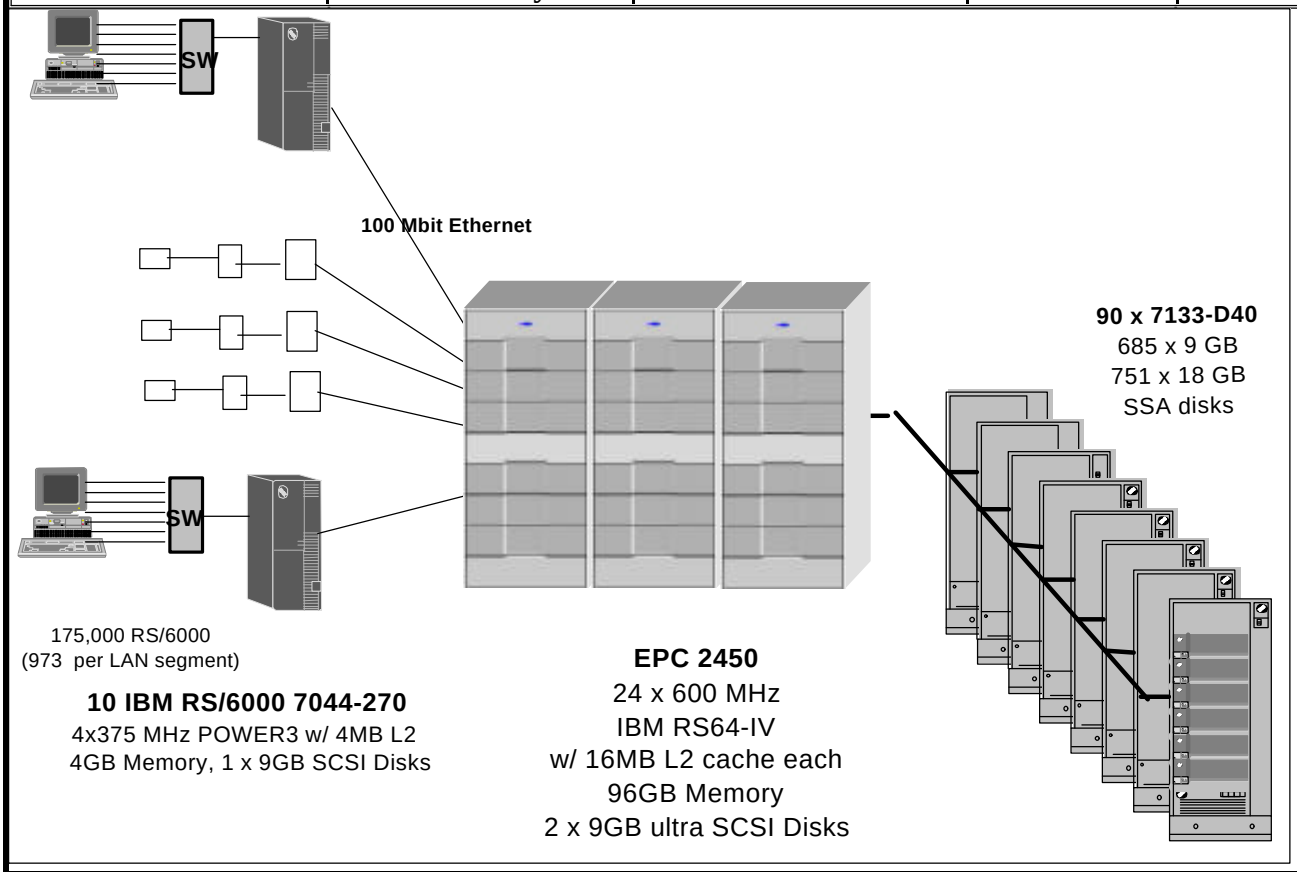
Bull Escala EPC2450 c/s

TPC-C Rev 5.0 upgrade from TPC-C rev 3.5

Report Date May 28, 2001

Total System Cost	TPC-C Throughput	Price/Performance	Availability Date
$7,657,157	220,807.27 tpmC	$34.67 /tpmC	Available

Processors	Database Manager	Operating System	Other Software	No. Users
24 x IBM RS64-IV	Oracle8i™ Enterprise Edition(64-bit) Release 3 (8.1.7) for AIX - Based System	AIX 4.3.3 +APAR IY13076	Websphere Application Server Enterprise Edition Version 3.0	175 000



System Components	Clients		Server	
	Quantity	Description	Quantity	Description
Processor	10	4 x 375 MHz Power3 w/ 4MB L2 cache each	1	24 x 600 MHz IBM RS64 IV w/ 16 MB L2 cache each
Memory	4 GB		96 GB	
Disk Controllers	1	SCSI-2 (Integrated)	1 19	SCSI-2 (Integrated) SSA Adapters
Disk Drives	1	9.1 GB SCSI each client	751 685 2	18 GB SSA disk 9.1 GB SSA disk 9.1 GB SCSI Disk
Total Storage	8.4 GB each client		18,451.40 GB	
Terminals	10	System Console	1	System Console

BULL
Escala EPC2450

TPC-C Rev. 5.0 Upgrade
From TPC-C Rev. 3.5

Report Date: May 28, 2001

Description	Part Number	Brand	Pricing	Unit Price	Quantity	Extended Price	3-year Maint. Price
Server Hardware							
ESCALA EPC2450 SYSTEM	CPXG249-0000	Bull	1	49 606	1	49 606	36 000
Kit Ultra2 SCSI Basic Implementation	CKTG126-0100	Bull	1	1 465	1	1 465	
32X (Max) SCSI-2 Internal CD ROM drive	CDRG016-0000	Bull	1	375	1	375	
9,1 GB Ultra-SCSI 16-bit Hot Swap Disk Drive (1")	MSUG104-0000	Bull	1	1 260	2	2 520	
ETHERNET 10/100Mb/s PCI ADAPTER	DCCG137-0000	Bull	1	275	14	3 850	
Remote I/O Cable - 3m	CBLG202-1000	Bull	1	595	2	1 190	
Remote I/O Cable - 6m	CBLG199-1800	Bull	1	745	2	1 490	
16384 MB Memory (4 boards of 4096MB)	CMMG151-0000	Bull	1	147 456	2	294 912	
32768 MB Memory (4 boards of 8192MB)	CMMG171-0000	Bull	1	294 912	2	589 824	
CPU Board with 6 RS64-4@600MHz - 16MB L2 cache (F	CPUG052-0000	Bull	1	230 000	1	230 000	93 600
CPU Board with 6 RS64-4@6000MHz - 16MB L2 cache (/	CPUG053-0000	Bull	1	250 000	3	750 000	280 800
I/O Drawer to Drawer Power Control Cable (SPCN) - 2	CBLG184-1000	Bull	1	60	2	120	
I/O Rack to Rack Power Control Cable (SPCN) - 15 m	CBLG185-2000	Bull	1	75	1	75	
Kit Power Supply Extension	PSKG006-0000	Bull	1	3270	1	3 270	
Additional I/O drawer, 10EIA (14 PCI slots, 12 disk ba	DRWG012-0000	Bull	1	24 500	3	73 500	
Rack 36U (with one PDU)	RCKG008-0000	Bull	1	3 850	11	42 350	
ADDITIONAL POWER DISTRIBUTION UNIT- SING	PSSG028-0000	Bull	1	1 000	20	20 000	
8-PORT ASYNC RS232/422 PCI ADAPTER with Far	DCCG130-0000	Bull	1	1 395	1	1 395	
Async/Terminal cable	2934	IBM	1	45	1	45	
Advanced serial Raid adapter	6230	IBM	1	3 000	19	57 000	
32MB Cache option	6235	IBM	1	575	3	1 725	
6000VA UPS	9910-EP8	IBM	1	5904	1	5 904	
ext UPS	9910-U33	IBM	1	3 822	2	7 644	
SSA	7133-D40	IBM	1	13 000	90	1 170 000	397 440
50/60 hz power supply	8022	IBM	1	2 000	90	180 000	
9.1GB disk	8509	IBM	1	2 760	685	1 890 600	
18GB disk	8518	IBM	1	4 500	751	3 379 500	
SSA Cables	8802	IBM	1	125	90	11 250	
					Subtotal	8 769 610	807 840
Server Software							
C for AIX V5.0 Initial User (incl. Media)	CLGG023-WA0A	Bull	1	799	1	799	540
AIX 4.3 License support - Class G		Bull	1		1		8 910
Oracle Version 8.1.7 64 bits		Oracle	2	666 900	1	666 900	926 640
					Subtotal	667 699	936 090
Client Hardware							
RS/6000 Model 44P-270 w/ CD-ROM	7044-270	IBM	1	5137	10	51 370	16 800
Async Terminal/Printer Cable	2934	IBM	1	45	10	450	0
10/100 Mbps Ethernet Adapter, PCI	2968	IBM	1	275	40	11 000	0
9.1 GB SCSI Hard Disk	3029	IBM	1	1260	10	12 600	0
Serial Port Converter Cable	3925	IBM	1	25	10	250	0
Memory Expansion Feature	4098	IBM	1	1038	10	10 380	0
512MB SDRAM DIMM Memory	4120	IBM	1	3584	80	286 720	0
2-way 375 MHz Power3 , 4MB L2	4362	IBM	1	13000	20	260 000	33 600
IBM ASCII Terminal, Keyboard, Cable	3153-BG3	IBM	1	577	11	6 347	3 344
					Subtotal	639 117	53 744
Client Software							
AIX 4. Unlimited Users(Media only)	5765-C34	IBM	1	50	10	500	21 031
IBM Websphere Applicaton Server	41L3462	IBM	1	21000	10	210 000	15 665
					Subtotal	210 500	36 696
					Discounts	-4 329 012	-135 126
					TOTAL	5 957 914	1 699 243

Notes:
Pricing: 1-Bull 2-Oracle

Audited by Francois Raab of InfoSizing

Three-Year Cost of Ownership: $7 657 157
tpmC Rating: 220807,27
$ / tpmC: 34,67

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

Numerical Quantities Summary for the Bull Escala EPC2450

MQTH, computed Maximum Qualified Throughput: 220,807.27 tpmC

Repeatability Run: 220,405.93 tpmC 0.18% difference

Response Times (in seconds)	90th %	Average	Maximum
New Order	0.78	0.37	11.90
Payment	0.73	0.33	12.67
Order-Status	0.76	0.35	10.81
Delivery (interactive)	0.19	0.11	1.87
Delivery (deferred)	0.27	0.15	2.63
Stock-Level	1.14	0.70	10.93
Menu	0.00	0.00	2.54

Transaction Mix, in percent of total transactions	Percent
New Order	44.91%
Payment	43.02%
Order-Status	4.01%
Delivery	4.01%
Stock-Level	4.02%

Keying/Think Times (in seconds)	Min.	Average	Max.
New Order	18.00/0.01	18.01/12.02	18.13/120.21
Payment	3.00/0.01	3.01/12.02	3.13/120.21
Order-Status	2.00/0.01	2.01/10.01	2.12/100.11
Delivery	2.00/0.01	2.01/5.02	2.11/50.21
Stock-Level	2.00/0.01	2.01/5.02	2.12/50.20

Test Duration

Ramp-up Time	37 min 40 sec
Measurement interval	30 minutes
Transactions during measurement interval (all types)	14,747,794
Ramp-down time	10 minutes

Checkpointing

Number of checkpoints	1
Checkpoint interval	29 min 54 sec

Abstract

This report documents the full disclosure information required by the TPC Benchmark™ C Standard Specification Revision 3.5 dated October 25, 1999, and upgraded to Revision 5.0 dated February 26, 2001 for measurements on the BULL ESCALA EPC2450 . .

The software used on the BULL ESCALA EPC2450 includes AIX Version 4.3.3 operating system + APAR IY13076, Oracle8i™ Enterprise Edition(64-bit) Release 3 (8.1.7) for AIX - Based System database manager, and Websphere Application Server Enterprise Edition Version 3.0 for AIX transaction manager.

BULL ESCALA EPC2450

Company Name	System Name	Data Base Software	Operating System Software
Bull SA Oracle Corporation	BULL ESCALA EPC2450	Oracle8i™ Enterprise Edition(64-bit) Release 3 (8.1.7) for AIX - Based System	AIX Version 4.3.3 +APARIY13076

Total System Cost	TPC-C Throughput	Price/Performance
• Hardware • Software • 3 Years Maintenance	Sustained maximum throughput of system running TPC-C expressed in transactions per minute	Total system cost/tpmC
$7,657,157	**220,807.27 tpm-C**	**$34.67 per tpm-C**

Preface

TPC Benchmark™ C Standard Specification was developed by the Transaction Processing Performance Council (TPC). It was released on August 13, 1992 and updated with revision 5.0 on February 26, 2001.

This is the full disclosure report for benchmark testing of the BULL ESCALA EPC2450 according to the TPC Benchmark™ C Standard Specification.

TPC Benchmark™ C exercises the system components necessary to perform tasks associated with that class of on-line transaction processing (OLTP) environments emphasizing a mixture of read-only and update intensive transactions. This is a complex OLTP application environment exercising a breadth of system components associated by such environments characterized by:

- The simultaneous execution of multiple transaction types that span a breadth of complexity
- On-line and deferred transaction execution modes
- Multiple on-line terminal sessions
- Moderate system and application execution time
- Significant disk input/output
- Transaction integrity (ACID properties)
- Non-uniform distribution of data access through primary and secondary keys
- Data bases consisting of many tables with a wide variety of sizes, attributes, and relationships
- Contention on data access and update

This benchmark defines four on-line transactions and one deferred transaction, intended to emulate functions that are common to many OLTP applications. However, this benchmark does not reflect the entire range of OLTP requirements. The extent to which a customer can achieve the results reported by a vendor is highly dependent on how closely TPC-C approximates the customer application. The relative performance of systems derived from this benchmark does not necessarily hold for other workloads or environments. Extrapolations to any other environment are not recommended.

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

The performance metric reported by TPC-C is a “business throughput” measuring the number of orders processed per minute. Multiple transactions are used to simulate the business activity of processing an order, and each transaction is subject to a response time constraint. The performance metric for this benchmark is expressed in transactions-per-minute-C (tpmC). To be compliant with the TPC-C standard, all references to tpmC results must include the tpmC rate, the associated price-per-tpmC, and the availability date of the priced configuration.

1. General Items

1.1 Application Code Disclosure

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 contains the eServer pSeries application code for the five TPC Benchmark™ C transactions. Appendix D contains the terminal functions and layouts.

1.2 Benchmark Sponsor

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

This benchmark was sponsored by **Bull SA** and **Oracle Corporation.**

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:

- *Data Base tuning options*
- *Recovery/commit options*
- *Consistency/locking options*
- *Operating system and application configuration parameters.*

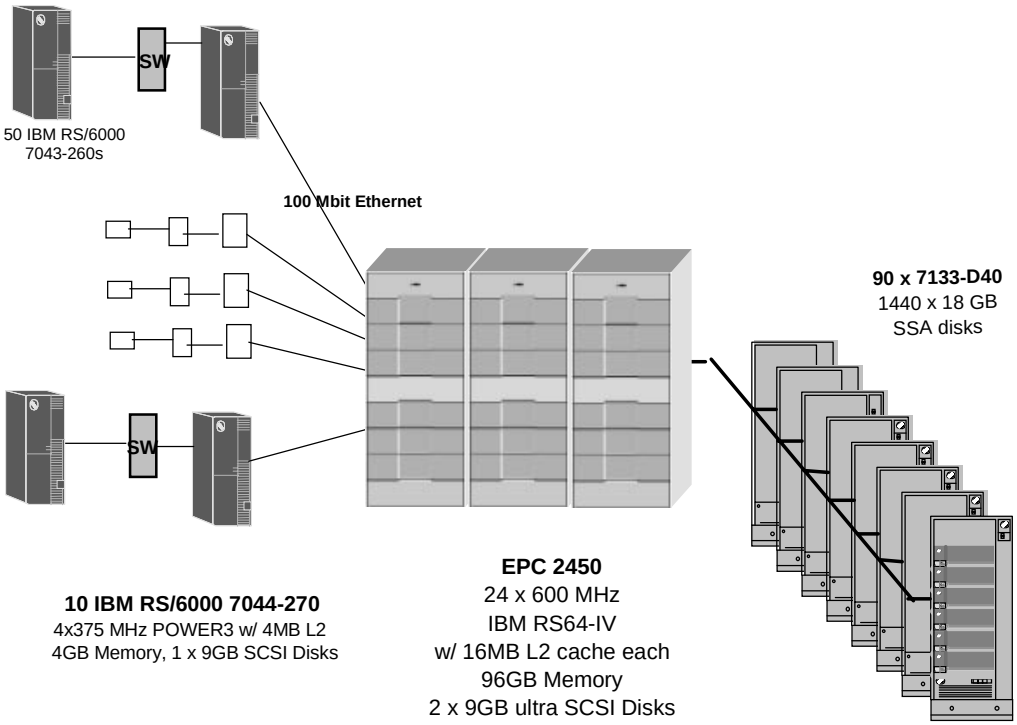
Appendix B contains the system, data base, and application parameters changed from their default values used in these TPC Benchmark™ C tests.

1.4 Configuration Diagrams

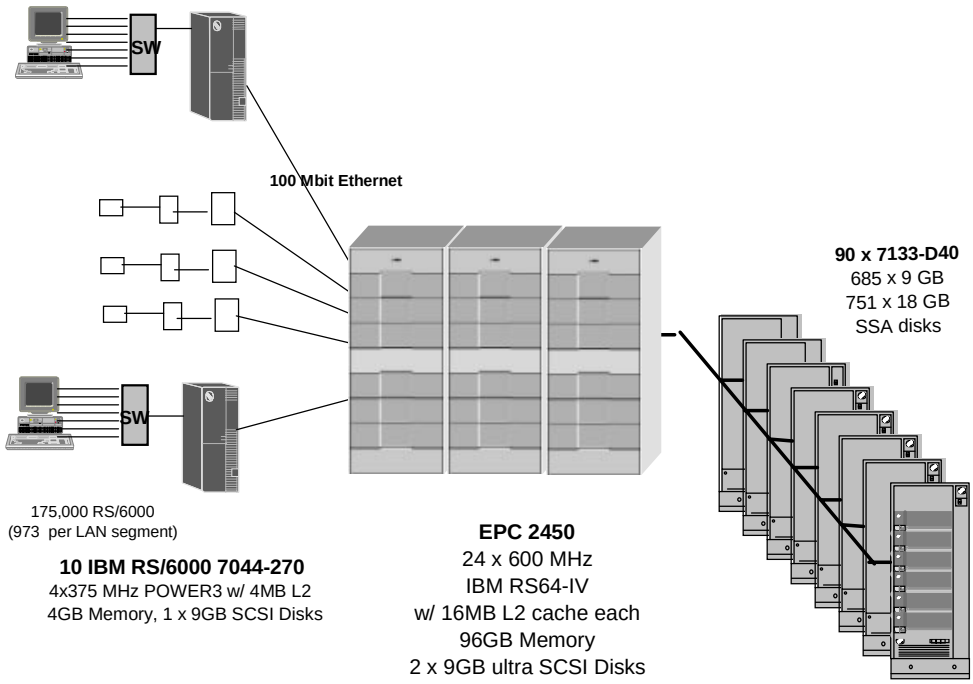
Diagrams of both measured and priced configurations must be provided, accompanied by a description of the differences. This includes, but is not limited to:

- *Number and type of processors*
- *Size of allocated memory, and any specific mapping/partitioning of memory unique to the test*
- *Number and type of disk units (and controllers, if applicable)*
- *Number of channels or bus connections to disk units, including the protocol type*
- *Number of LAN (e.g. Ethernet) connections, including routers, work stations, terminals, etc, that were physically used in the test or are incorporated into the pricing structure (see Clause 8.1.8)*
- *Type and run-time execution location of software components (e.g. DBMS, client processes, transaction monitors, software drivers, etc)*

Bull Escala EPC2450 Benchmark Configuration



Bull Escala EPC2450 Priced Configuration



2. Clause 1: Logical Data Base Design Related Items

2.1 Table Definitions

Listings must be provided for all table definition statements and all other statements used to setup the data base.

Appendix C contains the table definitions and the database load programs used to build the data base.

2.2 Database Organization

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

Physical space was allocated to Oracle8i Server on the server disks according to the details provided in Appendix C. The size of the space segments on each disk was calculated to provide even distribution of data across the disk subsystem.

2.3 Insert and/or 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 restriction in the SUT data base 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/or delete operations to any of the tables. The space required for an additional five percent of the initial table cardinality was allocated to Oracle8i Server and priced as static space.

2.4 Horizontal or Vertical Partitioning

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

Partitioning was not used for any of the measurement reported in this full disclosure.

3. Clause 2: Transaction and Terminal Profiles Related Items

3.1 Verification for the Random Number Generator

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

The srandom(), getpid() and gettimeofday() functions are used to produce unique random seeds for each driver. The drivers use these seeds to seed the srand(), srandom() and srand48() functions. Random numbers are produced using wrappers around the standard system random number generators.

The negative exponential distribution uses the following function to generate the distribution. This function has the property of producing a negative exponential curve with a specified average and a maximum value 4 times the average.

```
        const double RANDOM_4_Z = 0.89837799236185
const double RANDOM_4_K = 0.97249842407114

        double neg_exp_4(double average {
                return - average * (1/RANDOM_4_Z * log (1 - RANDOM_4_K * drand48())));
}
```

The random functions used by the driver system and the data base generation program were verified. The C_LAST column was queried to verify the random values produced by the database generation program. After a measurement, the HISTORY, ORDER, and ORDER_LINE tables were queried to verify the randomness of values generated by the driver. The rows were counted and grouped by customer and item numbers.

Here is an example of one SQL query used to verify the random number generation functions:

- create table TEMP (W_ID int, D_ID, C_LAST char(16), CNTR int);
- insert into TEMP select C_W_ID, C_D_ID, C_LAST, COUNT(*) from CUSTOMER group by C_W_ID, C_D_ID, C_LAST;
- select CNTR, COUNT(*) from TEMP group by CNTR order by 1;

3.2 Input/Output Screens

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

The screen layouts corresponds exactly to the layout corresponding in clauses 2.4.3, 2.5.3, 2.6.3, 2.7.3 and 2.8.3 of the TPC-C specifications.

3.3 Priced Terminal Features

The method used to verify that the emulated terminals provide all the features described in Clause 2.2.2.4 must be explained. Although not specifically priced, the type and model of the terminals used for the demonstration in 8.1.3.3 must be disclosed and commercially available (including supporting software and maintenance).

The emulated workstations, IBM RS/6000 Model 44P-170, are commercially available and support all of the requirements in Clause 2.2.2.4.

3.4 Presentation Managers

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

The RS/6000 Model 44P-170 workstations did not involve screen presentations, message bundling or local storage of TPC-C rows. All screen processing was handled by the client system. All data manipulation was handled by the server system.

3.5 Home and Remote Order-lines

The percentage of home and remote order-lines in the New-Order transactions must be disclosed.

Table 3-1 show the percentage of home and remote transactions that occurred during the measurement period for the New-Order transactions.

3.6 New-Order Rollback Transactions

The percentage of New-Order transactions that were rolled back as a result of an illegal item number must be disclosed.

Table 3-1 show the percentage of New-Order transactions that were rolled back due to an illegal item being entered.

3.7 Number of Items per Order

The number of items per order entered by New-Order transactions must be disclosed.

Table 3-1 show the average number of items ordered per New-Order transaction.

3.8 Home and Remote Payment Transactions

The percentage of home and remote Payment transactions must be disclosed.

Table 3-1 show the percentage of home and remote transactions that occurred during the measurement period for the Payment transactions.

3.9 Non-Primary Key Transactions

The percentage of Payment and Order-Status transactions that used non-primary key (C_LAST) access to the data base must be disclosed.

Table 3-1 show the percentage of non-primary key accesses to the data base by the Payment and Order-Status transactions.

3.10 Skipped Delivery Transactions

The percentage of Delivery transactions that were skipped as a result of an insufficient number of rows in the NEW-ORDER table must be disclosed.

Table 3-1 show the percentage of Delivery transactions missed due to a shortage of supply of rows in the NEW-ORDER table.

3.11 Mix of Transaction Types

The mix (i.e. percentages) of transaction types seen by the SUT must be disclosed.

Table 3-1 show the mix percentage for each of the transaction types executed by the SUT.

3.12 Queueing Mechanism of Delivery

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

The Delivery transaction was submitted using an RPC call to an IBM Websphere Application Server Enterprise Edition Version 3.0, Encina interface transaction manager (TM). Websphere returns an immediate response to the calling program and schedules the work to be performed. This allows the Delivery transaction to be submitted, obtain an interactive response and queue the actual data base transaction for deferred execution. Please see the application code in Appendix A for details.

Table 3-1 Numerical Quantities for Transaction and Terminal Profiles

New Order	BULL ESCALA EPC2450
Percentage of Home order lines	99.01%
Percentage of Remote order lines	0.99%
Percentage of Rolled Back Transactions	1.00%
Average Number of Items per order	10
Payment	
Percentage of Home transactions	84.99%
Percentage of Remote transactions	15.01%
Non-Primary Key Access	
Percentage of Payment using C_LAST	60.00%
Percentage of Order-Status using C_LAST	59.88%
Delivery	
Delivery transactions skipped	0
Transaction Mix	
New-Order	44.91%
Payment	43.02%
Order-Status	4.01%
Delivery	4.01%
Stock-Level	4.02%

4. Clause 3: Transaction and System Properties

The results of the ACID test must be disclosed along with a description of how the ACID requirements were met.

All ACID tests were conducted according to specification.

4.1 Atomicity Requirements

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

4.1.1 Atomicity of Completed Transaction

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

The following steps were performed to verify the Atomicity of completed transactions.

1. The balance was retrieved from the CUSTOMER table for a random Customer, District and Warehouse giving BALANCE_1.
2. The Payment transaction was executed for the Customer, District and Warehouse used in step 1.
3. The balance was retrieved again for the Customer used in step 1 and step 2 giving BALANCE_2. It was verified that BALANCE_1 was greater than BALANCE_2 by AMT.

4.1.2 Atomicity of Aborted Transactions

Perform the Payment transaction for a randomly selected warehouse, district, and customer (by customer number) 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.

The following steps were performed to verify the Atomicity of the aborted Payment transaction:

1. The Payment application code was changed to execute a rollback of the transaction instead of performing the commit.
2. Using the balance, BALANCE_2, from the CUSTOMER table retrieved for the completed transaction, the Payment transaction was executed for the Customer, District, and Warehouse used in step 1 of the section 4.1.1, using a payment amount (AMT) of 410.00. The transaction rolled back due to the change in the application code from step 1.
3. The balance was retrieved again for the Customer used for step 2 giving BALANCE_3. It was verified that BALANCE_2 was equal to BALANCE_3.

4.2 Consistency Requirements

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

Verify that the data base is initially consistent by verifying that it meets the consistency conditions defined in Clauses 3.3.2.1 to 3.3.2.4. Describe the steps used to do this in sufficient detail so that the steps are independently repeatable.

4.2.1 Consistency Condition 1

Entries in the WAREHOUSE and DISTRICT tables must satisfy the relationship:

- *W_YTD = sum(D_YTD)*

for each warehouse defined by (W_ID = D_W_ID)

4.2.2 Consistency Condition 2

Entries in the DISTRICT, ORDER, and NEW-ORDER tables must satisfy the relationship:

- *D_NEXT_O_ID - 1 = max(O_ID) = max(NO_O_ID)*

for each district defined by (D_W_ID = O_W_ID = NO_W_ID) and (D_ID = O_D_ID = NO_D_ID). This condition does not apply to the NEW-ORDER table for any districts which have no outstanding new orders.

4.2.3 Consistency Condition 3

Entries in the New-Order table must satisfy the relationship:

- *max(NO_O_ID) - min(NO_O_ID) + 1 = [number of rows in the New-Order table for this district]*

for each district defined by NO_W_ID and NO_D_ID. This condition does not apply to any districts which have no outstanding new orders.

4.2.4 Consistency Condition 4

Entries in the ORDER and ORDER-LINE tables must satisfy the relationship:

- *sum(O_OL_CNT) = [number of rows in the ORDER-LINE table for this district]*

for each district defined by (O_W_ID = OL_W_ID) and (O_D_ID = OL_D_ID).

4.2.5 Consistency Tests

Verify that the data base is initially consistent by verifying that it meets the consistency conditions defined in Clauses 3.3.2.1 to 3.3.2.4. Describe the steps used to do this in sufficient detail so that the steps are independently repeatable.

The consistency conditions defined in 4.2.1 through 4.2.4 were tested using a shell script to issue queries to the database. All queries showed that the data base was in a consistent state.

After executing transactions at full load for approximately sixty minutes the shell script was executed again. All queries show that the database was still in a consistent state.

4.3 Isolation Requirements

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

4.3.1 Isolation Test 1

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

1. An Order status transaction T0 was executed for a randomly selected customer, and the order returned was as recorded. Transaction T0 was committed.

2. A new-order transaction T1 was started for the same customer used in T0. T1 was stopped immediately prior to commit.

3. An order-status transaction T2 was started for the same customer used in T1. Transaction T2 completed and was committed without being blocked by T1. T2 returned the same order that T0 had returned.

4. T1 completed and was committed.

5. An order-status transaction T3 was started for the same customer used in T1. T3 returned the order inserted by T1.

This result demonstrates serialization of T2 before T1. It has equivalent validity to the outcome specified in the Standard which supposes T1 to be serialized before T2.

4.3.2 Isolation Test 2

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

The following steps were performed to satisfy the test of isolation for Order-Status and a rolled back New-Order transactions:

1. An Order status transaction T0 was executed for a randomly selected customer, and the order returned was recorded. Transaction T0 was committed.
2. A new-order transaction T1 with an invalid item was started for the same customer used in T0. Transaction T1 was stopped prior to rollback.
3. An order-status transaction T2 was started for the same customer used in T1. T2 completed and was committed without being blocked by T1. Transaction T2 returned the same order that T0 had returned.
4. T1 was rollback.
5. An order-status transaction T3 was started for the same customer used in T1. T3 returned the same order that T0 returned.

4.3.3 Isolation Test 3

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

The following steps were performed to verify isolation of two New-Order transactions:

1. The D_NEXT_O_ID of a randomly selected district was retrieved.
2. A new-order transaction T1 was started for a randomly selected customer within the district used in step1. T1 was stopped immediately prior to commit.
3. Another new-order transaction was started for the same customer used in T1. Transaction T2 waited.
4. T1 completed. T2 completed and was committed.
5. The order number returned by T1 was the same as the D_NEXT_O_ID retrieved in step 1. The order number returned by T2 was one greater that the order number returned by T1.
6. The D_NEXT_O_ID of the same district was retrieved again. It had been incremented by two (it was one greater that the order number returned by T2).

4.3.4 Isolation Test 4

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

The following steps were performed to verify the isolation of two New-Order transactions after one is rolled back:

1. The D_NEXT_O_ID of a randomly selected district was retrieved.
2. A new-order transaction T1 with an invalid item was started for a randomly selected customer with the district used in step1. T1 was stopped immediately prior to rollback.
3. Another new-order transaction was started for the same customer used in T1. T2 waited.
4. T1 was allowed to rollback. T2 completed and was committed.
5. The order number returned by T2 was the same as the D_NEXT_O_ID retrieved in step 1.
6. The D_NEXT_O_ID of the same district was retrieved again. It had been incremented by one (it was one greater that the order number returned by T2).

4.3.5 Isolation Test 5

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

The following steps were performed to successfully conduct this test:

1. A query was executed to find out the customer who would be updated by the next delivery transaction for a randomly selected warehouse and district.
2. The C_BALANCE of the customer found in step 1 is retrieved.
3. A delivery transaction T1 was started for the same warehouse used in step 1. T1 was stopped immediately prior to the commit of the database transaction corresponding to the district used in step 1.
4. A payment transaction T2 was started for the same customer found in step 1. T2 waited.
5. T1 was allowed to complete. T2 completed and was committed.
6. The C_BALANCE of the customer found in step 1 was retrieved again. The C_BALANCE reflected the results of both T1 and T2.

4.3.6 Isolation Test 6

This test demonstrates isolation for write-write conflicts of Payment and Delivery transactions when the Delivery transaction is rolled back.

The following steps were performed to successfully conduct this test:

1. A query was executed to find out the customer who would be updated by the next delivery transaction for a randomly selected warehouse and district.
2. The C_BALANCE of the customer found in step 1 is retrieved
3. A delivery transaction T1 was started for the same warehouse used in step 1. T1 was stopped immediately prior to the rollback of the database transaction corresponding to the district used in step 1.
4. A payment transaction T2 was started for the same customer found in step 1. Transaction T2 waited.
5. T1 was allowed to rollback. T2 completed and was committed.
6. The C_BALANCE of the customer found in step 1 was retrieved again. The C_BALANCE reflected the results of only Transaction T2.

4.3.7 Isolation Test 7

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

The following steps were performed to successfully conduct this test:

1. The I_PRICE of two randomly selected items were retrieved.
2. A new-order transaction T2 with a group of items X and Y was started. T2 was stopped immediately, after retrieving the prices of all items. The prices of items X and Y retrieved matched those values retrieved in step 1.
3. A transaction T3 was started to increase the price of items X and Y by 10%.
4. T3 did not stall and no transaction was rolled back. T3 was committed.
5. T2 was resumed, and the prices of all items were retrieved again within T2. The prices of items X and Y matched those retrieved in step 1.
6. T2 was committed.
7. The prices of items X and Y were retrieved again. The values matched the values set by T3.

4.3.8 Isolation Test 8

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

The following steps were performed to successfully conduct this test:

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

4.3.9 Isolation Test 9

This test demonstrates isolation for phantom protection between an Order-Status and a New-Order transaction.

The following steps were performed to successfully conduct this test:

1. An order status transaction T1 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 found.
3. A new order transaction T2 was started for the same customer. T2 completed and was committed without being blocked by T1.
4. T1 was resumed and the order table was read again to determine the most recent order for the same customer. The order found was the same as the one found in step 2.
5. T1 completed and was committed.

4.4 Durability Requirements

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

4.4.1 Permanent Unrecoverable Failure of any Single Durable Medium

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

Failure of Durable Medium containing recovery log data and Instantaneous Interruption and Memory Failure.

This test was conducted on a fully scaled database. The following steps were performed successfully.

1. The current count of the total number of orders was determined by the sum of D_NEXT_O_ID of all rows in the DISTRICT table giving SUM_1.
2. A test was started and allowed to run for twelve minutes.
3. One of the disks containing the Oracle8i transaction log data was powered off. Since the log was on a raid disk, Oracle8i continued to process the transactions successfully.
4. The test continued for another 1 1/2 minutes.
5. The system was immediately shut down by switching the Emergency Power Off , thereby removing system power.
6. The disk from step 3 was powered back on.
7. The system was powered back on and rebooted.

8. Step 1 is performed returning the value for SUM_2. It was verified that SUM_2 was equal to SUM_1 plus the completed New_Order transactions recorded by the RTE and that no entries existed for rolled-back transactions.

9. Consistency condition 3 was verified.

Failure of Durable Medium containing TPC-C data base tables.

The following steps were successfully performed to pass the Durability test of failure of a disk unit with data base tables:

1. The contents of a disk containing a TPCC table was backed up by copying it to another disk.

2. The current count of the total number of orders was determined by the sum of D_NEXT_O_ID of all rows in the DISTRICT table giving SUM_1.

3. A scaled-down test was started and allowed to run until steady state.

4. The disk containing the TPCC table was powered off.

5. The run was stopped.

6. The disk from step 4 was powered back on and was restored from the backup copy in step 1.

7. Oracle8i was restarted and its transaction log was used to roll forward through the transactions that had completed since the run had started.

8. Step 2 was performed returning SUM_2. It was verified that SUM_2 was equal to SUM_1 plus the completed New_Order transactions recorded by the RTE and that no entries existed for rolled-back transactions.

9. Consistency condition 3 was verified.

Failure of Durable Fast Write Cache on SSA Adapter for Redo Logs

The following steps were successfully performed to pass the Durability test for failure of a durable medium that contains transient redo log transactions:

1. The SSA adapter for the Redo logs contains a cache that is powered by an onboard battery which will retain its contents if the adapter fails, or system power goes off. This test was performed in two parts:

   A) failure of the adapter/system power

   B) failure of the onboard battery

2. Test (A) was performed with the power-off test of the log above. After the system was powered off, the cache was removed from its current adapter and re-inserted into the system before rebooting.

3. Data on the cache was recovered successfully by meeting the requirements listed in the power-off test of the logs above.

4. Test (B). The current count of the total number of orders was determined by the sum of D_NEXT_O_ID of all rows in the DISTRICT table, giving SUM_1.

5. Test (B) was conducted by inducing a battery failure during a test run. Once the system had reached steady state, the battery was failed using a toggle switch. The system recorded the failure, flushed out its vram contents and quit using the cache. Error notices were posted into the system error log.

6. The run continued without the cache.

7. Step 4 was performed returning SUM_2. It was verified that SUM_2 was equal to SUM_1 plus the completed New_Order transactions recorded by the RTE and that no entries existed for rolled-back transactions.

8. Consistency condition 3 was verified..

5. Clause 4: Scaling and Data Base Population Related Items

5.1 Cardinality of Tables

The cardinality (e.g., the number of rows) of each table, as it existed at the start of the benchmark run, must be disclosed.

Table 5-1 portrays the TPC Benchmark™ C defined tables and the number of rows for each table as they were built initially. Table 5-1 Initial Cardinality of Tables (eServer pSeries 680). While 20,000 warehouses were built initially, only 17,500 warehouses were used during the tests. The unused warehouses were deleted.

Table Name	Number of Rows
Warehouse	17 500
District	200 000
Customer	600 000 000
History	600 000 000
Order	600 000 000
New Order	180 000 000
Order Line	5 998 902 200
Stock	2 000 000 000
Item	100 000

5.2 Distribution of Tables and Logs

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

The following table depicts the data base configuration of the system tested.

Table 5-2. Escala EPC 2450 Data Distribution Benchmark Configuration

Cntrl	Disk	Contents	Capacity
ssa0	hdisk6-20	lvcust1-6	18 GB
ssa0	hdisk21-35	lvcust91-96, lvroll4	18 GB
ssa0	hdisk36-55	lvstock41-48	18 GB
ssa0	hdisk56-75	lvstock161-168	18 GB
ssa0	hdisk76-78	lvordl1-11, lvordl67-77, lvroll3	18 GB
ssa0	hdisk88-101	lvordl1-11, lvordl67-77, lvroll3	18 GB
ssa1	hdisk102-116	lvcust7-12, lvroll5	18 GB
ssa1	hdisk117-131	lvcust97-102, lvroll2	18 GB
ssa1	hdisk132-151	lvstock49-56	18 GB
ssa1	hdisk152-170	lvstock169-176	18 GB
ssa1	hdisk171-181	lvordl12-22, lvordl78-88	18 GB
ssa1	hdisk191-196	lvordl12-22, lvordl78-88	18 GB
ssa1	hdisk197	lvstock169-176	18 GB
ssa2	hdisk198-212	lvcust13-18	18 GB
ssa2	hdisk213-227	lvcust103-108	18 GB
ssa2	hdisk228-247	lvstock57-64	18 GB
ssa2	hdisk248-267	lvstock177-184	18 GB
ssa2	hdisk268-284	lvordl23-33, lvordl89-99	18 GB
ssa3	hdisk294-308	lvcust19-24	18 GB
ssa3	hdisk309-323	lvcust109-114	18 GB
ssa3	hdisk324-342	lvstock65-72	18 GB
ssa3	hdisk343-362	lvstock185-192	18 GB

Cntrl	Disk	Contents	Capacity
ssa3	hdisk363-379	lvordl34-44, lvordl100-110	18 GB
ssa3	hdisk388	lvstock65-72	18 GB
ssa4	hdisk390-391	lvrunlog1-2 (RAID 5)	2x16x18GB
ssa5	hdisk392-393	lvrunlog1-2 (RAID 5)	2x16x18GB
ssa6	hdisk394-395	lvrunlog1-2 (RAID 5)	2x16x18GB
ssa7	hdisk396-410	lvcust25-30	18 GB
ssa7	hdisk411-425	lvcust115-120	18 GB
ssa7	hdisk426-445	lvstock73-80	18 GB
ssa7	hdisk446-465	lvstock193-200	18 GB
ssa7	hdisk466-477	lvordl45-55, lvordl111-121	18 GB
ssa7	hdisk487-491	lvordl45-55, lvordl111-121	18 GB
ssa8	hdisk492-506	lvcust31-36	18 GB
ssa8	hdisk507-521	lvcust121-126	18 GB
ssa8	hdisk522-541	lvstock81-88	18 GB
ssa8	hdisk542-549	lvstock201-208	18 GB
ssa8	hdisk550	lvordl56-66, lvordl122-132	18 GB
ssa8	hdisk551-562	lvstock201-208	18 GB
ssa8	hdisk563-575	lvordl56-66, lvordl122-132	18 GB
ssa8	hdisk585-587	lvordl56-66, lvordl122-132	18 GB
ssa9	hdisk588-602	lvcust37-42	18 GB
ssa9	hdisk603-617	lvcust127-132	18 GB
ssa9	hdisk618-636	lvstock89-96	18 GB
ssa9	hdisk637-656	lvstock209-216	18 GB
ssa9	hdisk657-672	lvi2ord1-2, lvi2ord9-10	18 GB
ssa9	hdisk682	lvi2ord1-2, lvi2ord9-10	18 GB
ssa9	hdisk683	lvstock89-96	18 GB
ssa10	hdisk684-698	lvcust43-48	18 GB
ssa10	hdisk699-713	lvstock133-138	18 GB
ssa10	hdisk714-733	lvstock97-104	18 GB
ssa10	hdisk734-753	lvstock217-224	18 GB
ssa10	hdisk754-770	lvi2ord3-4, lvi2ordl11-12	18 GB
ssa11	hdisk780-793	lvcust49-54	18 GB
ssa11	hdisk794-808	lvcust139-144	18 GB
ssa11	hdisk809-828	lvstock105-112	18 GB
ssa11	hdisk829-848	lvstock225-232	18 GB
ssa11	hdisk849-854	lvi2ord5-6, lvi2ord13-14	18 GB
ssa11	hdisk864-874	lvi2ord5-6, lvi2ord13-14	18 GB
ssa11	hdisk875	lvcust49-54	18 GB
ssa12	hdisk876-890	lvcust55-60	18 GB
ssa12	hdisk891-904	lvcust145-150	18 GB
ssa12	hdisk916-935	lvstock113-120	18 GB
ssa12	hdisk936-955	lvstock233-240	18 GB
ssa12	hdisk956-971	lvi2ord7-8, lvi2ord15-16	18 GB
ssa13	hdisk972	lvi1ord1-8	18 GB
ssa13	hdisk973	lvstock1-8	18 GB
ssa13	hdisk974-988	lvcust61-66	18 GB
ssa13	hdisk989-1007	lvstock1-8	18 GB
ssa13	hdisk1008-hdisk1027	lvstock121-128	18 GB
ssa13	hdisk1028-1047	lvstock241-248	18 GB
ssa13	hdisk1048-hdisk1054	lvi1ord1-8	18 GB
ssa13	hdisk1061-1067	lvi1ord1-8	18 GB

5.3 Data Base Model Implemented

A statement must be provided that describes the data base model implemented by the DBMS used.

The database manager used for this testing was Oracle8i™ Enterprise Edition(64-bit) Release 3 (8.1.7) for AIX - Based System from Oracle Corp. Oracle8i™ Enterprise Edition(64-bit) Release 3 (8.1.7) is a relational DBMS.

5.4 Partitions/Replications Mapping

The mapping of data base partitions/replications must be explictly described.

No horizontal or vertical partitioning was implemented for this TPC-C test.

5.5 180 day space calculations

BULL ESCALA EPC2450

TPM	220807
Warehouses	20000.00

SEGMENT	TYPE	TSPACE	BLOCKS	FIVE_PCT	DAILY_GROW	TOTAL
CUSTOMER	TABLE	CUST	150000001	7500000	0	157,500,001.05
DISTRICT	TABLE	WARE	100002	5000	0	105,002.10
HISTORY	TABLE	HIST	8718107	0	1540015	10,258,122.24
ICUSTOMER	INDEX	ICUST1	4099328	204966	0	4,304,294.40
ICUSTOMER2	INDEX	ICUST2	7056640	352832	0	7,409,472.00
IDISTRICT	INDEX	WARE	1280	64	0	1,344.00
IITEM	INDEX	ITEMS	2560	128	0	2,688.00
INORD	INDEX	NORD	733225	36661	0	769,886.25
IORDERS	INDEX	IORD1	4193280	209664	0	4,402,944.00
IORDERS2	INDEX	IORD2	5990400	299520	0	6,289,920.00
IORDL	INDEX	ORDL	111653864	0	19723164	131,377,027.80
ISTOCK	INDEX	ISTR	10690560	534528	0	11,225,088.00
ITEM	TABLE	ITEMS	3031	152	0	3,182.55
IWAREHOUSE	INDEX	WARE	256	13	0	268.80
ORDERS	TABLE	ORD	6024464	0	1064195	7,088,659.06
ROLL_SEG	SYS	ROLL	736000	0	0	736,000.00
STOCK	TABLE	STOCKS	181818183	9090909	0	190,909,092.15
SYSTEM	SYS	SYSTEM	384768	0	0	384,768.00
WAREHOUSE	TABLE	WARE	10006	500	0	10,506.30
Total			492,215,955	18,234,938	22,327,374	532,778,266.70

Dynamic space	126,396,435		
Static space	384,054,458		
Free space	22,327,374		
Daily growth	22,327,374		
Daily spread	0	Oracle may be configured such that daily spread is 0	
180-day space (blk.)	4,402,981,795		
Block size (bytes)	4,096		
180-day (GB)	16,796.04		
		new_order	16475957.00
Log block size	512	Redo blocks writte	443718574.00
Log blocks/tpmC	26.93	Number of log blocks used in one tpmC	
8-hour log (GB)	1,361.07		

Disk Type	Disk Formatted Capaci	SUT # of disks	SUT Capacity(GB)	Priced # of disks	Priced Capacity(GB)	Space usage (GB)	
						180-day	16813.81
						RAID	1527.00
9.1	8672.00			685	5801.09	os+paging	110.59
18.2	17376	1334	22,636.31	649	11012.72		
RAID(16-18.1GB)	260608.00			6	1527.00	Total Space	18451.40

6. Clause 5: Performance Metrics and Response Time Related Items

6.1 Response Times

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

Table 6-1 list the response times and the ninetieth percentiles for each of the transaction types for the measured system.

6.2 Keying and Think Times

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

Table 6-1 list the TPC-C keying and think times for the measured system.

Table 6-1. Escala EPC2450 Response, Think and Keying Times

Response Times	New Order	Payment	Order Status	Delivery (int./def.)	Stock Level	Menus
90 %	0,78	0,73	0,76	0.19/0.27	1,14	0
Average	0,37	0,33	0,35	0.11/0.15	0,7	0
Maximum	11,9	12,67	10,81	1.87/2.63	10,93	2,54
			Think Times			
Minimum	0,01	0,01	0,01	0,01	0,01	N/A
Average	12,02	12,02	10,01	5,02	5,02	N/A
Maximum	120,21	120,21	100,11	50,21	50,20	N/A
			Keying Times			
Minimum	18,00	3,00	2,00	2,00	2,00	N/A
Average	18,01	3,01	2,01	2,01	2,01	N/A
Maximum	18,13	3,13	2,12	2,11	2,12	N/A

6.3 Response Time Frequency Distribution

Response time frequency distribution curves must be reported for each transaction type.

Figure 6-3-1. BULL ESCALA EPC2450 New-Order Response Time Distribution

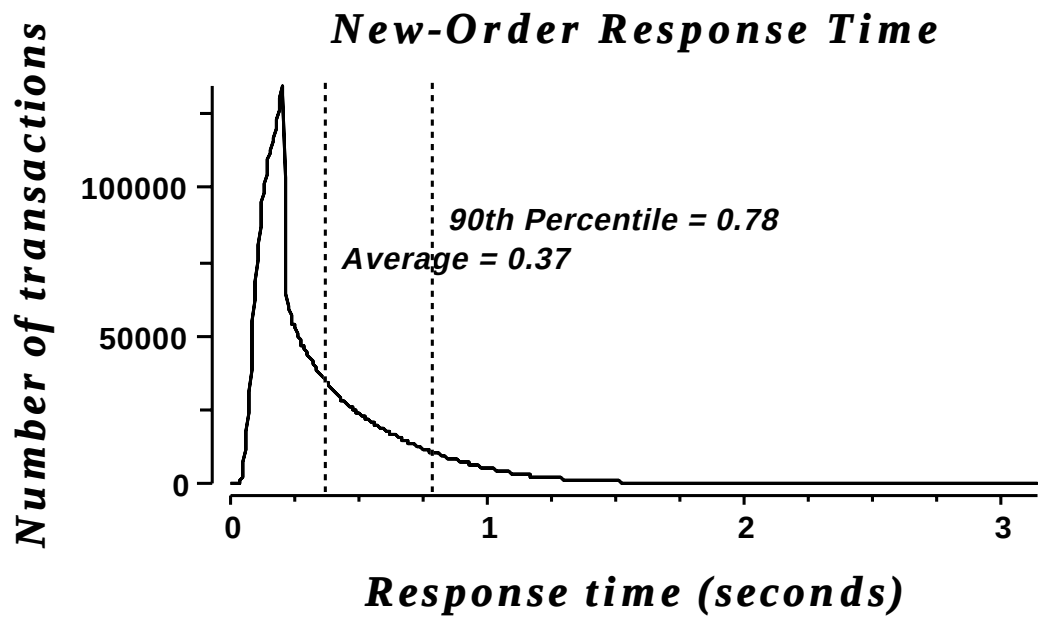


Figure 6-3-2. BULL ESCALA EPC2450 Payment Response Time Distribution

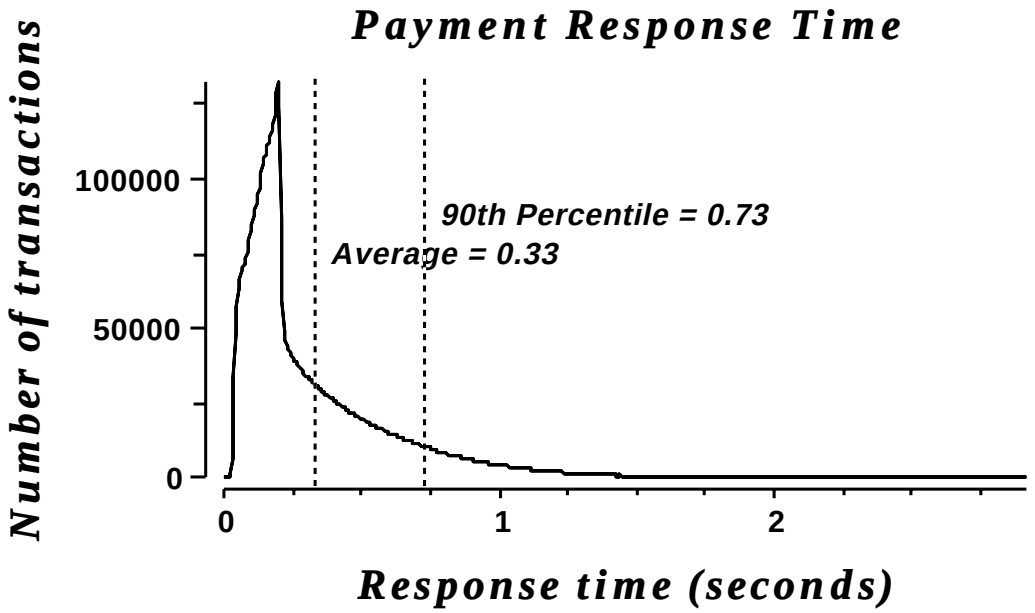


Figure 6-3-3. BULL ESCALA EPC2450 Order-Status Response Time Distribution

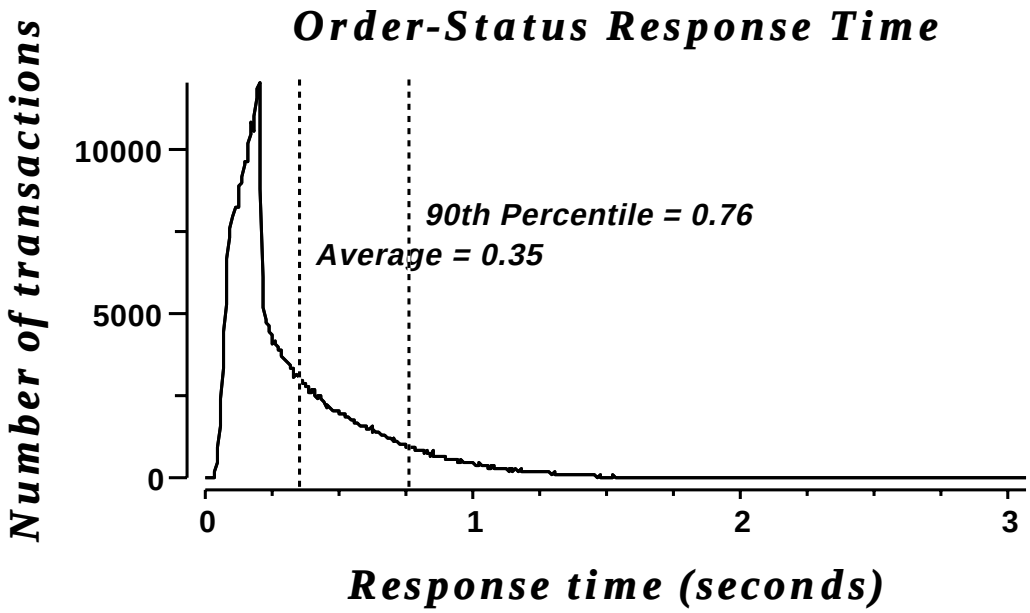


Figure 6-3-4. BULL ESCALA EPC2450 Delivery (Interactive) Response Time Distribution

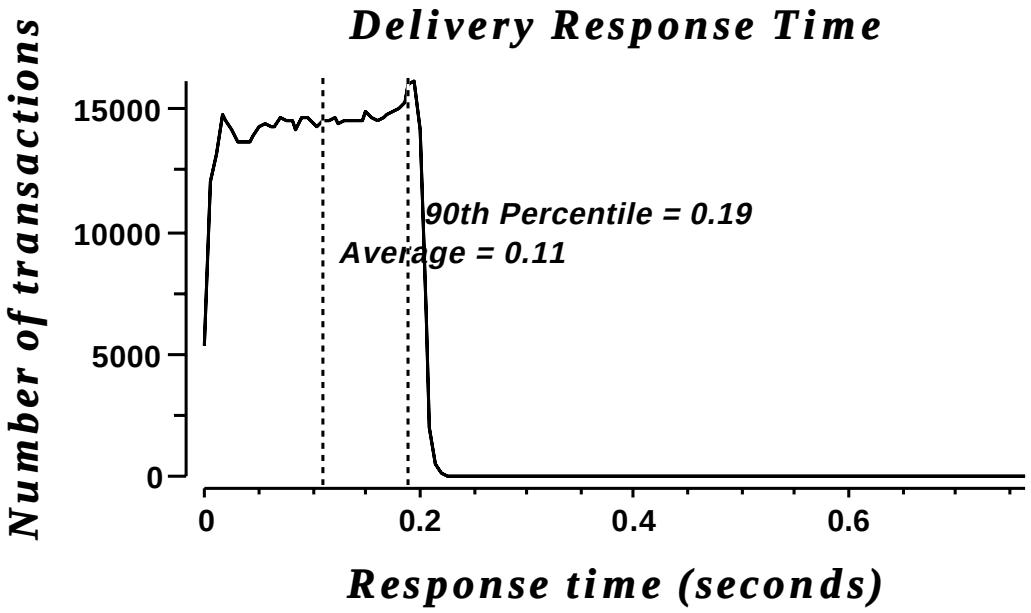


Figure 6-3-5. BULL ESCALA EPC2450 Delivery (Deferred) Response Time Distribution

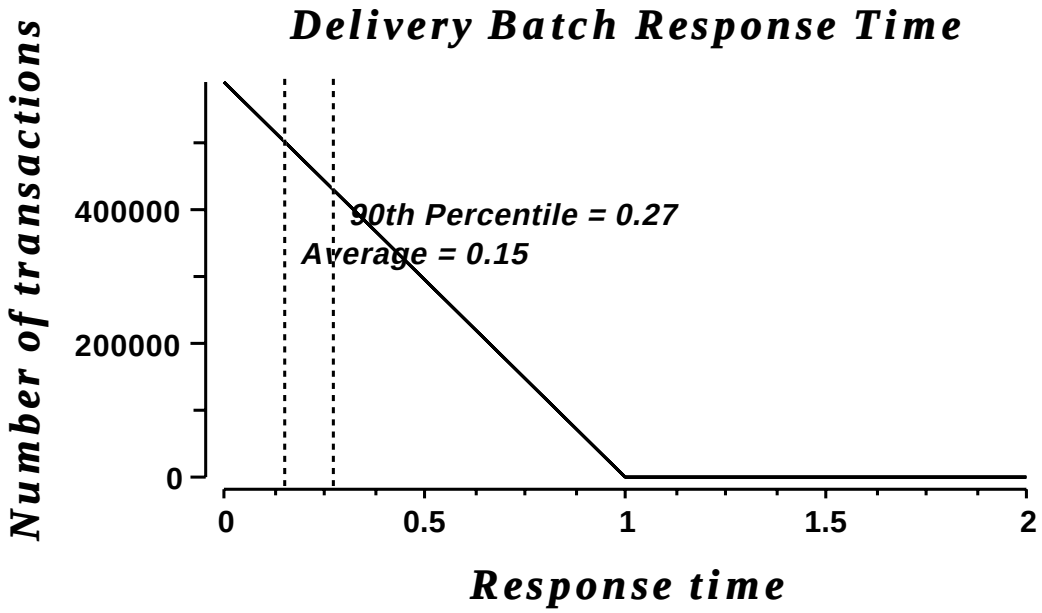
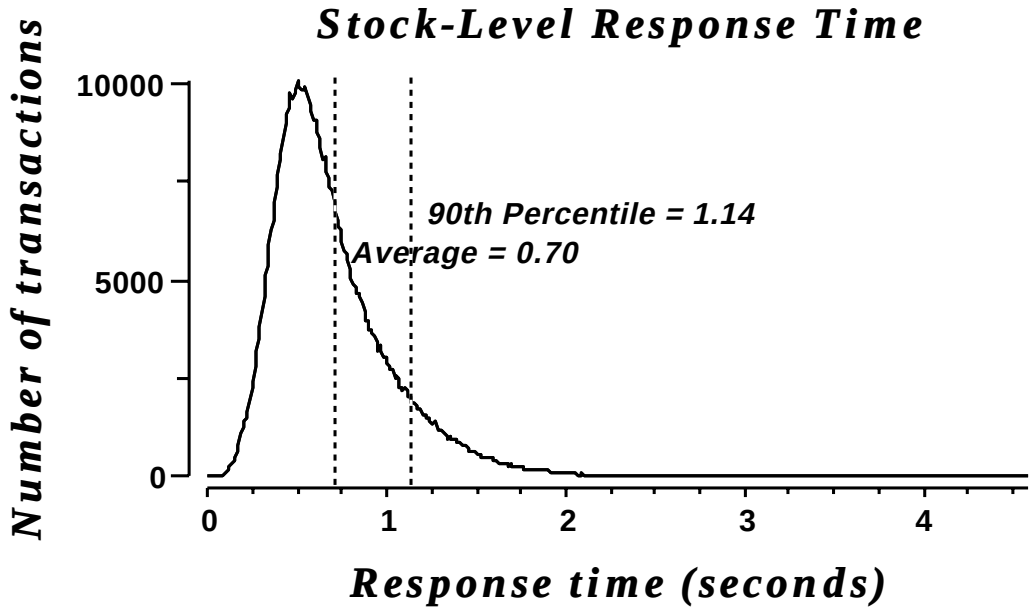


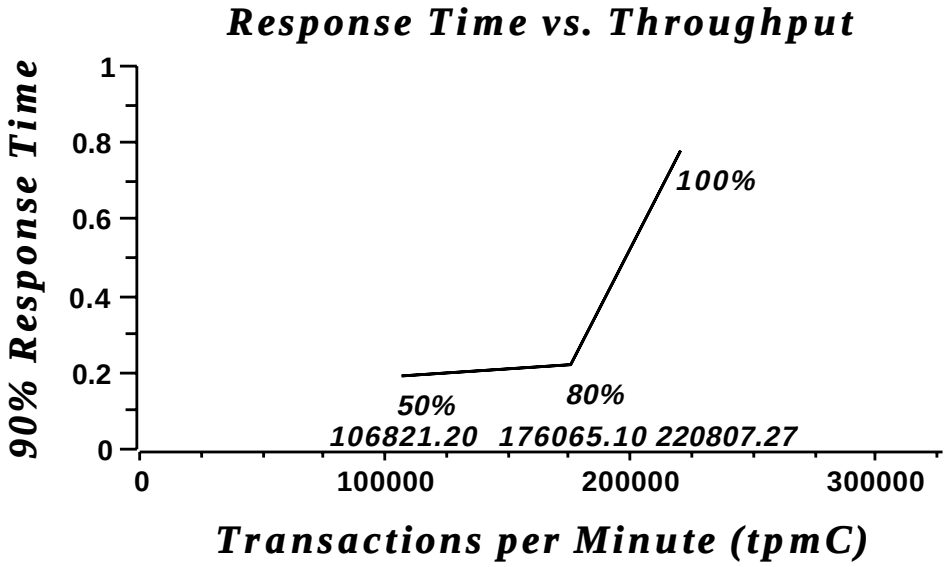
Figure 6-3-6. BULL ESCALA EPC2450 Stock Level Response Time Distribution



6.4 Performance Curve for Response Time versus Throughput

The performance curve for response times versus throughput must be reported for the New-Order transaction.

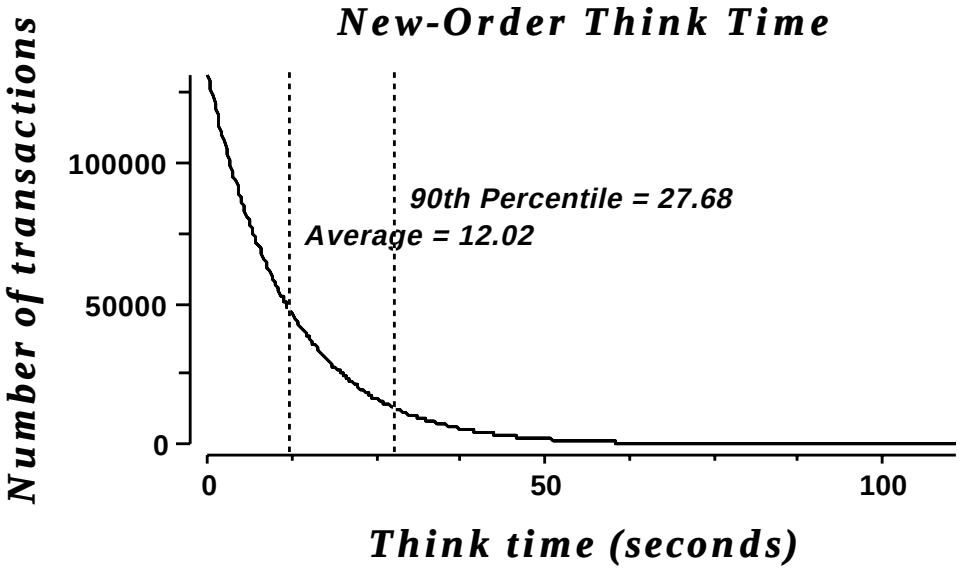
Figure 6-4-1. BULL ESCALA EPC2450 New-Order Response Time vs. Throughput



6.5 Think Time Frequency Distribution

A graph of the think time frequency distribution must be reported for the New-Order transaction.

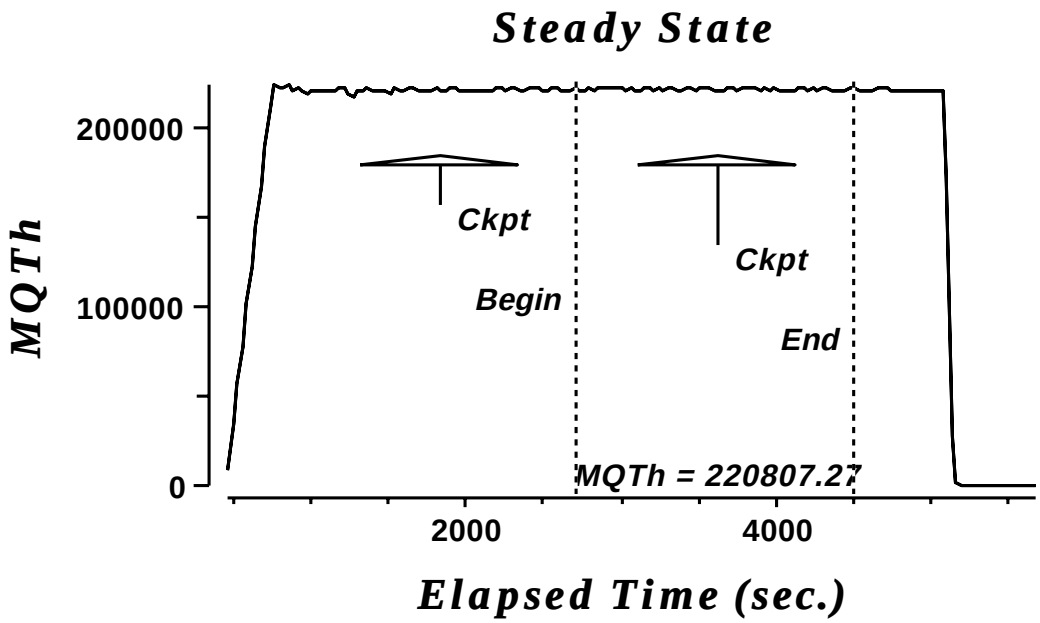
Figure 6-5-1. BULL ESCALA EPC2450 New-Order Think Time Distribution



6.6 Throughput versus Elapsed Time

A graph of throughput versus elapsed time must be reported for the New-Order transaction.

Figure 6-6-1. BULL ESCALA EPC2450 New-Order Throughput vs. Elapsed Time



6.7 Steady State Determination

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

All the emulated users were allowed to logon and do transactions. The time stamping interval was set to start after several minutes of rampup. Refer to the Numerical Quantities Summary pages for the rampup time. Figure 6.6.1 New-Order throughput versus Elapsed Time graph shows that the system was in steady state at the beginning of the Measurement Interval.

6.8 Work Performed During Steady State

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

6.8.1 Transaction Flow

For each of the TPC Benchmark™C transaction types, the following steps are executed:

IBM Websphere Application Server Enterprise Edition Version 3.0, Encina interface, was used as a transaction manager (TM). Each transaction was divided into three programs. The front end program handled all screen I/O, a database client program which connected to the database and served as a Websphere Server (a back end program), and a database server program which handled all database operations at the SUT. Both the front end and back end programs ran on the client system. The front end program communicates with the database client program through DCE RPCs. The database client program communicates with the Server system over Ethernet using SQL*Net calls. Besides calling Websphere Application Server Enterprise Edition Encina initialization code during startup, all other functions are transparent to the application code. Encina routes the transaction and balances the load according to the options defined in the configuration file in appendix B.2, The transaction flow is described below.

- Each client machine is a node in an Encina Cell.
- Three servers are configured in each.node: one processes the delivery transactions and two all other transaction.

- The delivery server is configured with five processing agents each with 3 background threads to process deferred deliveries. Each process has two connections to the database.

- The two online servers is configured with 43 processing agents. Each processing agent has 1 server manager DCE threads. Each thread has one connection to the database.

- When the Encina clients are started, they connect to Encina cell.

- When terminals are started, each terminal connects to the Encina client. The client spawns a thread for each connection to handle that connection. The thread executes the 'process_terminal' routine. The process_terminal displays the TPC-C transaction menu on the user terminal.

- The TPC-C user chooses the transaction type and proceeds to fill the screen fields required for transaction.

- The process_terminal accepts all values entered by the user and transmits those values to one of the TPC_C backend programs. The transaction is performed through a DCE RPC. There is an interface for each TPC-C transaction type and each TPC-C backend program exports one or more of these interfaces. (The delivery servers export only the delivery interface, the other servers export the other four interfaces, and only those). Encina transparently routes the RPC to one of the servers exporting the corresponding interface.

- A TPC-C backend server program receives an RPC and proceeds to execute all database operations related to the request. All information entered on the user terminal is contained in the RPC.

- Once the transaction is committed, the server program fills in the output parameters. The RPC is then sent back to the client program.

- When the RPC returns to the client, the process_terminal routine writes the transaction out on the user terminal.

6.8.2 Database Transaction

All database operations are performed by the TPC-C back-end programs. The process is described below:

Using SQL*Net calls, the TPC-C back-end program interacts with Oracle8i Server to perform SQL data manipulations such as update, select, delete and insert, as required by the transaction. After all database operations are performed for a transaction, the transaction is committed.

Oracle8i Server proceeds to update the database as follows:

When Oracle8i Server changes a database table with an update, insert, or delete operation, the change is initially made in memory, not on disk. When there is not enough space in the memory buffer to read in or write additional data pages, Oracle8i Server will make space by flushing some modified pages to disk. Modified pages are also written to disk when a checkpoint occurs. Before a change is made to the database, it is first recorded in the transaction log. This ensures that the database can be recovered completely in the event of a failure. Using the transaction log, transactions that started but did not complete prior to a failure can be undone, and transactions recorded as complete in the transaction log but not yet written to disk can be redone.

6.8.3 Checkpoints

A checkpoint is the process of writing all modified data pages to disk. The TPC-C benchmark was setup to automatically checkpoint every 30 minutes. One checkpoint occurs during the rampup period, with another occurring during the measurement interval.

6.9 Reproducibility

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

A,repeatability measurement was taken for the same length of time as the measured run. The repeatability measurement was 220,405.93 tpmC.

6.10 Measurement Interval

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

A thirty minute Measurement Interval was used. Further, the measurement interval is a multiple of the checkpoint interval, and the checkpoints fall outside the protected zones of either edge of the measurement interval (as required by Clause 5.5.2.2). This demonstrates that a different measurement interval over the eight hour period would yield similar throughput results.

7. Clause 6: SUT, Driver, and Communication Definition Related Items

7.1 RTE Availability

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

An internally developed RTE was used for these tests. Appendix D contains the scripts used in the testing.

7.2 Functionality and Performance of 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 50 RS/6000 Model 7043-260 emulates a network of 175000 RS/6000 Model 44P-170 workstations. The communications mechanism used in the benchmark and priced configurations are the same. In the benchmark configuration a separate Ethernet LAN was used to connect two driver systems to a RS/6000 Model 7044-270 client system. In other words, there was a separate LAN segment for every two drivers to a client. Each LAN segment in the priced configuration is used to connect 973 workstations.

7.3 Network Bandwidth

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

The Ethernet used in the LAN complies with the IEEE 802.3 standard and has a bandwidth of 10 Megabits per second Half Duplex. Each LAN segment in the BULL ESCALA EPC2450 configuration connected 973 workstations.

7.4 Operator Intervention

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

No operator intervention is required to sustain the reported throughput during the eight hour period.

8. Clause 7: Pricing Related Items

8.1 Hardware and Programs Used

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

The detailed list of hardware and programs for the priced configuration is listed in the pricing sheet (refer to the executive summary statement). Prices for all Bull S.A. products are US list prices. Each priced configuration consists of an integrated system package, additional components and third party components. The prices for all products and features that are provided by BULL are available the same day as product or feature availability.

For items quoted Bull, there are two cases:

- Standard Bull items (as Escala EPC 2450); normal Bull quotation
- IBM items: Bull is IBM partner solution. That means Bull may sell IBM products, making his own quotation

Pricing for IBM Websphere Application Server Enterprise Edition Version 3.0 is for Txseries License only.

8.2 Three Year Cost of System Configuration

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

The price sheets for the Escala EPC2450 are contained on the first pages.

The price sheets for the IBM RS/6000 and SSA disks are also contained on the first pages.

Bull provides complete hardware and software solutions to end-users and offers customers dollar volume discounts based on the total system price (total 3 year system cost, including all hardware, all software and maintenance charges).

Volume Revenue Discount

The Bull-supplied hardware and software is discounted by 45% from list price, based on the dollar value of this configuration only.

MAINTENANCE

The threee years support pricing for Bull S.A.consists of one year warranty included in the system package price and two years support price, defined as golden care in the "global care" Bull maintainance offer.

If the customer wants to commit for a **3 year hardware maintenance** service starting at delivery time (therefore, including the warranty period), he can pay a One time Fee and will benefit of 15% discount.

The golden care offers:

- labor and spare parts: provided free of charge
- HW Telephone assistance
- Unlimited calls receipt (24 hours a day, 7 days a week)
- Phone support: 7 days a week
- On-site intervention: 7 days a week, with 4 hours response time
- Remote maintainance and diagnostic
- Technical information by Web
- Field Change Orders (FCO)

For IBM products, the basis for the discounts used are:

3-year Term Maintenance Contract Discount

This discount is available for customers who sign a 3-year maintenance agreement on the hardware. A discount of 3% is available for customers when they sign a 3-year maintenance agreement

Scope incentive

A 2% discount is applied for a ServiceElect contract that combines hardware maintenance with one or more services, which in this pricing report the selected service is Support Line.

3-year Maintenance Prepay Discount

This is a discount for prepayment of miantenance costs. A discount of 10.36% is available for this configuration based on payment for 3 years maintenance at time of purchase. This discount is applied to the balance after the 3-year term maintenance contract discount and Scope discount is applied.

8.3 Availability Dates

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

All products are generally available today .

8.4 Statement of tpmC and Price/Performance

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 disclosed.

.

System	tpmC	5-year System Cost	$/tpmC	Availability Date
BULL ESCALA EPC2450	220,807.27	$7,657,157	$34.67	All HS/SW available as shown in Section 8.3

9. Clause 9: Audit Related Items

If the benchmark has been independently audited, then the auditor's name, address, phone number, and a brief audit summary report indicating compliance must be included in the Full Disclosure Report. A statement should be included, specifying when the complete audit report will become available and who to contact in order to obtain a copy.

The auditor's attestation letter is included in this section of this report

INFO SIZING

TPC TRANSACTION PROCESSING PERFORMANCE COUNCIL CERTIFIED AUDITOR

Benchmark Sponsors: Jean-Francois Lemere
Bull S.A.
1, rue de Provence
38432 Echirolles
France

Ray Glasstone
Manager DSS performance.
Oracle Corporation
100 Oracle Parkway
Redwood Shores, CA 94065

May 27, 2001

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

Platform:	**Bull Escala EPC 2450 c/s**
Operating system:	**AIX Version 4.3.3**
Database Manager:	**Oracle8i Enterprise Edition Version 8.1.7**
Transaction Manager:	**Webshpere Application Server Version 3.0**

The results were:

CPU's Speed	Memory	Disks	NewOrder 90% Response Time	**tpmC**
Server: Bull Escale EPC 2450				
24 x RS64-IV (600 MHz)	96 GB Main 16 MB L2-cache/cpu	751 x 18 GB SSA 685 x 9 GB SSA 2 x 9.1 GB SCSI	0.78 Seconds	**220,807.27**
Ten (10) Clients: IBM RS/6000 7044-270 (Specification for each)				
4 x Power3 (375 MHz)	4 GB Main 4 MB L2-cache/cpu	1 x 9.1 GB	n/a	n/a

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

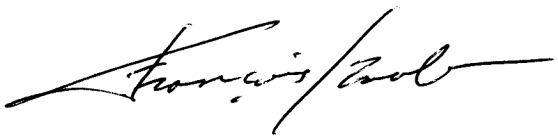
- The database records were the proper size
- The database was properly scaled and populated

- The required ACID properties were met
- The transactions were correctly implemented
- Input data was generated according to the specified percentages
- The transaction cycle times included the required keying and think times
- The reported response times were correctly measured.
- All 90% response times were under the specified maximums
- At least 90% of all delivery transactions met the 80 Second completion time limit
- The reported measurement interval was 120 minutes (2 hours)
- The reported measurement interval was representative of steady state conditions
- Four checkpoints were taken during the reported measurement interval
- The repeatability of the measured performance was verified
- The 60 day storage requirement was correctly computed
- The system pricing was verified for major components and maintenance

Additional Audit Notes:

none.

Respectfully Yours,



François Raab
President

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

Appendix A: TPC-C Application Source

A.1 Client/Terminal Handler code

callora.c

```
/*
 * callora.c
 *
 * $Revision: 1.3 $
 * $Date: 1999/05/06 21:28:29 $
 * $Log:         callora.c,v $
 *
 * $TALog: callora.c,v $
 * Revision 1.3  1999/05/06  21:28:29  oz
 * - Removed all the .. from the includes
 * - Added -I.. to the makefiles instead
 * - Moved all the thread related code and connection
 *   selection to serverMon.c
 *
 * - get_db_ready now does not take the number of connections
 * - Export create_connection() and clean_connection(void *)
 * - All the transactions take a connection pointer as a first param
 * [from r1.2 by delta oz-24309-TPCC-add-oracle8.1-code, r1.5]
 *
 * Revision 1.2  1999/04/19  20:14:48  oz
 * - Moved all the simulated code to server.c
 * - Created nulldb.c for compilation with no DB
 * [from r1.1 by delta oz-24331-TPCC-move-sim-code-to-common-file, r1.1]
 *
 * Revision 1.1  1999/04/19  14:37:27  oz
 * [added by delta wenjian-23742-TPCC-update-with-Raliegh-code, r1.3]
 *
 * Revision 1.15  1998/10/22  20:51:00  wenjian
 * [merge of changes from 1.6 to 1.14 into 1.12]
 *
 * Revision 1.14  1998/10/08  14:17:57  dongfeng
 * Add codes for doing web-based tpcc.
 * [from r1.6 by delta dongfeng-23067-TPCC-add-web-based-tpcc-client, r1.1]
 *
 * Revision 1.12  1998/09/04  19:17:54  wenjian
 * Add new variables: more_srv_work, period_to_add_rt, and
 * period_to_check_tran to replace the original constants in
 * order to control the increment of server RT.
 * [from r1.11 by delta wenjian-23183-TPCC-sync-AIX-code-with-Austin, r1.5]
 *
 * Revision 1.11  1998/08/28  18:29:56  wenjian
 * This delta sync the TPCC code with Austin.
 *
 * Modify get_wait_time():
 *  - add rt_increment so that the wait time is increased in a certain time;
 *  - rt_increment is reset to 0 at the beginning of each run
 *  - the waiting time is different for different tran type.
 * [from r1.8 by delta wenjian-23183-TPCC-sync-AIX-code-with-Austin, r1.1]
 *
 * Revision 1.8  1998/08/18  14:38:37  wenjian
 * Change the wait time for NewOrder to 0.23 second
 * [from r1.6 by delta wenjian-21750-TPCC-changes-for-porting-on-NT, r1.4]
 *
 * Revision 1.6  1998/06/17  15:28:50  wenjian
 * - Reduce matrix size
 * - In get_wait_time(), the waiting time is decided by transaction type.
 * [from r1.5 by delta wenjian-22495-TPCC-add-new-feature-to-monitor-tpcc-clients, r1.2]
 *
 * Revision 1.5  1998/02/17  22:06:58  wenjian
 * Define macro RANDOM as rand on NT and random on other platforms
 * [from r1.4 by delta wenjian-21750-TPCC-changes-for-porting-on-NT, r1.1]
 *
 * Revision 1.4  1998/01/23  15:07:42  oz
 * - Updated the SP TPCC directory to the latest files used
 *   during the SP tpcc audit.
 * [from r1.3 by delta oz-20774-TPCC-update-to-latest-SP-version-11-27, r1.1]
 *
 * Revision 1.1  1997/07/22  21:17:14  radha
 * [added by delta radha-20360-TPCC-integrate-with-Oracle-7322-drivers, r1.1]
 *
 *
 */


#include <stdio.h>
#include <time.h>
#include <string.h>
#include "serverDebug.h"

#ifdef MULTIPLE_INTERFACE
#include "common/neworder.h"
#include "common/payment.h"
#include "common/stocklevel.h"
#include "common/orderstatus.h"
#else
#include "common/tpcc_trans.h"
#endif
#include "common/databuf.h"
#include "server.h"

#ifdef WIN32
#include <winsock.h>
#endif


#include "tpcc_info.h"

#ifdef WIN32
#define RANDOM rand
#else
#define RANDOM random
#endif

extern int server_null_test;
extern void *create_ora_connection();

#ifdef DEBUG_SERVER
#define PRINT_NEW_IN(a, b) fprintf(stderr, "%s\n", b); print_new_in(a)
#define PRINT_NEW_ORDER(a, b) fprintf(stderr, "%s\n", b); print_new_order(a)
#define PRINT_NEW_RES(rc, a) \
   fprintf(stderr, "<R do_new_order, rc=%d, transtatus=%d, duplicates=%d, all_local=%d\n", \
         rc, (a)->s_transtatus, (a)->s_all_local, (a)->duplicate_items)

#else
#define PRINT_NEW_RES(rc, a)
#define PRINT_NEW_ORDER(a, b)
#define PRINT_NEW_IN(a, b)
#define PRINT_DIST_NEW_ORDER(a, b)
#endif


#define TPCC_RET_SCP(a,b,len) \
    strncpy((char *)dataP->b, (char *)oraStruct.a, len); \
    (char *)dataP->b[(len)-1] = '\0'
#define TPCC_CP(a,b) oraStruct.a = dataP->b
#define TPCC_SCP(a,b,len) strncpy((char *)oraStruct.a, (char *)dataP->b, len)
#define TPCC_RET_CP(a,b) dataP->b = oraStruct.a

#define TPCCP_RET_SCP(a,b,len)  \
    strncpy((char *)dataP->b, (char *)oraStructP->a, len);  \
    dataP->b[(len)-1] = '\0'
#define TPCCP_CP(a,b) oraStructP->a = dataP->b
#define TPCCP_SCP(a,b,len) strncpy((char *)oraStructP->a, (char *)dataP->b, len)
#define TPCCP_RET_CP(a,b) dataP->b = oraStructP->a

/*
 * Talk to Oracle
 */
int get_db_ready(char *dbName, int flag)
{
   int rc;
   char dvryFileName[100];
   extern char *tpcc_serverName;

   AUDITLOG(("> get_db_ready to %s flag %d\n", dbName, flag));
   if (server_null_test) return(0);

   fprintf(stderr, ">> get_db_ready, db: %s, flag %d\n", dbName, flag);

   sprintf (dvryFileName, "/home/encina/runs/deliveries/%s",
         tpcc_serverName);
   rc = TPCinit (serverIdNumber, "tpcc", "tpcc", dvryFileName);
   err_printf("TPCinit(%d, tpcc, tpcc, %s) returned %d\n",
                                 serverIdNumber, dvryFileName, rc);
   if (rc) {
      fprintf(stderr, "TPCinit(%d, tpcc, tpcc, %s) returned %d\n",
                                 serverIdNumber, dvryFileName, rc);
   }

   AUDITLOG(("< get_db_ready rc %d\n", rc));
   return(rc);
}

void *create_connection() {
   return create_ora_connection();
}


void do_delivery(cnP, dataP)
    void *cnP;
    delivery_data_t *dataP;
{
   struct delstruct oraStruct;
   int rc;

   AUDITLOG(("> do_delivery\n"));

   TPCC_CP(delin.w_id, w_id);
   TPCC_CP(delin.o_carrier_id, o_carrier_id);
   TPCC_CP(delin.qtime, start_queue);
   TPCC_CP(delin.in_timing_int, queued_time);
```

```
  DPRINT(("Calling TPCdel: w_id %d, o_carrier_id %d, %f qtime, %d in_timing_int\n",
                oraStruct.delin.w_id, oraStruct.delin.o_carrier_id,
                oraStruct.delin.qtime, oraStruct.delin.in_timing_int));

  rc = TPCdel(cnP, &oraStruct);
  if ((rc != 0) && (rc != -666)) {
     err_printf("Error TPCdel: terror %d, rc %d, retry %d, w_id %d, o_carrier_id %d, %f qtime,
%din_timing_int\n",
                oraStruct.delout.terror, rc, oraStruct.delout.retry,
                oraStruct.delin.w_id, oraStruct.delin.o_carrier_id,
                oraStruct.delin.qtime, oraStruct.delin.in_timing_int);
  }
  dataP->header.returncode = rc == 0 ? TPCC_SUCCESS : oraStruct.delout.terror;
  AUDITLOG(("< do_delivery rc %d\n", rc));
}

void copyout_order_status(orderStatus_data_t *dataP,
                                                struct ordstruct *oraStructP)
{
  int i;
  TPCCP_RET_CP(ordout.c_balance, c_balance);
  TPCCP_RET_CP(ordout.o_id, o_id);
  TPCCP_RET_CP(ordout.o_carrier_id, o_carrier_id);
  TPCCP_RET_CP(ordout.o_ol_cnt, o_ol_cnt);
  TPCCP_RET_CP(ordout.c_id, c_id);
#define I_CP(ind, a,b) dataP->item[ind].b = oraStructP->ordout.a[ind]
#define I_SCP(ind, a, b, len) \
 strncpy((char *)dataP->item[ind].b, (char *)oraStructP->ordout.a[ind], len); \
 dataP->item[ind].b[(len) - 1] = '\0'
  for (i=0; i<oraStructP->ordout.o_ol_cnt && i < 15; i++) {
     I_CP(i, ol_amount, ol_amount);
     I_CP(i, ol_i_id, ol_i_id);
     I_CP(i, ol_supply_w_id, ol_supply_w_id);
     I_CP(i, ol_quantity, ol_quantity);
     I_SCP(i, ol_delivery_d, delivery_date, 11);
  }
#undef I_CP
#undef I_SCP
  TPCCP_RET_SCP(ordout.c_first, c_first, 17);
  TPCCP_RET_SCP(ordout.c_middle, c_middle, 3);
  TPCCP_RET_SCP(ordout.c_last, c_last, 17);
  TPCCP_RET_SCP(ordout.o_entry_d, entry_date, 20);
}

void do_order_status(cnP, dataP)
   void *cnP;
   orderStatus_data_t *dataP;
{
  struct ordstruct oraStruct;
  int i, rc;

  AUDITLOG(("> do_order_status\n"));

  TPCC_CP(ordin.w_id, w_id);
  TPCC_CP(ordin.d_id, d_id);
  TPCC_CP(ordin.c_id, c_id);
  oraStruct.ordin.bylastname = ((dataP->c_id == 0) ? 1 : 0);
  TPCC_SCP(ordin.c_last, c_last, 17);

  DEBUGP(("Calling TPCord: w_id %d, d_id %d, c_id %d, bylastname %d, c_last %s\n",
oraStruct.ordin.w_id, oraStruct.ordin.d_id, oraStruct.ordin.c_id, oraStruct.ordin.bylastname,
oraStruct.ordin.c_last));

  rc = TPCord(cnP, &oraStruct);
  if ( rc != 0 ) {
     err_printf("Error TPCord: terror %d, rc %d, retry %d, w_id %d, d_id %d, c_id %d, bylastname %d,
c_last %s\n ",
                  oraStruct.ordout.terror, rc, oraStruct.ordout.retry,
                  oraStruct.ordin.w_id, oraStruct.ordin.d_id, oraStruct.ordin.c_id,
                  oraStruct.ordin.bylastname, oraStruct.ordin.c_last);
  }

  copyout_order_status(dataP, &oraStruct);

  dataP->header.returncode = rc == 0 ? TPCC_SUCCESS : oraStruct.ordout.terror;
  AUDITLOG(("< do_order_stats rc %d\n", dataP->header.returncode));
}

void do_stock_level(cnP, dataP)
   void *cnP;
   stockLevel_data_t *dataP;
{
  struct stostruct oraStruct;
  /* What's this comment?? -- srs: i only did this one to check the links */
  int rc;

  AUDITLOG(("> do_stock_level\n"));

  TPCC_CP(stoin.w_id, w_id);
  TPCC_CP(stoin.d_id, d_id);
  TPCC_CP(stoin.threshold, threshold);

  DEBUGP(("Calling TPCsto: w_id %d, d_id %d, threashold %d\n",
                  oraStruct.stoin.w_id, oraStruct.stoin.d_id,
                  oraStruct.stoin.threshold));

  rc = TPCsto(cnP, &oraStruct );
  if ( rc != 0 ) {
     err_printf("Error TPCsto : terror %d, rc %d, retry %d, w_id %d, d_id %d, threashold %d\n",
                  oraStruct.stoout.terror, rc, oraStruct.stoout.retry,
                  oraStruct.stoin.w_id, oraStruct.stoin.d_id,
                  oraStruct.stoin.threshold);
  }

  TPCC_RET_CP(stoout.low_stock, stock_count);

  dataP->header.returncode = rc == 0 ? TPCC_SUCCESS : oraStruct.stoout.terror;

  DEBUGP(("do_stock_lev returning %d\n", dataP->header.returncode));
  AUDITLOG(("< do_stock_level rc %d\n", dataP->header.returncode));

}

void copyin_payment(dataP, oraStructP)
   payment_data_t *dataP;
   struct paystruct *oraStructP;
{
  TPCCP_CP(payin.w_id, w_id);
  TPCCP_CP(payin.d_id, d_id);
  TPCCP_CP(payin.c_w_id, c_w_id);
  TPCCP_CP(payin.c_d_id, c_d_id);
  TPCCP_CP(payin.c_id, c_id);
  oraStructP->payin.bylastname = ((dataP->c_id == 0) ? 1 : 0);
  TPCCP_CP(payin.h_amount, h_amount);
  TPCCP_SCP(payin.c_last, c_last, 17);
}

void copyout_payment(dataP, oraStructP)
   payment_data_t *dataP;
   struct paystruct *oraStructP;
{
  TPCCP_RET_SCP(payout.w_street_1, w_street_1, 21);
  TPCCP_RET_SCP(payout.w_street_2, w_street_2, 21);
  TPCCP_RET_SCP(payout.w_city, w_city, 21);
  TPCCP_RET_SCP(payout.w_state, w_state, 3);
  TPCCP_RET_SCP(payout.w_zip, w_zip, 10);
  TPCCP_RET_SCP(payout.d_street_1, d_street_1, 21);
  TPCCP_RET_SCP(payout.d_street_2, d_street_2, 21);
  TPCCP_RET_SCP(payout.d_city, d_city, 21);
  TPCCP_RET_SCP(payout.d_state, d_state, 3);
  TPCCP_RET_SCP(payout.d_zip, d_zip, 10);
  TPCCP_RET_CP(payout.c_id, c_id);
  TPCCP_RET_SCP(payout.c_first, c_first, 17);
  TPCCP_RET_SCP(payout.c_middle, c_middle, 3);
  TPCCP_RET_SCP(payout.c_last, c_last, 17);
  TPCCP_RET_SCP(payout.c_street_1, c_street_1, 21);
  TPCCP_RET_SCP(payout.c_street_2, c_street_2, 21);
  TPCCP_RET_SCP(payout.c_city, c_city, 21);
  TPCCP_RET_SCP(payout.c_state, c_state, 3);
  TPCCP_RET_SCP(payout.c_zip, c_zip, 10);
  TPCCP_RET_SCP(payout.c_phone, c_phone, 17);
  TPCCP_RET_SCP(payout.c_since, c_date, 11);
  TPCCP_RET_SCP(payout.c_credit, c_credit, 3);
  TPCCP_RET_CP(payout.c_credit_lim, c_credit_lim);
  TPCCP_RET_CP(payout.c_discount, c_discount);
  TPCCP_RET_CP(payout.c_balance, c_balance);
  TPCCP_RET_SCP(payout.c_data, c_data, 201);
  TPCCP_RET_SCP(payout.h_date, pay_date, 20);
  strcpy((char *)dataP->w_name, "W_NAME");
  strcpy((char *)dataP->d_name, "D_NAME");
  /* Ignore c_ytd_payment, c_payment_cnt */
}

void do_payment(cnP, dataP)
   void *cnP;
   payment_data_t *dataP;
{

  struct paystruct oraStruct;
  int firstWh, secondWh;
  int rc;

  AUDITLOG(("> do_payment\n"));

  copyin_payment(dataP, &oraStruct);

#if 0
     err_printf("TPCpay: w_id %d, D_id %d, C_w_id %d, c_id %d, bylastname %d, amount %.2f, c_last %s
(%s)\n",
                oraStruct.payin.w_id,
                oraStruct.payin.d_id,
                oraStruct.payin.c_w_id,
                oraStruct.payin.c_id,
                oraStruct.payin.bylastname,
                oraStruct.payin.h_amount,
                oraStruct.payin.c_last,
                dataP->c_last);
#endif


  rc = TPCpay(cnP, &oraStruct);

#if 0
  err_printf("< TPCpay terror %d, rc %d, retry %d\n",
                oraStruct.payout.terror, rc, oraStruct.payout.retry);
#endif
```

```
  dataP->header.num_rms = 1;
  if (rc != 0 ) {
      err_printf("Error TPCpay: terror %d, rc %d, retry %d, w_id %d, D_id %d, C_w_id %d, c_id %d,
bylastname %d, amount %.2f, c_last %s (%s)\n",
                oraStruct.payout.terror, rc, oraStruct.payout.retry,
                                oraStruct.payin.w_id,
                oraStruct.payin.d_id,
                oraStruct.payin.c_w_id,
                oraStruct.payin.c_id,
                oraStruct.payin.bylastname,
                oraStruct.payin.h_amount,
                oraStruct.payin.c_last ? oraStruct.payin.c_last : "-NULL-",
                                (char *)dataP->c_last ? (char *)dataP->c_last : "-NULL-");
  }

  copyout_payment(dataP, &oraStruct);

  dataP->header.returncode = rc == 0 ? TPCC_SUCCESS : oraStruct.payout.terror;
  AUDITLOG(("< do_payment rc %d\n", dataP->header.returncode));
}

static void copyin_new_order(dataP, oraStructP)
    newOrder_data_t *dataP;
    struct newstruct *oraStructP;
{
    int i;

   TPCCP_CP(newin.w_id, w_id);
   TPCCP_CP(newin.d_id, d_id);
   TPCCP_CP(newin.c_id, c_id);

#define NO_I_CP(ind,a,b) oraStructP->a[ind] = dataP->item[ind].b
#define NO_I_SCP(ind,a,b,len) strncpy((char *)oraStructP->a[ind], (char *)dataP->item[ind].b, len)

    /* tpccpl.c loops over 15 items, we do the same */
   for (i=0; i<15; i++) {
       NO_I_CP(i, newin.ol_i_id, ol_i_id);
       NO_I_CP(i, newin.ol_supply_w_id, ol_supply_w_id);
       NO_I_CP(i, newin.ol_quantity, ol_quantity);
#ifdef DEBUG_SERVER
       fprintf(stderr, "NewOrder: Item %d, supplyWh %d (local %d)\n",
               i,
               oraStructP->newin.ol_supply_w_id[i],
               oraStructP->newin.w_id);
#endif
    }
   /* Ignore all_local field, total_items,
    * tpccpl.c doesnt use them
    */
#undef NO_I_CP
#undef NO_I_SCP
}

void copyout_new_order(dataP, oraStructP)
    newOrder_data_t *dataP;
    struct newstruct *oraStructP;
{
    int i;

   TPCCP_RET_CP(newout.o_id, o_id);
   TPCCP_RET_CP(newout.o_ol_cnt, o_ol_cnt);
   TPCCP_RET_SCP(newout.c_last, c_last, 17);
   TPCCP_RET_SCP(newout.c_credit, c_credit, 3);
   TPCCP_RET_CP(newout.c_discount, c_discount);
   TPCCP_RET_CP(newout.w_tax, w_tax);
   TPCCP_RET_CP(newout.d_tax, d_tax);
   TPCCP_RET_SCP(newout.o_entry_d, entry_date, 20);
   TPCCP_RET_CP(newout.total_amount, total);
   TPCCP_RET_SCP(newout.status, statusline, 26);

#define NO_RET_CP(ind,a,b) dataP->item[ind].b = oraStructP->newout.a[ind]
#define NO_RET_SCP(ind,a,b,len) strncpy((char *)dataP->item[ind].b, (char *)oraStructP->newout.a[ind],
len)

   for (i=0; i<oraStructP->newout.o_ol_cnt && i<15; i++) {
       NO_RET_SCP(i, i_name, name_i, 25);
       NO_RET_CP(i, s_quantity, s_quantity);
                dataP->item[i].brand_generic[0] = oraStructP->newout.brand_generic[i];
                dataP->item[i].brand_generic[1] = '\0';
       NO_RET_CP(i, i_price, price);
       NO_RET_CP(i, ol_amount, ol_amount);
                /* Ignore s_idx and s_dist */
   }
   if (oraStructP->newout.status[0] != '\0') {
                DEBUGP(("TPCnew: status -- %s\n", oraStructP->newout.status));
                dataP->items_valid = 0;
   } else {
                dataP->items_valid = 1;
   }

#undef NO_RET_CP
#undef NO_RET_SCP
}

void do_new_order(cnP, dataP)
 void *cnP;
 newOrder_data_t *dataP;
{
    static int num_calls = 0;
    int i;
    struct newstruct oraStruct;
    int rc;

    AUDITLOG(("> do_new_order\n"));

    /*  Copy the structure into the TPCC structure. */
    copyin_new_order(dataP, &oraStruct);

    DEBUGP(("-> TPCnew %d items to wh %d\n",
                        dataP->o_ol_cnt, dataP->w_id));
    dataP->header.num_rms = 1;

#if 0
       err_printf("Error TPCnew : w_id %d, d_id %d, c_id %d, o_ol_cnt %d (out cnt %d)\n",
           oraStruct.newin.w_id, oraStruct.newin.d_id,
           oraStruct.newin.c_id, dataP->o_ol_cnt, oraStruct.newout.o_ol_cnt);
        for (i=0; i<15; i++) {
           err_printf("ol_i_id %d, ol_supply_w_id %d, ol_quantity %d\n",
              oraStruct.newin.ol_i_id[i], oraStruct.newin.ol_supply_w_id[i],
              oraStruct.newin.ol_quantity[i]);
        }
#endif

    rc = TPCnew(cnP, &oraStruct);

#if 0
   err_printf("< TPCnew terror %d, rc %d, retry %d\n",
            oraStruct.newout.terror, rc, oraStruct.newout.retry);
#endif

   if (rc != 0) {
       err_printf("Error TPCnew : terror %d, rc %d, retry %d, w_id %d, d_id %d, c_id %d, o_ol_cnt %d (out
cnt %d)\n",
                        oraStruct.newout.terror, rc, oraStruct.newout.retry,
                        oraStruct.newin.w_id, oraStruct.newin.d_id,
                        oraStruct.newin.c_id, dataP->o_ol_cnt, oraStruct.newout.o_ol_cnt);
                    for (i=0; i<15; i++) {
                        err_printf("ol_i_id %d, ol_supply_w_id %d, ol_quantity %d\n",
                                oraStruct.newin.ol_i_id[i], oraStruct.newin.ol_supply_w_id[i],
                                oraStruct.newin.ol_quantity[i]);
                    }
   }
    DEBUGP(("-< TPCnew %d\n", rc));

    /* copy out results */
    copyout_new_order(dataP, &oraStruct);

    if (rc == 0) {
                    dataP->header.returncode =
                                dataP->items_valid ? TPCC_SUCCESS : INVALID_NEWO;
#if 0
                    if (dataP->items_valid && (++num_calls % 500) == 0) {
                        int i;
                        err_printf("TPCnew Success: w_id %d, d_id %d, c_id %d, o_ol_cnt %d, Oid %d\n",
                                    oraStruct.newin.w_id, oraStruct.newin.d_id,
                                    oraStruct.newin.c_id, oraStruct.newout.o_ol_cnt,
                    oraStruct.newout.o_id);
                        for (i=0; i<15 && i<oraStruct.newout.o_ol_cnt; i++) {
                                err_printf("   %2d: i_id %i5d, sw_id %4d, qty %d, price %.2f amt %.2f\n",
                                            i, oraStruct.newin.ol_i_id[i],
                                            oraStruct.newin.ol_supply_w_id[i],
                                            oraStruct.newin.ol_quantity[i],
                        oraStruct.newout.i_price[i],
                        oraStruct.newout.ol_amount[i]);
                        }
                    }
#endif
    } else {
                    dataP->header.returncode = oraStruct.newout.terror;
    }

    AUDITLOG(("< do_new_order rc %d\n", dataP->header.returncode));
}
```

client.C

```
/* (C)1997 IBM Corporation */
#include <unistd.h>
#include <stdlib.h>
#include <stdio.h>
#include <sys/types.h>
#include <ctype.h>
#include <string.h>
#include <math.h>

#include "screen.h"
#include "encina.h"

extern "C" void set_client_debug_state(void *contextP, int state, int tran);

Encina encina;

extern "C" int client_login(int infd, int outfd, int *w_idP, int *d_idP)
{
```

```
    Thread_data thread(infd, outfd, NULL);
    User_data user_data;
    Login log(&user_data, &thread);
    log.handle();
    *w_idP = user_data.warehouse;
    *d_idP = user_data.district;
    return 0;
}

extern "C" int client_init (int infd, int outfd, int w_id, int d_id,
                                                    void *contextP) {
    int rc = 0;
    Thread_data *threadP = new Thread_data(infd, outfd, contextP);
    Field *menuField = new IntField(threadP, 8);
    User_data user_data;
    Menu  menu(&user_data, threadP);

    user_data.warehouse = w_id;
    user_data.district = d_id;
    menu.present();

    Payment pay(&user_data, threadP);
    Delivery del(&user_data, threadP);
    OrderStatus os(&user_data, threadP);
    StockLevel sl(&user_data, threadP);
    NewOrder no(&user_data, threadP);

    while (rc == 0) {
                int key = menuField->get_key();
                set_client_debug_state(contextP, 1, key - '0');
                switch (key) {
                   case EOF: rc = -1; break;
                   case '1': case 'N': case 'n': rc = no.handle();  break;
                   case '2': case 'P': case 'p': rc = pay.handle(); break;
                   case '3': case 'O': case 'o': rc = os.handle();  break;
                   case '4': case 'D': case 'd': rc = del.handle(); break;
                   case '5': case 'S': case 's': rc = sl.handle();  break;
                   case '\030':
                     position(threadP, 1, 1);
                     threadP->flush(); break;
                   case '9': case 'Q': case 'q': case 'E': case 'e':
                                return(0);
                   default: threadP->write("\a", 1); break;
                }
                set_client_debug_state(contextP, 4, key - '0');
     }
    return 0;
}
```

client.h

```
/*
*               client.h
*
* $Revision: 1.6 $
* $Date: 1998/11/24 21:45:58 $
* $Log:             $
*
*
* $TALog: client.h,v $
* Revision 1.6  1998/11/24  21:45:58  wenjian
* - Add MULTIPLE_INTERFACE compile flag
* [from r1.5 by delta wenjian-23742-TPCC-update-with-Raliegh-code, r1.1]
*
* Revision 1.5  1998/11/09  14:48:13  wenjian
* In an effort to make a new directory structure for TPCC, this delta
* creates two directories: tpcc/client and tpcc/server. All the files
* for this revision are copied from tpcc/sp-tpcc without any change.
* Further change may be needed for some files due to the change of
* the directory structure.
* [added by delta wenjian-23677-TPCC-reorganize-directory-structure, r1.1]
*
* Revision 1.10  1998/10/26  14:41:34  dongfeng
* Add Init command in web client so when something bad happens during
* initialization web client sends back error information and allows
* reinitialization instead of killing IIS server.
*
* Define values of initialization errors.
* [from r1.9 by delta dongfeng-23067-TPCC-add-web-based-tpcc-client, r1.3]
*
* Revision 1.9  1998/10/22  20:55:53  wenjian
* [merge of changes from 1.5 to 1.8 into 1.6]
*
* Revision 1.8  1998/10/22  19:18:31  dongfeng
* [from r1.7 by delta dongfeng-23067-TPCC-add-web-based-tpcc-client, r1.2]
*
* Revision 1.7  1998/10/08  14:17:59  dongfeng
* Add codes for doing web-based tpcc.
* [from r1.5 by delta dongfeng-23067-TPCC-add-web-based-tpcc-client, r1.1]
*
* Revision 1.6  1998/09/26  10:56:25  oz
* - renamed thread_init and thread_done to clnt_thread_init and
*   clnt_thread_done respectively because of name conflicts on AIX4.3
* [from r1.5 by delta oz-23339-TPCC-update-for-NT, r1.2]
*
* Revision 1.5  1998/01/26  16:19:22  oz
* - moved all the code pertaining to the background
*   thread to its own file and all the data structures
*   to client_utils.h
* [from r1.4 by delta oz-21689-TPCC-move-client-bg-thread-to-separate-file, r1.1]
*
* Revision 1.4  1998/01/23  15:07:43  oz
* - Updated the SP TPCC directory to the latest files used
*   during the SP tpcc audit.
* [from r1.3 by delta oz-20774-TPCC-update-to-latest-SP-version-11-27, r1.1]
*
*
*
*/

#ifndef TPCC_CLIENT_H
#define TPCC_CLIENT_H

#if defined (solaris)
#include <dce/pthread.h>
#else   /* solaris */
#include <pthread.h>
#endif  /* solaris */



#ifdef WEB_TPCC_CLIENT
#include <windows.h>

#define MUTEX_T CRITICAL_SECTION
#define MUTEX_LOCK(a) EnterCriticalSection(a)
#define MUTEX_UNLOCK(a) LeaveCriticalSection(a)
#define MUTEX_INIT(mut)   InitializeCriticalSection(mut)
#define MUTEX_DESTROY(mut) DeleteCriticalSection(mut)
#define ERROUT errtpcc

/*initialization status */
#define INIT_SUCCESS 0
#define INIT_FAILED  1
#define CELL_NAME_UNAVAILABLE 2
#define MON_RETRIEVEENABLE_FAILED 3
#define MON_INITCLIENT_FAILED 4
#define MON_SECURITYSET_FAILED 5
#define MON_SETREFRESHINTERVAL_FAILED 6
#define NOINFO_TRPC_ERROR 7
#define ENROLL_CLIENT_EXCEPTION 8
#define ERROUT_FILE_NOT_FOUND 9
#define LOG_FILE_NOT_FOUND 10
#define TPCC_KEY_NOT_FOUND 11
#define TERM_ALLOC_FAILED 12

#else
#define MUTEX_T pthread_mutex_t
#define COND_T  pthread_cond_t
#define MUTEX_LOCK(a) pthread_mutex_lock(a)
#define MUTEX_UNLOCK(a) pthread_mutex_unlock(a)
#define COND_WAIT(cond,mut) pthread_cond_wait(cond,mut)
#define COND_SIGNAL(cond) pthread_cond_signal(cond)
#define COND_BROADCAST(cond) pthread_cond_broadcast(cond)
#define MUTEX_INIT(mut)   pthread_mutex_init(mut, pthread_mutexattr_default)
#define COND_INIT(cond)   pthread_cond_init(cond, pthread_condattr_default)
#define MUTEX_DESTROY(mut) pthread_mutex_destroy(mut)
#define COND_DESTROY(cond) pthread_cond_destroy(cond)
#define ERROUT stderr
#endif
/*
 *  Routines and declarations that are common to all clients
 */
void *clnt_thread_init(void);

void clnt_thread_done(void *);

void *terminal_context_init(int);

void send_new_order(void *, newOrder_data_t *);

void send_payment(void *, payment_data_t *);

void send_order_status(void *, orderStatus_data_t *);

void send_delivery(void *, delivery_data_t *);

void send_stock_level(void *, stockLevel_data_t *);

void send_batch_request(void *contextP, int num, tpcc_data_t *dataP);

void send_unmarshalled(void *contextP,
                                        int tran_type,
                                        int size,
                                        ndr_byte *dataP);

void enroll_client(int id);

#endif  /*  TPCC_CLIENT_H  */
```

client_bg_thread.c

```
/*
*                   client_bg_thread.c
*
* $Revision: 1.17 $
* $Date: 1999/05/06 21:28:25 $
* $Log:               $
*
*
* $TALog: client_bg_thread.c,v $
* Revision 1.17  1999/05/06  21:28:25  oz
* - Removed all the .. from the includes
* - Added -I.. to the makefiles instead
* - Moved all the thread related code and connection
*   selection to serverMon.c
* [from r1.13 by delta oz-24309-TPCC-add-oracle8.1-code, r1.5]
*
* Revision 1.13  1999/01/29  20:16:31  wenjian
* Small changes to make check_threads more robust
* [from r1.12 by delta wenjian-23787-TPCC-integrate-code-for-AIX-and-NT, r1.7]
*
* Revision 1.12  1998/12/28  20:07:11  wenjian
* - Change client_info to a pointer pClientInfo for flexibility.
* [from r1.11 by delta wenjian-23788-TPCC-use-single-stats-var-for-each-client-and-server, r1.5]
*
* Revision 1.11  1998/12/14  20:27:53  wenjian
* Made corresponding changes due to data structure change of tran_info_t.
* [from r1.10 by delta wenjian-23788-TPCC-use-single-stats-var-for-each-client-and-server, r1.3]
*
* Revision 1.10  1998/12/11  16:14:18  wenjian
* Add code for checking statistic data in a single variable and collecting
* statistic data based on iStatsFrequency.
*
* - Add new check_threads() in order to use the single statistic var.
* [from r1.9 by delta wenjian-23788-TPCC-use-single-stats-var-for-each-client-and-server, r1.1]
*
* Revision 1.9  1998/12/08  23:03:48  wenjian
* Add (or rename) Makefile for each platform (AIX and NT). Reorganize the
* files a little bit.
*
* - Change path for tran_stat.h
* - Add ifdef before getStatsForm since it is only used by NT
* [from r1.8 by delta wenjian-23787-TPCC-integrate-code-for-AIX-and-NT, r1.1]
*
* Revision 1.8  1998/12/07  20:04:11  wenjian
* Clean up
* [from r1.7 by delta wenjian-23742-TPCC-update-with-Raliegh-code, r1.2]
*
* Revision 1.7  1998/11/24  21:45:58  wenjian
* - Add #ifdef MULTIPLE_INTERFACE
* - Take care special case for check_threads
* [from r1.6 by delta wenjian-23742-TPCC-update-with-Raliegh-code, r1.1]
*
* Revision 1.6  1998/11/09  16:59:35  wenjian
* In this revision, most of the changes are related to the directory of header
* files after directory reorganization. Other changes include adding or removing
* files to put them in the right directories. Makefiles are written for NT
* platform so that nmake is working on NT now. Need a top level Makefile for all
* the directories.
* [from r1.5 by delta wenjian-23677-TPCC-reorganize-directory-structure, r1.2]
*
* Revision 1.5  1998/11/09  14:48:14  wenjian
* In an effort to make a new directory structure for TPCC, this delta
* creates two directories: tpcc/client and tpcc/server. All the files
* for this revision are copied from tpcc/sp-tpcc without any change.
* Further change may be needed for some files due to the change of
* the directory structure.
* [added by delta wenjian-23677-TPCC-reorganize-directory-structure, r1.1]
*
* Revision 1.29  1998/11/06  16:10:54  wenjian
* - Move gettimeofday() in check_threads out of the for loop
* - Minor change for cleanup
* [from r1.28 by delta wenjian-23646-TPCC-clean-up-source-code, r1.1]
*
* Revision 1.28  1998/10/26  15:17:53  dongfeng
* remove #include <sys/times.h> from NT tests
* [from r1.27 by delta dongfeng-23067-TPCC-add-web-based-tpcc-client, r1.4]
*
* Revision 1.27  1998/10/22  21:05:37  wenjian
* [merge of changes from 1.12 to 1.26 into 1.25]
*
* Revision 1.26  1998/10/22  19:18:31  dongfeng
* [from r1.24 by delta dongfeng-23067-TPCC-add-web-based-tpcc-client, r1.2]
*
* Revision 1.24  1998/10/08  14:17:59  dongfeng
* Add codes for doing web-based tpcc.
* [from r1.12 by delta dongfeng-23067-TPCC-add-web-based-tpcc-client, r1.1]
*
* Revision 1.25  1998/10/08  18:03:00  gerstl
* Changes to allow configurations where some servers only service
* specific transaction types. Split transaction interfaces by type.
* [from r1.23 by delta gerstl-23515-TPCC-allow-separate-online-transaction-interfaces, r1.1]
*
* Revision 1.23  1998/09/03  16:07:11  wenjian
* Change GET_USER_SYS_TIME to GET_CLIENT_USAGE
* [from r1.19 by delta wenjian-23183-TPCC-sync-AIX-code-with-Austin, r1.3]
*
* Revision 1.19  1998/08/18  13:35:41  wenjian
* - Clean up including header files
* - Remove client_report() and socket_print_rt_avg()
* - Use #ifdef for the call of getUserSysTime()
* [from r1.16 by delta wenjian-22495-TPCC-add-new-feature-to-monitor-tpcc-clients, r1.7]
*
* Revision 1.16  1998/07/08  18:15:42  wenjian
* Add getUserSysTime().
* [from r1.15 by delta wenjian-22495-TPCC-add-new-feature-to-monitor-tpcc-clients, r1.6]
*
* Revision 1.15  1998/07/02  18:28:51  wenjian
* Change client_status_report to send more information of the
* client process. These changes are matched with changes in
* tpcc_monitor.c.
* [from r1.9 by delta wenjian-22495-TPCC-add-new-feature-to-monitor-tpcc-clients, r1.5]
*
* Revision 1.7  1998/04/29  19:47:40  wenjian
* - Add client_status_report to comunnicate with tpcc_monitor
* - Add socket_print_rt_avg
* [from r1.6 by delta wenjian-22495-TPCC-add-new-feature-to-monitor-tpcc-clients, r1.1]
*
* Revision 1.6  1998/02/17  22:12:40  wenjian
* [merge of changes from 1.3 to 1.4 into 1.5]
*
* Revision 1.4  1998/02/17  16:04:40  oz
* - Split the login into two parts to allow for special logins
* - If the warehouse ID is 0, this is a special login to
*   query the client for status
*
* - check_threads: Return the number of threads
* - New function: client_report
* [from r1.3 by delta oz-21864-TPCC-split-client-login-screen, r1.1]
*
* Revision 1.5  1998/02/17  22:06:59  wenjian
* Add necessary head files for win32
* [from r1.3 by delta wenjian-21750-TPCC-changes-for-porting-on-NT, r1.1]
*
* Revision 1.3  1998/01/29  22:53:34  oz
* - Use pthread delay instead of sleep
* [from r1.2 by delta oz-21749-TPCC-use-pthread-delay-for-bg-thread, r1.1]
*
* Revision 1.2  1998/01/26  20:37:34  oz
* - Remove all the code associated with explicit binding
*
* - Removed include of mon_client_utils.h
* [from r1.1 by delta oz-21697-TPCC-remove-explicit-binding-code, r1.1]
*
* Revision 1.1  1998/01/26  16:19:22  oz
* - moved all the code pertaining to the background
*   thread to its own file and all the data structures
*   to client_utils.h
* [added by delta oz-21689-TPCC-move-client-bg-thread-to-separate-file, r1.1]
*
*
*/

/*
 *  client_bg_thread
 *                  A file used for debug purposes only.
 *
 *  It implements a background thread that once a minute checks the
 *  state of all the threads and reports the state of the client.
 *
 */


#include <stdio.h>
#include <stdlib.h>
#include <string.h>
#include <stdarg.h>
#include <time.h>
#ifndef WIN32
#include <sys/times.h>  /* for getUserSysTime */
#endif
#if defined (solaris)
#include <dce/pthread.h>
#else
#include <pthread.h>
#endif  /* solaris */
#include <tpm/mon/mon.h>
#include <utils/trace.h>
#include "common/delivery.h"
#ifdef MULTIPLE_INTERFACE
#include "common/neworder.h"
#include "common/payment.h"
#include "common/stocklevel.h"
#include "common/orderstatus.h"
#else
#include "common/tpcc_trans.h"
#endin
#include "common/utilities.h"
#include "client_utils.h"
#include "common/do_tpcc.h"
#include "client.h"
#include "encina_client.h"
#include "tools/tran_stat.h"
#include "common/get_local_time.h"

#ifdef WIN32
#define    read(A,B,C)      recv(A,B,C,0)
#define    write(A,B,C)     send(A,B,C,0)
```

```
#endif

#if 1
#define PRINT_AV(total, num, str)                    \
{                                                    \
   if ((num) > 0) {                                  \
      fprintf(ERROUT, " %s %.0f,", str, (double)(total)/(num));      \
   }                                                 \
}
#else
#define PRINT_AV(a,b,c)
#endif

static void check_threads(total_tran_count_t *tran_ctP, int *numP, int *numInitP);
static struct timeval *client_last_time(thread_descr_t *descrP);
void getUserSysTime(struct timeval *user_time, struct timeval *sys_time);

/*
 *  client_last_time
 *
 *  Each thread maintains the current state it is in and the time
 *  it entered this state.
 *  This routined returns a pointer to the structure in the thread
 *  data that contains the time corresponding to the threads current
 *  state.
 *  Typical use:
 *                  - Set the state, then call gettime on the pointer
 *                    returned by this function.
 */
static struct timeval *client_last_time(thread_descr_t *descrP)
{
   struct timeval *lastTimeP = &descrP->done;
   switch (descrP->state) {
                  case thread_state_init:              /*  Thread is initializing - no trans yet */
                     lastTimeP = &descrP->init;
                     break;
      case thread_state_called:  /*  Tran type was sent by the RTE  */
         lastTimeP = &descrP->called;
         break;
      case thread_state_returned:  /*  Final screen sent to RTE  */
         lastTimeP = &descrP->returned;
         break;
      case thread_state_sent:  /*  Sent to server  */
         lastTimeP = &descrP->sent;
         break;
      case thread_state_received:  /*  Received reply from server  */
         lastTimeP = &descrP->received;
         break;
      case thread_state_done:  /*  The thread exited  */
         lastTimeP = &descrP->done;
         break;
      default:
                     err_printf("client_last_time: bad state: %d\n", descrP->state);
         lastTimeP = &descrP->done;
         break;
   }
   return(lastTimeP);
}

void set_client_debug_state(void *contextP, int state, int tran)
{
   thread_info_t *thread_context = (thread_info_t *)contextP;
   struct timezone tz;
   thread_descr_t *descrP = &thread_context->descr;

   descrP->state = state;

   gettimeofday(client_last_time(descrP), &tz);
   if (state == thread_state_called) descrP->tran = tran;
}



/*  How often to report the state of a thread:
 *  If it is in the thread_state_init phase: report if it has been in
 *  that state for more than 5 minutes.
 *  Report if it takes the terminal more thatn 3 minutes to generate the next
 *  transaction.  Otherwise, report if anything takes longer than 60 seconds.
 */
#define THREAD_STATE_REPORT_DELTA(state) \
  ((state) == thread_state_init ? 300 : \
   (state) == thread_state_returned ? 180 : 60)

static char *thread_state_to_str(int state)
{
   char *ret_val = "-Unknown-";
   switch(state) {
                  case thread_state_init:     ret_val = "state_init"; break;
                  case thread_state_called:   ret_val = "state_called"; break;
                  case thread_state_sent:     ret_val = "state_sent"; break;
                  case thread_state_received: ret_val = "state_received"; break;
                  case thread_state_done:     ret_val = "state_done"; break;
                  case thread_state_returned: ret_val = "state_returned"; break;
   }
   return(ret_val);
}

static void print_rt_avg(total_tran_count_t *curP,
                                                total_tran_count_t *prevP,
                                                int type)
{
   int i;
   static char *names[] = {"0", "no", "pa", "os", "dl", "sl"};
   err_printf("%s RT avg: ", type ? "server" : "client");

   for (i=1; i<=MAX_TRAN_TYPE; i++) {
                  int num_trans = curP->tran[i].RTcount - prevP->tran[i].RTcount;
                  double rt_diff = curP->tran[i].RTtotal[type] - prevP->tran[i].RTtotal[type];
                  PRINT_AV(rt_diff, num_trans, names[i]);
   }
   fprintf(ERROUT, "\n");
}


/*
 *  A background thread that keeps tabs on the state of all the
 *  threads of the client.  (For Debug)
 */
static void *bg_thread(void *argP)
{
   static int sleep_time = 60000; /*  in ms  */
   static struct timespec time_wait = {60, 0};
   struct timespec sleep_end;

   total_tran_count_t tran_ct, tran_reported[2];
   int total_newo, total_tran_err;
   struct timeval cur_time;
   struct timezone tz;
   struct timeval time_reported[2];

   gettimeofday(&time_reported[0], &tz);
   time_reported[1] = time_reported[0];

   memset(&tran_reported[0], '\0', 2 * sizeof(tran_reported[0]));

   while (1) {
                  double time_diff1, time_diff2;
                  double tran_diff1, tran_diff2;
      double prev_newo1, prev_newo2;
                  double err_diff1, err_diff2;

                  check_threads(&tran_ct, NULL, NULL);

                  total_tran_err = tran_ct.errors;
      total_newo = tran_ct.tran[NEWO_TRANS].num-tran_ct.tran[NEWO_TRANS].errs;

                  gettimeofday(&cur_time, &tz);
                  time_diff1 = time_diff_ms(&cur_time, &time_reported[0]);
                  prev_newo1 = tran_reported[0].tran[NEWO_TRANS].num -
tran_reported[0].tran[NEWO_TRANS].errs;
                  tran_diff1 = total_newo - prev_newo1;
                  err_diff1 = total_tran_err - tran_reported[0].errors;

                  time_diff2 = time_diff_ms(&cur_time, &time_reported[1]);
                  prev_newo2 = tran_reported[1].tran[NEWO_TRANS].num -
tran_reported[1].tran[NEWO_TRANS].errs;
                  tran_diff2 = total_newo - prev_newo2;
                  err_diff2 = total_tran_err - tran_reported[1].errors;
                  if (total_newo != 0 && tran_diff2 > 0) {
                     err_printf("bg_thread: TPM: %.0f (last %.0f sec), %.0f (last %.0f sec)\n",
                                    tran_diff1 / time_diff1 * 60000, time_diff1 / 1000.,
                                    tran_diff2 / time_diff2 * 60000, time_diff2 / 1000.);
         /* print av server response time for all transactions */
                     print_rt_avg(&tran_ct, &tran_reported[1], 0);
                     print_rt_avg(&tran_ct, &tran_reported[1], 1);
      }

                  if (err_diff2 != 0) {
                     err_printf("bg_thread: errPM %.1f (last %.0f sec)\n",
                                                   err_diff2 / time_diff2 * 60000, time_diff2 / 1000.);
                  }
                  tran_reported[0] = tran_reported[1];
                  tran_reported[1] = tran_ct;
                  time_reported[0] = time_reported[1];
                  time_reported[1] = cur_time;
      pthread_delay_np(&time_wait);
   }
}

#ifdef KEEP_TERMINAL_INFO
static void check_threads(total_tran_count_t *tran_ctP, int *num_threadsP, int *num_threadsInitP)
{
   struct timezone tz;
   int num_per_state[NUM_STATES];
   int total_stuck = 0;
   static int init_printed = 0;
   int total_tran_err;
   int num_active = 0;


   MUTEX_LOCK(&init_lock);

   if (info_list == NULL || (info_list_len < 1)) {
      if (num_threadsP)
                     *num_threadsP = 0;
      if (num_threadsInitP)
                     *num_threadsInitP = 0;
      memset(tran_ctP, '\0', sizeof(*tran_ctP));
```

```
} else {
    int i,j;
    struct timeval cur_time;
                int num_init = 0, num_done = 0;

                for (i=0; i<NUM_STATES; i++) num_per_state[i] = 0;

    gettimeofday(&cur_time, &tz);
    memset(tran_ctP, '\0', sizeof(*tran_ctP));
    for (i=0; i<info_list_len; i++) {
                    struct timeval *client_timeP;
                    int time_diff;
                    thread_descr_t *descrP;
                    int delta;
      if (info_list[i] == NULL || !info_list[i]->initialized) {
                                continue;
                    }
                    if (!info_list[i]->done) num_active++;
                    descrP = &info_list[i]->descr;
                    delta = THREAD_STATE_REPORT_DELTA(descrP->state);
                    client_timeP = client_last_time(descrP);

                    for (j=1; j<=MAX_TRAN_TYPE; j++) {
                tran_ctP->tran[j].num += info_list[i]->tran[j].num;
                tran_ctP->tran[j].errs += info_list[i]->tran[j].errs;
                tran_ctP->tran[j].RTcount += info_list[i]->tran[j].RTcount;
                tran_ctP->tran[j].RTtotal[0] += info_list[i]->tran[j].RTtotal[0];
                tran_ctP->tran[j].RTtotal[1] += info_list[i]->tran[j].RTtotal[1];
                                tran_ctP->errors += info_list[i]->tran[j].errs;
                    }

                    time_diff = cur_time.tv_sec - client_timeP->tv_sec;
                    DPRINT(("bg_thread: thread %d (index %d) state %s tran %d for %d sec\n",
              info_list[i]->thread_id, i,
              thread_state_to_str(descrP->state),
              descrP->tran,
              time_diff));
                    if (descrP->state == thread_state_init) {
                                num_init++;
                    } else if (descrP->state == thread_state_done) {
                                num_done++;
                    } else if (time_diff > delta) {
          num_per_state[descrP->state] ++;
                                total_stuck++;
                                if (!descrP->printed) {
                                    err_printf("bg_thread: thread %d (index %d) state %s tran %d stuck for %d
sec\n",
                        info_list[i]->thread_id, i,
                        thread_state_to_str(descrP->state),
                        descrP->tran,
                        time_diff);

                                    descrP->printed = 1;
                                }
                    } else if (descrP->printed) {
                                err_printf("bg_thread: thread %d (index %d) state %s tran %d unstuck.\n",
                        info_list[i]->thread_id, i,
                        thread_state_to_str(descrP->state),
                        descrP->tran);

                                descrP->printed = 0;
        }
    }
                if (num_threadsP)
                    *num_threadsP = num_active;
                if (num_threadsInitP)
                    *num_threadsInitP = num_init;

                if (num_init > 0) {
                    err_printf("bg_thread: %d threads still in the init state\n",
                                            num_init);
                } else if (!init_printed) {
                    err_printf("bg_thread: All %d threads are running\n",
                                    info_list_len);
                    init_printed = 1;
                }
                if (num_active != info_list_len)
                    err_printf("%d threads of %d are still active\n",
                                    num_active, info_list_len);

                if (num_done > 0) {
                    err_printf("bg_thread: %d threads done so far.\n", num_done);
                }
                if (total_stuck > 0) {
                    err_printf("bg_thread: Summary %d stuck: ", total_stuck);
                    for (i=0; i<NUM_STATES; i++) {
                        if (num_per_state[i] > 0) {
                                fprintf(ERROUT, "%d %s, ",
                                                num_per_state[i], thread_state_to_str(i));
                        }
                    }
                    fprintf(ERROUT, "\n");
                }
                total_tran_err = 0;
    for (i=0; i<=MAX_TRAN_TYPE; i++)
                total_tran_err += tran_ctP->tran[i].errs;
    if (total_tran_err > 0) {
                    err_printf("bg_thread: %d errs: %d no, %d pa, %d os, %d sl\n",
                                    total_tran_err,
                                    tran_ctP->tran[NEWO_TRANS].errs,
                                    tran_ctP->tran[PAYMENT_TRANS].errs,
                                    tran_ctP->tran[ORDER_STAT_TRANS].errs,
                                    tran_ctP->tran[STOCK_TRANS].errs);
        }
    }
    MUTEX_UNLOCK(&init_lock);
}

#else
static void check_threads(total_tran_count_t *tran_ctP, int *num_threadsP, int *num_threadsInitP)
{
    int i;
    extern total_tran_count_t *pClientInfo;

    if (num_threadsP != NULL)
                *num_threadsP = 0;
    if (num_threadsInitP != NULL)
                *num_threadsInitP = 0;

    memcpy(tran_ctP, pClientInfo, sizeof(total_tran_count_t));

    /* report error info */
    if (pClientInfo->errors > 0) {
        err_printf("bg_thread: %d errs: %d no, %d pa, %d os, %d sl\n",
                pClientInfo->errors,
                pClientInfo->tran[NEWO_TRANS].errs,
                pClientInfo->tran[PAYMENT_TRANS].errs,
                pClientInfo->tran[ORDER_STAT_TRANS].errs,
                pClientInfo->tran[STOCK_TRANS].errs);
    }

}

#endif

void start_bg_debug_thread()
{
    int rc;
    pthread_attr_t attr;
    pthread_t thread;

    if (rc = pthread_attr_create(&attr)) {
        err_printf("start_bg_debug_thread: pthread_attr_create failed: %d\n", rc);
                return;
    }
    if ((rc = pthread_create(&thread,
                    attr,
                    bg_thread,
                    (pthread_addr_t)NULL)) != 0) {
        err_printf("start_bg_debug_thread: pthread_create failed: %d\n", rc);
                return;
    }
    if ( rc = pthread_detach(&thread) != 0) {
                err_printf("start_bd_debug_thread: pthread_detach failed %d\n", rc);
                return;
    }
}



/* client_status_report:
 * mainly copied from bg_thread
 */
void *client_status_report(int fileno)
{
    static struct timespec time_wait = {60, 0};

    total_tran_count_t tran_ct;
    tran_info_t  *curP;
    struct timeval cur_time;
    struct timezone tz;
    char   buf[1024], cmd='\0';
    int    i, cnt=0;

    /* a loop for communication with tpcc_monitor */
    while ( cmd != 'q' ) {
        struct timeval cur_time;
        struct timeval user_time={0,0}, sys_time={0,0};
        struct timezone tz;
                int num_threads, num_threadsInit;

        memset(&tran_ct, 0, sizeof(tran_ct));

            /* read next cmd from the socket */
                    read(fileno, buf, 1);
                    cmd = buf[0];
                    /* DPRINT(("%c\n",cmd));  */
                    if (cmd=='q') {
                                break;
                    }

                    check_threads(&tran_ct, &num_threads, &num_threadsInit);
                    gettimeofday(&cur_time, &tz);
#ifdef GET_CLIENT_USAGE
            getUserSysTime(&user_time, &sys_time);
#endif

                    /* The tpcc_monitor has to read the data in the same order
```

```
         * to get the correct data.
         */
                prefix_sprintf(buf,"\n");
                write(fileno,buf,strlen(buf));
                sprintf(buf, "%d %d %d %d %d %d\n",
                        cur_time.tv_sec, cur_time.tv_usec,
                        tran_ct.tran[NEWO_TRANS].num-tran_ct.tran[NEWO_TRANS].errs,
                        tran_ct.errors, num_threads, num_threadsInit);
                write(fileno, buf, strlen(buf));
                sprintf(buf, "%d %d %d %d\n", user_time.tv_sec,user_time.tv_usec,
                                sys_time.tv_sec, sys_time.tv_usec);
                write(fileno, buf, strlen(buf));
        for (i=0, curP=tran_ct.tran; i<=MAX_TRAN_TYPE; i++, curP++) {
                        if (i==0) continue;
            sprintf(buf, "%d %d %d %.3f %.3f\n",
              i, curP->RTtotal, curP->errs, curP->RTtotal[0],
              curP->RTtotal[1]);
            write(fileno, buf, strlen(buf));
                }
                write(fileno, ENDMSG, strlen(ENDMSG));

  }
}

/* for AIX only */
void getUserSysTime(struct timeval *user_time, struct timeval *sys_time)
{
#if defined(AIX)
  struct rusage rubuff;

  if (getrusage(RUSAGE_SELF,&rubuff) == 0) {
                  user_time->tv_sec = rubuff.ru_utime.tv_sec;
    user_time->tv_usec = rubuff.ru_utime.tv_usec;

    sys_time->tv_sec = rubuff.ru_stime.tv_sec;
    sys_time->tv_usec = rubuff.ru_stime.tv_usec;

  } else {
    user_time->tv_sec = user_time->tv_usec = 0;
    sys_time->tv_sec = sys_time->tv_usec = 0;
  }
#elif defined(solaris)
  /* WARNING: not test it yet */
  struct tms t;
  static long ticks = 0;
  register long n;

  if (ticks == 0) ticks = sysconf(_SC_CLK_TCK);

  (void)times(&t);

  user_time->tv_sec = t.tms_utime / ticks;
  user_time->tv_usec = (t.tms_utime % ticks) * 1000000 / ticks;

  sys_time->tv_sec = t.tms_stime / ticks;
  sys_time->tv_usec = (t.tms_stime % ticks) * 1000000 / ticks;
#else
  user_time->tv_sec = 0;
  user_time->tv_usec = 1000;

  sys_time->tv_sec = 0;
  sys_time->tv_usec = 1000;
#endif

}

#ifdef WEB_TPCC_CLIENT
extern void getStatsForm(char* outBufP, char* rawStatsP, int interval);

int web_client_status(char* szFormP, int cmd, int interval)
{
  total_tran_count_t tran_ct;
  tran_info_t *curP;
  struct timeval cur_time;
  struct timezone tz;
  int i, cnt=0;
  int num_threads, num_threadsInit;
  char *statusP;
  char tempP[512];

  if(cmd==1)
                statusP = szFormP;
  else
                statusP = tempP;

  *statusP = '\0';
  memset(&tran_ct, 0, sizeof(tran_ct));

  if(cmd == 2) /* quit */
    return 1;

  check_threads(&tran_ct, &num_threads, &num_threadsInit);
  gettimeofday(&cur_time, &tz);

  prefix_sprintf(statusP,"\n");
  sprintf(statusP+strlen(statusP), "%d %d %d %d %d %d\n", cur_time.tv_sec,
        cur_time.tv_usec,
        tran_ct.tran[NEWO_TRANS].num-tran_ct.tran[NEWO_TRANS].errs,
                tran_ct.errors,
          num_threads, num_threadsInit);
  sprintf(statusP+strlen(statusP), "0 0 0 0\n");
  for (i=0, curP=tran_ct.tran; i<=MAX_TRAN_TYPE; i++, curP++) {
    if (i==0) continue;
    sprintf(statusP+strlen(statusP), "%d %d %d %.3f %.3f\n",
              i, curP->RTcount, curP->errs, curP->RTtotal[0],
              curP->RTtotal[1]);
  }

  if(cmd != 1)
                getStatsForm(szFormP, statusP, interval);
  return 0;
}
#endif
```

client_listen.c

```
/*
 *                client_listen.c
 *
 * $Revision: 1.8 $
 * $Date: 1999/05/06 21:28:26 $
 * $Lo:               $
 *
 *
 * $TALog: client_listen.c,v $
 * Revision 1.8  1999/05/06  21:28:26  oz
 * - Removed all the .. from the includes
 * - Added -I.. to the makefiles instead
 * - Moved all the thread related code and connection
 *   selection to serverMon.c
 * [from r1.7 by delta oz-24309-TPCC-add-oracle8.1-code, r1.5]
 *
 * Revision 1.7  1999/01/29  20:16:32  wenjian
 * Change logprintf to err_printf
 * [from r1.6 by delta wenjian-23787-TPCC-integrate-code-for-AIX-and-NT, r1.7]
 *
 * Revision 1.6  1998/11/09  16:59:36  wenjian
 * In this revision, most of the changes are related to the directory of header
 * files after directory reorganization. Other changes include adding or removing
 * files to put them in the right directories. Makefiles are written for NT
 * platform so that nmake is working on NT now. Need a top level Makefile for all
 * the directories.
 * [from r1.5 by delta wenjian-23677-TPCC-reorganize-directory-structure, r1.2]
 *
 * Revision 1.5  1998/11/09  14:48:14  wenjian
 * In an effort to make a new directory structure for TPCC, this delta
 * creates two directories: tpcc/client and tpcc/server. All the files
 * for this revision are copied from tpcc/sp-tpcc without any change.
 * Further change may be needed for some files due to the change of
 * the directory structure.
 * [added by delta wenjian-23677-TPCC-reorganize-directory-structure, r1.1]
 *
 * Revision 1.30  1998/09/26  10:56:25  oz
 * - renamed thread_init and thread_done to clnt_thread_init and
 *   clnt_thread_done respectively because of name conflicts on AIX4.3
 * [from r1.22 by delta oz-23339-TPCC-update-for-NT, r1.2]
 *
 * Revision 1.22  1998/08/18  14:38:38  wenjian
 * Minor change
 * [from r1.18 by delta wenjian-21750-TPCC-changes-for-porting-on-NT, r1.4]
 *
 * Revision 1.18  1998/04/29  19:47:41  wenjian
 * - Use fd instead of stream on NT
 * - Add code to consider tpcc_monitor as a special client login
 * - Use TRY and CATCH_ALL to deal with exceptions
 * [from r1.17 by delta wenjian-22495-TPCC-add-new-feature-to-monitor-tpcc-clients, r1.1]
 *
 * Revision 1.17  1998/02/17  22:13:28  wenjian
 * [merge of changes from 1.14 to 1.15 into 1.16]
 *
 * Revision 1.15  1998/02/17  16:04:41  oz
 * - Split the login into two parts to allow for special logins
 * - If the warehouse ID is 0, this is a special login to
 *   query the client for status
 *
 * - First, login
 *   If the w_id is bigger than 0: normal thread.
 *   Otherwise, call client_report.
 * [from r1.14 by delta oz-21864-TPCC-split-client-login-screen, r1.1]
 *
 * Revision 1.16  1998/02/17  22:06:59  wenjian
 * Add head files and define macros for win32
 * [from r1.14 by delta wenjian-21750-TPCC-changes-for-porting-on-NT, r1.1]
 *
 * Revision 1.14  1998/01/28  22:24:48  oz
 * [from r1.13 by delta oz-20774-TPCC-update-to-latest-SP-version-11-27, r1.4]
 *
 * Revision 1.13  1998/01/26  16:19:22  oz
 * - moved all the code pertaining to the background
 *   thread to its own file and all the data structures
 *   to client_utils.h
 * [from r1.12 by delta oz-21689-TPCC-move-client-bg-thread-to-separate-file, r1.1]
 *
 * Revision 1.12  1998/01/24  14:17:04  oz
 * - User server name to identify server and name delivery file
 * - Use env variable HOME instead of /home/encina if HOME is set
 *
```

```
* - Print the thread ID on thread exit as well
* [from r1.11 by delta oz-21687-TPCC-use-server-name-to-identify-process, r1.1]
*
* Revision 1.11  1998/01/23  15:07:44  oz
* - Updated the SP TPCC directory to the latest files used
*   during the SP tpcc audit.
* [from r1.10 by delta oz-20774-TPCC-update-to-latest-SP-version-11-27, r1.1]
*
*
*  Exported functions:
*                   make_connections
*
*  Private functions:
*                   process_terminal
*
*
*/

/*   client_listen.c
 *                  Code in the client that listens for requests from the
 *                  terminal processes and submits them for processing.
 *
 *                  There is one listening function: make_connection.
 *                  That function calls cnm_ManageConnection which never returns
 *                  and so it is best to call it in its own independent thread.
 *
 *                  As soon as cnm_ManageConnections receives a connection it
 *  starts a new thread and calls process_terminal in that
 *  thread passing in the file descriptor for the new connection.
 *
 *                  Note that the client does not need to know in advance how many
 *                  terminals it will talk to.
 *
 *                  The function process_terminal reads initializes the thread
 *  and then calls client_init to process all the requests from
 *  that terminal.
 */


#include <stdlib.h>
#ifdef WIN32
#include <io.h>
#endif
#include <stdio.h>
#include <sys/types.h>
#include <tc/tc.h>
#include "common/do_tpcc.h"
#include "common/tpcc_type.h"

#if defined (solaris)
#include <dce/pthread.h>
#else   /* solaris */
#include <pthread.h>
#endif  /* solaris */

#include "client_utils.h"
#ifdef WIN32
#include "cnm.h"
#else
#include <cnm/cnm.h>
#endif

#ifdef WIN32
#define         close           _close
#define         fileno          _fileno
#endif
/*
 *  State about the terminal stored by the terminal thread
 *  work_entry: The work entry to be used by this terminal thread.
 */
typedef struct {
   int profiling;
   int terminal_id;
   void *handle_contextP;
} terminal_context_t;

/**
 **  Function Prototypes
 **/
static void process_terminal(cnm_arg_t *argP);

extern void client_init(int, int, int, int, void *);
extern void client_login(int, int, int *, int *);

/*
 *  process_terminal
 *
 *                  The argument we get is a file descriptor for a terminal
 *                  process.  We read from that file to receive input and send
 *                  output back to that file.
 */
static void process_terminal(cnm_arg_t *argP)
{
   int w_id, d_id;
   terminal_context_t terminal_context;
   tpcc_data_t tran_data;
   int fdIn;
   pthread_t thread = pthread_self();
   int thread_id = pthread_getunique_np(&thread);
   struct timespec rand_sleep;
#if defined(_AIX)
   tid_t tid = thread_self();
#else
   int tid = thread_id;
#endif

#ifdef WIN32
   fdIn = argP->fd;
#else
   fdIn = fileno(argP->stream);
#endif /* WIN32 */

   /*
    *  Default terminal context
    *  This may be updated later by the terminal
    */
   terminal_context.terminal_id = -1;
   terminal_context.profiling = 0;

   TRY {
      client_login(fdIn, fdIn, &w_id, &d_id);
      if (w_id > 0) {
         /*  Initialize the server handle and other thread structures  */
         terminal_context.handle_contextP = (void *)clnt_thread_init();

         err_printf("Tid: %d (0x%x) w_id %d, d_id %d\n", tid, tid, w_id, d_id);
                  client_init(fdIn, fdIn, w_id, d_id, terminal_context.handle_contextP);
                  err_printf("Thread done - Tid %d (0x%x)\n", tid, tid);
                  clnt_thread_done(terminal_context.handle_contextP);
      } else {
                  err_printf("Starting Auxiliary Thread, Tid %d (0x%x)\n", tid, tid);
                  client_status_report(fdIn);
                  err_printf("End of Auxiliary Thread, Tid %d (0x%x)\n", tid, tid);
      }
   } CATCH_ALL {
                  err_printf("An exception happened\n");
                  logprintf("End of Auxiliary Thread, Tid %d (0x%x)\n", tid, tid);
   }
   ENDTRY

   close(fdIn);
}

/*
 *  make_connections
 *
 *    Listen for connections on a socket.
 *    Whenever a connection is made, start a thread to talk
 *    to the terminal.
 *                  This functions is spawned on its own thread.
 */
void make_connections(argP)
  void *argP;
{
   int port = (int)argP;
   char port_descr[28];
   int rc;

   DPRINT(("Using socket %d\n", port));
   err_printf("Using thread stack size default\n");
   sprintf(port_descr, "ncacn_ip_tcp[%d]", port);
   rc = cnm_ManageConnections(port_descr,
                                                   (cnm_userRountine_t)process_terminal,
                                                   NULL,
                                                   0,           /*  Max Connections  */
                                                   1);   /*  Spawn threads   */
   err_printf("cnm_ManageConnections returned %d\n", rc);
}
```

client_listen.h

```
/*
 *                  client_listen.h
 *
 * $Revision: 1.5 $
 * $Date: 1998/11/09 14:48:14 $
 * $Log:            $
 *
 *
 * $TALog: client_listen.h,v $
 * Revision 1.5  1998/11/09  14:48:14  wenjian
 * In an effort to make a new directory structure for TPCC, this delta
 * creates two directories: tpcc/client and tpcc/server. All the files
 * for this revision are copied from tpcc/sp-tpcc without any change.
 * Further change may be needed for some files due to the change of
 * the directory structure.
 * [added by delta wenjian-23677-TPCC-reorganize-directory-structure, r1.1]
 *
 * Revision 1.1  1997/04/20  11:57:55  oz
 * - This is the code base modified at IBM Poughkeepsie
 *   by Ofer Zajicek and Radha Sivaramakrishnan for the
 *   SP scaling test for TPCC.
 * [added by delta oz-19782-TPCC-add-ibm-sp-code, r1.1]
 *
 * Revision 1.1  1995/07/09  18:12:10  oz
 * - Modified the client side of the TPCC benchmark to have multithreaded
 *   clients.  There is a terminal process for each terminal -- when
 *   not using the terminal emulator each terminal process emulates one
```

```
*   terminal.  The terminal processes communication with the client
*   process using a unix socket.
*
*   On the client side there is a thread for each terminal process.
*   That thread receives the request from the terminal and puts it on
*   a queue.  There is one processing thread that dequeues the requests
*   and sends them to the server for processing.
* [added by delta oz-15875-TPCC-reduce-the-number-of-clients, r1.1]
*
*
*
*/

/*   client_listen.h
*/

#ifndef TPCC_CLIENT_LISTEN_H
#define TPCC_CLIENT_LISTEN_H


void make_connections(void *argP);

#endif /* TPCC_CLIENT_LISTEN_H */
```

client_main.c

```
#include "string.h"
#include "tpcc.h"

extern void client_init(int infd, int outfd, int w_id, int d_id, void *conP);
extern void client_login(int infd, int outfd, int *w_idP, int *d_idP);

main()
{
    int w_id, d_id;
    client_login(0, 1, &w_id, &d_id);
    client_init(0, 1, w_id, d_id, (void *)0);
}


int send_new_order(void *contextP, NewOrder_data *data) {
    int             i;

    data->s_W_ID = 11;
    data->s_D_ID = 22;
    data->s_C_ID = 3333;
    strcpy((char *)data->s_C_LAST, "1234567890123456");
    strcpy((char *)data->s_C_CREDIT, "BC");
    data->s_C_DISCOUNT = 0.1556;
    data->s_O_ID = 4444;
    strcpy((char *)data->s_O_ENTRY_D, "1992-10-2 12:33:11");
    strcpy((char *)data->s_status_line, "123456789012345678901234");
    data->s_total_amount = 12.98;
    data->s_transtatus = 0;
    data->s_W_TAX = 0.1234;
    data->s_D_TAX = 0.5678;

    for (i=0; i < data->s_O_OL_CNT; i++) {
                strcpy((char *)data->item[i].s_I_NAME, "123456789012345678901234");
                data->item[i].s_S_QUANTITY = i + 1;
                data->item[i].s_brand_generic[0] = 'B';
                data->item[i].s_I_PRICE = i + 1;
                data->item[i].s_OL_AMOUNT = i + 1;
    }
    return 0;
}

int send_payment(void *contextP, Payment_data *data) {
    data->s_W_ID = 11;
    data->s_D_ID = 22;
    data->s_C_ID = 3333;
    data->s_C_W_ID = 44;
    data->s_C_D_ID = 55;
    data->s_H_AMOUNT = 9.55;
    strcpy((char *)data->s_W_STREET_1, "1234567890123456789O");
    strcpy((char *)data->s_W_STREET_2, "1234567890123456789O");
    strcpy((char *)data->s_W_CITY, "123456789012345678901");
    strcpy((char *)data->s_W_STATE, "PR");
    strcpy((char *)data->s_W_ZIP, "123456789");
    strcpy((char *)data->s_D_STREET_1, "1234567890123456789O");
    strcpy((char *)data->s_D_STREET_2, "1234567890123456789O");
    strcpy((char *)data->s_D_CITY, "123456789012345678901");
    strcpy((char *)data->s_D_STATE, "PR");
    strcpy((char *)data->s_D_ZIP, "123456789");
    strcpy((char *)data->s_C_FIRST, "1234567890123456");
    strcpy((char *)data->s_C_MIDDLE, "12");
    strcpy((char *)data->s_C_LAST, "1234567890123456");
    strcpy((char *)data->s_C_STREET_1, "1234567890123456789O");
    strcpy((char *)data->s_C_STREET_2, "1234567890123456789O");
    strcpy((char *)data->s_C_CITY, "123456789012345678901");
    strcpy((char *)data->s_C_STATE, "PR");
    strcpy((char *)data->s_C_ZIP, "123456789");
    strcpy((char *)data->s_C_PHONE, "1234567890123456");
    strcpy((char *)data->s_C_SINCE, "1992-23-22 21:11:11");
    strcpy((char *)data->s_H_DATE, "1992-10-2 12:33:11");
    strcpy((char *)data->s_C_CREDIT, "BC");
    data->s_C_CREDIT_LIM = 5000;
    data->s_C_DISCOUNT = 0.10;
    data->s_C_BALANCE = 122.10;
    strcpy((char *)data->s_C_DATA,
"1234567890123456789012345678901234567890123456789012345678901234567890123456789012345678901234567890");
    return 0;
}

int send_order_status(void *contextP, OrderStatus_data *data) {
    int             i;

    data->s_W_ID = 11;
    data->s_D_ID = 22;
    data->s_C_ID = 3333;
    strcpy((char *)data->s_C_FIRST, "1234567890123456");
    strcpy((char *)data->s_C_MIDDLE, "12");
    strcpy((char *)data->s_C_LAST, "1234567890123456");
    data->s_C_BALANCE = 122.10;
    data->s_O_ID = 44;
    strcpy((char *)data->s_O_ENTRY_D,"1992-10-2 12:33:11");
    data->s_O_CARRIER_ID = 55;
    data->s_ol_cnt = 10;

    for (i=0; i < data->s_ol_cnt; i++) {
                data->item[i].s_OL_SUPPLY_W_ID = i + 1;
                data->item[i].s_OL_I_ID = i + 1;
                data->item[i].s_OL_QUANTITY = i + 1;
                data->item[i].s_OL_AMOUNT = i + 1;
                strcpy((char *)data->item[i].s_OL_DELIVERY_D, "1992-10-2 12:33:11");
    }
    return 0;
}

int send_delivery(void *contextP, Delivery_data *data) {
    strcpy((char *)data->s_exec_status, "Delivery has been queued");
    return 0;
}

int send_stock_level(void *contextP, StockLevel_data *data) {
    data->s_low_stock = 22;
    return 0;
}
```

client_utils.c

```
/*
 *
 *              client_utils.c
 *
 * $Revision: 1.9 $
 * $Date: 1999/05/06 21:28:26 $
 * $Log:        $
 *
 *
 *
 *
 * $TALog: client_utils.c,v $
 * Revision 1.9  1999/05/06  21:28:26  oz
 * - Removed all the .. from the includes
 * - Added -I.. to the makefiles instead
 * - Moved all the thread related code and connection
 *   selection to serverMon.c
 * [from r1.7 by delta oz-24309-TPCC-add-oracle8.1-code, r1.5]
 *
 * Revision 1.7  1998/12/11  16:37:57  wenjian
 * Move some common functions from client/client_utils.c to common/tpcc_utils.c.
 * In this version, we only move time_diff_ms(). Need some work in order to
 * move other functions like ERROUT.
 *
 * - Move time_diff_ms() to common/tpcc_utils.c
 * [from r1.6 by delta wenjian-23788-TPCC-use-single-stats-var-for-each-client-and-server, r1.2]
 *
 * Revision 1.6  1998/11/09  16:59:36  wenjian
 * In this revision, most of the changes are related to the directory of header
 * files after directory reorganization. Other changes include adding or removing
 * files to put them in the right directories. Makefiles are written for NT
 * platform so that nmake is working on NT now. Need a top level Makefile for all
 * the directories.
 * [from r1.5 by delta wenjian-23677-TPCC-reorganize-directory-structure, r1.2]
 *
 * Revision 1.5  1998/11/09  14:48:14  wenjian
 * In an effort to make a new directory structure for TPCC, this delta
 * creates two directories: tpcc/client and tpcc/server. All the files
 * for this revision are copied from tpcc/sp-tpcc without any change.
 * Further change may be needed for some files due to the change of
 * the directory structure.
 * [added by delta wenjian-23677-TPCC-reorganize-directory-structure, r1.1]
 *
 * Revision 1.9  1998/10/08  14:18:00  dongfeng
 * Add codes for doing web-based tpcc.
 * [from r1.7 by delta dongfeng-23067-TPCC-add-web-based-tpcc-client, r1.1]
 *
 * Revision 1.7  1998/04/29  19:47:42  wenjian
 * - Add prefix_sprintf
 * - Remove ENCINA_C_CALLING_CONVENTION from err_printf
 * [from r1.6 by delta wenjian-22495-TPCC-add-new-feature-to-monitor-tpcc-clients, r1.1]
 *
 * Revision 1.6  1998/02/17  22:07:00  wenjian
 * Minor changes for NT
```

```
* [from r1.5 by delta wenjian-21750-TPCC-changes-for-porting-on-NT, r1.1]
*
* Revision 1.5  1998/01/24  14:17:04  oz
* - User server name to identify server and name delivery file
* - Use env variable HOME instead of /home/encina if HOME is set
*
* - Flush the logfile after each write
* [from r1.4 by delta oz-21687-TPCC-use-server-name-to-identify-process, r1.1]
*
* Revision 1.4  1998/01/23  15:07:46  oz
* - Updated the SP TPCC directory to the latest files used
*   during the SP tpcc audit.
* [from r1.3 by delta oz-20774-TPCC-update-to-latest-SP-version-11-27, r1.1]
*
*
*    client_utils.c
*                Generic utilities used by the client processes
*/

#include <stdio.h>
#include <time.h>
#include <string.h>
#include <stdarg.h>

#if defined (solaris)
#include <dce/pthread.h>
#else   /* solaris */
#include <pthread.h>
#endif

#include "common/databuf.h"
#include "client_utils.h"
#include "common/do_tpcc.h"
#include "common/tpcc_type.h"


#define CASE(a) case a: retVal = #a; break

int print_thread_id = 1;
extern int user_id;
extern char *user_code;
/*
 *  Translate the tpcc return code to a string value
 */
static char *TpccRcToStr(rc)
 tpcc_rc_t rc;
{
   char *retVal;
   switch (rc) {
                CASE(INVALID_NEWO);
                CASE(INVALID_HANDLE);
                CASE(SQL_ERROR);
                CASE(TRPC_ERROR);
                CASE(DCE_ERROR);
                CASE(NO_SUCH_LAST_NAME);
                CASE(INVALID_TRAN_TYPE);
                CASE(TPCC_ERROR_BEGIN_NEWO);
                CASE(TPCC_ERROR_DECL_NEWO_SEL_ITEM);
                CASE(TPCC_ERROR_OPEN_NEWO_SEL_ITEM);
                CASE(TPCC_ERROR_OPEN_DIST_NEWO_SEL_ITEM);
                CASE(TPCC_ERROR_FETCH_NEWO_SEL_ITEM);
                CASE(TPCC_ERROR_FETCH_DIST_NEWO_SEL_ITEM);
                CASE(TPCC_ERROR_PREP_NEWO_SEL_STCK);
                CASE(TPCC_ERROR_DECL_NEWO_SEL_STCK);
                CASE(TPCC_ERROR_OPEN_NEWO_SEL_STCK);
                CASE(TPCC_ERROR_OPEN_DIST_NEWO_SEL_STCK);
                CASE(TPCC_ERROR_FETCH_NEWO_SEL_STCK);
                CASE(TPCC_ERROR_FETCH_DIST_NEWO_SEL_STCK);
                CASE(TPCC_ERROR_NEWO_SELECT);
                CASE(TPCC_ERROR_NEWO_UPD_STCK);
                CASE(TPCC_ERROR_DIST_NEWO_UPD_STCK);
                CASE(TPCC_ERROR_NEWO_SELECT_2);
                CASE(TPCC_ERROR_DECL_NEWO_SEL_CUST);
                CASE(TPCC_ERROR_OPEN_NEWO_SEL_CUST);
                CASE(TPCC_ERROR_OPEN_DIST_NEWO_SEL_CUST);
                CASE(TPCC_ERROR_FETCH_NEWO_SEL_CUST);
                CASE(TPCC_ERROR_FETCH_DIST_NEWO_SEL_CUST);
                CASE(TPCC_ERROR_DECL_NEWO_SEL_DIST);
                CASE(TPCC_ERROR_OPEN_NEWO_SEL_DIST);
                CASE(TPCC_ERROR_OPEN_DIST_NEWO_SEL_DIST);
                CASE(TPCC_ERROR_FETCH_NEWO_SEL_DIST);
                CASE(TPCC_ERROR_FETCH_DIST_NEWO_SEL_DIST);
                CASE(TPCC_ERROR_PREP_NEWO_INS_OL);
                CASE(TPCC_ERROR_DECL_NEWO_INS_OL);
                CASE(TPCC_ERROR_OPEN_NEWO_INS_OL);
                CASE(TPCC_ERROR_OPEN_DIST_NEWO_INS_OL);
                CASE(TPCC_ERROR_PUT_NEWO_INS_OL);
                CASE(TPCC_ERROR_PUT_DIST_NEWO_INS_OL);
                CASE(TPCC_ERROR_DECL_NEWO_SEL_WARE);
                CASE(TPCC_ERROR_OPEN_NEWO_SEL_WARE);
                CASE(TPCC_ERROR_OPEN_DIST_NEWO_SEL_WARE);
                CASE(TPCC_ERROR_FETCH_NEWO_SEL_WARE);
                CASE(TPCC_ERROR_FETCH_DIST_NEWO_SEL_WARE);
                CASE(TPCC_ERROR_EXECUTE_NEWO_UPD_INS);
                CASE(TPCC_ERROR_UPDATE_NEWO_NEXT_OID);
                CASE(TPCC_ERROR_PREP_NEWO_INS);
                CASE(TPCC_ERROR_EXECUTE_DIST_NEWO_INS);
                CASE(TPCC_ERROR_EXECUTE_NEWO_COMMIT);
                CASE(TPCC_ERROR_ROLLBACK_NEWO);
                CASE(TPCC_ERROR_REMOTE_OL_SELECT);
                CASE(TPCC_ERROR_REMOTE_OL_UPDATE);
                CASE(TPCC_ERROR_OPEN_ORDS_CNT_CID);
                CASE(TPCC_ERROR_FETCH_ORDS_CNT_CID);
                CASE(TPCC_ERROR_OPEN_ORDS_SEL_CLAST);
                CASE(TPCC_ERROR_FETCH_ORDS_SEL_CLAST);
                CASE(TPCC_ERROR_OPEN_ORDS_SEL_CID);
                CASE(TPCC_ERROR_FETCH_ORDS_SEL_CID);
                CASE(TPCC_ERROR_OPEN_ORDS_SEL_OLDORD);
                CASE(TPCC_ERROR_FETCH_ORDS_OLDORD);
                CASE(TPCC_ERROR_OPEN_ORDS_SEL_OL);
                CASE(TPCC_ERROR_FETCH_ORDS_SEL_OL);
                CASE(TPCC_ERROR_EXECUTE_ORDS_COMMIT);
                CASE(TPCC_ERROR_OPEN_DELIVERY_OLDEST_OID);
                CASE(TPCC_ERROR_FETCH_DELIVERY_OLDEST_OID);
                CASE(TPCC_ERROR_EXECUTE_DELIVERY_COMMIT);
                CASE(TPCC_ERROR_OPEN_DELIVERY_SEL_ORD);
                CASE(TPCC_ERROR_FETCH_DELIVERY_SEL_ORD);
                CASE(TPCC_ERROR_OPEN_DELIVERY_SEL_SUM_OL);
                CASE(TPCC_ERROR_FETCH_DELIVERY_SEL_SUM_OL);
                CASE(TPCC_ERROR_EXECUTE_DELIVERY_EXEC_DVRY);
                CASE(TPCC_ERROR_SELECT_DELIVERY_ORDER_ID);
                CASE(TPCC_ERROR_SELECT_DELIVERY_CARRIER_ID);
                CASE(TPCC_ERROR_SELECT_DELIVERY_BALANCE);
                CASE(TPCC_ERROR_OPEN_STOCKLEVEL_SEL_OID);
                CASE(TPCC_ERROR_FETCH_STOCKLEVEL_SEL_OID);
                CASE(TPCC_ERROR_OPEN_STOCKLEVEL_CNT_SID);
                CASE(TPCC_ERROR_FETCH_STOCKLEVEL_CNT_SID);
                CASE(TPCC_ERROR_OPEN_STOCKLEVEL_FIND);
                CASE(TPCC_ERROR_FETCH_STOCKLEVEL_FIND);
                CASE(TPCC_ERROR_EXECUTE_STOCKLEVEL_COMMIT);
                CASE(TPCC_ERROR_OPEN_PAYMENT_CNT_CID);
                CASE(TPCC_ERROR_FETCH_PAYMENT_CNT_CID);
                CASE(TPCC_ERROR_OPEN_PAYMENT_SEL_CLAST);
                CASE(TPCC_ERROR_FETCH_PAYMENT_SEL_CLAST);
                CASE(TPCC_ERROR_OPEN_PAYMENT_SEL_CID);
                CASE(TPCC_ERROR_FETCH_PAYMENT_SEL_CID);
                CASE(TPCC_ERROR_DECL_PAYMENT_SEL_DIST);
                CASE(TPCC_ERROR_OPEN_PAYMENT_SEL_DIST);
                CASE(TPCC_ERROR_OPEN_DIST_PAYMENT_SEL_DIST);
                CASE(TPCC_ERROR_FETCH_PAYMENT_SEL_DIST);
                CASE(TPCC_ERROR_FETCH_DIST_PAYMENT_SEL_DIST);
                CASE(TPCC_ERROR_DECL_PAYMENT_SEL_WARE);
                CASE(TPCC_ERROR_OPEN_PAYMENT_SEL_WARE);
                CASE(TPCC_ERROR_OPEN_DIST_PAYMENT_SEL_WARE);
                CASE(TPCC_ERROR_FETCH_PAYMENT_SEL_WARE);
                CASE(TPCC_ERROR_FETCH_DIST_PAYMENT_SEL_WARE);
                CASE(TPCC_ERROR_EXECUTE_PAYMENT_UPD_CUST_LAST);
                CASE(TPCC_ERROR_EXECUTE_PAYMENT_UPD_CUST_ID);
                CASE(TPCC_ERROR_COMMIT_PAYMENT_UPD_CUST);
                CASE(TPCC_ERROR_SELECT_PAYMENT_W_YTD);
                CASE(TPCC_ERROR_SELECT_PAYMENT_D_YTD);
                CASE(TPCC_ERROR_BEGIN_PAYMENT);
                CASE(TPCC_ERROR_EXECUTE_PAYMENT_COMMIT);
     default: retVal = "-Unknown-"; break;
   }
   return(retVal);
}

/*
 *  get_thread_id
 *      A function that returns the thread ID of the current thread
 */
int get_thread_id()
{
#ifdef WEB_TPCC_CLIENT
   return(GetCurrentThreadId());
#else
   pthread_t thread = pthread_self();
   int thread_id = pthread_getunique_np(&thread);
   return(thread_id);
#endif
}

#define A_CASE(a,b)  case a: retVal = b; break
/*
 *  Translate the transaction code to its name - for formatting
 */
char *clientUtils_TranCodeToName(type)
  int type;
{
   char *retVal = "-Unknown-";
   switch (type) {
                A_CASE(NEWO_TRANS,      "NEWOR");
                A_CASE(PAYMENT_TRANS,   "PAYMN");
                A_CASE(ORDER_STAT_TRANS, "ORDER");
                A_CASE(DELIVERY_TRANS,  "DELIV");
                A_CASE(STOCK_TRANS,     "STOCK");
   }
   return(retVal);
}

/*
 *  Print the return status of a TPCC transaction
 *  and the corresponding SQL codes and ISAM codes
 */
void clientUtils_ReportReturn(msg, statusP)
  char *msg;
  data_header *statusP;
```

```
{
  switch (statusP->returncode) {
    case SUCCESS_CODE:
                err_printf( "After %s, rc = %d\n", msg, statusP->returncode);
                break;
    case SQL_ERROR:
                err_printf("ERROR: After %s, rc = SQL_ERROR, SQL=%d, ISAM=%d\n", msg,
                                statusP->sql_code,
                                statusP->isam_code);
                break;
    case INVALID_NEWO:
                err_printf("After %s, rc = INVALID_NEWO\n", msg);
                break;
    case DCE_ERROR:
                err_printf("ERROR: After %s, rc = DCE_ERROR\n", msg);
                break;
    case TRPC_ERROR:
                err_printf("ERROR: After %s, rc = TRPC_ERROR\n", msg);
                break;
    case NO_SUCH_LAST_NAME:
                err_printf("After %s, rc = NO_SUCH_LAST_NAME.\n", msg);
                break;
    case DISTRIBUTED_TRAN_FAILED:
                err_printf("After %s, rc = DISTRIBUTED_TRAN_FAILED.\n", msg);
                break;
    default:
                err_printf("ERROR: After %s, rc = %s (%d), SQL=%d, ISAM=%d\n", msg,
                                TpccRcToStr(statusP->returncode),
                                statusP->returncode,
                                statusP->sql_code, statusP->isam_code);
                break;
  }
}


/*
*  clientUtils_SetReturnCode
*
*  Set the return code in the dataP union.
*  dataP is a pointer to a union of all the transaction types.
*  Each member of the union has a header field that contains
*  a return code.  Set the returncode value of the header field
*  for dataP to be code.
*/
void clientUtils_SetReturnCode(dataP, code)
    tpcc_data_t *dataP;
    tpcc_rc_t code;
{
  switch (dataP->tran_type) {
    case NEWO_TRANS: {
                  newOrder_data_t *ptr = &dataP->data.new_order;
                  ptr->header.returncode = code;
                  break;
    }
    case PAYMENT_TRANS: {
                  payment_data_t *ptr = &dataP->data.payment;
                  ptr->header.returncode = code;
                  break;
    }
    case ORDER_STAT_TRANS: {
                  orderStatus_data_t *ptr = &dataP->data.order_status;
                  ptr->header.returncode = code;
                  break;
    }
    case DELIVERY_TRANS: {
                  delivery_data_t *ptr = &dataP->data.delivery;
                  ptr->header.returncode = code;
                  break;
    }
    case STOCK_TRANS: {
                  stockLevel_data_t *ptr = &dataP->data.stock_level;
                  ptr->header.returncode = code;
                  break;
    }
  }
}

/*
*  get_prefix
*                Format the output prefix for printing:
*                It contains the user_id, 'C' or 'T' depending on whether it
*                is a terminal or a client and optional a thread identifier
*                The prefix is written in the buffer passed in by the caller.
*/
void get_prefix(buffer)
 char *buffer;
{
  if (print_thread_id) {
                int thread_id = get_thread_id();
                sprintf(buffer,  "%s(%d-%s-%d)%s",
                                user_id < 10 ? "  " : user_id < 100 ? " " : "",
                                user_id,
                                user_code,
                                thread_id,
                                thread_id < 10 ? " " : "");
  } else {
                sprintf(buffer,  "%s(%2d-%s)",
                                user_id < 10 ? " " : "", user_id, user_code);
  }
}

/*
 * err_printf
 *      A var-arg function that appends the current time and
 *      other data to the print request and sends it to stderr
 *      if it is not a web client, to a file if it is
 */
void err_printf(char *format, ...)
{
    time_t cur_timet;
    char time_str[30];
    char line_prefix[50];
    va_list ap;

    va_start(ap, format);

    cur_timet = time(&cur_timet);
    strftime(time_str, 29, "%X", localtime(&cur_timet));

    get_prefix(line_prefix);

    fprintf(ERROUT, "%s %s - ", line_prefix, time_str);
    vfprintf(ERROUT, format, ap);
#ifdef WEB_TPCC_CLIENT
    fflush(ERROUT);
#endif

    va_end(ap);
}

/*
 * logprintf
 *      A var-arg function that prints both to standard error to to
 *      the log file.  It prepends every line with the current time
 *      and the user id.
 */
void logprintf( char *format, ...)
{
    time_t cur_timet;
    char time_str[30];
    char line_prefix[50];
    va_list ap;

    va_start(ap, format);

    cur_timet = time(&cur_timet);
    strftime(time_str, 29, "%X", localtime(&cur_timet));

    get_prefix(line_prefix);

    fprintf(logtpcc ? logtpcc : ERROUT, "%s %s - ", line_prefix, time_str);
    vfprintf(logtpcc ? logtpcc : ERROUT, format, ap);
    if (logtpcc)
        fflush(logtpcc);

    if (debug && logtpcc) {
        fprintf(ERROUT, "%s %s - ", line_prefix, time_str);
        vfprintf(ERROUT, format, ap);
    }

    va_end(ap);
}

void prefix_sprintf(char *buf, char *format, ...)
{
    time_t cur_timet;
    char time_str[30];
    char line_prefix[50];
    char info[256];
    va_list ap;

    va_start(ap, format);

    cur_timet = time(&cur_timet);
    strftime(time_str, 29, "%X", localtime(&cur_timet));

    get_prefix(line_prefix);

    sprintf(buf, "%s %s - ", line_prefix, time_str);
    vsprintf(info, format, ap);
    strcat(buf,info);

    va_end(ap);
}
```

client_utils.h

```
/*
 *
 *                  client_utils.h
 *
 * $Revision: 1.11 $
 * $Date: 1999/05/06 21:28:26 $
 * $Log:          $
 *
 *
```

```
*
*
* $TALog: client_utils.h,v $
* Revision 1.11  1999/05/06  21:28:26  oz
* - Removed all the .. from the includes
* - Added -I.. to the makefiles instead
* - Moved all the thread related code and connection
*   selection to serverMon.c
* [from r1.8 by delta oz-24309-TPCC-add-oracle8.1-code, r1.5]
*
* Revision 1.8  1998/12/14  20:27:54  wenjian
* Made corresponding changes due to data structure change of tran_info_t.
*
* - Change data structure tran_info_t
* [from r1.7 by delta wenjian-23788-TPCC-use-single-stats-var-for-each-client-and-server, r1.3]
*
* Revision 1.7  1998/12/11  16:14:19  wenjian
* Add code for checking statistic data in a single variable and collecting
* statistic data based on iStatsFrequency.
*
* - Add total_num_trans to tran_info_t;
* [from r1.6 by delta wenjian-23788-TPCC-use-single-stats-var-for-each-client-and-server, r1.1]
*
* Revision 1.6  1998/11/09  16:59:37  wenjian
* In this revision, most of the changes are related to the directory of header
* files after directory reorganization. Other changes include adding or removing
* files to put them in the right directories. Makefiles are written for NT
* platform so that nmake is working on NT now. Need a top level Makefile for all
* the directories.
* [from r1.5 by delta wenjian-23677-TPCC-reorganize-directory-structure, r1.2]
*
* Revision 1.5  1998/11/09  14:48:15  wenjian
* In an effort to make a new directory structure for TPCC, this delta
* creates two directories: tpcc/client and tpcc/server. All the files
* for this revision are copied from tpcc/sp-tpcc without any change.
* Further change may be needed for some files due to the change of
* the directory structure.
* [added by delta wenjian-23677-TPCC-reorganize-directory-structure, r1.1]
*
* Revision 1.4  1998/11/09  14:26:51  wenjian
* Change enc_status to a data structure that has fields:
*   - Status code
*   - Line Number
*   - File Name
*   - Encina Error Code
*   - Error Msg
* Remove statusMsgs in web_tpcc.c
*
* Add definition of enc_status_t
* [from r1.19 by delta dongfeng-23067-TPCC-add-web-based-tpcc-client, r1.6]
*
* Revision 1.19  1998/10/22  21:13:07  wenjian
* [merge of changes from 1.11 to 1.18 into 1.14]
*
* Revision 1.18  1998/10/22  19:18:32  dongfeng
* [from r1.17 by delta dongfeng-23067-TPCC-add-web-based-tpcc-client, r1.2]
*
* Revision 1.17  1998/10/08  14:18:00  dongfeng
* Add codes for doing web-based tpcc.
* [from r1.11 by delta dongfeng-23067-TPCC-add-web-based-tpcc-client, r1.1]
*
* Revision 1.14  1998/08/18  14:38:39  wenjian
* Minor change
* [from r1.13 by delta wenjian-21750-TPCC-changes-for-porting-on-NT, r1.4]
*
* Revision 1.13  1998/08/18  13:35:42  wenjian
* Remove NUM_NEXT_REPORTS since it is no use.
* [from r1.11 by delta wenjian-22495-TPCC-add-new-feature-to-monitor-tpcc-clients, r1.7]
*
* Revision 1.11  1998/06/17  15:28:51  wenjian
* Add 'double time' in struct total_tran_count_t.
* [from r1.10 by delta wenjian-22495-TPCC-add-new-feature-to-monitor-tpcc-clients, r1.2]
*
* Revision 1.10  1998/04/29  19:47:43  wenjian
* - Define ENDMSG marking the end of socket message between tpcc_client
*   and tpcc_monitor
* - Remove ENCINA_C_CALLING_CONVENTION from err_printf
* [from r1.9 by delta wenjian-22495-TPCC-add-new-feature-to-monitor-tpcc-clients, r1.1]
*
* Revision 1.9  1998/02/17  22:13:41  wenjian
* [merge of changes from 1.6 to 1.7 into 1.8]
*
* Revision 1.7  1998/02/17  16:04:41  oz
* - Split the login into two parts to allow for special logins
* - If the warehouse ID is 0, this is a special login to
*   query the client for status
* [from r1.6 by delta oz-21864-TPCC-split-client-login-screen, r1.1]
*
* Revision 1.8  1998/02/17  22:07:00  wenjian
* Minor changes for NT
* [from r1.6 by delta wenjian-21750-TPCC-changes-for-porting-on-NT, r1.1]
*
* Revision 1.6  1998/01/26  16:43:32  oz
* - Removed the code for collecting stats in the client
*   and dumping them before exit.
*
* - Removed timeP and time_allocated from thread_info_t
* [from r1.5 by delta oz-21691-TPCC-remove-client-stats-code, r1.1]
*
 * Revision 1.5  1998/01/26  16:19:23  oz
 * - moved all the code pertaining to the background
 *   thread to its own file and all the data structures
 *   to client_utils.h
 * [from r1.4 by delta oz-21689-TPCC-move-client-bg-thread-to-separate-file, r1.1]
 *
 * Revision 1.4  1998/01/23  15:07:47  oz
 * - Updated the SP TPCC directory to the latest files used
 *   during the SP tpcc audit.
 * [from r1.3 by delta oz-20774-TPCC-update-to-latest-SP-version-11-27, r1.1]
 *
 *
 *    client_utils.h
 *              Generic utilities used by the client processes
 */

#ifndef TPCC_CLIENT_UTILS_H
#define TPCC_CLIENT_UTILS_H

#include "common/tpcc_type.h"
#include <stdio.h>
#include <time.h>
#include <encina/encina.h>
#include "client.h"
#ifdef WIN32
#include <winsock.h>
#endif


/*
 *  err_printf
 *              Print a string to stderr after prefixing it with the client
 *              info and the current time.
 *  logprintf
 *              Prints as above to the log file.
 */
#ifdef WEB_TPCC_CLIENT
extern FILE * errtpcc;
#endif
extern FILE *logtpcc;
extern char log_file_name[];
extern void logprintf( char *format, ...);
extern void err_printf( char *format, ...);
extern void prefix_sprintf( char *buf, char *format, ...);

/*  tran_timing_t: for debug:
 *  Keep track of the timestamps of all the transactions
 *  and dump it out upon exit.  There is an array of timestamps
 *  per thread and each thread dumps it when it exits.
 */
typedef struct {
  int server;
  int terminal;
  int tran;
  int sub_tran;  /*  Subclass: for NewOrder and payment: 1=>hasRemote  */
  struct timeval start;                         /*  Time received from terminal  */
  struct timeval send;                          /*  Time the RPC was made (explicit only) */
  struct timeval srvr_start;      /*  Time received by server      */
  struct timeval srvr_done;       /*  Time sent by server          */
  struct timeval end;                           /*  Time sent to terminal        */
  int num_rms;                                  /*  Number of RMs the tran involved */
  int tran_failed;
} tran_timing_t;

typedef enum {
   thread_state_init = 0,
   thread_state_called,
   thread_state_sent,
   thread_state_received,
   thread_state_returned,
   thread_state_done
} thread_state_t;

#define NUM_STATES thread_state_done
#define ENDMSG "...."  /* a special string to mark the end of a message */

typedef struct {
   thread_state_t state;
   int tran;
   struct timeval init, called, sent, received, returned, done;
   int printed, done_printed;
} thread_descr_t;

typedef struct {
    int num;
    int errs;
    double RTtotal[2];
    int RTcount;
} tran_info_t;
/*
 * total_tran_count_t
 *
 * structure that holds the total count of transaction of each type
 * as well as the reposne times.
 *
 */
typedef struct {
    tran_info_t tran[MAX_TRAN_TYPE + 1];
    int errors;
```

```
    double time;   /* used for tools/tpcc_monitor.c */
} total_tran_count_t;

/* enc_status_t
 * structure that holds error information
 */
typedef struct {
    int status;
    int line;
    char file[268];
    unsigned long encinaError;
    char errorMsg[ENCINA_MAX_STATUS_STRING_SIZE];
} enc_status_t;

/*
 *  thread_info_t
 *
 *  per thread information kept by this module
 */
typedef struct {
    int thread_index;
    int thread_id;
    int initialized;
    tran_timing_t last_tran;
    int num_trans;
    int consecutive_errors;
    thread_descr_t descr;
    tran_info_t tran[MAX_TRAN_TYPE + 1];
    int done;
} thread_info_t;

int  time_diff_ms(struct timeval *t2, struct timeval *t1);

extern int debug;
#define DPRINT(args)  if (debug) err_printf args

extern MUTEX_T init_lock;
extern int info_list_len;
extern thread_info_t **info_list;  /*  List of all the thread info */

/*
 *  A global variable by which the process would like to
 *  identify itself in the prefix to output
 */
extern int user_id;

/*
 *  clientUtils_ReportReturn
 *                  Called when a transaction is returned in order to error codes
 */
extern void clientUtils_ReportReturn(char *msg, data_header *statusP);

#define CHECK_ENVIRON(str,var)  if (str == NULL) { fprintf(ERROUT, \
                                    "%s environment variable is not defined.\n",var);  }

char *clientUtils_TranCodeToName(int type);

#endif /*  TPCC_CLIENT_UTILS_H  */
```

databuf.h

```
/*
 *     databuf.h
 *
 * $Revision: 1.1 $
 * $Date: 1998/11/06 21:10:11 $
 * $Log:          databuf.h,v $
 * Revision 4.2  95/05/16  10:55:31  10:55:31  tpcc (TPCC Benchmark)
 * Added necessary RCS ident strings
 *
 * Revision 4.1  95/05/09  15:21:02  15:21:02  strue (Scott Truesdale)
 * New code from Transarc - initial version
 *
 * Revision 3.2  95/04/03  17:43:09  17:43:09  strue (Scott Truesdale)
 * Changes from Transarc - added sql error handling in client; cleaned up debug handling with macros; added
check on db paramters via call to server.
 *
 * Revision 3.1  95/04/03  15:10:30  15:10:30  strue (Scott Truesdale)
 * Base of rev 3 - shipped to transarc
 *
 *
 *
 *
 *  $TALog: databuf.h,v $
 * Revision 1.1  1998/11/06  21:10:11  dongfeng
 * - Move all files common to client and server to tpcc/common
 *   directory
 * [added by delta dongfeng-23677-TPCC-new-directory-structures, r1.1]
 *
 * Revision 1.3  1998/10/22  15:33:04  wenjian
 * Make changes to Encina server code to connect with SQL server and add
 * callsql.c and sql directory.
 *
 * Add ERR_BAD_ITEM_ID, which is returned by SLQnew and same as INVALID_NEWO
 * [from r1.2 by delta wenjian-23529-TPCC-integrate-with-SQL-server, r1.1]
 *
 * Revision 1.2  1998/01/23  15:07:47  oz
 * - Updated the SP TPCC directory to the latest files used
 *   during the SP tpcc audit.
 * [from r1.1 by delta oz-20774-TPCC-update-to-latest-SP-version-11-27, r1.1]
 *
 * Revision 1.1  1997/04/20  11:57:57  oz
 * - This is the code base modified at IBM Poughkeepsie
 *   by Ofer Zajicek and Radha Sivaramakrishnan for the
 *   SP scaling test for TPCC.
 * [added by delta oz-19782-TPCC-add-ibm-sp-code, r1.1]
 *
 * Revision 1.31  1995/10/30  19:10:54  oz
 * [merge of changes from 1.29 to 1.30 into 1.27]
 *
 * Revision 1.30  1995/10/27  15:41:30  oz
 * - Modified the tpc-c code to work with the new informix
 *   sql code that is in ex_trans.ec
 * [from r1.29 by delta oz-16761-TPCC-modify-code-to-work-with-oracle, r1.1]
 *
 * Revision 1.27  1995/10/20  18:44:30  ctipper
 * [merge of changes from 1.17 to 1.25 into 1.22]
 *
 * Revision 1.25  1995/10/20  18:15:34  ctipper
 * Incorporate changes per code review.
 *
 * - add DISTRIBUTED_TRAN_FAILED, TPCC_DB_INFO_PARTIAL, and
 * TPCC_DB_INFO_FAILED error codes to tpcc_rc_t
 * - got rid of MAX_NUM_SERVERS variables
 * [from r1.23 by delta ctipper-16547-TPCC-more-distributed-trans, r1.2]
 *
 * Revision 1.23  1995/10/13  17:00:26  ctipper
 * This delta encompasses all changes necessary to do distributed, XA
 * transactions with the TPCC benchmark. This includes the changes
 * necessary to build with Informix version 6.
 *
 * Each client still talks to only one server, however, if a distributed
 * transaction is necessary, the client sends the request to a different
 * interface of that server which then forwards all or part of the
 * request on to the appropriate remote server.
 *
 * - added new error codes to the tpcc_rc_t enumeration.
 * - defined MAX_NUM_SERVERS to be 10
 * [from r1.19 by delta ctipper-16547-TPCC-more-distributed-trans, r1.1]
 *
 * Revision 1.19  1995/09/20  21:02:39  oz
 * -Corrected code for the payment transaction
 * - The distributed case now no longer uses
 *   stored procedures
 * [from r1.18 by delta oz-16547-TPCC-add-distributed-transactions, r1.2]
 *
 * Revision 1.18  1995/09/20  17:51:10  oz
 * - Added distributed transactions for the new order and
 *   payment transaction
 *
 * - Added new error codes
 * [from r1.17 by delta oz-16547-TPCC-add-distributed-transactions, r1.1]
 *
 * Revision 1.22  1995/10/02  20:31:07  oz
 * - Corrected definition of ERROR()
 * [from r1.21 by delta oz-16638-tpcc-modify-terminal-for-RTE, r1.3]
 *
 * Revision 1.21  1995/10/02  18:51:45  oz
 * - Added definitions needed for utils.c and liberty.c
 * [from r1.20 by delta oz-16638-tpcc-modify-terminal-for-RTE, r1.2]
 *
 * Revision 1.20  1995/10/02  15:52:35  oz
 * - Modified the TPC-C benchmark to be compatible with the RTE.
 * - There are now 3 terminal processes:
 *     emulator: the old terminal process with a built in
 *                     simple emulator
 *     curses: An interactive terminal process using curses
 *     liberty: An interactive terminal process to be used with
 *                     the RTE compatible with the liberty freedom terminal.
 *
 * - Define TRUE and FALSE only if they are not already defined.
 *   (curses.h defines TRUE)
 * - Removed READ_TO_DATE and YEAR_TO_SECOND
 * - Added term_type_t
 * - Added
 *                 GOOD_INPUT (0)
 *                 WRONG_INPUT (10)
 * [from r1.17 by delta oz-16638-tpcc-modify-terminal-for-RTE, r1.1]
 *
 * Revision 1.17  1995/07/28  15:28:23  oz
 * - Added a -null and -no_marshalling option to TPCC
 *
 * - Added INVALID_TRAN_TYPE return code
 * [from r1.16 by delta oz-16070-TPCC-add-null-and-marshalling-test, r1.1]
 *
 * Revision 1.16  1995/07/18  17:02:38  oz
 * - Added a DCE_ERROR error code
 * [from r1.15 by delta oz-15938-TPCC-add-dce-only-client, r1.1]
 *
 * Revision 1.15  1995/05/22  19:50:48  shl
 * [merge of changes from 1.12 to 1.13 into 1.14]
 *
 * Revision 1.13  1995/05/18  15:11:27  oz
 * [from r1.12 by delta oz-15290-TPCC-incorporate-hp-drop-of-05-16-95, r1.1]
 *
 * Revision 1.14  1995/05/22  17:26:35  ctipper
 * [merge of changes from 1.5 to 1.9 into 1.11]
```

```
*
* [*** log entries omitted ***]
*
*/

#ifndef __TPCC_DATABUF_H__
#define __TPCC_DATABUF_H__

#define I_NAME_LEN      24
#define I_DATA          50
#define W_NAME_LEN      10
#define ADDR_LEN        20
#define STATE_LEN       2
#define ZIP_LEN         9
#define DIST_INFO_LEN   24
#define S_DATA_LEN      50
#define D_NAME_LEN      10
#define H_DATA_LEN      24
#define CARRIER_LEN     2
#define C_LAST_LEN          17
#define C_MID_LEN       2
#define PHONE_LEN       16
#define CREDIT_LEN      2
#define C_DATA_LEN      500
#define BC_DTA_LEN          23

#define YEAR_TO_DATE   1
#define YEAR_TO_SECOND 2

#define ERROR(x) fprintf(stderr,"Error: %s\n",#x),exit(11)

#define MAX_STR_LEN     255
#define MAX_OL                                  15

#ifndef TRUE
#define TRUE    1
#endif
#ifndef FALSE
#define FALSE   0
#endif

#define CANCEL                          -1

#define DATETIME_LEN    19

#define D_PER_W         10

#define COLLECTOR           1                                   /* ctipper 5/3/95 */

#define ERR_BAD_ITEM_ID  1  /* copied from sql/tpcc.h */
#define RPC_ERROR                               -2
#define SUCCESS_CODE                            0

#define CHAR_NULL       '\0'                    /* strue 1/23/95 */

typedef enum {
   liberty_term,
   curses_term,
   emulator_term
} term_type_t;

typedef enum {
   TPCC_SUCCESS = 0,
   GOOD_INPUT = 0,

   INVALID_NEWO = 100,
   SQL_ERROR = 2,
   TRPC_ERROR = 3,
   DCE_ERROR = 4,
   NO_SUCH_LAST_NAME = 5,
   INVALID_TRAN_TYPE = 6,
   INVALID_HANDLE = 7,

   WRONG_INPUT = 10,

   DISTRIBUTED_TRAN_FAILED = 15,

   TPCC_DB_INFO_PARTIAL = 20,
   TPCC_DB_INFO_FAILED,

   TPCC_ERROR_BEGIN_NEWO = 110,

   TPCC_ERROR_DECL_NEWO_SEL_ITEM,
   TPCC_ERROR_OPEN_NEWO_SEL_ITEM,
   TPCC_ERROR_OPEN_DIST_NEWO_SEL_ITEM,
   TPCC_ERROR_FETCH_NEWO_SEL_ITEM,
   TPCC_ERROR_FETCH_DIST_NEWO_SEL_ITEM,
   TPCC_ERROR_PREP_NEWO_SEL_STCK,
   TPCC_ERROR_DECL_NEWO_SEL_STCK,
   TPCC_ERROR_OPEN_NEWO_SEL_STCK,
   TPCC_ERROR_OPEN_DIST_NEWO_SEL_STCK,
   TPCC_ERROR_FETCH_NEWO_SEL_STCK,
   TPCC_ERROR_FETCH_DIST_NEWO_SEL_STCK,
   TPCC_ERROR_NEWO_SELECT,
   TPCC_ERROR_NEWO_UPD_STCK,
   TPCC_ERROR_DIST_NEWO_UPD_STCK,
   TPCC_ERROR_NEWO_SELECT_2,
   TPCC_ERROR_DECL_NEWO_SEL_CUST,
   TPCC_ERROR_OPEN_NEWO_SEL_CUST,
   TPCC_ERROR_OPEN_DIST_NEWO_SEL_CUST,
   TPCC_ERROR_FETCH_NEWO_SEL_CUST,
   TPCC_ERROR_FETCH_DIST_NEWO_SEL_CUST,
   TPCC_ERROR_DECL_NEWO_SEL_DIST,
   TPCC_ERROR_OPEN_NEWO_SEL_DIST,
   TPCC_ERROR_OPEN_DIST_NEWO_SEL_DIST,
   TPCC_ERROR_FETCH_NEWO_SEL_DIST,
   TPCC_ERROR_FETCH_DIST_NEWO_SEL_DIST,
   TPCC_ERROR_PREP_NEWO_INS_OL,
   TPCC_ERROR_DECL_NEWO_INS_OL,
   TPCC_ERROR_OPEN_NEWO_INS_OL,
   TPCC_ERROR_OPEN_DIST_NEWO_INS_OL,
   TPCC_ERROR_PUT_NEWO_INS_OL,
   TPCC_ERROR_PUT_DIST_NEWO_INS_OL,
   TPCC_ERROR_DECL_NEWO_SEL_WARE,
   TPCC_ERROR_OPEN_NEWO_SEL_WARE,
   TPCC_ERROR_OPEN_DIST_NEWO_SEL_WARE,
   TPCC_ERROR_FETCH_NEWO_SEL_WARE,
   TPCC_ERROR_FETCH_DIST_NEWO_SEL_WARE,
   TPCC_ERROR_EXECUTE_NEWO_UPD_INS,
   TPCC_ERROR_UPDATE_NEWO_NEXT_OID,
   TPCC_ERROR_PREP_NEWO_INS,
   TPCC_ERROR_EXECUTE_DIST_NEWO_INS,
   TPCC_ERROR_EXECUTE_NEWO_COMMIT,
   TPCC_ERROR_ROLLBACK_NEWO,
   TPCC_ERROR_REMOTE_OL_SELECT,
   TPCC_ERROR_REMOTE_OL_UPDATE,

   TPCC_ERROR_OPEN_ORDS_CNT_CID = 200,
   TPCC_ERROR_FETCH_ORDS_CNT_CID,
   TPCC_ERROR_OPEN_ORDS_SEL_CLAST,
   TPCC_ERROR_FETCH_ORDS_SEL_CLAST,
   TPCC_ERROR_OPEN_ORDS_SEL_CID,
   TPCC_ERROR_FETCH_ORDS_SEL_CID,
   TPCC_ERROR_OPEN_ORDS_SEL_OLDORD,
   TPCC_ERROR_FETCH_ORDS_OLDORD,
   TPCC_ERROR_OPEN_ORDS_SEL_OL,
   TPCC_ERROR_FETCH_ORDS_SEL_OL,
   TPCC_ERROR_EXECUTE_ORDS_COMMIT,

   TPCC_ERROR_OPEN_DELIVERY_OLDEST_OID = 300,
   TPCC_ERROR_FETCH_DELIVERY_OLDEST_OID,
   TPCC_ERROR_EXECUTE_DELIVERY_COMMIT,
   TPCC_ERROR_OPEN_DELIVERY_SEL_ORD,
   TPCC_ERROR_FETCH_DELIVERY_SEL_ORD,
   TPCC_ERROR_OPEN_DELIVERY_SEL_SUM_OL,
   TPCC_ERROR_FETCH_DELIVERY_SEL_SUM_OL,
   TPCC_ERROR_EXECUTE_DELIVERY_EXEC_DVRY,
   TPCC_ERROR_SELECT_DELIVERY_ORDER_ID,
   TPCC_ERROR_SELECT_DELIVERY_CARRIER_ID,
   TPCC_ERROR_SELECT_DELIVERY_BALANCE,

   TPCC_ERROR_OPEN_STOCKLEVEL_SEL_OID = 400,
   TPCC_ERROR_FETCH_STOCKLEVEL_SEL_OID,
   TPCC_ERROR_OPEN_STOCKLEVEL_CNT_SID,
   TPCC_ERROR_FETCH_STOCKLEVEL_CNT_SID,
   TPCC_ERROR_OPEN_STOCKLEVEL_FIND,
   TPCC_ERROR_FETCH_STOCKLEVEL_FIND,
   TPCC_ERROR_EXECUTE_STOCKLEVEL_COMMIT,

   TPCC_ERROR_OPEN_PAYMENT_CNT_CID = 500,
   TPCC_ERROR_FETCH_PAYMENT_CNT_CID,
   TPCC_ERROR_OPEN_PAYMENT_SEL_CLAST,
   TPCC_ERROR_FETCH_PAYMENT_SEL_CLAST,
   TPCC_ERROR_OPEN_PAYMENT_SEL_CID,
   TPCC_ERROR_FETCH_PAYMENT_SEL_CID,
   TPCC_ERROR_DECL_PAYMENT_SEL_DIST,
   TPCC_ERROR_OPEN_PAYMENT_SEL_DIST,
   TPCC_ERROR_OPEN_DIST_PAYMENT_SEL_DIST,
   TPCC_ERROR_FETCH_PAYMENT_SEL_DIST,
   TPCC_ERROR_FETCH_DIST_PAYMENT_SEL_DIST,
   TPCC_ERROR_DECL_PAYMENT_SEL_WARE,
   TPCC_ERROR_OPEN_PAYMENT_SEL_WARE,
   TPCC_ERROR_OPEN_DIST_PAYMENT_SEL_WARE,
   TPCC_ERROR_FETCH_PAYMENT_SEL_WARE,
   TPCC_ERROR_FETCH_DIST_PAYMENT_SEL_WARE,
   TPCC_ERROR_EXECUTE_PAYMENT_UPD_CUST_LAST,
   TPCC_ERROR_EXECUTE_PAYMENT_UPD_CUST_ID,
   TPCC_ERROR_COMMIT_PAYMENT_UPD_CUST,
   TPCC_ERROR_SELECT_PAYMENT_W_YTD,
   TPCC_ERROR_SELECT_PAYMENT_D_YTD,
   TPCC_ERROR_BEGIN_PAYMENT,
   TPCC_ERROR_EXECUTE_PAYMENT_COMMIT,
   TPCC_ERROR_PAYMENT_UPD_CUST_BY_NAME,
   TPCC_ERROR_PAYMENT_UPD_CUST_BY_ID,
   TPCC_ERROR_PAYMENT_UPDATE_DIST,
   TPCC_ERROR_PAYMENT_UPDATE_WH,
   TPCC_ERROR_PAYMENT_INSERT_HISTORY,
   TPCC_ERROR_EXECUTE_PAYMENT_WH_DIST

} tpcc_rc_t;

typedef enum {
   TPCC_DEADLOCK_MSG = 10,
   TPCC_RETRY_MSG
} tpcc_msg_t;

#endif /* __TPCC_DATABUF_H__ */
```

debug.c

```
#include <stdio.h>
#include <string.h>
#include <stdarg.h>
#include <sys/stat.h>
#include <errno.h>
#include <math.h>
#include <time.h>
#include <fcntl.h>
#include <unistd.h>
#ifdef WIN32
#include <process.h>
#else
#include <termio.h>
#endif

int print_thread_id = 0;
int user_id = 1;
char *user_code = "C";

int get_thread_id()
{
   return(0);
}

/*
 *  get_prefix
 *                  Format the output prefix for printing:
 *                  It contains the user_id, 'C' or 'T' depending on whether it
 *                  is a terminal or a client and optional a thread identifier
 *                  The prefix is written in the buffer passed in by the caller.
 */
void get_prefix(buffer)
 char *buffer;
{
   if (print_thread_id) {
                  int thread_id = get_thread_id();
                  sprintf(buffer,  "%s(%d-%s-%d)%s",
                                 user_id < 10 ? "  " : user_id < 100 ? " " : "",
                                 user_id,
                                 user_code,
                                 thread_id,
                                 thread_id < 10 ? " " : "");
   } else {
                  sprintf(buffer,  "%s(%2d-%s)",
                                 user_id < 10 ? " " : "", user_id, user_code);
   }
}


/*
 * err_printf
 *                  A var-arg function that appends the current time and
 *                  other data to the print request and sends it to stderr
 */
void err_printf(char *format, ...)
{
   static int initialized = 0;
   static FILE *debug_f = NULL;
   time_t cur_timet;
   char time_str[30];
   char line_prefix[50];
   va_list ap;

   va_start(ap, format);

   if (!initialized) {
                  char fileName[45];
                  initialized = 1;
                  sprintf(fileName, "DebugFile.%d", getpid());
                  debug_f = fopen(fileName, "w");
   }

   cur_timet = time(&cur_timet);
   strftime(time_str, 29, "%X", localtime(&cur_timet));

   get_prefix(line_prefix);

   if (debug_f) {
                  fprintf(debug_f, "%s %s - ", line_prefix, time_str);
                  vfprintf(debug_f, format, ap);
                  fflush(debug_f);
   }

   va_end(ap);
}

void set_client_debug_state(void *contextP, int state, int tran)
{
}
```

delivery.tacf

```
/*
 * Copyright (C) 1991, 1990 Transarc Corporation
 * All Rights Reserved
 */
/*
 *  neworder.tacf -- attribute configuration file for tpcc server.
 * used for transparent binding
 *
 * $Revision: 1.1 $
 * $Date: 1998/11/06 21:10:11 $
 * $Log:          tpcc.tacf,v $
 *
 * $TALog: delivery.tacf,v $
 * Revision 1.1  1998/11/06  21:10:11  dongfeng
 * - Move all files common to client and server to tpcc/common
 *   directory
 * [added by delta dongfeng-23677-TPCC-new-directory-structures, r1.1]
 *
 * Revision 1.1  1997/04/20  11:57:57  oz
 * - This is the code base modified at IBM Poughkeepsie
 *   by Ofer Zajicek and Radha Sivaramakrishnan for the
 *   SP scaling test for TPCC.
 * [added by delta oz-19782-TPCC-add-ibm-sp-code, r1.1]
 *
 * Revision 1.3  1996/01/12  16:06:44  oz
 * - Added transaction specific servers:  there are 5 different interfacese
 *   one for each transaction type.
 * [added by delta oz-16955-TPCC-add-transaction-specific-servers, r1.1]
 *
 */

[implicit_handle (mon_handle_t handle)]
interface delivery
{
}
```

delivery.tidl

```
/*
 * id: $id: $
 *
 * component_name: encina benchmarks
 *
 * the following functions list may not be complete.
 * functions defined by/via macros may not be included.
 *
 * functions:
 *    <fill_me_in>
 *
 * origins: transarc corp.
 *
 * (c) copyright transarc corp. 1995, 1993
 * all rights reserved
 * licensed materials - property of transarc
 *
 * us government users restricted rights - use, duplication or
 * disclosure restricted by gsa adp schedule contract with transarc corp
 */
/*
 * history
 * $talog: $
 */

/*
 * delivery.tidl -- interface definition file for tpccserver.
 *
 * $revision: 1.11 $
 * $date: 1995/10/20 21:55:05 $
 * $log:          tpcc.tidl,v $
 */

[uuid(d714d8f8-2105-11cf-830f-0800093b9834), version(1.0)]

interface delivery
{
import "tpm/mon/mon_handle.idl";
import "tpcc_type.idl";

[nontransactional] void
                  impTPCCDelivery([in,out] delivery_data_t *dataP,
                                                [out] trpc_status_t  * trpcStatus);

}
```

do_tpcc.c

```
/*
 *      do_tpcc.c
 *
 * $Revision: 1.12 $
 * $Date: 1999/05/06 21:28:26 $
 * $Log:          do_tpcc.c,v $
 *
 * $TALog: do_tpcc.c,v $
 * Revision 1.12  1999/05/06  21:28:26  oz
 * - Removed all the .. from the includes
 * - Added -I.. to the makefiles instead
 * - Moved all the thread related code and connection
 *   selection to serverMon.c
 * [from r1.8 by delta oz-24309-TPCC-add-oracle8.1-code, r1.5]
```

```
*
* Revision 1.8  1999/01/29  20:16:32  wenjian
* Call init_encina_client since client_init has been renamed to
* init_encina_client
* [from r1.7 by delta wenjian-23787-TPCC-integrate-code-for-AIX-and-NT, r1.7]
*
* Revision 1.7  1998/12/09  14:44:53  wenjian
* Add a call to client_init() in main
* [from r1.6 by delta wenjian-23787-TPCC-integrate-code-for-AIX-and-NT, r1.3]
*
* Revision 1.6  1998/11/09  16:59:37  wenjian
* In this revision, most of the changes are related to the directory of header
* files after directory reorganization. Other changes include adding or removing
* files to put them in the right directories. Makefiles are written for NT
* platform so that nmake is working on NT now. Need a top level Makefile for all
* the directories.
* [from r1.5 by delta wenjian-23677-TPCC-reorganize-directory-structure, r1.2]
*
* Revision 1.5  1998/11/09  14:48:15  wenjian
* In an effort to make a new directory structure for TPCC, this delta
* creates two directories: tpcc/client and tpcc/server. All the files
* for this revision are copied from tpcc/sp-tpcc without any change.
* Further change may be needed for some files due to the change of
* the directory structure.
* [added by delta wenjian-23677-TPCC-reorganize-directory-structure, r1.1]
*
* Revision 1.15  1998/02/17  22:07:01  wenjian
* Define macros to deal with the different function names on NT
* [from r1.14 by delta wenjian-21750-TPCC-changes-for-porting-on-NT, r1.1]
*
* Revision 1.14  1998/01/26  20:37:34  oz
* - Remove all the code associated with explicit binding
*
* - Removed bindingType
* - Removed client_first_wh and client_last_wh
* - Removed command line args: binding, offset, ware
* [from r1.13 by delta oz-21697-TPCC-remove-explicit-binding-code, r1.1]
*
* Revision 1.13  1998/01/26  15:33:31  oz
* - Changed default binding to transparent
* [from r1.12 by delta oz-21671-TPCC-merge-online-transaction-interfaces, r1.2]
*
* Revision 1.12  1998/01/24  14:17:05  oz
* - User server name to identify server and name delivery file
* - Use env variable HOME instead of /home/encina if HOME is set
* [from r1.11 by delta oz-21687-TPCC-use-server-name-to-identify-process, r1.1]
*
* Revision 1.11  1998/01/23  15:07:48  oz
* - Updated the SP TPCC directory to the latest files used
*   during the SP tpcc audit.
* [from r1.10 by delta oz-20774-TPCC-update-to-latest-SP-version-11-27, r1.1]
*
* Revision 1.8  1997/08/04  19:50:41  oz
* [from r1.7 by delta oz-20506-TPCC-convert-to-new-format-of-connection-manager, r1.2]
*
*
*
*/
/*=========================================================================
* do_tpcc.c
*
*
*  This is the main client program for the TPCC benchmark using Encina.
*
*  The client program is multi-threaded: there is one thread for each
*  terminal and one thread to process incoming connections.
*
*  When the client starts up it starts a listening thread.  That thread
*  calls the encina function cnm_ManageConnections and provides it a
*  port number.  The client spawns a thread (through cnm_ManageConnections)
*  for each terminal that connects to it.  That thread receives the input
*  from the terminal and translates it to a transaction data structure
*  (such as payment_data_t or newOrder_data_t).  The terminal thread
*  (in the client) then sends an RPC over to the server to process the request.
*


            ______________________________
            |        Client          |
            |        Process         |              ----------
------   RPC  |                      |  socket      | Terminal |
     |<------|-------------------Terminal-----~~~~~~-------|         |
     |      |                Thread   |              ----------
Server|      |                       |
     |      |                       |              ----------
     |  RPC  |                      |  socket      | Terminal |
------ <------|-------------------Terminal-----~~~~~~--------|         |
            |                Thread   |              ----------
            |                       |
            |______________________________|


*
*
*=========================================================================
*/



#include <stdio.h>
#include <string.h>
#include <stdarg.h>
#include <sys/stat.h>
#include <errno.h>
#include <math.h>
#include <time.h>
#include <fcntl.h>
#ifndef WIN32
#include <termio.h>
#endif
#include <unistd.h>
#include <sys/ipc.h>
#include <tpm/mon/mon_client.h>
#include <tc/tc.h>
#include <dce/rpc.h>

#if defined (solaris)
#include <dce/pthread.h>
#else   /* solaris */
#include <pthread.h>
#endif

#include "common/tpcc_type.h"
#include "common/utilities.h"
#include "client_utils.h"
#include "common/do_tpcc.h"
#include "client_listen.h"
#include "client.h"

extern char *sys_errlist[];  /*  Translations of errno file errors */

#ifdef WIN32
#define STRCMP _stricmp
#else
#define STRCMP strcasecmp
#endif

/*
 *  ENTERING
 *                 A macro that is called before processing a TPCC transaction.
 *                 If debug mode is enabled it prints a message containing the name
 *                 of the transaction being executed.
 */
#define ENTERING(msg) if (debug) err_printf("Entering %s\n", msg)

#define MAX_CONSECUTIVE_ERRS 3000
/*
 *  RETURNED
 *                 A macro that is called after a transaction has been processed.
 *                 If the transaction failed it reports an error.
 *                 In debug mode it also emits a message indicating the processing
 *                 has been completed.
 */
#define RETURNED(msg, hdrP)                              \
{                                                        \
  if (((hdrP)->returncode == TPCC_SUCCESS) ||            \
      ((hdrP)->returncode == INVALID_NEWO)) {            \
    consecutiveErrors = 0;                               \
  } else {                                               \
    consecutiveErrors++;                                 \
  }                                                      \
  if (debug ||                                           \
      (((hdrP)->returncode != SUCCESS_CODE) &&           \
       ((hdrP)->returncode != INVALID_NEWO))) {          \
    clientUtils_ReportReturn(msg, hdrP);                 \
    if (consecutiveErrors > MAX_CONSECUTIVE_ERRS) {      \
      err_printf("Too many consecutive errors (%d)\n",   \
                              consecutiveErrors);        \
      exit_program(1);                                   \
    }                                                    \
  }                                                      \
}


int                            useSecurity = FALSE;
int                            null_test = 0;
int                            client_lock_handles = 0;

/* The following are global to the client */
char *LOG_FILE_DIR = "runs/threads";
int              user_id;
int              user_port = 4011;
char    *user_code = "C";       /*  Prefix for output to identify this
                                                                 *  process as a client or a terminal
                                                                 */
int              consecutiveErrors = 0;
char    *result_dir;

int debug = 0;
char log_file_name[100];
int logtrans = 0;
FILE *logtpcc = NULL;

static void check_parms(int argc, char *argv[]);
static void print_header(int argc, char *argv[]);


/*=====================================================*/

main(argc, argv)
```

```
int argc;
char *argv[];
{
   check_parms(argc,argv);  /*  Read and parse the command line parameters */

   err_printf("Client %d starting.\n", user_id);

   init_encina_client(user_id);
   enroll_client(user_id);  /* enroll as a client */

   /*
    *  Open log file
    */
   logtpcc = fopen(log_file_name, "w");
   print_header(argc, argv);   /** Print a test header to the logfile  **/

   /*
    *    Start the listening thread:
    *    This call will not return
    */
   make_connections((void *)user_port);

   exit_program( 0 );
   return (0);                      /* to statisfy lint */

}      /***************       end of main     *************/

/*=========================================================*/

/*
 * User must supply user_id as a parm and all other parameters
 * as environment variables.
 */

/*-----------------------------------------------------------------
 *       Check Parameters
 *  Check the parameters passed in.
 *
 *  Not all the parameters are relevant for this executable.
 *  This code is shared between the regular Encina Monitor
 *  based TPC-C client and other test clients that do not
 *  use the Encina Monitor.  The type of this executable is
 *  in client_type and is set to mon_client for the TPCC
 *  Monitor based client (the audited client).
 *-----------------------------------------------------------------
 */
static void check_parms (argc,argv)
  int argc;
  char *argv[];

{
   char *host_name = getenv("HOST");
   char *home_dir = getenv("HOME");
   int              next_arg = 1;
   int errors = 0;
   char             *progName;
   int print_help = 0;

   user_id = -1;
   result_dir = ".";

   while (next_arg < argc) {
                  if (!STRCMP("-debug", argv[next_arg])) {
                     /*  Enable debug mode (for testing)  */
                     debug = 1;
                  } else if (!STRCMP("-dir", argv[next_arg])) {
                     /*  The directory for the client output  */
                     result_dir = argv[++next_arg];
                  } else if (!STRCMP("-log", argv[next_arg])) {
                     /*  A less intrusive form of debug mode  */
                     logtrans = 1;
                  } else if (!STRCMP("-id", argv[next_arg])) {
                     /*  The id of this client  */
                     user_id = atol(argv[++next_arg]);
                  } else if (!STRCMP("-port", argv[next_arg])) {
                     /*  The id of this client  */
                     user_port = atol(argv[++next_arg]);
                     if (user_id < 0) user_id = user_port;
                  } else if (!STRCMP("-security", argv[next_arg])) {
                     /*  Enable security between the client and the server.
                      *  This is enabled by default
                      */
                     useSecurity = TRUE;
                  } else if (!STRCMP("-noSecurity", argv[next_arg])) {
                     /*  Disable security between the client and the server.
                      *  This is enabled by default
                      */
                     useSecurity = FALSE;
                  } else if (!STRCMP("-null", argv[next_arg])) {
                     /*  For testing: do not access the data in the DB  */
                     logprintf("Performing NULL test\n");
                     null_test = 1;
                  } else if (!STRCMP("-lock", argv[next_arg])) {
                     logprintf("Locking longterm handles\n");
                     client_lock_handles = atol(argv[++next_arg]);
                  } else {
                     printf("invalid parameter: %s\n", argv[next_arg]);
                     print_help = 1;
                     break;
                  }
               next_arg++;
   }

   if (user_id < 0) {
     printf("  Missing User Id\n");
     print_help = 1;
   }

   if (print_help) {
                  progName = strrchr(argv[0], '/');
                  progName = (progName ? progName + 1 : argv[0]);

                  printf("\nusage:\n You can specify the following in any order\n");
                  printf(" You must specify the Id\n");

                  printf("   -id <num>      The user ID for this client\n");
                  printf("   -dir <dir>     Directory for output (default \".\")\n");
                  printf("   -debug         enable debugging\n");
                  printf("   -log           log all activity to a file\n");
                  printf("   -security      enable secure communications between the client and PA\n");
                  printf("   -null          NULL test: the server immediately returns\n");

                  exit(-1);
   }

   sprintf(log_file_name, "%s/%s/C.%s.%d",
                     home_dir ? home_dir : "/home/encina",
                     LOG_FILE_DIR,
                     host_name ? host_name : "host", user_id);
}

/*
 *  print_header:
 *                Print some feedback to the user on the client configuration
 */
static void print_header(int argc, char *argv[])
{
   int i;
   if (!logtpcc)
                  return;

   logprintf("Client %d starting a %s test.\n",
                     user_id,
                     null_test ? "NULL" : "DB");

   logprintf("Params: ");

   for (i=0; i<argc; i++) {
                  fprintf(logtpcc, "%s ", argv[i]);
   }
   fprintf(logtpcc, "\n");
   fflush(logtpcc);
}
```

do_tpcc.h

```
/*
 * do_tpcc.h
 *
 *  $Revision: 1.1 $
 *  $Date: 1998/11/09 16:00:05 $
 *  $Log:         do_tpcc.h,v $
 *
 *  $TALog: do_tpcc.h,v $
 * Revision 1.1  1998/11/09  16:00:05  dongfeng
 * Move do_tpcc.h to common directory
 * [added by delta dongfeng-23677-TPCC-new-directory-structures, r1.4]
 *
 * Revision 1.7  1998/01/23  15:07:49  oz
 * - Updated the SP TPCC directory to the latest files used
 *   during the SP tpcc audit.
 * [from r1.6 by delta oz-20774-TPCC-update-to-latest-SP-version-11-27, r1.1]
 *
 *
 */

#ifndef _DO_TPCC_H_INCLUDED_
#define _DO_TPCC_H_INCLUDED_

#include <dce/rpc.h>
#include <trpc/trpc.h>
#include "databuf.h"

#define WRONG_INPUT      0
#define NEW_ORDER        1
#define PAYMENT                          2
#define ORDER_STATUS     3
#define DELIVERY         4
#define STOCK_LEVEL      5
#define QUIT             9
#define MIN_OL                           5
#define MAX_FLDS       200     /* Maximum fields in a TPC-C form */

#define THRESHOLD_LEN   2

#define ON               1
#define OFF              0
```

```
#define YES    1
#define NO     0

#define INSIZE  1024

#define DO_ROLLBACK     1
#define DONT_ROLLBACK   0

/**  The response time requirements for the transactions in seconds.
 **  90% of the transactions are required to have a response time less
 **  than or equal to the value below.
 **/
#define NEWORD_90RT      5
#define PAYMENT_90RT     5
#define ORDSTAT_90RT     5
#define DELIVERY_90RT    5  /* 5 for interactive or 80 for background */
#define STOCKLEV_90RT   20

/*
 *  What type of client is this?
 */
typedef enum {
   tk_client,
   dce_client,
   mon_client,
   db_client
} client_type_t;

extern client_type_t client_type;

typedef enum {
   transparent, explicit, longTerm, noReservation
} binding_t;

/* Handle from client to PA is now described using both the paHandle
and the mondHandle. */

#define NUM_TRANS        5
#define NEWO_ERR         6
#define PAYMENT_ERR      7
#define ORD_STAT_ERR     8
#define DELIVERY_ERR     9
#define STOCK_ERR       10
#define NEWO_ROLLBACK   11
#define END_OF_WINDOW  0xff
#define BEGIN_WINDOW   0xaa
#ifndef SHORT_WAITS
#define NEWO_MEAN_THINK_TIME                 122
#define PAYMENT_MEAN_THINK_TIME              122
#define ORDER_STAT_MEAN_THINK_TIME           102
#define DELIVERY_MEAN_THINK_TIME              51
#define STOCK_MEAN_THINK_TIME                 51
#define NEWO_MIN_KEY_TIME                    185
#define PAYMENT_MIN_KEY_TIME                  31
#define ORDER_STAT_MIN_KEY_TIME               21
#define DELIVERY_MIN_KEY_TIME                 21
#define STOCK_MIN_KEY_TIME                    21
#else
#define NEWO_MEAN_THINK_TIME                  61
#define PAYMENT_MEAN_THINK_TIME               61
#define ORDER_STAT_MEAN_THINK_TIME            51
#define DELIVERY_MEAN_THINK_TIME              26
#define STOCK_MEAN_THINK_TIME                 26
#define NEWO_MIN_KEY_TIME                     93
#define PAYMENT_MIN_KEY_TIME                  16
#define ORDER_STAT_MIN_KEY_TIME               11
#define DELIVERY_MIN_KEY_TIME                 11
#define STOCK_MIN_KEY_TIME                    11
#endif


#endif /* _DO_TPCC_H_INCLUDED_ */
```

encina.C

```
/* (C)1997 IBM Corporation */
/*****************************************************************/
/*
*/
/*                  File: tuxclient.h                            */
/*
*/
/*****************************************************************/

#include <stdlib.h>
#include "inout.h"
#include "encina.h"

extern "C" {
}

extern "C" send_new_order(void *contextP, NewOrder_data *dataP);
extern "C" send_payment(void *contextP, Payment_data *dataP);
extern "C" send_stock_level(void *contextP, StockLevel_data *dataP);
extern "C" send_order_status(void *contextP, OrderStatus_data *dataP);
extern "C" send_delivery(void *contextP, Delivery_data *dataP);

void Encina::cleanup() {
}

Encina::Encina() {
   return;
}

Encina::~Encina() {
   return;
}

int Encina::tran (NewOrder_data *dataP, void *contextP, char *servname) {
   send_new_order(contextP, dataP);
   return 0;
}


int Encina::tran (Payment_data *dataP, void *contextP, char *servname) {
   send_payment(contextP, dataP);
   return 0;
}


int Encina::tran (OrderStatus_data *dataP, void *contextP, char *servname) {
   send_order_status(contextP, dataP);
   return 0;
}


int Encina::tran (StockLevel_data *dataP, void *contextP, char *servname) {
   send_stock_level(contextP, dataP);
   return 0;
}

int Encina::tran (Delivery_data *dataP, void *contextP, char *servname) {
   send_delivery(contextP, dataP);
   return 0;
}

int Encina::tran (char *servname) {
   return -1;
}

int Encina::atran (char *servname) {

   return 0;
}
```

encina.h

```
/* (C)1997 IBM Corporation */
/*****************************************************************/
/*
*/
/*                  File: tuxclient.h                            */
/*
*/
/*****************************************************************/

#ifndef ENCINA_H
#define ENCINA_H

const int TMINBUFSIZE = 1536;

class Encina {
public:
   static void cleanup();
   int tran(char *servname);
   int tran(NewOrder_data *dataP, void *contextP, char *servname);
   int tran(Payment_data *dataP, void *contextP, char *servname);
   int tran(StockLevel_data *dataP, void *contextP, char *servname);
   int tran(OrderStatus_data *dataP, void *contextP, char *servname);
   int tran(Delivery_data *dataP, void *contextP, char *servname);
   int atran(char *servname);
   Encina();
   ~Encina();
};

extern Encina encina;

#endif
```

encina_client.c

```
/*
 *                  encina_client.c
 *
 * $Revision: 1.7 $
 * $Date: 1999/05/06 21:28:26 $
 * $Log:              $
 *
 *
 * $TALog: encina_client.c,v $
 * Revision 1.7  1999/05/06  21:28:26  oz
 * - Removed all the .. from the includes
 * - Added -I.. to the makefiles instead
```

```
* - Moved all the thread related code and connection
*   selection to serverMon.c
* [from r1.6 by delta oz-24309-TPCC-add-oracle8.1-code, r1.5]
*
* Revision 1.6  1998/11/09  16:59:37  wenjian
* In this revision, most of the changes are related to the directory of header
* files after directory reorganization. Other changes include adding or removing
* files to put them in the right directories. Makefiles are written for NT
* platform so that nmake is working on NT now. Need a top level Makefile for all
* the directories.
* [from r1.5 by delta wenjian-23677-TPCC-reorganize-directory-structure, r1.2]
*
* Revision 1.5  1998/11/09  14:48:16  wenjian
* In an effort to make a new directory structure for TPCC, this delta
* creates two directories: tpcc/client and tpcc/server. All the files
* for this revision are copied from tpcc/sp-tpcc without any change.
* Further change may be needed for some files due to the change of
* the directory structure.
* [added by delta wenjian-23677-TPCC-reorganize-directory-structure, r1.1]
*
* Revision 1.5  1998/01/23  15:07:51  oz
* - Updated the SP TPCC directory to the latest files used
*   during the SP tpcc audit.
* [from r1.4 by delta oz-20774-TPCC-update-to-latest-SP-version-11-27, r1.1]
*
*
*
*/

/*
 *  encina_client.c
 *
 *                  The Encina related code in the client that is common to both
 *                  the monitor client and the toolkit client.
 *
 */

#include <stdio.h>
#include <string.h>
#include <stdarg.h>
#include <trpc/trpc.h>
#include <encina/encina.h>
#include "common/utilities.h"
#include "client_utils.h"
#include "encina_client.h"


static trpc_handle_t bind_to_server(char *name);

/*
 *  encina_error_message
 *
 *  Report an encina error message by interpreting it and writing
 *  it to both the logfile (if any) and to standard error
 */
void encina_error_message(msg, n)
 char *msg;
 unsigned long n;
{
   char errorMsg[ENCINA_MAX_STATUS_STRING_SIZE];
   encina_StatusToString(n, ENCINA_MAX_STATUS_STRING_SIZE, errorMsg);
   err_printf("ERROR: %s.  Error code = %s (%d 0x%x) \n", msg, errorMsg, n, n);
}

/*
 *  encina_error
 *
 *  This is called for FATAL errors.  It reports the error and exits.
 */
void encina_error(funcName, n)
 char *funcName;
 unsigned long n;
{
   char msg[128];
   sprintf("%s failed", funcName);
   encina_error_message(msg, n);
   exit_program(1);
}

/*
 *   secure_handle
 *
 *                  Secure a handle to an encina server.
 *                  This can be called with either a PA handle or with
 *                  a trpc handle to a toolkit server.
 */
void secure_handle(trpc_handle_t handle, int use_security)
{
   rpc_binding_handle_t       rpcHandle;
   unsigned long              status = 0;
   unsigned char              *serverPrincipal;

   ENCINA_CALL("trpc_GetRpcHandleFromBinding",
            trpc_GetRpcHandleFromBinding(handle,&rpcHandle));

   rpc_mgmt_inq_server_princ_name(rpcHandle, rpc_c_authn_default,
                           &serverPrincipal, &status);

   if (use_security) {
                  DPRINT(("rpc_binding_set_auth_info -> principal %s, protect %d, authn %d authz %d\n",
                              serverPrincipal, rpc_c_protect_level_connect,
                              rpc_c_authn_default, rpc_c_authz_dce));

                  rpc_binding_set_auth_info(rpcHandle, serverPrincipal,
                                                      rpc_c_protect_level_connect,
                                                      rpc_c_authn_default,
                                                      NULL,
                                                      rpc_c_authz_dce,
                                                      &status);
   } else {
                  DPRINT(("rpc_binding_set_auth_info -> principal %s, protect %d, authn %d authz %d\n",
                              serverPrincipal, rpc_c_protect_level_none,
                              rpc_c_authn_default, rpc_c_authz_dce));

                  rpc_binding_set_auth_info(rpcHandle, serverPrincipal,
                                                      rpc_c_protect_level_none,
                                                      rpc_c_authn_default,
                                                      NULL,
                                                      rpc_c_authz_dce,
                                                      &status);
   }


   if (status != rpc_s_ok) {
      switch (status) {
         case rpc_s_invalid_binding :
            printf("rpc binding invalid ****** \n");
            break;
         case rpc_s_wrong_kind_of_binding :
            printf("rpc binding is the wrong kind \n");
            break;
         case rpc_s_unknown_authn_service :
            printf("rpc authn service unknown \n");
            break;
      } /* switch */
      bde_Exit(1);
   }
}
```

encina_client.h

```
/*
 *                  encina_client.h
 *
 * $Revision: 1.5 $
 * $Date: 1998/11/09 14:48:16 $
 * $Log:            $
 *
 *
 * $TALog: encina_client.h,v $
 * Revision 1.5  1998/11/09  14:48:16  wenjian
 * In an effort to make a new directory structure for TPCC, this delta
 * creates two directories: tpcc/client and tpcc/server. All the files
 * for this revision are copied from tpcc/sp-tpcc without any change.
 * Further change may be needed for some files due to the change of
 * the directory structure.
 * [added by delta wenjian-23677-TPCC-reorganize-directory-structure, r1.1]
 *
 * Revision 1.5  1998/01/23  15:07:52  oz
 * - Updated the SP TPCC directory to the latest files used
 *   during the SP tpcc audit.
 * [from r1.4 by delta oz-20774-TPCC-update-to-latest-SP-version-11-27, r1.1]
 *
 *
 *    Declarations common to monitor version and toolkit version
 *
 */

#ifndef ENCINA_CLIENT_H
#define ENCINA_CLIENT_H

#include <trpc/trpc.h>

void encina_error_message(char *msg, unsigned long n);
void encina_error(char *funcName, unsigned long n);
void secure_handle(trpc_handle_t handle, int use_security);


#endif  /*  ENCINA_CLIENT_H  */
```

field.C

```
/* (C)1997 IBM Corporation */
#include <stdio.h>
#include "field.h"
#include "inout.h"
#include "format.h"
#if 0
#if USE_ALLOCA
#include <alloca.h>
#endif
#endif

extern char const * const blanks;
```

```
extern char const * const underscores;
extern char const * const backspaces;
extern int position(InOut *ioP, int x, int y);

Field *genfield(InOut *ioP, int x, int y, int len, int *ptr) {
   return new IntField(ioP, x, y, len, ptr);
}
Field *genfield(InOut *ioP, int x, int y, int len, short *ptr) {
   return new ShortField(ioP, x, y, len, ptr);
}
Field *genfield(InOut *ioP, int x, int y, int len, long *ptr) {
   return new LongField(ioP, x, y, len, ptr);
}
Field *genfield(InOut *ioP, int x, int y, int len, char *ptr) {
   return new TextField(ioP, x, y, len, ptr);
}
Field *genfield(InOut *ioP, int x, int y, int len, double *ptr) {
   return new MoneyField(ioP, x, y, len, ptr);
}
Field *genfield(InOut *ioP, int x, int y, int len, unsigned char *ptr) {
   return new Int8Field(ioP, x, y, len, ptr);
}

/*****************************************************************************
Field
*****************************************************************************/
Field::Field(InOut *inoutP, int size, char *str)
   : ioP(inoutP), len(size), pos(0), changed(0), need_redisplay(0)
{
   need_free_string = need_free = 0;
   if (str == NULL) {
                string = new char[len+1];
                need_free_string = 1;
   } else {
                string = str;
   }
   ok_func = NULL;
   ok_data = NULL;
   string[0] = 0;
}

Field::Field(InOut *ioP, int inx, int iny, int size, char *str)
   : ioP(ioP), x(inx), y(iny), len(size), pos(0), changed(0), need_redisplay(0)
{
   need_free_string = need_free = 0;
   if (str == NULL) {
                string = new char[len+1];
                need_free_string = 1;
   } else {
                string = str;
   }
   ok_func = NULL;
   ok_data = NULL;
   string[0] = 0;
}

int Field::reset() {
   pos=0;
   changed=0;
   return 0;
}
Field::~Field() {
   if (need_free_string)
                delete [] string;
}
int Field::finalize_field() {
   changed = 0;
   string[pos] = 0;
   return 0;
}
int Field::display_field(int use_underscores) {
   position(ioP, x,y);
   ioP->write(string);
   if (use_underscores) {
                ioP->write(underscores, len-pos);
   } else {
                ioP->write(blanks, len-pos);
   }
   return 0;
}
int Field::get_key() {
   char key;
   int cc;
   cc = ioP->read(&key, 1);

   return (cc == 0)  ? EOF : key ;
}
int Field::add_char(int key) {
   if (pos >= len || (!isprint(key) && key != ' ')) {
                ioP->write("\a", 1);
                return 1;
   }
   changed = 1;
   string[pos] = key;
   ioP->write(&string[pos++], 1);
   return 0;
}
int Field::backspace() {
   ioP->write("\b_\b", 3);
   changed = 1;
   pos--;
   return 0;
}
int Field::start_position () {
   position(ioP, x, y);
   return 0;
}
int Field::get_field (int need_pos) {
   int key;

   if (need_pos)
                position(ioP, x, y);
   if (pos != 0) {
                need_redisplay = 1;
                ioP->write(string, pos);
                ioP->write(underscores, len-pos);
                if (len-pos < 6)
                   ioP->write(backspaces, len-pos);
                else
                   position(ioP, x+pos, y);
   }

   ioP->mark();
   while (1) {
                key = get_key();
                switch(key) {
                case EOF:
                   return EOF;

                case '\r':   /* Carriage Return */
                case '\n':   /* Newline */
                   ioP->hold();
                   if (changed) {
                                finalize_field();
                   }
                   ioP->pop();
                   display_field(1);
                   return ENTER;
                   break;

                case '\t':   /* Tab */
                case '\006': /* Ctrl-F */
                case '\016': /* Ctrl-N */
                   if (changed) {
                                finalize_field();
                   }
                   ioP->pop();
                   display_field(1);
                   return NEXT_FIELD;
                   break;

                case '\002': /* Ctrl-B */
                case '\020': /* Ctrl-P */
                   if (changed) {
                                finalize_field();
                   }
                   ioP->pop();
                   display_field(1);
                   return PREV_FIELD;

                case '\b':   /* Backspace */
                case '\177': /* Del */
                   if (pos > 0) {
                                backspace();
                   } else
                                ioP->write("\a", 1);
                   break;

                case '\014': /* Ctrl-L */
                   ioP->pop();
                   return REDISPLAY;

                case '\030': /* Ctrl-X */
                case '\003': /* Ctrl-C */
                   ioP->unmark();
                   return ABORT;

                default:
                   add_char(key);
                }
   }
}

/*****************************************************************************
IntField
*****************************************************************************/
IntField::IntField(InOut *ioP, int inx, int iny, int size, int *val) : Field(ioP, inx, iny, size), value(val) {
   if (value==NULL) {
                value = new int;
                need_free=1;
   }
}
IntField::IntField(InOut *ioP, int size, int *val) : Field(ioP, size), value(val) {
   if (value==NULL) {
                value = new int;
                need_free=1;
   }
}
```

```
IntField::~IntField() {
   if (need_free)
                delete value;
}

int IntField::add_char(int key) {
   if (pos < len && isdigit(key)) {
                changed = 1;
                string[pos] = key;
                ioP->write(&string[pos++], 1);
                return 0;
   }
   ioP->write("\a", 1);
   return 1;
}
int IntField::display_field(int use_underscores) {
   int firstchar;
#if USE_ALLOCA
   char *buf = (char *)alloca(len+1);
#else
   char *buf = new char[len+1];
#endif
   memset(buf, 'x', len);
   if (pos)
                firstchar = format_int(buf, len+1, *value);
   else
                firstchar = len;
   position(ioP, x, y);
   if (use_underscores) {
                ioP->write(underscores, firstchar);
                ioP->write(buf+firstchar, len-firstchar);
   } else {
                ioP->write(buf, len);
   }
   return 0;
}
int IntField::finalize_field() {
   changed = 0;
   string[pos] = 0;
   if (value != NULL)
                *value = atoi(string);
   return 0;
}

/*****************************************************************************
ShortField
*****************************************************************************/
ShortField::ShortField(InOut *ioP, int inx, int iny, int size, short *val) : Field(ioP, inx, iny, size), value(val) {
   if (value==NULL) {
                value = new short;
                need_free=1;
   }
}
ShortField::ShortField(InOut *ioP, int size, short *val) : Field(ioP, size), value(val) {
   if (value==NULL) {
                value = new short;
                need_free=1;
   }
}
ShortField::~ShortField() {
   if (need_free)
                delete value;
}

int ShortField::add_char(int key) {
   if (pos < len && isdigit(key)) {
                changed = 1;
                string[pos] = key;
                ioP->write(&string[pos++], 1);
                return 0;
   }
   ioP->write("\a", 1);
   return 1;
}
int ShortField::display_field(int use_underscores) {
   int firstchar;
#if USE_ALLOCA
   char *buf = (char *)alloca(len+1);
#else
   char *buf = new char[len+1];
#endif
   if (pos)
                firstchar = format_short(buf, len+1, *value);
   else
                firstchar = len;
   position(ioP, x, y);
   if (use_underscores) {
                ioP->write(underscores, firstchar);
                ioP->write(buf+firstchar, len-firstchar);
   } else {
                ioP->write(buf, len);
   }
   return 0;
}
int ShortField::finalize_field() {
   changed = 0;
   string[pos] = 0;
   if (value != NULL)
                *value = atoi(string);
   return 0;
}

/*****************************************************************************
ShortField
*****************************************************************************/
Int8Field::Int8Field(InOut *ioP, int inx, int iny, int size, unsigned char *val) : Field(ioP, inx, iny, size),
value(val) {
   if (value==NULL) {
                value = new unsigned char;
                need_free=1;
   }
}
Int8Field::Int8Field(InOut *ioP, int size, unsigned char *val) : Field(ioP, size), value(val) {
   if (value==NULL) {
                value = new unsigned char;
                need_free=1;
   }
}
Int8Field::~Int8Field() {
   if (need_free)
                delete value;
}

int Int8Field::add_char(int key) {
   if (pos < len && isdigit(key)) {
                changed = 1;
                string[pos] = key;
                ioP->write(&string[pos++], 1);
                return 0;
   }
   ioP->write("\a", 1);
   return 1;
}
int Int8Field::display_field(int use_underscores) {
   int firstchar;
#if USE_ALLOCA
   char *buf = (char *)alloca(len+1);
#else
   char *buf = new char[len+1];
#endif
   if (pos)
                firstchar = format_char(buf, len+1, *value);
   else
                firstchar = len;
   position(ioP, x, y);
   if (use_underscores) {
                ioP->write(underscores, firstchar);
                ioP->write(buf+firstchar, len-firstchar);
   } else {
                ioP->write(buf, len);
   }
   return 0;
}
int Int8Field::finalize_field() {
   changed = 0;
   string[pos] = 0;
   if (value != NULL)
                *value = atoi(string);
   return 0;
}

/*****************************************************************************
LongField
*****************************************************************************/
LongField::LongField(InOut *ioP, int inx, int iny, int size, long *val) : Field(ioP, inx, iny, size), value(val) {
   if (value==NULL) {
                value = new long;
                need_free=1;
   }
}
LongField::LongField(InOut *ioP, int size, long *val) : Field(ioP, size), value(val) {
   if (value==NULL) {
                value = new long;
                need_free=1;
   }
}
LongField::~LongField() {
   if (need_free)
                delete value;
}
int LongField::add_char(int key) {
   if (pos < len && isdigit(key)) {
                changed = 1;
                string[pos] = key;
                ioP->write(&string[pos++], 1);
                return 0;
   }
   ioP->write("\a", 1);
   return 1;
}
int LongField::display_field(int use_underscores) {
   int firstchar;
#if USE_ALLOCA
   char *buf = (char *)alloca(len+1);
#else
   char *buf = new char[len+1];
#endif
   if (pos)
```

```
                firstchar = format_long(buf, len+1, *value);
    else
                firstchar = len;
    position(ioP, x, y);
    if (use_underscores) {
                ioP->write(underscores, firstchar);
                ioP->write(buf+firstchar, len-firstchar);
    } else {
                ioP->write(buf, len);
    }
    return 0;
}
int LongField::finalize_field() {
    changed = 0;
    string[pos] = 0;
    if (value != NULL)
                *value = atoi(string);
    return 0;
}

/*****************************************************************************
MoneyField
*****************************************************************************/
MoneyField::MoneyField(InOut *ioP, int inx, int iny, int size, double *val) : Field(ioP, inx, iny, size),
value(val) {
    seen_dollar = seen_sign = seen_dot = seen_digit = 0;
    if (value==NULL) {
                value = new double;
                need_free=1;
    }
}
MoneyField::MoneyField(InOut *ioP, int size, double *val) : Field(ioP, size), value(val) {
    seen_dollar = seen_sign = seen_dot = seen_digit = 0;
    if (value==NULL) {
                value = new double;
                need_free=1;
    }
}
MoneyField::~MoneyField() {
    if (need_free)
                delete value;
}
int MoneyField::add_char(int key) {
    do {
                if (pos >= len)
                    break;
                if (key == '$') {
                    if (!(pos == 0 || (pos == 1 && seen_sign))) break;
                    seen_dollar = 1;
                } else if (key == '-') {
                    if (!(pos == 0 || (pos == 1 && seen_dollar))) break;
                    seen_sign = 1;
                } else if (key == '.') {
                    if (seen_dot) break;
                    seen_dot = 1;
                } else if (!isdigit(key))
                    break;
                if (seen_dot) {
                    if (seen_dot >= 4)
                                break;
                    seen_dot++;
                }
                changed = 1;
                string[pos] = key;
                ioP->write(&string[pos++], 1);
                return 0;
    } while (0);
    ioP->write("\a", 1);
    return 1;
}
int MoneyField::backspace() {
    ioP->write("\b_\b", 3);
    changed = 1;
    pos--;
    if (seen_dot)
                seen_dot--;
    if (string[pos] == '-')
                seen_sign = 0;
    if (string[pos] == '$')
                seen_dollar = 0;
    if (string[pos] == '.')
                seen_dot = 0;
    return 0;
}
int MoneyField::display_field(int use_underscores) {
    int firstchar;
#if USE_ALLOCA
    char *buf = (char *)alloca(len+1);
#else
    char *buf = new char[len+1];
#endif
    if (pos)
                firstchar = format_money(buf, len+1, *value);
    else
                firstchar = len;
    position(ioP, x, y);
    if (use_underscores) {
                ioP->write(underscores, firstchar);
                ioP->write(buf+firstchar, len-firstchar);
    } else {
                ioP->write(buf, len);
    }
    return 0;
}
int MoneyField::finalize_field() {
    changed = 0;
    string[pos] = 0;
    if (value != NULL) {
                *value = atof(string + seen_dollar + seen_sign);
                if (seen_sign)
                    *value = -*value;
    }
    return 0;
}
int MoneyField::reset() {
    Field::reset();
    seen_dollar = seen_sign = seen_dot = seen_digit = 0;
    return 0;
}

/*****************************************************************************
TextField
*****************************************************************************/
TextField::TextField(InOut *ioP, int inx, int iny, int size, char *str) : Field(ioP, inx, iny, size, str) {
    value=TextField::string;
}
TextField::TextField(InOut *ioP, int size, char *str) : Field(ioP, size, str) {
    value=TextField::string;
}
int TextField::add_char(int key) {
    if (pos >= len || (!isalnum(key) && key != ' ' && key != '.')) {
                ioP->write("\a", 1);
                return 1;
    }
    changed = 1;
    string[pos] = key;
    ioP->write(&string[pos++], 1);
    return 0;
}
```

field.h

```
/* (C)1997 IBM Corporation */
#if !defined(INCLUDE_FIELD_H)
#define INCLUDE_FIELD_H

#include "inout.h"

class Field {
public:
    enum return_codes { INVALID, ENTER, NEXT_FIELD, PREV_FIELD, ABORT, REDISPLAY };
    InOut *ioP;
    int x, y;
    const int len;
    int pos;
    int changed;
    int need_redisplay;
    char *string;
    int (*ok_func)(void *data);
    int need_free;
    int need_free_string;
    void *ok_data;
    Field(InOut *ioP, int size, char *string=NULL);
    Field(InOut *ioP, int x, int y, int size, char *string=NULL);
    virtual ~Field();
    virtual int get_field (int need_pos=1);
    int get_key ();
    virtual int backspace();
    virtual int reset();
    virtual int start_position();
    virtual int add_char(int key);
    virtual int display_field(int use_underscores=0);
    virtual int finalize_field();

    class Error {
                enum { USER_ABORT };
    };
};

class Int8Field : public Field {
public:
    unsigned char *value;
    int add_char(int key);
    int display_field(int use_underscores=0);
    int finalize_field();

    Int8Field(InOut *ioP, int x, int y, int size, unsigned char *value=NULL);
    Int8Field(InOut *ioP, int size, unsigned char *value=NULL);
    virtual ~Int8Field();
};

class ShortField : public Field {
public:
    short *value;
    int add_char(int key);
```

```
    int display_field(int use_underscores=0);
    int finalize_field();

    ShortField(InOut *ioP, int x, int y, int size, short *value=NULL);
    ShortField(InOut *ioP, int size, short *value=NULL);
    virtual ~ShortField();
};


class IntField : public Field {
public:
    int *value;
    int add_char(int key);
    int display_field(int use_underscores=0);
    int finalize_field();

    IntField(InOut *ioP, int x, int y, int size, int *value=NULL);
    IntField(InOut *ioP, int size, int *value=NULL);
    virtual ~IntField();
};

class LongField : public Field {
public:
    long *value;
    int add_char(int key);
    int display_field(int use_underscores=0);
    int finalize_field();

    LongField(InOut *ioP, int x, int y, int size, long *value=NULL);
    LongField(InOut *ioP, int size, long *value=NULL);
    virtual ~LongField();
};

class MoneyField : public Field {
public:
    int seen_dollar, seen_sign, seen_dot, seen_digit;
    double *value;
    int add_char(int key);
    int reset();
    int backspace();
    int display_field(int use_underscores=0);
    int finalize_field();
    MoneyField(InOut *ioP, int x, int y, int size, double *value=NULL);
    MoneyField(InOut *ioP, int size, double *value=NULL);
    virtual ~MoneyField();
};

class TextField : public Field {
public:
    char *value;
    int add_char(int key);
    TextField(InOut *ioP, int x, int y, int size, char *value=NULL);
    TextField(InOut *ioP, int size, char *value=NULL);
};

Field *genfield(InOut *ioP, int x, int y, int len, int *ptr);
Field *genfield(InOut *ioP, int x, int y, int len, short *ptr);
Field *genfield(InOut *ioP, int x, int y, int len, long *ptr);
Field *genfield(InOut *ioP, int x, int y, int len, char *ptr);
Field *genfield(InOut *ioP, int x, int y, int len, unsigned char *ptr);
Field *genfield(InOut *ioP, int x, int y, int len, double *ptr);

#endif /* INCLUDE_FIELD_H */
```

format.C

```
/* (C)1997 IBM Corporation */
#include <string.h>
#include <math.h>

int format_char(char *buf, int size, char val) {
    int neg, pos;
    pos = size;
    buf[--pos] = 0;
    if (val == 0 && pos > 0) {
                buf[--pos] = '0';
                neg = 0;
    } else {
                neg = (val < 0) ? 1 : 0;
                if (neg) val = -val;
                while (val && pos > 0) {
                    buf[--pos] = (val % 10) + '0';
                    val /= 10;
                }
    }
    /* Too long */
    if (!pos && (val || neg)) {
                memset (buf, '*', size);
                return -1;
    }
    if (neg)
                buf[--pos] = '-';
    if (pos)
                memset(buf, ' ', pos);
    return pos;
}
int format_short(char *buf, int size, short val) {
    int neg, pos;
    pos = size;
    buf[--pos] = 0;
    if (val == 0 && pos > 0) {
                buf[--pos] = '0';
                neg = 0;
    } else {
                neg = (val < 0) ? 1 : 0;
                if (neg) val = -val;
                while (val && pos > 0) {
                    buf[--pos] = (val % 10) + '0';
                    val /= 10;
                }
    }
    /* Too long */
    if (!pos && (val || neg)) {
                memset (buf, '*', size);
                return -1;
    }
    if (neg)
                buf[--pos] = '-';
    if (pos)
                memset(buf, ' ', pos);
    return pos;
}
int format_int(char *buf, int size, int val) {
    int neg, pos;
    pos = size;
    buf[--pos] = 0;
    if (val == 0 && pos > 0) {
                buf[--pos] = '0';
                neg = 0;
    } else {
                neg = (val < 0) ? 1 : 0;
                if (neg) val = -val;
                while (val && pos > 0) {
                    buf[--pos] = (val % 10) + '0';
                    val /= 10;
                }
    }
    /* Too long */
    if (!pos && (val || neg)) {
                memset (buf, '*', size);
                return -1;
    }
    if (neg)
                buf[--pos] = '-';
    if (pos)
                memset(buf, ' ', pos);
    return pos;
}
int format_long(char *buf, int size, long val) {
    int neg, pos;
    pos = size;
    buf[--pos] = 0;
    if (val == 0 && pos > 0) {
                buf[--pos] = '0';
                neg = 0;
    } else {
                neg = (val < 0) ? 1 : 0;
                if (neg) val = -val;
                while (val && pos > 0) {
                    buf[--pos] = (val % 10) + '0';
                    val /= 10;
                }
    }
    /* Too long */
    if (!pos && (val || neg)) {
                memset (buf, '*', size);
                return -1;
    }
    if (neg)
                buf[--pos] = '-';
    if (pos)
                memset(buf, ' ', pos);
    return pos;
}

int format_float(char *buf, int size, int dec, double val) {
    static double pow10[] = { 1, 10, 100, 1000, 10000, 100000, 1000000 };
    int neg, pos;
    pos = size;
    buf[--pos] = 0;
#ifndef WIN32
    val = rint(val * pow10[dec]);
#else /* there is no rint on NT. Use floor instead */
    val = floor(val * pow10[dec]+0.5);
#endif
    neg = (val < 0) ? 1 : 0;
    if (neg) val = -val;

    while (val >= 1 && pos > 0) {
                if (!dec--) {
                    buf[--pos] = '.';
                    continue;
                }
                buf[--pos] = (int)fmod(val, 10) + '0';
                val /= 10;
    }
```

```
    if (dec >= 0) {
                while (dec >= 0 && pos > 0) {
                    if (!dec--) {
                                buf[--pos] = '.';
                    } else {
                                buf[--pos] = '0';
                    }
                }
                if (pos > 0)
                    buf[--pos] = '0';
    }
    /* Too long */
    if (!pos && (val >= 1 || neg)) {
                memset (buf, '*', size);
                return -1;
    }
    if (neg)
                buf[--pos] = '-';
    if (pos)
                memset(buf, ' ', pos);
    return pos;
}

int format_money(char *buf, int size, double val) {
    int pos;
    pos = format_float(buf, size, 2, val);
    if (pos > 0)
                buf[--pos] = '$';
    return pos;
}

int format_date(char *buf, int size, unsigned char* val) {
    memcpy(buf, val, size);
    buf[size]=0;
    return 0;
}

int format_phone(char *buf, int size, unsigned char *phone) {
    buf[0] = phone[0];
    buf[1] = phone[1];
    buf[2] = phone[2];
    buf[3] = phone[3];
    buf[4] = phone[4];
    buf[5] = phone[5];
    buf[6] = '-';
    buf[7] = phone[6];
    buf[8] = phone[7];
    buf[9] = phone[8];
    buf[10] = '-';
    buf[11] = phone[9];
    buf[12] = phone[10];
    buf[13] = phone[11];
    buf[14] = '-';
    buf[15] = phone[12];
    buf[16] = phone[13];
    buf[17] = phone[14];
    buf[18] = phone[15];
    buf[19] = '\0';
    return size;
}

int format_zip(char *buf, int size, unsigned char *zip) {
    buf[0] = zip[0];
    buf[1] = zip[1];
    buf[2] = zip[2];
    buf[3] = zip[3];
    buf[4] = zip[4];
    buf[5] = '-';
    buf[6] = zip[5];
    buf[7] = zip[6];
    buf[8] = zip[7];
    buf[9] = zip[8];
    buf[10] = '\0';
    return size;
}
```

format.h

```
/* (C)1997 IBM Corporation */
#if !defined(INCLUDE_FORMAT_H)
#define INCLUDE_FORMAT_H

int format_char (char *buf, int size, char   val);
int format_int  (char *buf, int size, int    val);
int format_long (char *buf, int size, long   val);
int format_short(char *buf, int size, short  val);
int format_float(char *buf, int size, int    dec, double val);
int format_money(char *buf, int size, double val);
int format_date (char *buf, int size, unsigned char  *val);
int format_phone(char *buf, int size, unsigned char  *phone);
int format_zip  (char *buf, int size, unsigned char  *zip);

#endif /* INCLUDE_FORMAT_H */
```

get_local_time.c

```
/*
 *                  get_local_time.c
 *
 * $Revision: 1.2 $
 * $Date: 1998/11/06 21:42:02 $
 * $Log:            $
 *
 *
 * $TALog: get_local_time.c,v $
 * Revision 1.2  1998/11/06  21:42:02  dongfeng
 * - Add makefile-nt
 *
 * - cast cur_t from double to long to get rid of some warnings.
 * [from r1.1 by delta dongfeng-23677-TPCC-new-directory-structures, r1.2]
 *
 * Revision 1.1  1998/11/06  21:10:12  dongfeng
 * - Move all files common to client and server to tpcc/common
 *   directory
 * [added by delta dongfeng-23677-TPCC-new-directory-structures, r1.1]
 *
 * Revision 1.2  1998/10/22  19:18:33  dongfeng
 * [added by delta dongfeng-23067-TPCC-add-web-based-tpcc-client, r1.2]
 *
 */

#ifdef WIN32
#include "get_local_time.h"
#else
#include <sys/time.h>
#endif
#include <stdio.h>

#define Li2Double(x) ((double)((x).HighPart) * 4.294967296E9 + (double)((x).LowPart))

#ifdef WIN32
LARGE_INTEGER pFreq;
double sFreq;

get_time_init()
{
    QueryPerformanceFrequency(&pFreq);
    sFreq=Li2Double(pFreq);
}

get_local_time(struct timeval *timeP)
{
   double cur_t;
   LARGE_INTEGER counter;

   QueryPerformanceCounter(&counter);
   cur_t = Li2Double(counter) / sFreq;
   timeP->tv_sec = (long)cur_t;
   timeP->tv_usec = ((long)cur_t - timeP->tv_sec) * 1000000;
}

int gettimeofday(struct timeval *curTimeP, struct timezone *timezoneP)
{
   get_local_time(curTimeP);
   return 1;
}

#else
get_time_init()
{
}


get_local_time(struct timeval *timeP)
{
  struct timezone tz;

  gettimeofday(timeP, &tz);
}

#endif
```

get_local_time.h

```
#ifndef _GET_LOCAL_TIME_H_
#define _GET_LOCAL_TIME_H_

#ifdef WIN32
#include <windows.h>
#include <winsock.h>

/*
 * gettimeofday is not available in the Microsoft C/C++ Run Time
 * and the Win32 API.
 */

*
 * It is not used and just for unix compatibility.
 */
struct timezone {
                char a;
};

get_time_init();
```

```
int gettimeofday(struct timeval *curTimeP, struct timezone *timezoneP);

#endif

#endif
```

inout.C

```
/* (C)1997 IBM Corporation */
#include <string.h>
#ifndef WIN32
#include <strings.h>
#endif
#include <unistd.h>
#include <stdlib.h>
#ifdef WIN32
#include <io.h>
#include <winsock.h>
#endif
#include <stdio.h>
#include <ctype.h>
#include <errno.h>

#include "screen.h"

extern char *sys_errlist[];

#if 1
void InOut::write(const void *buf, size_t size) {
   if (IOError) return;
   debug("write('%*.*s', %d);\n", size, size, buf, size);
   output.queue(buf, size);
   if (!Hold && input.len() == 0) { /* Don't write anything until there is no input */
                flush();
   }
}

ssize_t InOut::read(void *buf, size_t size) {
   int rc;
   if (IOError) return(0);
   while (input.len() < size) {
#ifdef WIN32
                rc = recv(in_fd, (char *)input.ptr(), input.free(), 0);
#else
                rc = ::read(in_fd, input.ptr(), input.free());
#endif
      debug("::read('%*.*s', %d) = %d;\n", rc, rc, input.ptr(), input.free(), rc);
      if (inlog) {
                   fwrite(input.ptr(), rc, 1, inlog);
                   fflush(inlog);
      }
                if (rc > 0) {
                   input.queue(rc);
                } else if (rc <= 0) {
                   IOError = 1;
                   return(0);
                }
   }
   memcpy(buf, input.ptr(), size);
   input.dequeue(size);
   debug("read('%*.*s', %d) = %d;\n", size, size, buf, size, size);
   return size;
}
#else
void InOut::write(const void *buf, size_t size) {
   debug("write('%s', %d);\n", buf, size);
#ifdef WIN32
   send(out_fd, (char *)buf, size,0);
#else
   ::write(out_fd, buf, size);
#endif
}

ssize_t InOut::read(void *buf, size_t size) {
   int rc;
   rc = ::read(in_fd, buf, size);
   debug("read('%s', %d) = %d;\n", buf, size, rc);
   return rc;
}
#endif

void InOut::flush() {
   debug("flush();\n");
   Hold = 0;
   if (IOError) return;
   while (output.len()) {
      debug("::write('%*.*s', %d);\n", output.len(), output.len(), output.ptr(), output.len());
#ifdef WIN32
                int rc = send(out_fd, (char *)output.ptr(), output.len(),0);
#else
                int rc = ::write(out_fd, output.ptr(), output.len());
#endif
      if (outlog) {
                   fwrite(output.ptr(), rc, 1, outlog);
                   fflush(outlog);
      }
                if (rc > 0) {
                   output.dequeue(rc);
                } else if (rc < 0) {
                   err_printf("Error writing data!\n");
                   IOError = 1;
                   return;
                }
   }
}

void InOut::write(const void *buf) {
   write(buf, strlen((const char *)buf));
}

InOut::InOut(int in, int out) : input(256), output(2048) {
#ifndef WIN32
   struct termios buf;
#endif

#ifdef DEBUG
   {
                char buf[256];
                sprintf(buf, "logs/debug.%d", getpid());
                debugfile = fopen(buf, "w");
                sprintf(buf, "logs/in.%d", getpid());
                inlog     = fopen(buf, "w");
                sprintf(buf, "logs/out.%d", getpid());
                outlog    = fopen(buf, "w");
   }
#endif

   int rc;
   Hold = 0;
   debugfile = inlog = outlog = (FILE *)0;
   IOError = 0;

   in_fd = in;
   if (out < 0)
                out_fd = in;
   else
      out_fd = out;
#ifndef WIN32
   if ((rc = tcgetattr(in_fd, &save_term)) < 0) {
                return;
   }

   buf = save_term;

   buf.c_lflag &= ~(ECHO | ICANON); /* echo off, canonical mode off */

   buf.c_cc[VMIN] = 1;     /* Case B: 1 byte at a time, no timer */
   buf.c_cc[VTIME] = 0;

   err_printf("echo off - tcsetattr on %d\n", in_fd);
   if (tcsetattr(in_fd, TCSAFLUSH, &buf) < 0)
                return;
#endif
}

InOut::~InOut() {
#ifdef WIN32
   return;
#else
   if (tcsetattr(in_fd, TCSAFLUSH, &save_term) < 0)
                return;
#endif
}
```

inout.h

```
/* (C)1997 IBM Corporation */

#ifndef INOUT_H
#define INOUT_H
#include <unistd.h>
#include <stdlib.h>
#include <stdio.h>
#include <ctype.h>
#ifndef WIN32
#include <termios.h>
#endif
#include <stdarg.h>
#include <string.h>

#include "tpcc.h"

/* This is for a VT100 */
#if 1
#define ESC "\033"
#define ESCc '\033'
#else
#define ESCc '^'
#define ESC "^"
#endif

#define TRIGGER "\021"
#define TRIGGERc '\021'

extern "C" err_printf(...);
```

```
#define POS(x,y) ESC "[" #y ";" #x "H"
#define CLEAR_EOS ESC "[J"

#ifdef WIN32
typedef int ssize_t;
#endif

class InOut {
private:
   class Buffer {
   private:
                int BufSize;
                enum { NUMMARKS=8 };
                char *buffer;
                int marks[NUMMARKS];
   public:
                int Pos;
                int Start;
      int num_marks;
                Buffer(int size) {
                   BufSize = size;
                   buffer = new char [BufSize];
                   Pos = Start = 0;
                   num_marks = 0;
                }
                int  pos()        { return Pos; };
                void pos(int P)   { Pos = P; };
                int  start()      { return Start; };
                void start(int S) { Start = S; };
                int  len()        { return Pos-Start; };
                int  free()       { return BufSize-Pos-1; };
                void *ptr()       { return &buffer[Start]; };
                int  lastmark()   { if (num_marks) return marks[num_marks-1]; return 999; };

                void  mark()      {
                   if (num_marks < NUMMARKS)
                                marks[num_marks++] = Pos;
                   else {
                                fprintf(stderr, "Buffer mark overflow\n");
                                exit (1);
                   }
                }
                void unmark() {
                   if (num_marks <= 0)
                                return;
                   num_marks--;
                }
                void pop() {
                   if (num_marks <= 0)
                                return;
                   if (marks[num_marks-1] >= Start) {
                                Pos=marks[--num_marks];
                   } else {
                                num_marks=0;
                   }
                }
                void queue(int size) {
                   Pos += size;
                }
                void queue(const void *buf, int size) {
                   /* If this is too big see if we can move what we have over */
                   if (size+Pos >= BufSize) {
                                if (size + len() >= BufSize) {
                                   fprintf(stderr, "Buffer overflow\n");
                                   exit (1);
                                }
                                /* This requires memcpy to be "safe" */
                                if (Start + len() >= BufSize) {
                                   fprintf(stderr, "Strange Error: Start %d + len %d >= size %d\n",
                                                Start , len(), BufSize);
                                   exit(1);
                                }
                                memcpy(buffer, &buffer[Start], len());
                                Pos -= Start;

                                /* Fix up our marks*/
                                int count = 0;
                                for (int i = 0; i < num_marks; i++) {
                                   if (marks[i] - Start >= 0)
                                                marks[count++] = marks[i] - Start;
                                }
                                num_marks = count;
                                Start = 0;
                   }
                   memcpy(&buffer[Pos], buf, size);
                   Pos += size;
                }
                void dequeue(int size) {
                   Start += size;
                   if (Start >= Pos) {
                                /* Fix up our marks*/
                                int count = 0;
                                for (int i = 0; i < num_marks; i++) {
                                   if (marks[i] - Start >= 0)
                                                marks[count++] = marks[i] - Start;
                                }
                                num_marks = count;
                                Start = Pos = 0;
                   }
                }
   };
   int in_fd, out_fd;
   int Hold;
#ifndef WIN32
   struct termios save_term;
#endif
   Buffer input;
   Buffer output;
   FILE *debugfile;
   FILE *inlog, *outlog;
public:
   int IOError;
   ssize_t read(void *buf, size_t size);
   void write(const void *buf, size_t size);
   void write(const void *buf);
   void flush();
   void mark() { debug("mark()\n"); output.mark(); };
   void unmark() { debug("unmark()\n"); output.unmark(); };
   void pop()  { debug("pop()\n\n"); output.pop(); };
   void hold() { debug("hold()\n");  Hold = 1; };
#ifdef DEBUG
   void debug(char *fmt, ...) {
                va_list args;

      fprintf(debugfile, "Start=%2d, Pos=%2d, Marks=%2d(%03d): ", output.Start, output.Pos,
output.num_marks, output.lastmark());
                va_start(args,fmt);
                vfprintf (debugfile, fmt, args);
                va_end (args);
                ::fflush(debugfile);
   }
#else
   void debug(char *fmt, ...) {};
#endif
   InOut(int in=0, int out=1);
   ~InOut();
};

extern char const * const blanks;
extern char const * const underscores;
extern char const * const backspaces;

int format_int(char *buf, int size, int val);
int format_float(char *buf, int size, int dec, double val);
int format_money(char *buf, int size, double val);

#endif /*  INOUT_H */
```

mon_client.c

```
/*
 *              mon_client.c
 *
 * $Revision: 1.27 $
 * $Date: 1999/05/26 16:29:52 $
 * $Log:            $
 *
 *
 * $TALog: mon_client.c,v $
 * Revision 1.27  1999/05/26  16:29:52  wenjian
 * Sync with Austin code, and sync code for Oracle DB and SQL server.
 * [from r1.26 by delta wenjian-24433-TPCC-clean-up-and-update, r1.2]
 *
 * Revision 1.26  1999/05/06  21:28:26  oz
 * - Removed all the .. from the includes
 * - Added -I.. to the makefiles instead
 * - Moved all the thread related code and connection
 *   selection to serverMon.c
 * [from r1.16 by delta oz-24309-TPCC-add-oracle8.1-code, r1.5]
 *
 * Revision 1.16  1999/01/29  20:16:33  wenjian
 * - Rename client_init to init_encina_client because we have another
 *   client_init in screen/client.C
 * - Add code to read StatsFrequency from .tpccrc (UNIX only)
 * [from r1.15 by delta wenjian-23787-TPCC-integrate-code-for-AIX-and-NT, r1.7]
 *
 * Revision 1.15  1999/01/12  20:52:55  wenjian
 * Call initialization function to create the shared file mapping between
 * it and the corresponding dll.
 * [from r1.14 by delta wenjian-23856-TPCC-integrate-with-NT-performance-monitor, r1.1]
 *
 * Revision 1.14  1998/12/28  20:07:12  wenjian
 * - Change client_info to a pointer pClientInfo for flexibility.
 * [from r1.13 by delta wenjian-23788-TPCC-use-single-stats-var-for-each-client-and-server, r1.5]
 *
 * Revision 1.13  1998/12/16  17:17:41  wenjian
 * - Change (iStatsFrequency <= 1) to (iStatsFrequency < 1) in pre_rpc.
 * [from r1.12 by delta wenjian-23788-TPCC-use-single-stats-var-for-each-client-and-server, r1.4]
 *
 * Revision 1.12  1998/12/14  20:27:54  wenjian
 * Made corresponding changes due to data structure change of tran_info_t.
 * [from r1.11 by delta wenjian-23788-TPCC-use-single-stats-var-for-each-client-and-server, r1.3]
 *
 * Revision 1.11  1998/12/11  16:14:19  wenjian
```

```
* Add code for checking statistic data in a single variable and collecting
* statistic data based on iStatsFrequency.
*
* - Add code to store statistic data in a single var
* - Collect statistic data once every iStatsFreqency transactions
* [from r1.10 by delta wenjian-23788-TPCC-use-single-stats-var-for-each-client-and-server, r1.1]
*
* Revision 1.10  1998/12/08  23:03:49  wenjian
* Add (or rename) Makefile for each platform (AIX and NT). Reorganize the
* files a little bit.
*
* - Define variable iStatsFrequency for AIX
* [from r1.9 by delta wenjian-23787-TPCC-integrate-code-for-AIX-and-NT, r1.1]
*
* Revision 1.9  1998/12/08  18:55:19  wenjian
* In pre_rpc, set headerP->stats to iStatsFrequency
* [from r1.8 by delta wenjian-23785-TPCC-pass-statsFrequency-from-client-to-server, r1.1]
*
* Revision 1.8  1998/12/07  20:04:12  wenjian
* Clean up
* [from r1.7 by delta wenjian-23742-TPCC-update-with-Raliegh-code, r1.2]
*
* Revision 1.7  1998/11/24  21:45:59  wenjian
* - Add #ifdef MULTIPLE_INTERFACE
* - Check if we need to collect statistics for response time
* - Do mutex_lock for terminal_context_init
* [from r1.6 by delta wenjian-23742-TPCC-update-with-Raliegh-code, r1.1]
*
* Revision 1.6  1998/11/09  16:59:38  wenjian
* In this revision, most of the changes are related to the directory of header
* files after directory reorganization. Other changes include adding or removing
* files to put them in the right directories. Makefiles are written for NT
* platform so that nmake is working on NT now. Need a top level Makefile for all
* the directories.
* [from r1.5 by delta wenjian-23677-TPCC-reorganize-directory-structure, r1.2]
*
* Revision 1.5  1998/11/09  14:48:16  wenjian
* In an effort to make a new directory structure for TPCC, this delta
* creates two directories: tpcc/client and tpcc/server. All the files
* for this revision are copied from tpcc/sp-tpcc without any change.
* Further change may be needed for some files due to the change of
* the directory structure.
* [added by delta wenjian-23677-TPCC-reorganize-directory-structure, r1.1]
*
* Revision 1.43  1998/11/06  16:10:55  wenjian
* - Minor change to reduce the print statement
* [from r1.42 by delta wenjian-23646-TPCC-clean-up-source-code, r1.1]
*
* Revision 1.42  1998/10/27  14:57:51  dongfeng
* Change enc_status to a data structure that has fields:
*   - Status code
*   - Line Number
*   - File Name
*   - Encina Error Code
*   - Error Msg
* Remove statusMsgs in web_tpcc.c
* [from r1.41 by delta dongfeng-23067-TPCC-add-web-based-tpcc-client, r1.6]
*
* Revision 1.41  1998/10/26  14:41:34  dongfeng
* Add Init command in web client so when something bad happens during
* initialization web client sends back error information and allows
* reinitialization instead of killing IIS server.
*
* Define Macro CHK_STATUS instead of using #ifdef
* [from r1.40 by delta dongfeng-23067-TPCC-add-web-based-tpcc-client, r1.3]
*
* Revision 1.40  1998/10/22  21:24:11  wenjian
* [merge of changes from 1.23 to 1.39 into 1.38]
*
* Revision 1.39  1998/10/22  19:18:34  dongfeng
* [from r1.37 by delta dongfeng-23067-TPCC-add-web-based-tpcc-client, r1.2]
*
* Revision 1.37  1998/10/08  14:18:01  dongfeng
* Add codes for doing web-based tpcc.
* [from r1.23 by delta dongfeng-23067-TPCC-add-web-based-tpcc-client, r1.1]
*
* Revision 1.38  1998/10/08  18:03:01  gerstl
* Changes to allow configurations where some servers only service
* specific transaction types. Split transaction interfaces by type.
* [from r1.36 by delta gerstl-23515-TPCC-allow-separate-online-transaction-interfaces, r1.1]
*
* Revision 1.36  1998/10/07  15:14:22  gerstl
* [merge of changes from 1.26 to 1.31 into 1.34]
*
* Revision 1.31  1998/09/04  19:17:56  wenjian
* Remove log_file_handle and related code.
* [from r1.29 by delta wenjian-23183-TPCC-sync-AIX-code-with-Austin, r1.5]
*
* Revision 1.29  1998/08/28  18:30:00  wenjian
* This delta sync the TPCC code with Austin.
*
* Remove UNCOND_EVENT in CALLTPCC, pre_rpc and post_rpc.
* [from r1.26 by delta wenjian-23183-TPCC-sync-AIX-code-with-Austin, r1.1]
*
* Revision 1.34  1998/09/26  10:56:26  oz
* - renamed thread_init and thread_done to clnt_thread_init and
*   clnt_thread_done respectively because of name conflicts on AIX4.3
* [from r1.26 by delta oz-23339-TPCC-update-for-NT, r1.2]
*
* Revision 1.26  1998/08/18  14:38:41  wenjian
* Remove adl.h from this file since it is not ported on NT. Use corresponding
* rpc protect levels and authz levels to replace ADL_.... macros defined in
* adl.h
* [from r1.23 by delta wenjian-21750-TPCC-changes-for-porting-on-NT, r1.4]
*
* Revision 1.23  1998/06/17  15:05:45  wenjian
* Somehow, read and write didn't work for socket on NT, although they
* are supposed to work. As a work-around way, use recv and send for
* NT in this revision. We may change them back if the problem is gone.
*
* Define SKIP_RPC and add code to do tests without calling DCE.
* This addition is for test purpose only.
* [from r1.22 by delta wenjian-21750-TPCC-changes-for-porting-on-NT, r1.2]
*
* Revision 1.22  1998/02/17  22:13:49  wenjian
* [merge of changes from 1.19 to 1.20 into 1.21]
*
* Revision 1.20  1998/02/17  16:04:42  oz
* - Split the login into two parts to allow for special logins
* - If the warehouse ID is 0, this is a special login to
*   query the client for status
*
* - Keep track of threads that have been initialized and also
*   threads that are done.
* [from r1.19 by delta oz-21864-TPCC-split-client-login-screen, r1.1]
*
* Revision 1.21  1998/02/17  22:07:03  wenjian
* Minor changes for NT
* [from r1.19 by delta wenjian-21750-TPCC-changes-for-porting-on-NT, r1.1]
*
* Revision 1.19  1998/01/26  20:37:35  oz
* - Remove all the code associated with explicit binding
*
* - Removed GET_SERVER_INDEX
* - Removed bindingType
* - Removed explicit binding from CALLTPCC
* - Removed calls to cancel_all_reservations and to init_handles
* [from r1.18 by delta oz-21697-TPCC-remove-explicit-binding-code, r1.1]
*
* Revision 1.18  1998/01/26  16:43:32  oz
* - Removed the code for collecting stats in the client
*   and dumping them before exit.
*
* - Removed pre_rpc_stats and post_rpc_stats
* - Removed code to write the stats out
* [from r1.17 by delta oz-21691-TPCC-remove-client-stats-code, r1.1]
*
* Revision 1.17  1998/01/26  16:19:23  oz
* - moved all the code pertaining to the background
*   thread to its own file and all the data structures
*   to client_utils.h
* [from r1.16 by delta oz-21689-TPCC-move-client-bg-thread-to-separate-file, r1.1]
*
* Revision 1.16  1998/01/26  15:33:32  oz
* - call impTPCCNOInfo to make sure there is a server out there
* [from r1.15 by delta oz-21671-TPCC-merge-online-transaction-interfaces, r1.2]
*
* Revision 1.15  1998/01/23  21:58:51  oz
* - In order to simplify the Encina TPCC code: Merge the four
*   online transactions into 1 interface
* - Moved all the scripts to a scripts subdirectory
* - Removed unused files
* [from r1.14 by delta oz-21671-TPCC-merge-online-transaction-interfaces, r1.1]
*
* Revision 1.14  1998/01/23  15:07:53  oz
* - Updated the SP TPCC directory to the latest files used
*   during the SP tpcc audit.
* [from r1.13 by delta oz-20774-TPCC-update-to-latest-SP-version-11-27, r1.1]
*
*
*
*/

#include "common/get_local_time.h"
#include <stdio.h>
#include <stdlib.h>
#include <string.h>
#include <stdarg.h>
#include <time.h>
#if defined (solaris)
#include <dce/pthread.h>
#else   /* solaris */
#include <pthread.h>
#endif  /* solaris */
#include <tpm/mon/mon.h>
#include <utils/trace.h>
#include "common/delivery.h"
#ifdef MULTIPLE_INTERFACE
#include "common/neworder.h"
#include "common/payment.h"
#include "common/stocklevel.h"
#include "common/orderstatus.h"
#else
#include "common/tpcc_trans.h"
#endif
#include "common/utilities.h"
#include "client_utils.h"
#include "common/do_tpcc.h"
```

```
#include "client.h"
#include "encina_client.h"

#if 0
#define SKIP_RPC
#endif

extern void start_bg_debug_thread(void);
extern total_tran_count_t  *perfClntDataInit();

#define MAX_CONSECUTIVE_ERRORS 20

static void read_mon_environment(void);
static void client_trace(char *comp, int value, int add);
static void dump_pa_ring_buffer(trpc_handle_t pa_handle);

extern int warehouse_offset;

unsigned32      client_authnLevel;
unsigned32      client_authzSvc;

char *cellName;
int envRetrieval = 0;

static total_tran_count_t total_counts;  /* counts of transactions over
                                          * the entire test
                                          */

#ifndef WEB_TPCC_CLIENT
#undef CHK_STATUS
#define CHK_STATUS(status, val, a) if(status) {exit_program(status);}
MUTEX_T init_lock;
static int iStatsFrequency = 1;
#else
extern enc_status_t enc_status;
CRITICAL_SECTION    init_lock;
extern int iStatsFrequency;
#endif
int info_list_len = 0;
thread_info_t **info_list = NULL;  /*  List of all the thread info
                                    *  structures.  This can be used
                                    *  upon exit to cancel all the
                                    *  reservations
                                    */
total_tran_count_t  *pClientInfo=NULL;  /* keep stats for the client process */
static num_active_threads = 0;

#define NewOrder_code    NEWO_TRANS
#define Payment_code     PAYMENT_TRANS
#define OrderStatus_code ORDER_STAT_TRANS
#define Delivery_code    DELIVERY_TRANS
#define StockLevel_code  STOCK_TRANS

extern int useSecurity;

#define INT_ENV_VALUE(var, default) \
  (var = getenv(#var) ? atoi(getenv(#var)) : default)

#define PRE_RPC_WORK(contextP, dataP, tran, sub_tran) \
       if (contextP != NULL) \
                                  pre_rpc(contextP, &(dataP)->header, tran, sub_tran)
#define POST_RPC_WORK(contextP, dataP, tran) \
       if (contextP != NULL) \
                                  post_rpc(contextP, &(dataP)->header, tran)
#define TIME_STR_P(infoP)  (&((infoP)->last_tran))

/*                  CALTPCC
 *  Macro to sends 1 RPC and then handles any errors.
 *
 *  The macro takes the name of the RPC (e.g., NewOrder)
 *  and makes the RPC by calling the appropriate function
 *  (e.g., impTPCCNewOrder).
 */
#ifdef SKIP_RPC
#define CALLTPCC(name,infoP,data,trpcStatusP)              \
{                                                  \
  struct timezone tz;                                                                \
  struct timespec timeP;                                                   \
  char   tran_type[30];                                                              \
  strcpy(tran_type,UTIL_STRING(name));                                     \
  timeP.tv_sec = 0;                                                                  \
  timeP.tv_nsec = 190000000;                                               \
  if ( strcmp(tran_type,"NewOrder")==0 )                         \
      timeP.tv_nsec = 450000000;                                           \
  if ( strcmp(tran_type,"Payment")==0 )                          \
      timeP.tv_nsec = 90000000;                                            \
  pthread_delay_np(&timeP);                                                \
  gettimeofday(&TIME_STR_P(infoP)->send, &tz);                       \
}
#else
#define CALLTPCC(name,infoP,data,trpcStatusP)                   \
{                                                      \
  struct timezone tz;
\
  if (infoP) gettimeofday(&TIME_STR_P(infoP)->send, &tz);                  \
  UTIL_CONCAT(impTPCC,name)(data,trpcStatusP);                   \
  if (*(trpcStatusP)) {                                    \
    char msg[100];                                         \
    sprintf(msg, "TRPC error during impTPCC%s", UTIL_STRING(name));    \
    (data)->header.returncode = TRPC_ERROR;                          \
    encina_error_message(msg, *(trpcStatusP));                     \
  } else if (((data)->header.returncode != TPCC_SUCCESS) &&            \
            ((data)->header.returncode != INVALID_NEWO)) {            \
    char msg[100];                                                   \
    sprintf(msg, "App error during impTPCC%s: ", UTIL_STRING(name));   \
    encina_error_message(msg, (data)->header.returncode);              \
  }
    \
}
#endif

/*
 *  pre_rpc --   For debug purposes
 *
 *  Called before an RPC is made.
 *  Set the state of the thread and keep track of the time the RPC is sent.
 *  This is used by the Background thread to report the state of the client.
 */
static void pre_rpc(thread_info_t *thread_infoP,
                data_header *headerP,
                int tran_type,
                int sub_tran_type)
{
   tran_timing_t *curP;
   struct timezone tz;

   curP = &thread_infoP->last_tran;
   curP->terminal = thread_infoP->thread_index;
   curP->tran = tran_type;
   curP->sub_tran = sub_tran_type;

   if (iStatsFrequency < 1) {
                  headerP->stats = 0;
   } else {
      int num;
      num = ++ (pClientInfo->tran[tran_type].num);
      headerP->stats = (num % iStatsFrequency==0) ? 1 : 0;
   }
   if (headerP->stats) { /* measure the time for RT */
                  gettimeofday(&curP->start, &tz);
                  headerP->start_time.sec = 0;
                  headerP->start_time.usec = 0;
                  headerP->end_time.sec = 0;
                  headerP->end_time.usec = 0;
#ifdef KEEP_TERMINAL_INFO
      set_client_debug_state((void *)thread_infoP, thread_state_sent, tran_type);
#endif
   }
}

/*
 *  post_rpc
 *
 *  Called when the RPC returns from the server
 *
 *  Keeps track of the client response time and the server response time
 *  as well as the state of the thread.  This is used by the background
 *  debug thread to report the state of the client
 */
static void post_rpc(thread_info_t *thread_infoP,
                                  data_header *headerP,
                                  int tran_type)
{
   double time_diff_s, time_diff_c;
   tran_timing_t *curP;
   struct timezone tz;

   if (!thread_infoP) return;

   curP = &thread_infoP->last_tran;

   curP->server = headerP->dtype;  /*  The server sets this by convention */
   if (headerP->stats) {
                  curP->srvr_start.tv_sec = headerP->start_time.sec;
                  curP->srvr_start.tv_usec = headerP->start_time.usec;
                  curP->srvr_done.tv_sec = headerP->end_time.sec;
                  curP->srvr_done.tv_usec = headerP->end_time.usec;

      gettimeofday(&curP->end, &tz);
   }

#ifdef KEEP_TERMINAL_INFO
   /* Store the info for each terminal */
   thread_infoP->num_trans++;
   thread_infoP->tran[tran_type].num ++;
   if ((headerP->returncode == TPCC_SUCCESS) ||
      (headerP->returncode == INVALID_NEWO)) {
     thread_infoP->consecutive_errors = 0;
     curP->tran_failed = 0;
     if (headerP->returncode == INVALID_NEWO) {
        curP->sub_tran |= 0x100;
     }
   } else {
     thread_infoP->tran[tran_type].errs ++;
     thread_infoP->consecutive_errors++;
     curP->tran_failed = 1;
   }
```

```
  if (headerP->stats && tran_type <= MAX_TRAN_TYPE && tran_type > 0
      && !curP->tran_failed) {
     set_client_debug_state((void *)thread_infoP, thread_state_received, 0);

     /* update total server round trip response time */
     time_diff_s = time_diff_ms(&(curP->srvr_done), &(curP->srvr_start));
     thread_infoP->tran[tran_type].RTtotal[1] += time_diff_s;

     /* update total client round trip response time */
     time_diff_c = time_diff_ms(&(curP->end), &(curP->start));
     thread_infoP->tran[tran_type].RTtotal[0] += time_diff_c;

                /* update num for the number of trans which have RT measured */
     thread_infoP->tran[tran_type].RTcount ++;
  }

#else
   /* Store the info for each client.
    * Note: since we don't use mutex for performance reason, pClientInfo
          may not be accurate if more than one thread work on the same
          data at a same time. But this can reduce the overhead caused
          by scanning info_list for each terminal.
    */
   if ((headerP->returncode == TPCC_SUCCESS) ||
      (headerP->returncode == INVALID_NEWO)) {
    curP->tran_failed = 0;
    if (headerP->returncode == INVALID_NEWO) {
       curP->sub_tran |= 0x100;
    }
   } else {
    pClientInfo->tran[tran_type].errs ++;
    pClientInfo->errors ++;
    curP->tran_failed = 1;
   }
   if (headerP->stats && tran_type <= MAX_TRAN_TYPE && tran_type > 0
      && !curP->tran_failed) {
       /* update total server round trip response time */
       time_diff_s = time_diff_ms(&(curP->srvr_done), &(curP->srvr_start));
       pClientInfo->tran[tran_type].RTtotal[1] += time_diff_s;

       /* update total client round trip response time */
       time_diff_c = time_diff_ms(&(curP->end), &(curP->start));
       pClientInfo->tran[tran_type].RTtotal[0] += time_diff_c;

                /* update num for the number of trans which have RT measured */
       pClientInfo->tran[tran_type].RTcount ++;
   }
#endif
}

/*
 * exit_program - restores original terminal attributes before leaving the
 *                program.
 */

void exit_program( err )
 short int err;
{
   if ( err )
                fprintf(ERROUT , "exit_program: Error Code = %d\n", err );

   MUTEX_LOCK(&init_lock);
   /**  Cancel all the longterm reservations (if any)
    **              and write out the time-stamps
    **/
   if (info_list && (info_list_len > 0)) {
     int i;

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

                if (info_list[i] && info_list[i]->initialized) {
                  info_list[i]->initialized = 0;
                }
    }
   }

   MUTEX_UNLOCK(&init_lock);

   if (logtpcc) {
     fclose(logtpcc);
   } else {
     if (logtpcc = fopen(log_file_name, "w")) {
                fprintf(logtpcc, "ERROR: Client exiting before SYNC with error %d\n",
                                err);
                fclose(logtpcc);
     }
   }

   mon_ExitClient( err );

#ifndef WEB_TPCC_CLIENT
   exit( err );
#endif
}

/*
 *  clnt_thread_init
 *
 *  This function must be called by each work thread
 *  It returns a pointer to a context that must be passed
 *  on calls back to this module.
 *  There is 1 threadInfo entry in an array for each executor thread.
 *  When an executor thread is started the first thing it does is call
 *  this clnt_thread_init function.  This function creates a context for the
 *  thread and if longterm reservations are used this function
 *  initializes the pa handle.
 */
void *clnt_thread_init(void)
{
   int thread_index;
   struct timezone tz;
   thread_info_t *thread_infoP;

   if (iStatsFrequency < 1)
                return(NULL);

   thread_infoP = (thread_info_t *)calloc(1, sizeof(thread_info_t));

   thread_infoP->descr.state = thread_state_init;
   gettimeofday(&thread_infoP->descr.init, &tz);
   thread_infoP->initialized = 1;

   MUTEX_LOCK(&init_lock);
   thread_index = info_list_len++;
   thread_infoP->thread_index = thread_index;
   thread_infoP->thread_id = get_thread_id();

   num_active_threads++;
   info_list =
                (thread_info_t **)realloc((void *)info_list,
                                                sizeof(thread_info_t *) * info_list_len);
   info_list[thread_index] = thread_infoP;

   MUTEX_UNLOCK(&init_lock);

   if (num_active_threads % 200 == 0)
      err_printf("Thread %d Initialized (currently %d are active).\n",
                        thread_index, num_active_threads);


   return(thread_infoP);
}

/*
 *  clnt_thread_done
 *
 *  Called before a thread exits.
 *  Perform some cleanup.
 *
 */
void clnt_thread_done(contextP)
 void *contextP;
{
   int all_done = 0;
   int j;
   thread_info_t *infoP = (thread_info_t *)contextP;

   if (!infoP) return;


   MUTEX_LOCK(&init_lock);

   num_active_threads--;

#if 0
   err_printf("> thread_done, %d active\n", num_active_threads);
#endif

   set_client_debug_state((void *)infoP, thread_state_done, 0);
   infoP->done = 1;

   if (num_active_threads == 0) {
     all_done = 1;
   }

   if (info_list[infoP->thread_index] != infoP) {
     fprintf(ERROUT, "Strange error: expected to find %d in info_list[%d] and found %d instead\n",
                        infoP, infoP->thread_index,
                        info_list[infoP->thread_index]);
   }

   MUTEX_UNLOCK(&init_lock);
   if (all_done) {
                int i;
                thread_info_t **curP;
#if 0
                fprintf(ERROUT, "All Done - exiting\n");
#endif
                MUTEX_LOCK(&init_lock);
                for (i=0, curP=info_list; i<info_list_len; i++, curP++) {
                   free(*curP);
                }
                free(info_list);
                info_list = NULL;
                info_list_len = 0;
                MUTEX_UNLOCK(&init_lock);
#if 0
```

```
                exit(0);
#endif
    }
}

/*
 *  The following send_*** functions are called from the screen
 *  module after the transaction data is received in order to
 *  send the data to the server for processing.
 *
 */

/*
 *  send_new_order
 *              Send a new order request to the server
 */
void send_new_order(contextP, dataP)
 void *contextP;
 newOrder_data_t *dataP;
{
   thread_info_t *thread_context = (thread_info_t *)contextP;
   trpc_status_t trpcStatus;

   DPRINT(("New Order, w_id %d, %d orders\n", dataP->w_id, dataP->o_ol_cnt));
   PRE_RPC_WORK(thread_context, dataP, NEWO_TRANS, dataP->o_all_local == 0);
   CALLTPCC(NewOrder,thread_context,dataP,&trpcStatus)
   POST_RPC_WORK(thread_context, dataP, NEWO_TRANS);
}

/*
 *  send_payment
 *              Send a payment request to the server
 */
void send_payment(contextP, dataP)
 void *contextP;
 payment_data_t *dataP;
{
   trpc_status_t trpcStatus;
   thread_info_t *thread_context = (thread_info_t *)contextP;

   PRE_RPC_WORK(thread_context, dataP, PAYMENT_TRANS,
                                dataP->w_id != dataP->c_w_id);
   CALLTPCC(Payment,thread_context,dataP,&trpcStatus);
   POST_RPC_WORK(thread_context, dataP, PAYMENT_TRANS);
}

/*
 *  send_order_status
 *              Send a order status request to the server
 */
void send_order_status(contextP, dataP)
 void *contextP;
 orderStatus_data_t *dataP;
{
   trpc_status_t trpcStatus;
   thread_info_t *thread_context = (thread_info_t *)contextP;

   PRE_RPC_WORK(thread_context, dataP, ORDER_STAT_TRANS, 0);
   CALLTPCC(OrderStatus,thread_context,dataP,&trpcStatus);
   POST_RPC_WORK(thread_context, dataP, ORDER_STAT_TRANS);
}

/*
 *  send_delivery
 *              Send a delivery request to the server
 */
void send_delivery(contextP, dataP)
 void *contextP;
 delivery_data_t *dataP;
{
   trpc_status_t trpcStatus;
   thread_info_t *thread_context = (thread_info_t *)contextP;

   PRE_RPC_WORK(thread_context, dataP, DELIVERY_TRANS, 0);
   CALLTPCC(Delivery,thread_context,dataP,&trpcStatus);
   POST_RPC_WORK(thread_context, dataP, DELIVERY_TRANS);
}

/*
 *  send_stock_level
 *              Send a stock level request to the server
 */
void send_stock_level(contextP, dataP)
 void *contextP;
 stockLevel_data_t *dataP;
{
   trpc_status_t trpcStatus;
   thread_info_t *thread_context = (thread_info_t *)contextP;

   PRE_RPC_WORK(thread_context, dataP, STOCK_TRANS, 0);
   CALLTPCC(StockLevel,thread_context,dataP,&trpcStatus);
   POST_RPC_WORK(thread_context, dataP, STOCK_TRANS);
}

int too_many_errors(contextP)
 void *contextP;
{
 thread_info_t *thread_context = (thread_info_t *)contextP;
 return (thread_context->consecutive_errors > MAX_CONSECUTIVE_ERRORS);
}
/*
 *  Enroll the client:
 *              Perform the needed initialization
 */
void init_encina_client(user_id)
 int user_id;
{
   int i;
   mon_status_t                 monStatus;
   char *env_str;
   char serverName[48];
   struct timezone tz;
   struct timeval a_time;
   unsigned long status ;
   FILE  *rcFile;

#ifdef WIN32
   get_time_init();
   pClientInfo = perfClntDataInit();
#endif
   if (pClientInfo == NULL)
                pClientInfo = malloc(sizeof(total_tran_count_t));
   memset(pClientInfo, 0, sizeof(total_tran_count_t));

   read_mon_environment();

   if(!cellName)
                CHK_STATUS(30, CELL_NAME_UNAVAILABLE,
              "ENCINA_TPM_CELL is not set!");

   MUTEX_INIT(&init_lock);

   info_list = NULL;
   info_list_len = 0;

#ifndef WEB_TPCC_CLIENT
   /* initialize iStatsFrequency */
   iStatsFrequency = 1;
   rcFile = fopen("~/.tpccrc", "r");
   if (rcFile!=NULL) {
      char buf[100];
                int num = 1;
                while (1) { /* read the whole rcFile */
        num = fscanf(rcFile,"%s",buf);
        if (num<=0) break;
                  if (strcasecmp(buf,"StatsFrequency")==0) {
                    fscanf(rcFile,"%d", &iStatsFrequency);
          break;
        }
      }
   }
   err_printf("iStatsFrequency=%d\n", iStatsFrequency);
#endif

   gettimeofday(&a_time, &tz);
#ifdef WIN32
   srand(a_time.tv_sec ^ a_time.tv_usec);
#else
   srand48(a_time.tv_sec ^ a_time.tv_usec);
#endif
}


/*
 *  Enroll the client:
 *              get the necessary handles.
 */
void enroll_client(user_id)
 int user_id;
{
   int i;
   mon_status_t                 monStatus;
   char *env_str;
   char serverName[48];
   static  char  *clientName="tpcc_client";
   unsigned long status ;
   static  int   client_enrolled = 0;

   MUTEX_LOCK(&init_lock);
   if (client_enrolled) {
                MUTEX_UNLOCK(&init_lock);
                return;
   }
   if (useSecurity) {
                client_authnLevel = rpc_c_protect_level_connect;
                client_authzSvc = rpc_c_authz_dce;
   } else {
                client_authnLevel = rpc_c_protect_level_none;
                client_authzSvc = rpc_c_authz_none;
   }

   if (envRetrieval == 0) {
     ENCINA_CALL_RC("mon_RetrieveEnable",mon_RetrieveEnable(FALSE),status);
     CHK_STATUS(status, MON_RETRIEVEENABLE_FAILED,
              "mon_RetrieveEnable failed");
   }
```

```
    DPRINT(("Cell name: %s\n", cellName));

    ENCINA_CALL_RC("mon_InitClient",mon_InitClient(clientName,cellName),
status);
    CHK_STATUS(status, MON_INITCLIENT_FAILED,
               "mon_InitClient failed");

    DPRINT(("mon_SecuritySetDefaults-> authn %d, authz %d\n",
                    client_authnLevel, client_authzSvc));
    ENCINA_CALL_RC("mon_SecuritySetDefaults",
                                mon_SecuritySetDefaults(client_authnLevel,client_authzSvc),
             status);
    CHK_STATUS(status, MON_SECURITYSET_FAILED,
             "mon_SecuritySetDefaults failed");

    ENCINA_CALL_RC("mon_SetHandleCacheRefreshInterval",
                                mon_SetHandleCacheRefreshInterval(300), status);
    CHK_STATUS(status, MON_SETREFRESHINTERVAL_FAILED,
             "mon_SetHandleCacheRefreshInterval failed");

    {
       dbInfo_data_t data;
       trpc_status_t trpcStatus;
       /* Get DB Info -- currently id does not do anything
         but it will tell us if there is a server out there.
         Better to know instead of when all the terminals
         are up and ready
        */
       impTPCCNOInfo(&data, &trpcStatus);
       if (trpcStatus) {
          char msg[100];
          sprintf(msg, "TRPC error during db info at init.");
          encina_error_message(msg, trpcStatus);
          CHK_STATUS(33,NOINFO_TRPC_ERROR,
                   "TRPC error during db info at init");
       }
    }

    /* Start bg_thread for debug purpose and performance tuning.
     * In the final test, we do not start it in order to get the
     * best performance.
     * On NT, bg_thread may use lots of CPU. But we need to verify it.
     */
    if (1)
                    start_bg_debug_thread();

    client_enrolled = 1;
    MUTEX_UNLOCK(&init_lock);

}

/*--------------------------------------------------------------------*/
/*        Read environment paramaters                                 */
/*--------------------------------------------------------------------*/
static void read_mon_environment()
{
    char *env_str;


    cellName = getenv("ENCINA_TPM_CELL");
    CHECK_ENVIRON(cellName, "ENCINA_TPM_CELL");

    if (env_str = getenv("TPCC_ENV_RETRIEVE")) {
                    envRetrieval = atoi(env_str);
    }
}

/*
 *  dump_pa_ring_buffer() -- For Debugging --
 *      Dump the ring buffer in the PA we are talking to
 *      Only works if we are using long term reservation
 */
static void dump_pa_ring_buffer(pa_handle)
  trpc_handle_t pa_handle;
{
  err_printf("Dumping Ring Buffer of server\n");
  admin_trace_DumpRingBuffer((handle_t)pa_handle, "stderr");
}


/* terminal_context_init:
 *    The same function as thread_init in the thread-pool version.
 *
 *  This function must be called by each terminal when using
 *  thread pool. After a terminal is logged on, the first thing
 *  it does is to call this function.
 *  This function creates a context for the terminal.
 *  It returns a pointer to a context that must be passed
 *  on calls back to this module.
 */
void *terminal_context_init(int fdIn)
{
    int thread_index;
    struct timezone tz;
    thread_info_t *thread_infoP;

    if (iStatsFrequency < 1)
                    return(NULL);

    thread_infoP = (thread_info_t *)calloc(1, sizeof(thread_info_t));

    thread_infoP->descr.state = thread_state_init;
    gettimeofday(&thread_infoP->descr.init, &tz);
    thread_infoP->initialized = 1;

    MUTEX_LOCK(&init_lock);
    thread_index = info_list_len++;
    thread_infoP->thread_index = thread_index;
    thread_infoP->thread_id = fdIn;

    num_active_threads++;
    info_list =
       (thread_info_t **)realloc((void *)info_list, \
                                 sizeof(thread_info_t *) *\
                                  info_list_len);
    info_list[thread_index] = thread_infoP;

    MUTEX_UNLOCK(&init_lock);

    if (num_active_threads % 200 == 0)
       err_printf("Terminal %d Initialized (currently %d are\
active).\n",\
                    thread_index, num_active_threads);



    return(thread_infoP);
}
```

neworder.tacf

```
/*
 * Copyright (C) 1991, 1990 Transarc Corporation
 * All Rights Reserved
 */
/*
 * neworder.tacf -- attribute configuration file for tpcc server.
 * used for transparent binding
 *
 * $Revision: 1.1 $
 * $Date: 1998/11/06 21:10:13 $
 * $Log:          neworder.tacf,v $
 *
 * $TALog: neworder.tacf,v $
 * Revision 1.1  1998/11/06  21:10:13  dongfeng
 * - Move all files common to client and server to tpcc/common
 *   directory
 * [added by delta dongfeng-23677-TPCC-new-directory-structures, r1.1]
 *
 * Revision 1.2  1998/10/08  18:03:01  gerstl
 * Changes to allow configurations where some servers only service
 * specific transaction types. Split transaction interfaces by type.
 * [added by delta gerstl-23515-TPCC-allow-separate-online-transaction-interfaces, r1.1]
 *
 *
 *
 */

[implicit_handle (mon_handle_t handle)]
interface neworder
{
}
```

neworder.tidl

```
/*
 * id: $id: $
 *
 * component_name: encina benchmarks
 *
 * the following functions list may not be complete.
 * functions defined by/via macros may not be included.
 *
 * functions:
 *    <fill_me_in>
 *
 * origins: transarc corp.
 *
 * (c) copyright transarc corp. 1995, 1993
 * all rights reserved
 * licensed materials - property of transarc
 *
 * us government users restricted rights - use, duplication or
 * disclosure restricted by gsa adp schedule contract with transarc corp
 */
/*
 * history
 * $talog: $
 */

/*
 * neworder.tidl -- interface definition file for tpccserver.
 *
```

```
* $revision: 1.0 $
* $date: 1995/10/20 21:55:05 $
* $log:          tpcc.tidl,v $
*/

[
   uuid(f7065094-5e04-11d2-b351-9e621208aa77),
   version(1.0)
]
interface neworder
{
import "tpm/mon/mon_handle.idl";
import "tpcc_type.idl";

[nontransactional] void
                impTPCCNewOrder([in,out] newOrder_data_t *dataP,
                                                [out] trpc_status_t  * trpcStatus);
[nontransactional] void
       impTPCCNOInfo([out] dbInfo_data_t *dataP,
                [out] trpc_status_t  * trpcStatus);
}
```

orderstatus.tacf

```
/*
 * Copyright (C) 1991, 1990 Transarc Corporation
 * All Rights Reserved
 */
/*
 * orderstatus.tacf -- attribute configuration file for tpcc server.
 * used for transparent binding
 *
 * $Revision: 1.1 $
 * $Date: 1998/11/06 21:10:14 $
 * $Log:          $
 *
 * $TALog: orderstatus.tacf,v $
 * Revision 1.1  1998/11/06  21:10:14  dongfeng
 * - Move all files common to client and server to tpcc/common
 *   directory
 * [added by delta dongfeng-23677-TPCC-new-directory-structures, r1.1]
 *
 * Revision 1.2  1998/10/08  18:03:02  gerstl
 * Changes to allow configurations where some servers only service
 * specific transaction types. Split transaction interfaces by type.
 * [added by delta gerstl-23515-TPCC-allow-separate-online-transaction-interfaces, r1.1]
 *
 *
 */

[implicit_handle (mon_handle_t handle)]
interface orderstatus
{
}
```

orderstatus.tidl

```
/*
 * id: $id: $
 *
 * component_name: encina benchmarks
 *
 * the following functions list may not be complete.
 * functions defined by/via macros may not be included.
 *
 * functions:
 *    <fill_me_in>
 *
 * origins: transarc corp.
 *
 * (c) copyright transarc corp. 1995, 1993
 * all rights reserved
 * licensed materials - property of transarc
 *
 * us government users restricted rights - use, duplication or
 * disclosure restricted by gsa adp schedule contract with transarc corp
 */
/*
 * history
 * $talog: $
 */

/*
 * orderstatus.tidl -- interface definition file for tpccserver.
 *
 * $revision: 1.0 $
 * $date: 1995/10/20 21:55:05 $
 * $log:          tpcc.tidl,v $
 */
[
   uuid(06287200-5e05-11d2-8984-9e621208aa77),
   version(1.0)
]
interface orderstatus
{
import "tpm/mon/mon_handle.idl";
import "tpcc_type.idl";

[nontransactional] void
                impTPCCOrderStatus([in,out] orderStatus_data_t *dataP,
                                                [out] trpc_status_t  * trpcStatus);
}
```

payment.tacf

```
/*
 * Copyright (C) 1991, 1990 Transarc Corporation
 * All Rights Reserved
 */
/*
 * payment.tacf -- attribute configuration file for tpcc server.
 * used for transparent binding
 *
 * $Revision: 1.1 $
 *
 */

[implicit_handle (mon_handle_t handle)]
interface payment
{
}
```

payment.tidl

```
/*
 * payment.tidl -- interface definition file for tpccserver.
 *
 * $revision: 1.0 $
 * $date: 1995/10/20 21:55:05 $
 * $log:          tpcc.tidl,v $
 */
[
   uuid(1341a902-5e05-11d2-bb70-9e621208aa77),
   version(1.0)
]
interface payment
{
import "tpm/mon/mon_handle.idl";
import "tpcc_type.idl";

[nontransactional] void
                impTPCCPayment([in,out] payment_data_t *dataP,
                                                [out] trpc_status_t  * trpcStatus);
}
```

screen.C

```
/* (C)1997 IBM Corporation */
#include <unistd.h>
#include <stdlib.h>
#include <stdio.h>
#include <sys/types.h>
#include <ctype.h>
#include <string.h>
#include <math.h>

#include "screen.h"
#include "format.h"
#include "encina.h"

#define USE_INSULTS
#define LOCAL_SESSION_DATA

extern "C" err_printf(...);

extern char const * const blanks;
extern char const * const underscores;
extern char const * const backspaces;

static int clear_eos(InOut *ioP);
static int clear_eos(char *buf);
static int string_empty(char const *text);
static int pos_zero(int const *val);
static int pos_nonzeros(int const **val);

/*****************************************************************************
Screen
*****************************************************************************/
int Screen::reset() {
   has_data=0;
   pos=0;
   if (dataptr) memset(dataptr, 0, data_len);
   for (int i = 0; fields && fields[i] != NULL; i++) {
                fields[i]->reset();
   }
   return 0;
};
```

```
int Screen::present_empty_fields() {
   if (empty_fields)
                threadP->write(empty_fields, empty_fields_len);
//   threadP->write(end_str, end_str_len);
   return 0;
}
int Screen::present() {
   threadP->write(screen, screen_len);
   threadP->write(session_data, session_data_len);
   if (has_data) {
                for (int i = 0; fields[i] != NULL; i++) {
                   fields[i]->display_field(1);
                }
//              threadP->write(end_str, end_str_len);
   } else {
                present_empty_fields();
   }
   return 0;
};
int Screen::user_input() {
   int key;
   has_data = 1;
   fields[pos]->start_position();
   threadP->flush();
//   threadP->mark();
   key = fields[pos]->get_field(0);
   do {
                switch (key) {
                case EOF:
                   return 0;
                   break;
                case Field::NEXT_FIELD:
                   if (fields[++pos] == NULL) {
                                pos = 0;
                   }
                   break;
                case Field::PREV_FIELD:
                   if (--pos < 0) {
                                while (fields[++pos] != NULL);
                                pos--;
                   }
                   break;
                case Field::REDISPLAY:
                   present();
                   break;
                case Field::ABORT:
//                 position(1, 2);
                   threadP->write(end_str, end_str_len);
                   return 0;
                case Field::ENTER:
                   if (validate()) {
//                              threadP->pop();
                              return 1;
                   }
                   break;
                }
                key = fields[pos]->get_field();
   } while (1);
   return 0;
}
Screen::~Screen() {
   if (fields != NULL) {
                for (int lpos = 0; fields[lpos] != NULL; lpos++) {
                   delete fields[lpos];
                }
                delete [] fields;
   }
   fields=NULL;
}

int Screen::display_status(int status) {
   position(threadP, status_x, status_y);
   threadP->write("Execution Status: ");
   if (status == TRAN_OK) {
                threadP->write("Transaction Committed");
   } else if (status == INVALID_ITEM) {
                threadP->write("Item number is not valid");
   } else {
                threadP->write("ERROR: Rollback -- ");
//              threadP->write("Rollback -- ");
                char buf[6];
                format_int(buf, 5, status);
                threadP->write(buf, 5);
   }
   return 0;
}

int Screen::handle() {
   threadP->debug("%s - reset\n", tran_type);
   reset();

   threadP->debug("%s - present\n", tran_type);
   threadP->hold();
   present();
   threadP->write(TRIGGER, 1);
   threadP->debug("%s - user_input\n", tran_type);
   if (!user_input()) {
                threadP->write(end_str, end_str_len);
                threadP->write(TRIGGER, 1);
                return -1;
   }
   threadP->flush();
   threadP->hold();
   threadP->debug("%s - process\n", tran_type);
   if (process()) {
                threadP->write(end_str, end_str_len);
                threadP->write(TRIGGER, 1);
                return -1;
   }
   threadP->debug("%s - respond\n", tran_type);
   respond();
   //   position(threadP, 1, 2);
   threadP->write(end_str, end_str_len);
   threadP->write(TRIGGER, 1);
   threadP->flush();
   return 0;
}

/*****************************************************************************
NewOrder
*****************************************************************************/
int NewOrder::reset() {
   Screen::reset();
   pos=start_field;
   memset(dataptr, 0, sizeof(*data));
   return 0;
};
NewOrder::NewOrder(User_data *udP, Thread_data *threadP) : Screen(udP, threadP) {
   tran_type = NEWORDER_SERVICE;
   dataptr = data = new NewOrder_data;
   data_len = sizeof(NewOrder_data);


   status_x = 1;
   status_y = 24;

   screen          = static_screen;
   empty_fields    = static_empty_fields;
#ifdef LOCAL_SESSION_DATA
   session_data = new char[static_session_data_len+1];
   sprintf(session_data, "%s%5d", POS(12,4), user_dataP->warehouse);
#else
   session_data    = static_session_data;
   sprintf(session_data, "%s%5d", POS(12,4), user_dataP->warehouse);
#endif
   screen_len      = static_screen_len;
   empty_fields_len = static_empty_fields_len;
   session_data_len = static_session_data_len;

   int lpos = 0;
   fields = new Field *[2+MAX_ITEMS*3+1];
   for (int i = 0; i < MAX_ITEMS; i++) {
                fields[lpos++] = genfield(threadP,  3, 9+i, 5, &data->item[i].s_OL_SUPPLY_W_ID);
                fields[lpos++] = genfield(threadP, 10, 9+i, 6, &data->item[i].s_OL_I_ID);
                fields[lpos++] = genfield(threadP, 45, 9+i, 2, &data->item[i].s_OL_QUANTITY);
#if defined(USE_SMART_FIELDS)
                if (i > 0) {
                   int **tmp = new int *[4];
                   tmp[0] = &fields[lpos-6]->pos;
                   tmp[1] = &fields[lpos-5]->pos;
                   tmp[2] = &fields[lpos-4]->pos;
                   tmp[3] = NULL;
                   fields[pos-3]->ok_func = (int(*)(void*))pos_nonzeros;
                   fields[pos-3]->ok_data = tmp;
                   fields[pos-2]->ok_func = (int(*)(void*))pos_nonzeros;
                   fields[pos-2]->ok_data = tmp;
                   fields[pos-1]->ok_func = (int(*)(void*))pos_nonzeros;
                   fields[pos-1]->ok_data = tmp;
                }
#endif
   }
   start_field = lpos;
   fields[lpos++] = genfield(threadP, 29, 4, 4, &data->s_D_ID); /* District */
   fields[lpos++] = genfield(threadP, 12, 5, 4, &data->s_C_ID); /* Customer */
   fields[lpos++] = NULL;
   reset();
};

int NewOrder::validate() {
   if (!fields[start_field]->pos) {
                pos=start_field;
                message(threadP, "District ID is a required field");
                return 0;
   }
   if (!fields[start_field+1]->pos) {
                pos=start_field+1;
                message(threadP, "Customer ID is a required field");
                return 0;
   }

   int last=-1;
   data->s_O_OL_CNT = 0;
   data->s_all_local = 1;
   data->s_W_ID = user_dataP->warehouse;
   for (int i = 0; i < MAX_ITEMS*3; i+=3 ) {
                if (fields[i]->pos || fields[i+1]->pos || fields[i+2]->pos){
                   if (!fields[i]->pos) {
                                pos=i;
```

```
#if defined(USE_INSULTS)
                message(threadP, "Yeah, I think this is a bogus field too.");
#else
                message(threadP, "Warehouse ID is a required field");
#endif
                return 0;
        }
        if (!fields[i+1]->pos) {
                pos=i+1;
#if defined(USE_INSULTS)
                message(threadP, "Umm, WHAT did you want?");
#else
                message(threadP, "Item ID is a required field");
#endif
                return 0;
        }
        if (data->item[i/3].s_OL_QUANTITY <= 0) {
                pos=i+2;
#if defined(USE_INSULTS)
                message(threadP, "So something plus nothing is...");
#else
                message(threadP, "Please enter a quantity greater than 0");
#endif
                return 0;
        }
        if (data->item[i/3].s_OL_SUPPLY_W_ID != data->s_W_ID) {
                data->s_all_local=0;
        }
        data->s_O_OL_CNT++;
      } else if (last < 0) {
        last = i;
      }
  }
  if (data->s_O_OL_CNT <= 0) {
        pos=0;
#if defined(USE_INSULTS)
        message(threadP, "It's kind of pointless without ordering something isn't it?");
#else
        message(threadP, "Please enter an item to order");
#endif
        return 0;

  }
  // Compress the order lines:  some of them may be empty
  int ind;
  for (i=0, ind=0; ind<data->s_O_OL_CNT ; i++ ) {
    if (fields[i*3]->pos) {
      if (i > ind) {
        data->item[ind] = data->item[i];
      }
      ind ++;
    }
  }
  if (i > ind) {
        int j;
        for (j=ind; j<i; j++) {
          /*  At least one empty line was skipped  */
          data->item[j].s_OL_SUPPLY_W_ID = 0;
          data->item[j].s_OL_I_ID = 0;
          data->item[j].s_OL_QUANTITY = 0;
        }
  }

  return 1;
}

int NewOrder::respond() {
  int i;
  double amount, total_amount, cost;
  char buf[32];
  position(threadP,  1, 9); clear_eos(threadP);
  position(threadP, 25, 5); threadP->write(data->s_C_LAST);
  position(threadP, 52, 5); threadP->write(data->s_C_CREDIT);
  position(threadP, 15, 6); format_int(buf, 9, data->s_O_ID); threadP->write(buf, 8);

  display_status(data->s_transtatus);
  if (data->s_transtatus != TRAN_OK) {
        return -1;
  }

  position(threadP, 25, 5); threadP->write( data->s_C_LAST);
  position(threadP, 52, 5); threadP->write( data->s_C_CREDIT);
  position(threadP, 15, 6); format_int( buf, 9, data->s_O_ID); threadP->write(buf, 8);
  position(threadP, 48, 6); format_int( buf, 3, data->s_O_OL_CNT); threadP->write(buf, 2);
  position(threadP, 61, 4); format_date(buf, 20, data->s_O_ENTRY_D); threadP->write(buf, 19);
  position(threadP, 64, 5); format_float(buf, 6, 2, data->s_C_DISCOUNT/100); threadP->write(buf, 5);
  position(threadP, 59, 6); format_float(buf, 6, 2, data->s_W_TAX/100); threadP->write(buf, 5);
  position(threadP, 74, 6); format_float(buf, 6, 2, data->s_D_TAX/100); threadP->write(buf, 5);
  total_amount = 0;
  for (i=0; i < data->s_O_OL_CNT; i++) {
        position(threadP,  3, 9+i); format_int(buf, 6, data->item[i].s_OL_SUPPLY_W_ID);
threadP->write( buf, 5 );
        position(threadP, 10, 9+i); format_int(buf, 7, data->item[i].s_OL_I_ID); threadP->write(
buf, 6 );
        position(threadP, 19, 9+i); threadP->write( data->item[i].s_I_NAME);
        position(threadP, 45, 9+i); format_int(buf, 3, data->item[i].s_OL_QUANTITY);
threadP->write(buf, 2);
        position(threadP, 51, 9+i); format_int(buf, 4, data->item[i].s_S_QUANTITY);
threadP->write(buf, 3);
        position(threadP, 58, 9+i); threadP->write(&data->item[i].s_brand_generic, 1);
        position(threadP, 62, 9+i); format_money(buf, 8, data->item[i].s_I_PRICE);
threadP->write(buf, 7);
        position(threadP, 71, 9+i); format_money(buf, 10, data->item[i].s_OL_AMOUNT);
threadP->write(buf, 9);
    }
    /* Clear the screen of any empty input fields */
    position(threadP, 63, 24); threadP->write( "Total:");
    position(threadP, 70, 24); format_money( buf, 10, data->s_total_amount ); threadP->write( buf, 9 );

    return 0;
}

/*********************************************************************
Payment
*********************************************************************/
Payment::Payment(User_data *udP, Thread_data *threadP)  : Screen(udP, threadP) {
    tran_type = PAYMENT_SERVICE;
    dataptr = data = new Payment_data;
    data_len = sizeof(Payment_data);

    int lpos = 0;
    screen          = static_screen;
    empty_fields    = static_empty_fields;
#ifdef LOCAL_SESSION_DATA
    session_data = new char[static_session_data_len+1];
    sprintf(session_data, "%s%5d", POS(12,6), user_dataP->warehouse);
#else
    session_data    = static_session_data;
    sprintf(session_data, "%s%5d", POS(12,6), user_dataP->warehouse);
#endif
    screen_len      = static_screen_len;
    empty_fields_len = static_empty_fields_len;
    session_data_len = static_session_data_len;

    fields = new Field *[7];
    fields[lpos++] = genfield(threadP,  52,  6,  2, &data->s_D_ID); /* District */
    fields[lpos++] = genfield(threadP,  11, 11,  4, &data->s_C_ID); /* Customer # */
    fields[lpos++] = genfield(threadP,  29, 12, 16, (char *)data->s_C_LAST); /* Name */
    fields[lpos++] = genfield(threadP,  33, 11,  5, &data->s_C_W_ID); /* Cust-Warehouse */
    fields[lpos++] = genfield(threadP,  54, 11,  2, &data->s_C_D_ID); /* Cust-District */
    fields[lpos++] = genfield(threadP,  23, 17,  8, &data->s_H_AMOUNT); /* Amount Paid */
    fields[lpos++] = NULL;
#if defined(USE_SMART_FIELDS)
    fields[1]->ok_func = (int(*)(void*))pos_zero;
    fields[1]->ok_data = &fields[2]->pos;
    fields[2]->ok_func = (int(*)(void*))pos_zero;
    fields[2]->ok_data = &fields[1]->pos;
#endif
};

int Payment::validate() {
    if (!fields[0]->pos) {
        pos=0;
        message(threadP, "District ID is a required field");
        return 0;
    }
    if (fields[1]->pos) {
#if defined(USE_BYNAME)
        data->s_byname = 0;
#endif
    } else if (fields[2]->pos) {
#if defined(USE_BYNAME)
        data->s_byname = 1;
#endif
    } else {
        pos=1;
        message(threadP, "Customer ID or Name is required");
        return 0;
    }

    if (!fields[3]->pos) {
        pos=3;
        message(threadP, "Customer Warehouse is a required field");
        return 0;
    }

    if (!fields[4]->pos) {
        pos=4;
        message(threadP, "Customer District is a required field");
        return 0;
    }

    if (data->s_H_AMOUNT <= 0) {
        pos=5;
        message(threadP, "Enter a positive amount");
        return 0;
    }

    data->s_W_ID = user_dataP->warehouse;

    return 1;
}

int Payment::respond() {
    if (data->s_transtatus != TRAN_OK) {
        display_status(data->s_transtatus);
        return -1;
    }
```

```
  char buf[32];
  position(threadP,  52, 6); format_int(buf, 3, data->s_D_ID);   threadP->write(buf, 2);
  position(threadP,  33,11); format_int(buf, 5, data->s_C_W_ID); threadP->write(buf, 4);
  position(threadP,  54,11); format_int(buf, 3, data->s_C_D_ID); threadP->write(buf, 2);
  position(threadP,   7, 4); threadP->write( data->s_H_DATE );
  position(threadP,   1, 7); threadP->write( data->s_W_STREET_1);
  position(threadP,  42, 7); threadP->write( data->s_D_STREET_1);
  position(threadP,   1, 8); threadP->write( data->s_W_STREET_2);
  position(threadP,  42, 8); threadP->write( data->s_D_STREET_2);
  position(threadP,   1, 9); threadP->write( data->s_W_CITY);
  position(threadP,  22, 9); threadP->write( data->s_W_STATE);
  position(threadP,  25, 9); format_zip(buf, 10, data->s_W_ZIP); threadP->write(buf, 10);
  position(threadP,  42, 9); threadP->write( data->s_D_CITY);
  position(threadP,  63, 9); threadP->write( data->s_D_STATE);
  position(threadP,  66, 9); format_zip(buf, 10, data->s_D_ZIP); threadP->write(buf, 10);
  position(threadP,  11,11); format_int( buf, 5, data->s_C_ID); threadP->write(buf, 4);
  position(threadP,   9,12); threadP->write( data->s_C_FIRST);
  position(threadP,  26,12); threadP->write( data->s_C_MIDDLE);
  position(threadP,  29,12); threadP->write( data->s_C_LAST);
  position(threadP,  58,12); format_date(buf, 10, data->s_C_SINCE); threadP->write( buf, 10);
  position(threadP,   9,13); threadP->write( data->s_C_STREET_1);
  position(threadP,  58,13); threadP->write( data->s_C_CREDIT);
  position(threadP,   9,14); threadP->write( data->s_C_STREET_2);
  position(threadP,  58,14); format_float(buf, 6, 2, data->s_C_DISCOUNT/100); threadP->write(buf, 6);
  position(threadP,   9,15); threadP->write( data->s_C_CITY);
  position(threadP,  30,15); threadP->write( data->s_C_STATE);
  position(threadP,  33,15); format_zip(buf, 10, data->s_C_ZIP); threadP->write(buf, 10);
  position(threadP,  58,15); format_phone(buf, 18, data->s_C_PHONE ); threadP->write(buf, 18);
  position(threadP,  17,17); format_money( buf, 15, data->s_H_AMOUNT); threadP->write(buf, 14);
  position(threadP,  55,17); format_money( buf, 16, data->s_C_BALANCE); threadP->write(buf, 15);
  position(threadP,  17,18); format_money( buf, 15, data->s_C_CREDIT_LIM); threadP->write(buf, 14);

  if (data->s_C_CREDIT[0] == 'B' && data->s_C_CREDIT[1] == 'C') {
                int i, size = strlen((char *)data->s_C_DATA);
                for (i = 0; i < 4; i++) {
                   position(threadP, 12,20+i);
                   threadP->write(data->s_C_DATA, (size > 50)?50:size);
                   size -= 50;
                   if (size <= 0) break;

                }
  }

  return 0;
}

/*****************************************************************************
OrderStatus
*****************************************************************************/
OrderStatus::OrderStatus(User_data *udP, Thread_data *threadP) : Screen(udP, threadP) {
  tran_type = ORDERSTATUS_SERVICE;
  dataptr = data = new OrderStatus_data;
  data_len = sizeof(OrderStatus_data);

  status_x=1;
  status_y=25;

  int pos = 0;
  screen          = static_screen;
  empty_fields    = static_empty_fields;
#ifdef LOCAL_SESSION_DATA
  session_data = new char[static_session_data_len+1];
  sprintf(session_data, "%s%5d", POS(12,4), user_dataP->warehouse);
#else
  session_data    = static_session_data;
  sprintf(session_data, "%s%5d", POS(12,4), user_dataP->warehouse);
#endif
  screen_len      = static_screen_len;
  empty_fields_len = static_empty_fields_len;
  session_data_len = static_session_data_len;

  fields = new Field *[4];
  fields[pos++] = genfield(threadP,  29,  4,  2, &data->s_D_ID ); /* District */
  fields[pos++] = genfield(threadP,  11,  5,  4, &data->s_C_ID ); /* Customer ID */
  fields[pos++] = genfield(threadP,  44,  5, 16, (char *)data->s_C_LAST ); /* Customer Name */
  fields[pos++] = NULL;
#if defined(USE_SMART_FIELDS)
  fields[1]->ok_func = (int(*)(void*))pos_zero;
  fields[1]->ok_data = &fields[2]->pos;
  fields[2]->ok_func = (int(*)(void*))pos_zero;
  fields[2]->ok_data = &fields[1]->pos;
#endif
};

int OrderStatus::validate() {
  if (!fields[0]->pos) {
                pos=0;
                message(threadP, "District ID is a required field");
                return 0;
  }
  if (fields[1]->pos) {
#if defined(USE_BYNAME)
                data->s_byname = 0;
#endif
  } else if (fields[2]->pos) {
#if defined(USE_BYNAME)
                data->s_byname = 1;
#endif
  } else {
                pos=1;
                message(threadP, "Customer ID or Name is required");
                return 0;
  }

  data->s_W_ID = user_dataP->warehouse;

  return 1;
}

int OrderStatus::respond() {
  display_status(data->s_transtatus);
  if (data->s_transtatus != TRAN_OK)
                return -1;

  char buf[32];

  position(threadP, 11, 5); format_int(buf, 5, data->s_C_ID); threadP->write(buf, 4);
  position(threadP, 24, 5); threadP->write(data->s_C_FIRST);
  position(threadP, 41, 5); threadP->write(data->s_C_MIDDLE);
  position(threadP, 44, 5); threadP->write(data->s_C_LAST);
  position(threadP, 15, 6); format_money(buf, 11, data->s_C_BALANCE); threadP->write(buf, 10);
  position(threadP, 15, 8); format_int(buf, 9, data->s_O_ID); threadP->write(buf, 8);
  position(threadP, 38, 8); format_date(buf, 19, data->s_O_ENTRY_D); threadP->write(buf);
  if (data->s_O_CARRIER_ID > 0) {
                position(threadP, 76, 8);
                format_int(buf, 3, data->s_O_CARRIER_ID);
                threadP->write(buf, 2);
  }

  for (int i=0; i < data->s_ol_cnt; i++) {
                position(threadP,  3, i+10);
                format_int(buf, 6, data->item[i].s_OL_SUPPLY_W_ID);
                threadP->write(buf, 5);

                position(threadP, 14, i+10);
                format_int(buf, 7, data->item[i].s_OL_I_ID);
                threadP->write(buf, 6);

                position(threadP, 25, i+10);
                format_int(buf, 3, data->item[i].s_OL_QUANTITY);
                threadP->write(buf, 2);

                position (threadP, 32, i+10);
                format_money(buf, 10, data->item[i].s_OL_AMOUNT);
                threadP->write(buf, 9);

                position (threadP, 47, i+10);
                format_date(buf, 20, data->item[i].s_OL_DELIVERY_D);
                threadP->write(buf, 19);
  }

  return 0;
}

/*****************************************************************************
Delivery
*****************************************************************************/
Delivery::Delivery(User_data *udP, Thread_data *threadP) : Screen(udP, threadP) {
  tran_type = DELIVERY_SERVICE;
  dataptr = data = new Delivery_data;
  data_len = sizeof(Delivery_data);

  status_x = 1;
  status_y = 8;

  int pos = 0;
  screen          = static_screen;
  empty_fields    = static_empty_fields;
#ifdef LOCAL_SESSION_DATA
  session_data = new char[static_session_data_len+1];
  sprintf(session_data, "%s%5d", POS(12,4), user_dataP->warehouse);
#else
  session_data    = static_session_data;
  sprintf(session_data, "%s%5d", POS(12,4), user_dataP->warehouse);
#endif
  screen_len      = static_screen_len;
  empty_fields_len = static_empty_fields_len;
  session_data_len = static_session_data_len;

  fields = new Field *[2];
  fields[pos++] = genfield(threadP,  17,  6,  2, &data->s_O_CARRIER_ID ); /* Carrier Number */

  fields[pos++] = NULL;
};

int Delivery::validate() {
  if (!fields[0]->pos) {
                pos=0;
                message(threadP, "Carrier ID is a required field");
                return 0;
  }
  time((time_t *)&(data->s_queued_time));

  data->s_W_ID = user_dataP->warehouse;

  return 1;
}
```

```
int Delivery::respond() {
    if (data->s_transtatus == TRAN_OK) {
                position(threadP, status_x, status_y);
                threadP->write("Execution Status: Delivery has been queued");
    } else {
                display_status(data->s_transtatus);
                return -1;
    }
    return 0;
}

/*****************************************************************************
StockLevel
*****************************************************************************/
StockLevel::StockLevel(User_data *udP, Thread_data *threadP) : Screen(udP, threadP) {
    tran_type = STOCKLEVEL_SERVICE;
    dataptr = data = new StockLevel_data;
    data_len = sizeof(StockLevel_data);

    status_x = 1;
    status_y = 10;

    int pos = 0;
    screen          = static_screen;
    empty_fields    = static_empty_fields;
    session_data    = static_session_data;
#ifdef LOCAL_SESSION_DATA
    session_data = new char[static_session_data_len+1];
    sprintf(session_data, "%s%5d%s%2d", POS(12,4), user_dataP->warehouse,
                                                        POS(29,4),
user_dataP->district);
#else
    session_data    = static_session_data;
    sprintf(session_data, "%s%5d%s%2d", POS(12,4), user_dataP->warehouse,
                                                        POS(29,4),
user_dataP->district);
#endif
    screen_len      = static_screen_len;
    empty_fields_len = static_empty_fields_len;
    session_data_len = static_session_data_len;

    fields = new Field *[2];
    fields[pos++] = genfield(threadP,  24,  6,  2, &data->s_threshold ); /* Threshold */
    fields[pos++] = NULL;
};

int StockLevel::validate() {
    if (data->s_threshold <= 0) {
                pos=0;
                message(threadP, "A positive non-zero threshold is required");
                return 0;
    }
    data->s_W_ID = user_dataP->warehouse;
    data->s_D_ID = user_dataP->district;

    return 1;
}

int StockLevel::respond() {
    display_status(data->s_transtatus);
    if (data->s_transtatus != TRAN_OK)
                return -1;

    position(threadP, 12, 8);
    char buf[5];
    format_int(buf, 4, data->s_low_stock);
    threadP->write(buf, 4);

    return 0;
}

/*****************************************************************************
 perform
*****************************************************************************/
int NewOrder::process() {
    if (tran_type == NULL)
                return 0;

    if (encina.tran(data, threadP->contextP, tran_type) < 0) {
                return -1;
    }
    return 0;
}

int Payment::process() {
    if (tran_type == NULL)
                return 0;

    if (encina.tran(data, threadP->contextP, tran_type) < 0) {
                return -1;
    }
    return 0;
}

int StockLevel::process() {
    if (tran_type == NULL)
                return 0;

    if (encina.tran(data, threadP->contextP, tran_type) < 0) {
                return -1;
    }
    return 0;
}

int OrderStatus::process() {
    if (tran_type == NULL)
                return 0;

    if (encina.tran(data, threadP->contextP, tran_type) < 0) {
                return -1;
    }
    return 0;
}

int Delivery::process() {
    if (tran_type == NULL)
        return 0;

    if (encina.tran(data, threadP->contextP, tran_type) < 0) {
        return -1;
    }
    return 0;
}


int Screen::process() {
    if (tran_type == NULL)
                return 0;
    return 0;
}


/*****************************************************************************
Login
*****************************************************************************/
Login::Login(User_data *udP, Thread_data *threadP) : Screen(udP, threadP) {
    tran_type = NULL;
    status_x=1;
    status_y=24;

    dataptr = NULL;
    data_len = 0;

    int pos = 0;
    screen          = static_screen;
    screen_len      = static_screen_len;
    empty_fields    = static_empty_fields;
    empty_fields_len = static_empty_fields_len;

    fields = new Field *[3];
    fields[pos++] = genfield(threadP,  16,  5,  5, &(udP->warehouse) ); //Warehouse
    fields[pos++] = genfield(threadP,  34,  5,  2, &(udP->district)  ); //District
    fields[pos++] = NULL;
};
int Login::validate() {
    if (!fields[0]->pos) {
                pos=0;
                message(threadP, "Warehouse ID is a required field");
                return 0;
    }
    if (!fields[1]->pos) {
                pos=1;
                message(threadP, "District ID is a required field");
                return 0;
    }

    return 1;
}


/*****************************************************************************
Menu
*****************************************************************************/
Menu::Menu(User_data *udP, Thread_data *threadP) : Screen(udP, threadP) {
    tran_type = NULL;
    status_x=1;
    status_y=24;

    int pos = 0;
    screen          = static_screen;
    screen_len      = static_screen_len;
    empty_fields    = NULL;
    empty_fields_len = 0;


    fields = NULL;
};

/*****************************************************************************
Static data
*****************************************************************************/
char const * const blanks      = "                                        ";
char const * const underscores = "________________________________________";
char const * const backspaces  = "\b\b\b\b\b\b\b\b\b\b";

/*****************************************************************************
Utility Functions
```

```
*****************************************************************************/
static int string_empty(char const *data) {
   return data[0] == 0;
}
static int pos_zero(int const *val) {
   return *val == 0;
}
static int pos_nonzeros(int const **val) {
   int const **ptr;
   for (ptr = val; *ptr; ptr++) {
                  if (**ptr == 0)
                     return 0;
   }
   return 1;
}

int position(int x, int y, char *buf) {
   int pos = 0;
   buf[pos++] = ESCc;
   buf[pos++] = '[';
   if (y >= 10) buf[pos++] = (y / 10) + '0';
   buf[pos++] = (y % 10) + '0';
   buf[pos++] = ';';
   if (x >= 10) buf[pos++] = (x / 10) + '0';
   buf[pos++] = (x % 10) + '0';
   buf[pos++] = 'H';
   buf[pos++] = 0;
   return 0;
}

int position(InOut *threadP, int x, int y) {
   char buf[16];
   position(x, y, buf);
   threadP->write(buf);
   return 0;
}

static int clear_eos(InOut *threadP) {
   threadP->write (ESC "[J");
   return 0;
}


int message(InOut *threadP, char const *text, int need_flush) {
   position(threadP, 1,25);
   threadP->write(text);
   clear_eos(threadP);
   if (need_flush)
     threadP->flush();
   return 0;
}

static int clear_eos(char *buf) {
   buf[0] = ESCc;
   buf[1] = '[';
   buf[2] = 'J';
   return 0;
}
```

screen.h

```
/* (C)1997 IBM Corporation */
#include <unistd.h>
#include <stdlib.h>
#include <stdio.h>
#include <ctype.h>
#ifndef WIN32
#include <termios.h>
#endif
#include <time.h>

#include "field.h"
#include "inout.h"
#include "tpcc.h"

extern int position(int x, int y, char *buf);
extern int position(InOut *ioP, int x, int y);
extern int message(InOut *ioP, char const *text, int need_flush=1);


class User_data {
public:
   int warehouse;
   int district;
};

class Thread_data : public InOut {
 public:
   void            *contextP;
   Thread_data(int infd, int outfd, void *conP) : InOut(infd, outfd), contextP(conP) {};
};

class Screen {
protected:
   static char const end_str[];
   static int        end_str_len;
         int        has_data;
   void       *dataptr;
   char       *tran_type;
   char const *screen;
   char const *empty_fields;
   char       *session_data;
   int        screen_len;
   int        session_data_len;
   int        empty_fields_len;
   int        pos;
   int        status_x, status_y;
   int        data_len;
   Thread_data                  *threadP;

public:
   User_data  *user_dataP;
   Field **fields;
   virtual char const *isa() { return "Screen"; };
   virtual int reset();
   virtual int present();
   virtual int present_empty_fields();
   virtual int process();
   virtual int user_input();
   virtual int validate()           { return 1; };
   virtual int respond()            { return 0; };
   int handle();
   int display_status(int status);
   Screen(User_data *udP, Thread_data *thrP) {
                  user_dataP = udP;
                  threadP = thrP;
                  has_data = 0;
                  pos = 0;
                  fields = NULL;
                  screen = empty_fields = session_data = NULL;
                  screen_len = session_data_len = empty_fields_len = 0;
   };
   virtual ~Screen();
};

class Login : public Screen {
protected:
   static char const static_screen[];
   static char const static_empty_fields[];
   static char static_session_data[];
   static int  static_screen_len;
   static int  static_empty_fields_len;
   static int  static_session_data_len;
public:
   int validate();
   Login::Login(User_data *udP, Thread_data *thrP);
};

class NewOrder : public Screen {
protected:
   static char const static_screen[];
   static char const static_empty_fields[];
   static char static_session_data[];
   static int  static_screen_len;
   static int  static_empty_fields_len;
   static int  static_session_data_len;
   int start_field;
   void swap_fields(int i, int j);
public:
   NewOrder_data *data;

   int reset();
   NewOrder::NewOrder(User_data *udP, Thread_data *thrP);
   int validate();
   int process();
   int respond();
};

class Payment : public Screen {
protected:
   static char const static_screen[];
   static char const static_empty_fields[];
   static char static_session_data[];
   static int  static_screen_len;
   static int  static_empty_fields_len;
   static int  static_session_data_len;
public:
   Payment_data *data;
   int validate();
   int process();
   int respond();
   Payment(User_data *udP, Thread_data *thrP);
};

class OrderStatus : public Screen {
protected:
   static char const static_screen[];
   static char const static_empty_fields[];
   static char static_session_data[];
   static int  static_screen_len;
   static int  static_empty_fields_len;
   static int  static_session_data_len;
public:
   OrderStatus_data *data;
   int validate();
   int process();
   int respond();
```

```
    OrderStatus(User_data *udP, Thread_data *thrP);
};

class Delivery : public Screen {
protected:
    static char const static_screen[];
    static char const static_empty_fields[];
    static char static_session_data[];
    static int  static_screen_len;
    static int  static_empty_fields_len;
    static int  static_session_data_len;
public:
    Delivery_data *data;
    int validate();
    int process();
    int respond();

    Delivery(User_data *udP, Thread_data *thrP);
};

class StockLevel : public Screen {
protected:
    static char const static_screen[];
    static char const static_empty_fields[];
    static char static_session_data[];
    static int  static_screen_len;
    static int  static_empty_fields_len;
    static int  static_session_data_len;
public:
    StockLevel_data *data;
    int validate();
    int process();
    int respond();

    StockLevel(User_data *udP, Thread_data *thrP);
};

class Menu : public Screen {
protected:
    static char const static_screen[];
    static char const static_empty_fields[];
    static char static_session_data[];
    static int  static_screen_len;
    static int  static_empty_fields_len;
    static int  static_session_data_len;
public:
    Menu(User_data *udP, Thread_data *thrP);
};
```

screen_data.C

```
/* (C)1997 IBM Corporation */
#include "screen.h"


char const NewOrder::static_screen[] =
    POS( 1, 3) CLEAR_EOS
    POS(36, 3) "New Order"
    POS( 1, 4) "Warehouse"
    POS(19, 4) "District:"
    POS(55, 4) "Date:"
    POS( 1, 5) "Customer:"

    POS(19, 5) "Name:"
    POS(44, 5) "Credit:"
    POS(57, 5) "Disc.:"
    POS( 1, 6) "Order Number:"
    POS(25, 6) "Number of Lines:"
    POS(52, 6) "W_Tax:"
    POS(67, 6) "D_Tax:"
    POS( 2, 8) "Supp_W Item_Num Item_Name"
    POS(44, 8) "Qty  Stock  B/G   Price   Amount"
;

char const NewOrder::static_empty_fields[] =
    POS(29, 4) "____" /* District */
    POS(12, 5) "____" /* Customer */

    POS( 3, 9) "_____"
    POS(10, 9) "______"
    POS(45, 9) "__"
    POS( 3,10) "_____"
    POS(10,10) "______"
    POS(45,10) "__"
    POS( 3,11) "_____"
    POS(10,11) "______"
    POS(45,11) "__"
    POS( 3,12) "_____"
    POS(10,12) "______"
    POS(45,12) "__"
    POS( 3,13) "_____"
    POS(10,13) "______"
    POS(45,13) "__"
    POS( 3,14) "_____"
    POS(10,14) "______"
    POS(45,14) "__"
    POS( 3,15) "_____"
    POS(10,15) "______"
    POS(45,15) "__"
    POS( 3,16) "_____"
    POS(10,16) "______"
    POS(45,16) "__"
    POS( 3,17) "_____"
    POS(10,17) "______"
    POS(45,17) "__"
    POS( 3,18) "_____"
    POS(10,18) "______"
    POS(45,18) "__"
    POS( 3,19) "_____"
    POS(10,19) "______"
    POS(45,19) "__"
    POS( 3,20) "_____"
    POS(10,20) "______"
    POS(45,20) "__"
    POS( 3,21) "_____"
    POS(10,21) "______"
    POS(45,21) "__"
    POS( 3,22) "_____"
    POS(10,22) "______"
    POS(45,22) "__"
    POS( 3,23) "_____"
    POS(10,23) "______"
    POS(45,23) "__"
;

char NewOrder::static_session_data[] =
    POS(12,4) "#####" /* Warehouse Id */
;

int NewOrder::static_screen_len = sizeof(NewOrder::static_screen) - 1;
int NewOrder::static_empty_fields_len = sizeof(NewOrder::static_empty_fields) - 1;
int NewOrder::static_session_data_len = sizeof(NewOrder::static_session_data) - 1;

/* Payment */
char const Payment::static_screen[] =
    POS( 1, 3) CLEAR_EOS
    POS( 38,3) "Payment"
    POS( 1,4) "Date:"
    POS( 1,6) "Warehouse:"
    POS( 42,6) "District:"
    POS( 1,11) "Customer:"
    POS( 17,11) "Cust-Warehouse:"
    POS( 39,11) "Cust-District:"
    POS( 1,12) "Name:"
    POS( 50,12) "Since:"
    POS( 50,13) "Credit:"
    POS( 50,14) "%Disc:"
    POS( 50,15) "Phone:"
    POS( 1,17) "Amount Paid:"
    POS( 37,17) "New Cust-Balance:"
    POS( 1,18) "Credit Limit:"
    POS( 1,20) "Cust-Data:"
;
char const Payment::static_empty_fields[] =
    POS( 52, 6) "__" /* District */
    POS( 11,11) "____" /* Customer # */
    POS( 33,11) "_____" /* Cust-Warehouse */
    POS( 54,11) "__" /* Cust-District */
    POS( 29,12) "__________________" /* Name */
    POS( 23,17) "________" /* Amount Paid */
;

char Payment::static_session_data[] =
    POS( 12,6) "#####" /* Warehouse */
;

int Payment::static_screen_len = sizeof(Payment::static_screen) - 1;
int Payment::static_empty_fields_len = sizeof(Payment::static_empty_fields) - 1;
int Payment::static_session_data_len = sizeof(Payment::static_session_data) - 1;

/* Order Status */
char const OrderStatus::static_screen[] =
    POS( 1, 3) CLEAR_EOS
    POS(35, 3) "Order-Status"
    POS( 1, 4) "Warehouse:"
    POS(19, 4) "District:"
    POS( 1, 5) "Customer:"
    POS(18, 5) "Name:"
    POS( 1, 6) "Cust-Balance:"
    POS( 1, 8) "Order-Number"
    POS(26, 8) "Entry-Date:"
    POS(60, 8) "Carrier-Number:"
    POS( 1, 9) "Supply-W"
    POS(14, 9) "Item-Num"
    POS(25, 9) "Qty"
    POS(33, 9)"Amount"
    POS(45, 9) "Delivery-Date"
;
char const OrderStatus::static_empty_fields[] =
    POS(29, 4) "__" /* District */
    POS(11, 5) "____" /* Customer ID */
    POS(44, 5) "__________________" /* Customer Name */
;

char OrderStatus::static_session_data[] =
```

```
    POS(12, 4) "#####" /* Warehouse */
;
int OrderStatus::static_screen_len = sizeof(OrderStatus::static_screen) - 1;
int OrderStatus::static_empty_fields_len = sizeof(OrderStatus::static_empty_fields) - 1;
int OrderStatus::static_session_data_len = sizeof(OrderStatus::static_session_data) - 1;

/* Delivery */
char const Delivery::static_screen[] =
    POS(1,3) CLEAR_EOS
    POS( 38,3) "Delivery"
    POS( 1,4) "Warehouse:"
    POS( 1,6) "Carrier Number:"
;
char const Delivery::static_empty_fields[] =
    POS( 17,6) "__" /* Carrier Number */
;
char Delivery::static_session_data[] =
    POS( 12, 4) "#####" /* Warehouse */
;
int Delivery::static_screen_len = sizeof(Delivery::static_screen) - 1;
int Delivery::static_empty_fields_len = sizeof(Delivery::static_empty_fields) - 1;
int Delivery::static_session_data_len = sizeof(Delivery::static_session_data) - 1;

/* Stock level */
char const StockLevel::static_screen[] =
    POS( 1, 3) CLEAR_EOS
    POS(35, 3) "Stock-Level"
    POS( 1, 4) "Warehouse:"
    POS(19, 4) "District:"
    POS( 1, 6) "Stock Level Threshold:"
    POS( 1, 8) "Low Stock:"
;

char const StockLevel::static_empty_fields[] =
    POS( 24,6) "__" /* Threshold */
;

char StockLevel::static_session_data[] =
    POS( 12,4) "#####" /* Warehouse */
    POS( 29,4) "##"   /* District */
;
int StockLevel::static_screen_len = sizeof(StockLevel::static_screen) - 1;
int StockLevel::static_empty_fields_len = sizeof(StockLevel::static_empty_fields) - 1;
int StockLevel::static_session_data_len = sizeof(StockLevel::static_session_data) - 1;

/* Login */
char const Login::static_screen[] =
    POS( 1, 1) CLEAR_EOS
    POS(30, 3) "Please login."
    POS( 5, 5) "Warehouse:"
    POS(24, 5) "District:"
;
char const Login::static_empty_fields[] =
    POS( 16,5) "_____" /* Warehouse */
    POS( 34,5) "__" /* District */
;
int Login::static_screen_len = sizeof(Login::static_screen) - 1;
int Login::static_empty_fields_len = sizeof(Login::static_empty_fields) - 1;

/* Menu */
char const Menu::static_screen[] =
    POS(1, 1) CLEAR_EOS
    "(1)New-Order (2)Payment (3)Order-Status (4)Delivery (5)StockLevel (9)Exit"
;

int Menu::static_screen_len = sizeof(Menu::static_screen) - 1;

/* end string */
char const Screen::end_str[] = "\033[H\n";
int Screen::end_str_len = sizeof(Screen::end_str) - 1;
```

server.c

```
/*
 * server.c
 *
 * $Revision: 1.11 $
 * $Date: 1999/05/06 21:28:30 $
 * $Log:         server.c,v $
 *
 * $TALog: server.c,v $
 * Revision 1.11  1999/05/06  21:28:30  oz
 * - Removed all the .. from the includes
 * - Added -I.. to the makefiles instead
 * - Moved all the thread related code and connection
 *   selection to serverMon.c
 * [from r1.10 by delta oz-24309-TPCC-add-oracle8.1-code, r1.5]
 *
 * Revision 1.10  1999/04/19  20:14:48  oz
 * - Moved all the simulated code to server.c
 * - Created nulldb.c for compilation with no DB
 * [from r1.8 by delta oz-24331-TPCC-move-sim-code-to-common-file, r1.1]
 *
 * Revision 1.9  1999/04/14  18:11:56  wenjian
 * Make changes so that the web client data structures for transactions
 * are same as the data structures used in SQL server. It is an important
 * change to integrate with MS TPCC kit. It will also avoid copyin/copyout
 * for each transaction.
 * [from r1.8 by delta wenjian-24134-TPCC-make-client-data-structure-same-as-server, r1.1]
 *
 * Revision 1.8  1998/12/11  16:37:58  wenjian
 * Move some common functions from client/client_utils.c to common/tpcc_utils.c.
 * In this version, we only move time_diff_ms(). Need some work in order to
 * move other functions like ERROUT.
 *
 * - Move time_diff_ms() to common/tpcc_utils.c
 * [from r1.7 by delta wenjian-23788-TPCC-use-single-stats-var-for-each-client-and-server, r1.2]
 *
 * Revision 1.7  1998/12/11  16:14:20  wenjian
 * Add code for checking statistic data in a single variable and collecting
 * statistic data based on iStatsFrequency.
 *
 * - Add time_diff_ms()
 * [from r1.6 by delta wenjian-23788-TPCC-use-single-stats-var-for-each-client-and-server, r1.1]
 *
 * Revision 1.6  1998/11/09  16:59:47  wenjian
 * In this revision, most of the changes are related to the directory of header
 * files after directory reorganization. Other changes include adding or removing
 * files to put them in the right directories. Makefiles are written for NT
 * platform so that nmake is working on NT now. Need a top level Makefile for all
 * the directories.
 * [from r1.5 by delta wenjian-23677-TPCC-reorganize-directory-structure, r1.2]
 *
 * Revision 1.5  1998/11/09  14:48:24  wenjian
 * In an effort to make a new directory structure for TPCC, this delta
 * creates two directories: tpcc/client and tpcc/server. All the files
 * for this revision are copied from tpcc/sp-tpcc without any change.
 * Further change may be needed for some files due to the change of
 * the directory structure.
 * [added by delta wenjian-23677-TPCC-reorganize-directory-structure, r1.1]
 *
 * Revision 1.13  1998/11/06  16:10:56  wenjian
 * - Change num_mults from 5 to 20
 * [from r1.12 by delta wenjian-23646-TPCC-clean-up-source-code, r1.1]
 *
 * Revision 1.12  1998/10/22  16:25:12  wenjian
 * Multi-threaded version.
 *
 * - Define deliLog for the output of delivery server
 * - Stop printing to stderr in err_printf() since it seems to be too
 *   expensive on NT. Print to file instead.
 * [from r1.11 by delta wenjian-23529-TPCC-integrate-with-SQL-server, r1.2]
 *
 * Revision 1.11  1998/06/17  15:05:48  wenjian
 * Somehow, read and write didn't work for socket on NT, although they
 * are supposed to work. As a work-around way, use recv and send for
 * NT in this revision. We may change them back if the problem is gone.
 *
 * Use recv and send for socket read and write.
 * [from r1.10 by delta wenjian-21750-TPCC-changes-for-porting-on-NT, r1.2]
 *
 * Revision 1.10  1998/02/17  22:07:06  wenjian
 * Define macros to deal with the different function names on NT
 * [from r1.9 by delta wenjian-21750-TPCC-changes-for-porting-on-NT, r1.1]
 *
 * Revision 1.9  1998/01/23  15:08:48  oz
 * - Updated the SP TPCC directory to the latest files used
 *   during the SP tpcc audit.
 * [from r1.8 by delta oz-20774-TPCC-update-to-latest-SP-version-11-27, r1.1]
 *
 *
 */
/*
 *
 *      TPCC Server
 *
 *  There are currently three versions of the TPCC benchmark
 *  implemented here: An Encina monitor based benchmark,
 *  an Encina Toolkit based benchmark and a DCE only benchmark.
 *
 *  This file, server.c, contains all the code that is common to
 *  all the versions.  Each server has its own main file:
 *  serverMon.c for the monitor server, serverTK.c for the toolkit
 *  server and serverDce.c for the dce server.
 *
 *  Each server is comprised of three main modules: the server specifc
 *  one (mentioned above), the common one, in this file, and the
 *  server part, which is in the SQL files DBInfo.ec, dbInit.ec,
 *  delivery.ec, newOrder.ec, orderStatus.ec, payment.ec, stockLevel.ec.
 */
#include <sys/types.h>
#ifndef WIN32
#include <sys/socket.h>
#include <sys/errno.h>
#else
#include <winsock.h>
#include <io.h>
#endif
#include <fcntl.h>
#include <stdio.h>
#include <stdarg.h>
#include <stdlib.h>
#include <string.h>
#if defined (solaris)
#include <dce/pthread.h>
#else  /* solaris */
#include <pthread.h>
```

```
#endif
#include <utils/trace.h>
#include <tpm/mon.h>

#include "common/utilities.h"
#include "server.h"
#include "common/tpcc_type.h"
#include "common/do_tpcc.h"
#include <time.h>

#define DEFINE_SERVER_DEBUG
#include "serverDebug.h"

#if defined(solaris)
extern int errno;
#endif

#ifdef WIN32
#define O_RDONLY _O_RDONLY
#define  read(A,B,C)    recv(A,B,C,0)
#define open    _open
#define close    _close
#endif

#define SIM_ERROR_CODE TPCC_SUCCESS

#ifdef WIN32
#define RANDOM rand
#else
#define RANDOM random
#endif

#define TPCC_HOME   "/tmp"
#define TIME_PREFIX_LEN 50
extern char sys_errlist[];
extern time_diff_ms(struct timeval *, struct timeval *);

void dprint(char *format, ...);
/*
 *  Global variables common to all types of servers
 */
FILE *server_logtrans = NULL;
FILE *deliLog = NULL;
int logtrans = -1;
FILE *dvry_log = NULL;      /*  FILE structure for delivery log */
int dvry_log_fd = -1;       /*  File descriptor for delivery log */
int status_log = -1;        /*  File descriptor for status log   */
FILE *deliveryLog = NULL;
FILE *deliveryOut = NULL;
int serverIdNumber = 0;     /*  The ID of the server
                                *  This is used to identify output
                                */
int serverPid = 0;
int num_mults = 80;         /*  The number of times the matrices are
                                *  multiplied (in order to spend some time)
                                */

int server_null_test = 0;
int server_init = 0;        /*  The time (in seconds) the test started
                                *  This is used by the deferred delivery
                                *  which reports its times as elapsed time
                                *  since start time
                                */
int null_with_sleep = 1;  /*  Sleep for some time when simulating trans */

void err_printf(char *format, ...);
void logprintf(char *format, ...);

void open_log_files()
{
   /* open DVRY_LOG to keep delivery transactions logs*/
   char logname[MAX_STR_LEN], fname[MAX_STR_LEN];
   char buffer[MAX_STR_LEN];
   char *tpcc_home;
   char *log_dir;
   int  bytes;
   int  current_fp;
   int  current;

   log_dir = getenv("DELIVERY_LOGS");
   if (log_dir == NULL) {
                fprintf(stderr, "DELIVERY_LOGS not specified, using %s\n",
                        TPCC_HOME);
                log_dir = TPCC_HOME;
   }

/*
   sprintf(buffer, "%s/status.%d", log_dir, getpid());
   status_log = creat(buffer, 0666 );
 */

   tpcc_home = getenv("TPCC_HOME");
   if (tpcc_home == NULL) {
                fprintf(stderr, "TPCC_HOME not specified, using /tmp\n");
                tpcc_home = "/tmp";
   }

   sprintf(fname, "%s/CURRENT", tpcc_home );
   current_fp = open(fname, O_RDONLY);
   bytes = read(current_fp, buffer, MAX_STR_LEN);

   if (bytes == -1) {
                fprintf(stderr, "Could not read CURRENT file.\n");
                exit(1);
   }
   buffer[bytes] = '\0';
   current = atoi(buffer);
   close(current_fp);

   dvry_log = NULL;
}

/*
 * logprintf() -- variable argument function used to print error
 *                                and debug statements. Function is called when
 *                                any of the debug macros (defined in serverDebug.h)
 *                                are used.
 */


/*
 *  get_thread_id
 *     A function that returns the thread ID of the current thread
 */
int get_thread_id()
{
   pthread_t thread = pthread_self();
   int thread_id = pthread_getunique_np(&thread);
   return(thread_id);
}

void print_time_prefix(FILE *file)
{
   time_t cur_timet;
   char time_str[30];

   cur_timet = time(&cur_timet);
   strftime(time_str, 29, "%X", localtime(&cur_timet));

   fprintf(file, "%4d %5d %4d %s - ",
                   serverIdNumber, serverPid, get_thread_id(), time_str);
}


char *get_time_prefix(char *buffer)
{
   time_t cur_timet;
   char time_str[30];
   int len;

   cur_timet = time(&cur_timet);
   strftime(time_str, 29, "%X", localtime(&cur_timet));

   len = sprintf(buffer, "%4d %5d %4d %s - ",
                                serverIdNumber, serverPid, get_thread_id(), time_str);
   if (len >= TIME_PREFIX_LEN) {
     fprintf(stderr, "TIME_PREFIX_LEN (%d) too small: %d\n",
                                TIME_PREFIX_LEN, len);
     exit(12);
   }
   return(buffer);
}


void logprintf(char *format, ...)
{
   char formatBuffer[200];
   char *fmt = formatBuffer;
   int fmtLen;
   va_list ap;
   va_start(ap, format);

   fmtLen = TIME_PREFIX_LEN + strlen(format) + 2;
   if (fmtLen > sizeof(formatBuffer)) {
      fmt = (char *)malloc(fmtLen);
   }
   get_time_prefix(fmt);
   strcat(fmt, format);
   if (server_logtrans) {
                vfprintf(server_logtrans, fmt, ap);
                fflush(server_logtrans);
   } else {
                vfprintf(stderr, fmt, ap);
   }
   if (fmt != formatBuffer) free(fmt);
   va_end(ap);
}

void err_printf(char *format, ...)
{
   char formatBuffer[200];
   char *fmt = formatBuffer;
   int fmtLen;
   char timeBuffer[128];
   va_list ap;
   va_start(ap, format);

   fmtLen = TIME_PREFIX_LEN + strlen(format) + 2;
```

```
  if (fmtLen > sizeof(formatBuffer)) {
      fmt = (char *)malloc(fmtLen);
  }
  get_time_prefix(fmt);
  strcat(fmt, format);
  if (server_logtrans) {
     vfprintf(server_logtrans, fmt, ap);
     fflush(server_logtrans);
  } else {
                vfprintf(stderr, fmt, ap);
  }

  if (fmt != formatBuffer) free(fmt);
  va_end(ap);
}


/*
 * dprint() -- variable argument function used to print debug
 *                      statements; for use with DPRINT macro.
 */

void dprint(char *format, ...)
{
  va_list ap;
  va_start(ap, format);

  print_time_prefix(stderr);
  vfprintf(stderr, format, ap);

  va_end(ap);
}

/***  Code that has to do with null servers and simulated DBs  ***/

void mat_mult(int);

#define ROWS 5
#define COLS 5

double matrix_a[ROWS][COLS] = {
 {1.2, 3.4, 2.3, 4.6, 5.2},
 {2.3, 4.5, 1.2, 9.4, 3.1},
 {3.4, 5.2, 3.8, 6.5, 1.6},
 {1.2, 5.3, 6.1, 2.9, 3.8},
 {2.4, 1.2, 3.4, 7.2, 1.0}
};
double matrix_b[ROWS][COLS] = {
 {3.4, 5.9, 2.8, 3.4, 5.6},
 {7.2, 9.3, 4.6, 5.2, 1.3},
 {6.4, 5.2, 8.3, 9.4, 2.3},
 {7.2, 3.4, 6.9, 8.1, 2.3},
 {2.3, 4.5, 7.2, 3.4, 5.8}
};

/*  Num of ms to add to RT  */
static int rt_increment = 0;

/* Num of ms to add to rt_increment after a certain time. */
static int more_srv_work = 0;

/* how often (in second) to add more_srv_work to rt_increment*/
static int period_to_add_rt = 7*60;

/* how often (in second) to check if there is transaction */
static int period_to_check_tran = 10;

static struct timespec *get_wait_time(struct timespec *timeP, int tran)
{
  int ran = RANDOM() % 1000;
  int wait;

  if (0) {
     if (ran > 998) {
                timeP->tv_sec = 10;
     } else if (ran > 990) {
                timeP->tv_sec = 5;
     } else if (ran > 970) {
        timeP->tv_sec = 1;
     } else {
                timeP->tv_sec = 0;
     }
     timeP->tv_nsec = 50000000;
     if (tran == NEWO_TRANS) {
                timeP->tv_nsec *= 2;
                timeP->tv_sec *= 2;
     }
  } else {
                int time_ms = 0;
                if (tran == NEWO_TRANS) {
                   time_ms = 195;
                } else if (tran == PAYMENT_TRANS) {
                   time_ms = 50;
                } else if (tran == ORDER_STAT_TRANS) {
                   time_ms = 115;
                } else if (tran == STOCK_TRANS) {
                   time_ms = 10;
                } else if (tran == DELIVERY_TRANS) {
                   time_ms = 0;
                }
                time_ms += rt_increment;
                timeP->tv_sec = 0;
                timeP->tv_nsec = time_ms * 1000000;
  }
  return(timeP);
}

/**  A simulated new order transaction  */
void sim_new_order(dataP)
 newOrder_data_t *dataP;
{
 int i;
 static int next_id = 100;
 struct timespec wait_time;
 static int lasttime = 0;
 struct timeval now;
 static int periods = 0;

 get_local_time(&now);
 if (now.tv_sec - lasttime > period_to_check_tran) {
  static trans[3];  /*  Keep the counts for the last 5 periods  */
  lasttime = now.tv_sec;

  if ((trans[1] - trans[0] < 2) &&
                (trans[2] - trans[1] < 2)) {
   rt_increment = 0;
   periods = 0;
   more_srv_work = getenv("TPCC_MORE_SERVER_WORK") ?
                                                atoi(getenv("TPCC_MORE_SERVER_WORK")) : 0;
   err_printf("Nothing much happening - resetting test\n");
  } else {
   periods++;
   if (periods % (period_to_add_rt / period_to_check_tran) == 0) {
                rt_increment += more_srv_work;
                err_printf("rt_increment now %d\n", rt_increment);
   }
  }
  trans[0] = trans[1];
  trans[1] = trans[2];
  trans[2] = next_id;
 }


 if (null_with_sleep)
  pthread_delay_np(get_wait_time(&wait_time, NEWO_TRANS));

 mat_mult(num_mults);
 sprintf((char *)dataP->c_last, "BARBARBAR");
 sprintf((char *)dataP->c_credit, "GC");
 dataP->c_discount = 0.33;
 dataP->o_id = next_id++;
 sprintf((char *)dataP->entry_date, "17-12-1995.12:33:56");
 dataP->total = 99.1;
 dataP->w_tax = 0.729;
 dataP->d_tax = 0.15;
 for (i=0; i<dataP->o_ol_cnt; i++) {
  dataP->item[i].price = dataP->item[i].ol_i_id % 1000;
  sprintf((char *)dataP->item[i].name_i, "item %d", i);
  dataP->item[i].s_quantity = i;
  dataP->item[i].brand_generic[0] = i%2 ? 'O' : 'E',
  dataP->item[i].brand_generic[1] = '\0';
  dataP->item[i].ol_amount =
   dataP->item[i].price * dataP->item[i].ol_quantity;
 }

 if ((dataP->item[dataP->o_ol_cnt - 1].ol_i_id < 1) ||
    (dataP->item[dataP->o_ol_cnt - 1].ol_i_id > 100000)) {
  dataP->header.returncode = INVALID_NEWO;
 } else if (RANDOM() % 90 == 0) {
  dataP->header.returncode = SIM_ERROR_CODE;
 } else {
  dataP->header.returncode = TPCC_SUCCESS;
 }
 return;
}

/**  A simulated payment transaction  */
void sim_payment(dataP)
    payment_data_t *dataP;
{
  struct timespec wait_time;

  if (null_with_sleep)
   pthread_delay_np(get_wait_time(&wait_time, PAYMENT_TRANS));
  mat_mult(num_mults);

  dataP->c_id = 1;
  dataP->c_credit_lim = 100.9;
  dataP->c_discount = 0.2;
  dataP->c_balance = 11.1;

  sprintf((char *)dataP->c_first, "%-16s", "c_first");
  sprintf((char *)dataP->c_middle, "%-2s", "MI");
  sprintf((char *)dataP->c_last, "%-16s", "c_last");
  sprintf((char *)dataP->c_street_1, "%-20s", "c_street_1");
  sprintf((char *)dataP->c_street_2, "%-20s", "c_street_2");
  sprintf((char *)dataP->c_city, "%-20s", "c_city");
  sprintf((char *)dataP->c_state, "%-2s", "PA");
```

```
  sprintf((char *)dataP->c_zip, "%-9s", "152111111");
  sprintf((char *)dataP->c_phone, "%-16s", "6522573904218222");
  sprintf((char *)dataP->c_date, "%-19s", "28-11-1995");
  sprintf((char *)dataP->c_credit, "%-2s", "GC");
  sprintf((char *)dataP->pay_date, "%-19s", "17-12-1995.12:39:13");
  sprintf((char *)dataP->d_street_1, "%-20s", "d_street_1");
  sprintf((char *)dataP->d_street_2, "%-20s", "d_street_2");
  sprintf((char *)dataP->d_city, "%-20s", "d_city");
  sprintf((char *)dataP->d_state, "%-2s", "PA");
  sprintf((char *)dataP->d_zip, "%-9s", "152111111");
  sprintf((char *)dataP->w_street_1, "%-20s", "w_street_1");
  sprintf((char *)dataP->w_street_2, "%-20s", "w_street_2");
  sprintf((char *)dataP->w_city, "%-20s", "w_city");
  sprintf((char *)dataP->w_state, "%-2s", "OH");
  sprintf((char *)dataP->w_zip, "%-9s", "142411111");

  if (RANDOM() % 70 == 0) {
     dataP->header.returncode = SIM_ERROR_CODE;
  } else {
     dataP->header.returncode = TPCC_SUCCESS;
  }
}

/**  A simulated stock level  transaction  */
void sim_stock_level(dataP)
    stockLevel_data_t *dataP;
{
  struct timespec wait_time;

  if (null_with_sleep)
    pthread_delay_np(get_wait_time(&wait_time, STOCK_TRANS));

  mat_mult(num_mults);

  dataP->stock_count = 12;
  if (RANDOM() % 80 == 0) {
                dataP->header.returncode = SIM_ERROR_CODE;
  } else {
                dataP->header.returncode = TPCC_SUCCESS;
  }
}


/**  A simulated delivery transaction  */
void sim_delivery(dataP)
    delivery_data_t *dataP;
{
  struct timespec wait_time;

  if (null_with_sleep)
    pthread_delay_np(get_wait_time(&wait_time, DELIVERY_TRANS));

  dataP->start_queue = 2.2;
  dataP->header.returncode = TPCC_SUCCESS;
}

/**  A simulated order status transaction  */
void sim_order_status(dataP)
    orderStatus_data_t *dataP;
{
  int i;
  struct timespec wait_time;

  if (null_with_sleep)
    pthread_delay_np(get_wait_time(&wait_time, ORDER_STAT_TRANS));

  mat_mult(num_mults);


  dataP->c_id = dataP->c_id ? dataP->c_id : 99;
  strcpy((char *)dataP->c_first, "Jerome");
  strcpy((char *)dataP->c_middle, "LB");
  strcpy((char *)dataP->c_last, "Trevoe");
  dataP->c_balance = 90.78;
  dataP->o_id = 99;
  strcpy((char *)dataP->entry_date, "06-12-1995.16:42:28");
  dataP->o_carrier_id = 9;
  dataP->o_ol_cnt = 7;

  for (i=0; i<dataP->o_ol_cnt; i++) {
                dataP->item[i].ol_supply_w_id = 1;
                dataP->item[i].ol_i_id = dataP->w_id * 10 + dataP->d_id;
                dataP->item[i].ol_quantity = 10 * (i+1);
                dataP->item[i].ol_amount = dataP->item[i].ol_quantity * 10.1;
                strcpy((char *)dataP->item[i].delivery_date, "NOT DELIVR");
  }


 if (RANDOM() % 90 == 0) {
  dataP->header.returncode = SIM_ERROR_CODE;
 } else {
  dataP->header.returncode = 0;
 }
}

/*
*  mat_mult
*               Multiply the above two matrices
*/
static void mat_mult(iter)
    int iter;
{
  float res[ROWS][COLS];
  int i, j, k;
  int a_num_rows = ROWS;
  int a_num_columns = COLS;
  int b_num_rows = ROWS;
  int b_num_columns = COLS;

  for (; iter>0; iter--) {
    for (i=0; i<a_num_rows; i++) {
      for (j=0; j<b_num_columns; j++) {
                res[i][j] = 0;
                for (k=0; k<b_num_rows; k++) {
                  res[i][j] += matrix_a[i][k] * matrix_b[k][j];
                }
      matrix_a[i][j] = res[i][0];
      }
    }
    pthread_yield();
  }
}
```

server.h

```
/*
*               server.h
*
* $Revision: 1.11 $
* $Date: 1999/05/06 21:28:31 $
* $Log:          $
*
*
* $TALog: server.h,v $
* Revision 1.11  1999/05/06  21:28:31  oz
* - Removed all the .. from the includes
* - Added -I.. to the makefiles instead
* - Moved all the thread related code and connection
*   selection to serverMon.c
* [from r1.9 by delta oz-24309-TPCC-add-oracle8.1-code, r1.5]
*
* Revision 1.9  1999/01/12  20:52:59  wenjian
* Define MAPOBJNAMEFORMAT so that the server processes and dll can communicate
* via the shared file mappings.
* [from r1.8 by delta wenjian-23856-TPCC-integrate-with-NT-performance-monitor, r1.1]
*
* Revision 1.8  1998/12/14  20:27:57  wenjian
* Made corresponding changes due to data structure change of tran_info_t.
*
* - change server_tran_t
* [from r1.7 by delta wenjian-23788-TPCC-use-single-stats-var-for-each-client-and-server, r1.3]
*
* Revision 1.7  1998/12/11  16:14:20  wenjian
* Add code for checking statistic data in a single variable and collecting
* statistic data based on iStatsFrequency.
*
* - Add server_tran_t and server_info_t
* [from r1.6 by delta wenjian-23788-TPCC-use-single-stats-var-for-each-client-and-server, r1.1]
*
* Revision 1.6  1998/11/09  16:59:48  wenjian
* In this revision, most of the changes are related to the directory of header
* files after directory reorganization. Other changes include adding or removing
* files to put them in the right directories. Makefiles are written for NT
* platform so that nmake is working on NT now. Need a top level Makefile for all
* the directories.
* [from r1.5 by delta wenjian-23677-TPCC-reorganize-directory-structure, r1.2]
*
* Revision 1.5  1998/11/09  14:48:25  wenjian
* In an effort to make a new directory structure for TPCC, this delta
* creates two directories: tpcc/client and tpcc/server. All the files
* for this revision are copied from tpcc/sp-tpcc without any change.
* Further change may be needed for some files due to the change of
* the directory structure.
* [added by delta wenjian-23677-TPCC-reorganize-directory-structure, r1.1]
*
* Revision 1.9  1998/10/22  15:33:05  wenjian
* Make changes to Encina server code to connect with SQL server and add
* callsql.c and sql directory.
*
* Add delivery_sql_t to deal with SYSTEMTIME struct used in SQL
* [from r1.7 by delta wenjian-23529-TPCC-integrate-with-SQL-server, r1.1]
*
* Revision 1.7  1998/01/23  15:08:50  oz
* - Updated the SP TPCC directory to the latest files used
*   during the SP tpcc audit.
* [from r1.6 by delta oz-20774-TPCC-update-to-latest-SP-version-11-27, r1.1]
*
*
*/

/**  server.h  **/

/**  Declarations common to all the server modules  **/
```

```
#ifndef TPCC_SERVER_H
#define TPCC_SERVER_H

#include "common/tpcc_type.h"

#define get_dbname_from_id(i) rmList[i].dbName
#define MAPOBJNAMEFORMAT "srv_%s_PA%d"

#ifdef WIN32
typedef struct {
   delivery_data_t  data;
   SYSTEMTIME       queue_time;
} delivery_sql_t;
#endif

typedef enum {
   mon_server = 11
} server_type_t;

typedef struct {
   int num;
   double RTtotal;
   int RTcount;
} server_tran_t;

typedef struct {
   server_tran_t tran[MAX_TRAN_TYPE + 1];
   int    total_trans;
} server_info_t;

extern int server_no_db;
extern int serverIdNumber;
extern int server_init;
extern server_type_t server_type;
extern int get_db_for_wh(int);

#endif   /*  TPCC_SERVER_H  */
```

serverDebug.h

```
/*
 * serverDebug.h
 *
 * $Revision: 1.5 $
 * $Date: 1998/11/09 14:48:25 $
 * $Log:         serverDebug.h,v $
 * Revision 4.4  95/05/16  10:55:40  10:55:40  tpcc (TPCC Benchmark)
 * Added necessary RCS ident strings
 *
 *
 */
#ifndef SERVER_DEBUG
#define SERVER_DEBUG

#include <utils/trace.h>

#ifdef DEFINE_SERVER_DEBUG
long serverDebug = 0;
#else
extern long serverDebug;
#endif

#ifdef TRACE_TRANS
#define TRACETRAN(list) logprintf list
#else
#define TRACETRAN(list)
#endif

#ifdef DEBUG_SERVER
#define AUDITLOG(list) if (serverDebug & AUDIT_TRANS) UNCOND_EVENT list
#define NEWOLOG(list) if (serverDebug & DBG_NEWO) err_printf list
#define PAYLOG(list) if (serverDebug & DBG_PAY) err_printf list
#define OSLOG(list) if (serverDebug & DBG_OS) err_printf list
#define STKLOG(list) if (serverDebug & DBG_STK) err_printf list
#define DEBUGP(list) if (serverDebug) err_printf list
#else
#define AUDITLOG(list)
#define NEWOLOG(list)
#define PAYLOG(list)
#define OSLOG(list)
#define STKLOG(list)
#define DELLOG(list)
#define DEBUGP(list)
#endif

#define ERRLOG(list) err_printf list
#define SQL_RET_CODE(var, code) var = (code)

/* Fix DPRINT to write on a debugging unit that can get set differently
for delivery */

#ifdef UNIT_TEST
#define DPRINT(list) dprint list
#define DELPRINT(list) delprint list
#else
#define DPRINT(list)
#define DELPRINT(list)
#endif

#define DBG_NEWO        0x0001
#define DBG_PAY                 0x0002
#define DBG_OS                  0x0004
#define DBG_STK                 0x0008
#define DBG_DEL                 0x0010
#define DBG_ERR                 0x0020
#define AUDIT_TRANS     0x0100

#endif                  /* SERVER_DEBUG */
```

serverMon.c

```
/*
 * serverMon.c
 *
 * $Revision: 1.23 $
 * $Date: 1999/05/28 19:44:17 $
 * $Log:         serverEncina.c,v $
 *
 * $TALog: serverMon.c,v $
 * Revision 1.23  1999/05/28  19:44:17  wenjian
 * Add create_null_connection and clean_null_connection so that
 * we can run with NULL DB.
 * [from r1.22 by delta wenjian-24433-TPCC-clean-up-and-update, r1.4]
 *
 * Revision 1.22  1999/05/28  14:30:22  wenjian
 * - Fix a bug for calling get_thread_data()
 * [from r1.21 by delta wenjian-24433-TPCC-clean-up-and-update, r1.3]
 *
 * Revision 1.21  1999/05/26  16:29:59  wenjian
 * Sync with Austin code, and sync code for Oracle DB and SQL server.
 *
 * - Fix some minor bugs
 * [from r1.20 by delta wenjian-24433-TPCC-clean-up-and-update, r1.2]
 *
 * Revision 1.20  1999/05/06  21:28:31  oz
 * - Removed all the .. from the includes
 * - Added -I.. to the makefiles instead
 * - Moved all the thread related code and connection
 *   selection to serverMon.c
 *
 * - Added connection and thread related code.
 * - pre_DB and post_DB always get called.
 * - get_db_ready has only 2 parameters
 * - added tran_info_t, total_tran_count_t, and thread_info_t
 * - Added clean_thread_data and get_thread_data
 * - Preallocate all the connections if necessary after
 *   initializing the DB.
 * - A connection is created by calling the DB specific
 *   create_connection() which returns a void* handle to
 *   be passed to all the transactions.
 * [from r1.18 by delta oz-24309-TPCC-add-oracle8.1-code, r1.5]
 *
 * Revision 1.18  1999/04/20  15:11:28  oz
 * [merge of changes from 1.13 to 1.17 into 1.12]
 *
 * Revision 1.17  1999/04/19  20:14:49  oz
 * - Moved all the simulated code to server.c
 * - Created nulldb.c for compilation with no DB
 * [from r1.13 by delta oz-24331-TPCC-move-sim-code-to-common-file, r1.1]
 *
 * Revision 1.12  1999/01/12  20:53:00  wenjian
 * - Call initialization function perfSrvDataInit to create the shared file
 *   mapping for this server process
 * - Change server_info to pServerInfo
 * [from r1.11 by delta wenjian-23856-TPCC-integrate-with-NT-performance-monitor, r1.1]
 *
 * Revision 1.11  1998/12/14  20:27:58  wenjian
 * Made corresponding changes due to data structure change of tran_info_t.
 *
 * - Made changes for server_tran_t
 * - Add tran_type to FUNCTION_BEGIN, FUNCTION_END, pre_DB, and post_DB
 * [from r1.10 by delta wenjian-23788-TPCC-use-single-stats-var-for-each-client-and-server, r1.3]
 *
 * Revision 1.10  1998/12/11  16:14:20  wenjian
 * Add code for checking statistic data in a single variable and collecting
 * statistic data based on iStatsFrequency.
 *
 * - Change pre_oracle to pre_DB, post_oracle to post_DB
 * - Add code to collect server RT in a global var
 * [from r1.9 by delta wenjian-23788-TPCC-use-single-stats-var-for-each-client-and-server, r1.1]
 *
 * Revision 1.9  1998/12/08  18:55:22  wenjian
 * - Remove "statsFrequency=" command line argument.
 * - Check rpc header for stats
 * [from r1.8 by delta wenjian-23785-TPCC-pass-statsFrequency-from-client-to-server, r1.1]
 *
 * Revision 1.8  1998/12/07  20:04:16  wenjian
 * Remove interfaces for explicit bindings
 * [from r1.7 by delta wenjian-23742-TPCC-update-with-Raliegh-code, r1.2]
 *
 * Revision 1.7  1998/11/24  21:46:03  wenjian
 * - Remove COLLECT_TIMESTAMPS; use command line argument iStatsFrequency
 *   instead
 * - Take care of MULTIPLE_INTERFACE and SINGLE_INTERFACE
 * [from r1.6 by delta wenjian-23742-TPCC-update-with-Raliegh-code, r1.1]
```

```
*
* Revision 1.6  1998/11/09  16:59:48  wenjian
* In this revision, most of the changes are related to the directory of header
* files after directory reorganization. Other changes include adding or removing
* files to put them in the right directories. Makefiles are written for NT
* platform so that nmake is working on NT now. Need a top level Makefile for all
* the directories.
* [from r1.5 by delta wenjian-23677-TPCC-reorganize-directory-structure, r1.2]
*
* Revision 1.5  1998/11/09  14:48:25  wenjian
* In an effort to make a new directory structure for TPCC, this delta
* creates two directories: tpcc/client and tpcc/server. All the files
* for this revision are copied from tpcc/sp-tpcc without any change.
* Further change may be needed for some files due to the change of
* the directory structure.
* [added by delta wenjian-23677-TPCC-reorganize-directory-structure, r1.1]
*
* Revision 1.36  1998/11/06  16:10:56  wenjian
* - Increase the range for the number of threads communicating to the DB.
* - Print warning if the number of threads is out of the range.
* [from r1.35 by delta wenjian-23646-TPCC-clean-up-source-code, r1.1]
*
* Revision 1.35  1998/10/22  21:30:47  wenjian
* [merge of changes from 1.20 to 1.29 into 1.34]
*
* Revision 1.29  1998/10/08  14:18:02  dongfeng
* Add codes for doing web-based tpcc.
* [from r1.20 by delta dongfeng-23067-TPCC-add-web-based-tpcc-client, r1.1]
*
* Revision 1.34  1998/10/22  19:43:38  wenjian
* [merge of changes from 1.28 to 1.32 into 1.30]
*
* Revision 1.32  1998/10/22  16:25:13  wenjian
* Multi-threaded version.
*
* - Open server_logtrans for err_printf() and deliLog for delivery server
* - Call get_time_init() for get_local_time
* - Changes for multi-threaded version
* [from r1.31 by delta wenjian-23529-TPCC-integrate-with-SQL-server, r1.2]
*
* Revision 1.31  1998/10/22  15:33:05  wenjian
* Make changes to Encina server code to connect with SQL server and add
* callsql.c and sql directory.
*
* - Add SYSTEMTIME *queue_time to deferred_dvry_t for NT
* - Allocate space and set value for queue_time
* - Pass delivery_sql_t instead of delivery_data_t for SQLdel on NT
* [from r1.28 by delta wenjian-23529-TPCC-integrate-with-SQL-server, r1.1]
*
* Revision 1.30  1998/10/08  18:03:03  gerstl
* Changes to allow configurations where some servers only service
* specific transaction types. Split transaction interfaces by type.
*
* Transaction interface support is based upon a bitmap passed to the
* server.
* [from r1.28 by delta gerstl-23515-TPCC-allow-separate-online-transaction-interfaces, r1.1]
*
* Revision 1.28  1998/10/07  15:49:49  gerstl
* [merge of changes from 1.22 to 1.26 into 1.27]
*
* Revision 1.26  1998/09/03  20:22:02  wenjian
* Sync with Austin code: mostly use servrMon.c in Austin.
* [from r1.25 by delta wenjian-23183-TPCC-sync-AIX-code-with-Austin, r1.4]
*
* Revision 1.25  1998/09/03  16:07:12  wenjian
* Remove UNCOND_EVENT which is not in austin code.
* [from r1.24 by delta wenjian-23183-TPCC-sync-AIX-code-with-Austin, r1.3]
*
* Revision 1.24  1998/09/02  15:43:30  wenjian
* Define num_worker_threads.
* [from r1.23 by delta wenjian-23183-TPCC-sync-AIX-code-with-Austin, r1.2]
*
* Revision 1.23  1998/08/28  18:30:02  wenjian
* This delta sync the TPCC code with Austin.
*
* - Take care of 1 thread per PA
* - Update with Austin code
* - Remove the old code starting from #ifdef THIS_WAS_THE_OLD_CODE
* - Remove impTPCCDvryInfo()
* [from r1.22 by delta wenjian-23183-TPCC-sync-AIX-code-with-Austin, r1.1]
*
* Revision 1.27  1998/09/26  10:27:33  oz
* Changes for NT.
* [from r1.22 by delta oz-23339-TPCC-update-for-NT, r1.1]
*
* Revision 1.22  1998/08/18  14:38:43  wenjian
* Minor change
* [from r1.20 by delta wenjian-21750-TPCC-changes-for-porting-on-NT, r1.4]
*
* Revision 1.20  1998/02/17  22:07:06  wenjian
* Minor changes for NT
* [from r1.19 by delta wenjian-21750-TPCC-changes-for-porting-on-NT, r1.1]
*
* Revision 1.19  1998/01/30  15:12:28  oz
* - Remove the explicit binding functions from the tidl
*   files and from serverMon.c
* [from r1.18 by delta oz-21697-TPCC-remove-explicit-binding-code, r1.2]
*
* Revision 1.18  1998/01/24  14:17:06  oz
* - User server name to identify server and name delivery file
* - Use env variable HOME instead of /home/encina if HOME is set
*
* - Removed the machine list
*   The server ID is computed from the first number found in the host name
* [from r1.17 by delta oz-21687-TPCC-use-server-name-to-identify-process, r1.1]
*
* Revision 1.17  1998/01/23  21:59:00  oz
* - In order to simplify the Encina TPCC code: Merge the four
*   online transactions into 1 interface
* - Moved all the scripts to a scripts subdirectory
* - Removed unused files
* [from r1.16 by delta oz-21671-TPCC-merge-online-transaction-interfaces, r1.1]
*
* Revision 1.16  1998/01/23  15:08:53  oz
* - Updated the SP TPCC directory to the latest files used
*   during the SP tpcc audit.
* [from r1.15 by delta oz-20774-TPCC-update-to-latest-SP-version-11-27, r1.1]
*
*
*                       serverMon.c
*
*  Code that is monitor specific.
*
*/

#include <sys/types.h>
#ifndef WIN32
#include <unistd.h>
#else
#include <process.h>
#include <winsock.h>
#endif
#include <stdio.h>
#include <stdarg.h>
#include <time.h>
#include <tmxa/tmxa.h>
#include <tc/tc.h>
#include <tpm/mon/mon_server.h>

#if defined (solaris)
#include <dce/pthread.h>
#else   /* solaris */
#include <pthread.h>
#endif  /* solaris */
#include <utils/trace.h>

#include "common/databuf.h"
#include "common/utilities.h"
#include "serverDebug.h"
#include "common/delivery.h"
#ifdef MULTIPLE_INTERFACE
#include "common/neworder.h"
#include "common/payment.h"
#include "common/stocklevel.h"
#include "common/orderstatus.h"
#else
#include "common/tpcc_trans.h"
#endif
#include "server.h"

#  define FUNCTION_BEGIN(name, dataP, tran_type, infoP)                 \
                pre_DB(name, &(dataP)->header, tran_type, infoP);

#  define FUNCTION_END(name, dataP, tran_type, infoP)   \
                post_DB(name, &(dataP)->header, tran_type, infoP);   \


#ifdef WIN32
#define CASECMP(x,y) _stricmp(x,y) == 0
#define getpid  _getpid
extern void TPCexit();
#else
#define CASECMP(x,y) strcasecmp(x,y) == 0
extern void TPCexit();
#endif

extern void *create_connection();
extern void clean_connection(void *);
extern int get_db_ready(char *, int);

inModule("serverMon");

static void start_deferred_delivery_threads();
static void queue_delivery(delivery_data_t *dataP);
static void *create_null_connection();
static void clean_null_connection(void *ptr);

extern int server_null_test;

extern void err_printf( char *format, ...);
extern int get_db_ready(char *, int);
extern void logprintf(char *format, ...);
extern server_info_t *perfSrvDataInit(char *, int);
extern void *start_bg_thread();

static void get_mon_server_env();

server_type_t server_type = mon_server;
```

```
char *tpcc_serverName = NULL;
char *dbName = NULL;
int total_num_warehouses;
int num_deferred_dvry_threads = 1;
int num_worker_threads = 1;
int dvry_queue_size = 3000;
server_info_t *pServerInfo = NULL;
char oracle_home[256];  /* will be used in tpccpl.c */

typedef struct {
    pthread_mutex_t         lock;
    pthread_cond_t          q_cond;
    pthread_cond_t          work_cond;

    int                     num_waiters;  /*  Number of new requests waiting   */

    int                     head, tail;
    int                     allocated;  /* Total size of the queue  */
    int                     size;   /* Num elements currently there  */
#ifdef WIN32
    SYSTEMTIME              *queue_time;
#endif
    delivery_data_t         *data;
} deferred_dvry_t;

static deferred_dvry_t deferred_dvry_data;
#define MAX_DVRY_QUEUE deferred_dvry_data.allocated

/*
 *  Information about one transaction type
 */
typedef struct {
    int num;
    int errs;
    double RT;
} tran_info_t;

/*
 * total_tran_count_t
 *
 * structure that holds the total count of transaction of each type
 * as well as the reposne times.
 *
 */
typedef struct {
    tran_info_t tran[MAX_TRAN_TYPE + 1];
    int errors;
} total_tran_count_t;



typedef struct {
    void *cnP;  /*  DB specific connection to be used by this thread  */

    int calls;      /*  Number of times it was used  */
    int errors;     /*  Total number of errors on this connection  */
    int calls_last_err;   /*  Number of calls when the last error occured  */
    int consecutive_errs; /*  Number of consecutive errs  */
    int connect_time;           /*  Time (seconds) connections was created  */

    /*  For debug  */
    int state;                  /*  State of the connection  */
    struct timeval tran_time;     /*  Time this tran started */
    int cur_tran_type;
    void *cur_tran_dataP;
    total_tran_count_t stat;
    int printed;

} thread_info_t;


#define SVR_STATE_NONE                  0
#define SVR_STATE_SENT                  1
#define SVR_STATE_REPLIED               2
#define SVR_STATE_ERR                   3

/*  Connection related data structures */

static void clean_thread_data(void *ptr);

pthread_key_t thread_key;
pthread_mutex_t init_lock;
thread_info_t *info_array = NULL;  /*  Array of thread data */
int num_threads = 0;  /*  number of threads that have already been init */
int next_thread = 0;  /*  next thread id: next entry in the array  */

int preallocate_cn = 1;  /*  Should all connections be preallocated */
int num_connections = 0;
int num_allocated = 0;

static thread_info_t *get_thread_data();

static void display_mon_env()
{
    char *env_str;
    char envMsg[64];

#define DISPLAY_ENV_VAR(var) \
    if ((env_str = getenv(var)) != NULL) { \
            UNCOND_EVENT("%s == '%s'\n", var, env_str); \
    } else { \
            UNCOND_EVENT("%s not set\n", var);  \
    }

    UNCOND_EVENT("TPCC Server display env.  ID: %d\n", serverIdNumber);

    /*
     *          For debugging purpose: have the first PA
     *  display the following information
     */


    if ((serverIdNumber & 0xff) == 0) {
      DISPLAY_ENV_VAR("RPC_SUPPORTED_PROTSEQS");
      DISPLAY_ENV_VAR("RPC_UNSUPPORTED_NETADDRS");
      DISPLAY_ENV_VAR("ENCINA_BINDING_TIMEOUT");
      DISPLAY_ENV_VAR("ENCINA_THREAD_POOL_QUEUE_LENGTH");
      DISPLAY_ENV_VAR("ENCINA_THREAD_POOL_QUEUE_LENGTH");
      DISPLAY_ENV_VAR("ENCINA_TPOOL_SIZE");
      DISPLAY_ENV_VAR("ENCINA_RPC_THREAD_STACK_SIZE");
    }
}



/*  get_server_index()  --      This is used for debug purposes only
 *
 *  Return the server index for this server.
 *  By convention, all the client machines hvae similar
 *  names with different numbers, as in client1 client2, ...
 *  If the convention is followed the server index is the first
 *  number found.  Otherwise, it is 0.
 *
 */
static int get_server_index()
{
  int i, ind;
  char host_name[128];
  if (0 == gethostname(host_name, sizeof(host_name))) {
    err_printf("Machine is on host %s\n", host_name);
    ind = strcspn(host_name, "0123456789");
    return(atol(host_name + ind));
  }

  return(0);
}


static parse_cmd_line(int argc, char *argv[], char **scheduling, int *interface_type)
{
    int nextInd = 1;
    char usageStr[128];
    int envRetrieval;
    if ((nextInd + 3) > argc) {
        sprintf(usageStr,
            "Not enough parameters.  Usage: %s [-no_db] interfaces schedulingPolicy envRetrievalFlag
[dvry=#] [debugFlag] [db:<rmName>] [cn=#].", argv[0]);

        fprintf(stderr, "%s\n", usageStr);
        mon_TerminateServer(usageStr);

    } else {
        if (strcmp(argv[nextInd], "-no_db") == 0) {
            server_null_test = 1;
            fprintf(stderr, " ---== NULL test ==---\n");
            nextInd++;
        }
        *interface_type = strtol(argv[nextInd++], NULL, 0);
        *scheduling = argv[nextInd++];
        envRetrieval = atoi(argv[nextInd++]);

        while (nextInd < argc) {
            if (strncmp(argv[nextInd], "db:", 3) == 0) {
                                                                dbName = argv[nextInd] + 3;
                nextInd++;
            } else if (strncmp(argv[nextInd], "dvry=", 5) == 0) {
                num_deferred_dvry_threads = atol(argv[nextInd] + 5);
                if (num_deferred_dvry_threads < 0 || num_deferred_dvry_threads > 200) {
                                    err_printf("num_deferred_dvry_threads was %d (>200), reset to 10\n",
num_deferred_dvry_threads);
                    num_deferred_dvry_threads = 10;
                                }
                nextInd++;
            } else if (strncmp(argv[nextInd], "dvryQ=", 6) == 0) {
                dvry_queue_size = atol(argv[nextInd] + 6);
                if (dvry_queue_size < 1 || dvry_queue_size > 200000)
                    dvry_queue_size = 10;
                nextInd++;
            } else {
                serverDebug = atol(argv[nextInd++]);
            }
        }
    }
}


static void set_scheduling(char *scheduling)
```

```
{
   mon_paAccess_t paAccess;
   UNCOND_EVENT("Setting Scheduling Policy: %s\n", scheduling);

   if(CASECMP(scheduling, "MON_CONCURRENT_SHARED")) {
      paAccess = MON_CONCURRENT_SHARED;
   } else if(CASECMP(scheduling, "MON_EXCLUSIVE")) {
      num_deferred_dvry_threads = 1;
      paAccess = MON_EXCLUSIVE;
   } else if(CASECMP(scheduling, "MON_SHARED")) {
                num_deferred_dvry_threads = 1;
      paAccess = MON_SHARED;
   } else {
                err_printf("Invalid Policy: '%s'\n", scheduling);
      mon_TerminateServer("Invalid scheduling policy specified.");
   }

   ENCINA_CALL("mon_SetSchedulingPolicy",
            mon_SetSchedulingPolicy(paAccess));
}

static void register_interfaces(int interface_type)
{
   extern FILE *deliLog;
   char *env_str;
   int env_val;

   UNCOND_EVENT("Registering interfaces\n");

   num_worker_threads = 0;

   /* interface_type is a bitmap of the interfaces this
    * server needs to support.
    */
#ifdef MULTIPLE_INTERFACE
   if (interface_type & NEWO_INTERFACE) {
                ENCINA_CALL("mon_InitServerInterface",
                                mon_InitServerInterface(MON_SERVER_INTERFACE(neworder,1,0)));
   }
   if (interface_type & PAYMENT_INTERFACE) {
                ENCINA_CALL("mon_InitServerInterface",
                                mon_InitServerInterface(MON_SERVER_INTERFACE(payment,1,0)));
   }
   if (interface_type & ORDER_STAT_INTERFACE) {
                ENCINA_CALL("mon_InitServerInterface",
                                mon_InitServerInterface(MON_SERVER_INTERFACE(orderstatus,1,0)));
   }
   if (interface_type & STOCK_INTERFACE) {
                ENCINA_CALL("mon_InitServerInterface",
                                mon_InitServerInterface(MON_SERVER_INTERFACE(stocklevel,1,0)));
   }
#else
   if (interface_type & ONLINE_INTERFACES) {
                ENCINA_CALL("mon_InitServerInterface",
                                mon_InitServerInterface(MON_SERVER_INTERFACE(tpccTrans,1,0)));
   }
#endif

   if (interface_type & DELIVERY_INTERFACE) {
#ifdef WIN32
     deliLog = fopen("deliLog.out", "w");
#endif
     if (num_deferred_dvry_threads > 0) {
        start_deferred_delivery_threads();
     }
     ENCINA_CALL("mon_InitServerInterface",
                                mon_InitServerInterface(MON_SERVER_INTERFACE(delivery,1,0)));
   } else {
     num_deferred_dvry_threads = 0;
   }

   /* ENCINA_TPOOL_SIZE and ENCINA_APPL_TPOOL_SIZE
    * are set in tpccCommon.tcl for each
    * server started. If we are delivery only, we don't care
    * about it, otherise we need to adjust num_worker_threads
    */
   if (interface_type & ONLINE_INTERFACES) {
     if ((env_str = getenv("ENCINA_APPL_TPOOL_SIZE")) != NULL) {
       env_val = atol(env_str);
       if (env_val >= 0 && env_val < 1000)
         num_worker_threads += env_val;
       else {
                  err_printf("ENCINA_APPL_TPOOL_SIZE was %d, reset to 10\n", env_val);
         num_worker_threads += 10;
                }
     }
     if ((env_str = getenv("ENCINA_TPOOL_SIZE")) != NULL) {
       env_val = atol(env_str);
       if (env_val >= 0 && env_val < 1000)
         num_worker_threads += env_val;
       else {
                  err_printf("ENCINA_TPOOL_SIZE was %d, reset to 10\n", env_val);
         num_worker_threads += 5;
                }
     }
     if (num_worker_threads < 1) num_worker_threads = 1;
   }

}

void main(argc,argv)
   int argc;
   char *argv[];
{
   extern FILE *server_logtrans;
   int rc;
   int pa_num;
   char *scheduling = "";
   int rmId;
   char intermediary[256];
   extern int serverPid;
   int interface_type = ALL_INTERFACE;
   int status;

   inFunction("server_Init");

   /* hard code first for a quick test */
   /* getenv didn't work, though we have ORACLE_HOME defined */
   /*    strcpy(oracle_home,getenv("ORACLE_HOME")); */
   strcpy(oracle_home, "/home/oracle815/app/oracle/product/8.1.5");

   server_logtrans = fopen("server_print.out", "w");

   get_time_init();

   serverPid = getpid();
   UNCOND_EVENT("TPCC Server Starting\n");

   /*  Use the top 8 bits of the serverIdNumber to store the server index */
   serverIdNumber = (get_server_index() & 0xff) * 1000;

   parse_cmd_line(argc, argv, &scheduling, &interface_type);

   display_mon_env();

   DEBUGP(("Debug level set at %d\n", serverDebug));


   DEBUGP(("Creating thread data key"));
   if(status = pthread_keycreate(&thread_key, clean_thread_data)) {
                fprintf(stderr, "init_global_data : pthread_keycreate failed: %d\n", status);
                mon_TerminateServer("Cannot create a key for the thread data");
   }

   mon_RetrieveEnable(FALSE);

   err_printf("Setting scheduling %s.\n", scheduling);
   set_scheduling(scheduling);
   err_printf(" Registering interfaces \n");
   register_interfaces(interface_type);

   err_printf("Calling mon_init\n");
   ENCINA_CALL("mon_InitServer", mon_InitServer());
   ENCINA_CALL("mon_SetHandleCacheRefreshInterval",
            mon_SetHandleCacheRefreshInterval(300));

   pa_num = mon_RetrievePaNum();
   tpcc_serverName = mon_RetrieveServerId();
   if (pa_num > 0)
                serverIdNumber += pa_num;
   err_printf("PA Number %d, serverId %d (%s)\n",
                        pa_num, serverIdNumber, tpcc_serverName);


   num_connections = num_deferred_dvry_threads + num_worker_threads;

   if ((rc = get_db_ready(dbName, 0)) != 0) {
                char msg[128];
                sprintf(msg, "failed to open database tpcc/tpcc: %d", rc);
     WARNING("%s\n", msg);
     err_printf("%s\n", msg);
                mon_TerminateServer(msg);
   }
   if (preallocate_cn || num_connections == 1) {
                int i;
                thread_info_t *curP;
                /*  Preallocate all the desired connections  */
                logprintf("Preallocating %d connections to the DB\n", num_connections);
                info_array = (thread_info_t*)calloc(num_connections, sizeof(*info_array));

                for (i=0, curP = info_array; i<num_connections; i++, curP++) {
                  if (server_null_test)
                                curP->cnP = create_null_connection();
                  else
                                curP->cnP = create_connection();
                }
                num_allocated = num_connections;
   }

   /* initialize pServerInfo */
#ifdef WIN32
   pServerInfo = perfSrvDataInit(tpcc_serverName, pa_num);
#endif
   if (pServerInfo == NULL)
                pServerInfo = malloc(sizeof(server_info_t));
   memset(pServerInfo,0,sizeof(server_info_t));
#ifndef WIN32
   start_bg_thread();
```

```
#endif

   err_printf(">> Calling mon_BeginService()\n");

   ENCINA_CALL("mon_BeginService", mon_BeginService());

   fprintf(stderr, "mon_BeginService returned ... terminating\n");
   TPCexit();
}

static void clean_thread_data(void *ptr) {
   thread_info_t *threadP = (thread_info_t *)ptr;
   if (server_null_test)
                clean_null_connection(threadP->cnP);
   else
                clean_connection(threadP->cnP);
   err_printf("Closing connection 0x%p.  Called %d, %d errors\n",
                        threadP->cnP, threadP->calls, threadP->errors);
}

/*
 *  The routine executed by the deferred delivery thread
 *
 *  Logic:
 *                Wait until there is a valid request in the deferred delivery data.
 *                After processing the request data_valid is set to FALSE
 *                (allowing new requests to be queued).
 *  This is a simple fixed size queue implemented in a cyclic array
 */
static void deferred_delivery()
{
   thread_info_t *infoP;
   pthread_mutex_lock(&deferred_dvry_data.lock);

   while (1) {
                if (deferred_dvry_data.size > 0) {
                   /*
                    *  There is a request to be processed
                    */
                   int ind = deferred_dvry_data.head % MAX_DVRY_QUEUE;
#ifdef WIN32
                   delivery_sql_t  dbData;
                   dbData.data = deferred_dvry_data.data[ind];
                   dbData.queue_time = deferred_dvry_data.queue_time[ind];
#else
                   delivery_data_t data = deferred_dvry_data.data[ind];
#endif

                   deferred_dvry_data.head ++;
                   deferred_dvry_data.size --;

                   if (deferred_dvry_data.num_waiters > 0)
                                pthread_cond_signal(&deferred_dvry_data.q_cond);

                   if (deferred_dvry_data.head % 1000 == 0) {
                                err_printf("Processed %d deferred deliveries so far, queue size %d\n",
                                                deferred_dvry_data.head,
                                                deferred_dvry_data.size);
                   }
                   if (deferred_dvry_data.head > deferred_dvry_data.tail) {
                                err_printf("Error: Deferred Queue: head %d > tail %d\n",
                                                deferred_dvry_data.head,
                                                deferred_dvry_data.tail);
                                continue;
                   }
                   pthread_mutex_unlock(&deferred_dvry_data.lock);

#ifdef WIN32
                   if (server_null_test) {
                                sim_delivery(&dbData);
                   } else {
                                infoP = get_thread_data();
                                do_delivery(infoP->cnP, &dbData);
                   }
#else
                   if (server_null_test) {
                                sim_delivery(&data);
                   } else {
                                infoP = get_thread_data();
                                do_delivery(infoP->cnP, &data);
                   }
#endif

                   DPRINT(("Deferred: Locking\n"));
                   pthread_mutex_lock(&deferred_dvry_data.lock);

                } else {
                   /*
                    *  Wait for a request to be queued
                    */
                   DPRINT(("Deferred delivery waiting\n"));
                   pthread_cond_wait(&deferred_dvry_data.work_cond,
                                                &deferred_dvry_data.lock);
          DPRINT(("Deferred: Awake\n"));
       }
   }
}

/*
 *  queue_delivery
 *
 *  Queue a delivery request to be processed in the background
 *  The queue is implemented as a simple queue of size 1.
 *  if data_valid is true: there is already a request waiting in the queue
 *  Sleep on a condition variable until the queue is empty.
 *  Once the queue is empty put the request in the queue, wake up the
 *  background thread and leave.
 */

static void queue_delivery(dataP)
  delivery_data_t *dataP;
{
   struct timeval now;
   int waited = 0;
   static int last_report_time = 0;
#ifdef WIN32
   SYSTEMTIME  queue_time;
#endif

   DPRINT(("queue: Locking\n"));
   pthread_mutex_lock(&deferred_dvry_data.lock);
   DPRINT(("queue: Locked\n"));

   while (deferred_dvry_data.size >= MAX_DVRY_QUEUE) {
                /*  The request queue is full
                 *  Wait until a request is processed and removed from the queue.
                 */
                deferred_dvry_data.num_waiters ++;
                DPRINT((">> queue_delivery: %d waiters, size %d\n",
                                deferred_dvry_data.num_waiters, deferred_dvry_data.size));
                DPRINT(("Queue Delivery waiting, %d waiters\n",
                                deferred_dvry_data.num_waiters));
                pthread_cond_wait(&deferred_dvry_data.q_cond,
                                                &deferred_dvry_data.lock);
                deferred_dvry_data.num_waiters --;
                waited ++;
   }
   DPRINT(("Queuing delivery\n"));
   /*
    *  There is room in the queue.
    *  Enter the request and wake up the background thread
    */
#ifdef WIN32
   GetLocalTime(&queue_time);
   deferred_dvry_data.size++;
   deferred_dvry_data.data[deferred_dvry_data.tail % MAX_DVRY_QUEUE] = *dataP;
   deferred_dvry_data.queue_time[deferred_dvry_data.tail % MAX_DVRY_QUEUE] = queue_time;

#else
   get_local_time(&now);
   dataP->start_queue = (double)now.tv_sec + (now.tv_usec / 1000000.0);
   deferred_dvry_data.size++;
   deferred_dvry_data.data[deferred_dvry_data.tail % MAX_DVRY_QUEUE] = *dataP;
   if (now.tv_sec - last_report_time > 29) {
                err_printf("queue_delivery - %d waiters, size %d\n",
              deferred_dvry_data.num_waiters, deferred_dvry_data.size);
                last_report_time = now.tv_sec;
   }
#endif

   deferred_dvry_data.tail++;
   DPRINT(("queue_delivery: Signalling\n"));
   pthread_cond_signal(&deferred_dvry_data.work_cond);

   DPRINT(("queue_delivery: Unlocking.  Tail %d, size %d Max %d\n",
                deferred_dvry_data.tail,
                deferred_dvry_data.size,
                MAX_DVRY_QUEUE));
   pthread_mutex_unlock(&deferred_dvry_data.lock);

   if (waited) err_printf(">> queue_delivery waited %d times\n", waited);
   dataP->header.returncode = TPCC_SUCCESS;
}

/*
 * start_deferred_delivery_threads
 *
 *                Initialize the deferred delivery data structure and start
 *                a background thread to process the delivery requests
 */
static void start_deferred_delivery_threads()
{
   pthread_t thread;
   int i;
   int rc;

   pthread_mutex_init(&deferred_dvry_data.lock, pthread_mutexattr_default);
   pthread_cond_init(&deferred_dvry_data.work_cond, pthread_condattr_default);
   pthread_cond_init(&deferred_dvry_data.q_cond, pthread_condattr_default);
   deferred_dvry_data.num_waiters = 0;
   deferred_dvry_data.head = 0;
   deferred_dvry_data.tail = 0;
   deferred_dvry_data.size = 0;
   deferred_dvry_data.allocated = dvry_queue_size;
   deferred_dvry_data.data =
                (delivery_data_t *)malloc(dvry_queue_size * sizeof(delivery_data_t));
#ifdef WIN32
   deferred_dvry_data.queue_time =
```

```
                (SYSTEMTIME *)malloc(dvry_queue_size * sizeof(SYSTEMTIME));
#endif

  /*
   *  Create the background delivery thread.
   */
  err_printf("Starting %d deferred delivery threads, queue size %d\n",
                        num_deferred_dvry_threads,
                        dvry_queue_size);
  for (i=0; i<num_deferred_dvry_threads; i++) {
     if ((rc = pthread_create(&thread,
                                                pthread_attr_default,
                                                (pthread_startroutine_t)deferred_delivery,
                                                (pthread_addr_t)0)) != 0) {
                WARNING("Failed to create delivery thread rc=%d\n", rc);
                exit(1);
     }
     (void)pthread_detach(&thread);
  }
}

void exit_program(code)
    int code;
{
 char errMsg[55];
 sprintf(errMsg, "exit_program called with code %d", code);
 fprintf(stderr, "%s\n", errMsg);

 TPCexit();

 mon_TerminateServer(errMsg);
}

static char *thread_state_to_str(int state)
{
  char *retval;
  switch(state) {
                case SVR_STATE_NONE: retval = "None"; break;
                case SVR_STATE_SENT: retval = "Sent"; break;
                case SVR_STATE_REPLIED: retval = "Replied"; break;
                case SVR_STATE_ERR: retval = "Err"; break;
                default: retval = "unknown"; break;
  }
  return retval;
}


static thread_info_t *get_thread_data() {
  thread_info_t *dataP;
  struct timeval cur_time;

  /*  Get a thread structure.
   *  Each thread always uses the same connection.
   *  The first time the thread tries to talk to the DB it creates
   *  a connection, initializes it and stores it in a thread global
   *  data structure.
   *
   *  There is a special case for the single connection case:  If there
   *  is exactly one connection then it is global and not per thread.
   *  There may be maany threads but it is assumed that the application is
   *  responsible for synchronizing the threads so that no two threads
   *  ever use the connection at the same time.
   */
  if (num_connections == 1) {
                dataP = &info_array[0];
  } else {
     pthread_getspecific(thread_key, (pthread_addr_t *)&dataP);
  }
  if (dataP == NULL) {  /* No connection assigned to this thread */
                pthread_mutex_lock(&init_lock);  /*  Initialize a connection */
                get_local_time(&cur_time);

     fprintf(stderr, "get_cn> initializing thread slot\n");

                if (preallocate_cn) {
                   if (next_thread >= num_allocated) {
                                fprintf(stderr, "Too many threads, not enough connections\n");
                                mon_TerminateServer("Too many threads, not enough connections");
                   }
                   dataP = &info_array[next_thread++];
                } else {
                   dataP = (thread_info_t *)malloc(sizeof(thread_info_t));
                   memset(dataP, (char)0, sizeof(*dataP));
                   if (server_null_test)
                                dataP->cnP = create_null_connection();
                   else
                                dataP->cnP = create_connection();
                }
     pthread_setspecific(thread_key, dataP);  /*  Store it  */

     fprintf(stderr, "get_cn> initialized connection 0x%x\n", dataP);
                pthread_mutex_unlock(&init_lock);

  }
  return dataP;
}


static void pre_DB(char *name, data_header *headerP,
                                int tran_type, thread_info_t *infoP)
{
  struct timeval tp;
  DPRINT(("> %s", name));
  get_local_time(&tp);
 if (infoP != NULL) {
  infoP->cur_tran_type = tran_type;
  infoP->calls++;
  infoP->state = SVR_STATE_SENT;
  infoP->tran_time = tp;
 }

  headerP->start_time.sec = tp.tv_sec;
  headerP->start_time.usec = tp.tv_usec;
}

static void post_DB(char *name, data_header *headerP,
                                int tran_type, thread_info_t *infoP)
{
  struct timeval tp;
  DPRINT(("< %s\n", name));
  get_local_time(&tp);
  headerP->end_time.sec = tp.tv_sec;
  headerP->end_time.usec = tp.tv_usec;
  headerP->dtype = serverIdNumber;

 if (infoP != NULL){
  infoP->tran_time = tp;
  infoP->state = SVR_STATE_REPLIED;
 }

  pServerInfo->tran[tran_type].num++;
  /* store the RT info for this server */
  if (tran_type <= MAX_TRAN_TYPE && tran_type > 0) {
        pServerInfo->tran[tran_type].RTtotal +=
time_diff_ms(&(headerP->end_time),&(headerP->start_time));
        pServerInfo->tran[tran_type].RTcount ++;
   }

 }

/*
 * ----------------------  The following are the entry points
 *                                                for the RPCs arriving at the Server
 */

void impTPCCDbInfo(dataP,trpcStatus)
  dbInfo_data_t *dataP;
  trpc_status_t  *trpcStatus;
{
    UNCOND_EVENT("> impTPCCDbInfo");
    err_printf("> impTPCCDbInfo");
    dataP->server_id = serverIdNumber;
    err_printf("< impTPCCDbInfo");
}



void impTPCCNOInfo(dataP,trpcStatus)
  dbInfo_data_t *dataP;
  trpc_status_t  *trpcStatus;
{
    impTPCCDbInfo(dataP,trpcStatus);
}


void impTPCCNewOrder(dataP,trpcStatus)
  newOrder_data_t *dataP;
  trpc_status_t  *trpcStatus;
{

    static int numCalls = 0;
    thread_info_t *infoP = get_thread_data();
    FUNCTION_BEGIN("NewOrder", dataP, NEWO_TRANS, infoP);
    if (server_null_test) {
                sim_new_order(dataP);
    } else {
                do_new_order(infoP->cnP, dataP);
    }

    if ((dataP->header.returncode != TPCC_SUCCESS) &&
                (dataP->header.returncode != INVALID_NEWO)) {
      logprintf("< impTPCCNewOrder; rc=%d, sql=%d, isam=%d\n",
                                dataP->header.returncode,
                                dataP->header.sql_code,
                                dataP->header.isam_code);
    } else if (dataP->header.returncode == INVALID_NEWO) {
                DPRINT(("< impTPCCNewOrder INVALID_NEWO\n"));
    }
    if (++numCalls % 10000 == 0) {
                err_printf("impTPCCNewOrder so far %d\n", numCalls);
    }
    FUNCTION_END("NewOrder", dataP, NEWO_TRANS, infoP);
}

void impTPCCPayment(dataP,trpcStatus)
  payment_data_t *dataP;
  trpc_status_t  *trpcStatus;
{
```

```
    static int numCalls = 0;
    thread_info_t *infoP = get_thread_data();
    FUNCTION_BEGIN("Payment", dataP, PAYMENT_TRANS, infoP);
    if (server_null_test) {
                    sim_payment(dataP);
    } else {
                    do_payment(infoP->cnP, dataP);
    }

    if (dataP->header.returncode != TPCC_SUCCESS) {
      logprintf("< impTPCCPayment; rc=%d, sql=%d, isam=%d\n",
                                    dataP->header.returncode,
                                    dataP->header.sql_code,
                                    dataP->header.isam_code);
    }
    if (++numCalls % 10000 == 0) {
       err_printf("impTPCCPayment so far %d\n", numCalls);
    }
    FUNCTION_END("Payment", dataP, PAYMENT_TRANS, infoP);
}

void impTPCCOrderStatus(dataP,trpcStatus)
 orderStatus_data_t *dataP;
 trpc_status_t  *trpcStatus;
{
    thread_info_t *infoP = get_thread_data();
    FUNCTION_BEGIN("OrderStatus", dataP, ORDER_STAT_TRANS, infoP);
    if (server_null_test) {
                    sim_order_status(dataP);
    } else {
                    do_order_status(infoP->cnP, dataP);
    }

    if (dataP->header.returncode != TPCC_SUCCESS) {
      logprintf("< impTPCCOrderStatus; rc=%d, sql=%d, isam=%d\n",
                                    dataP->header.returncode,
                                    dataP->header.sql_code,
                                    dataP->header.isam_code);
    }
    FUNCTION_END("OrderStatus", dataP, ORDER_STAT_TRANS, infoP);
}


void impTPCCStockLevel(dataP,trpcStatus)
 stockLevel_data_t *dataP;
 trpc_status_t   *trpcStatus;
{
    thread_info_t *infoP = get_thread_data();
    FUNCTION_BEGIN("StockLevel", dataP, STOCK_TRANS, infoP);
    if (server_null_test) {
                    sim_stock_level(dataP);
    } else {
                    do_stock_level(infoP->cnP, dataP);
    }

    if (dataP->header.returncode != TPCC_SUCCESS) {
      logprintf("< impTPCCStockLevel; rc=%d, sql=%d, isam=%d\n",
                                    dataP->header.returncode,
                                    dataP->header.sql_code,
                                    dataP->header.isam_code);
    }
    FUNCTION_END("StockLevel", dataP, STOCK_TRANS, infoP);
}

void impTPCCDelivery(dataP,trpcStatus)
 delivery_data_t *dataP;
 trpc_status_t   *trpcStatus;
{
#ifdef WIN32
    delivery_sql_t dbData;
#endif

    thread_info_t *infoP = NULL;
    FUNCTION_BEGIN("DELIVERY", dataP, DELIVERY_TRANS, infoP);
    if (num_deferred_dvry_threads > 0) {
       queue_delivery(dataP);
    } else {
#ifdef WIN32
                    if (server_null_test) {
                       sim_delivery(&dbData);
                    } else {
                       infoP = get_thread_data();
                       do_delivery(infoP->cnP, &dbData);
                    }
#else
                    if (server_null_test) {
                       sim_delivery(dataP);
                    } else {
                       infoP = get_thread_data();
                       do_delivery(infoP->cnP, dataP);
                    }
#endif
    }


    if (dataP->header.returncode != TPCC_SUCCESS) {
      logprintf("< impTPCCDelivery; rc=%d, sql=%d, isam=%d\n",
                                    dataP->header.returncode,
                                    dataP->header.sql_code,
                                    dataP->header.isam_code);
    }
    FUNCTION_END("DELIVERY", dataP, DELIVERY_TRANS, infoP);
}

/* functions in order to run with NULL database */
static void *create_null_connection() {
    static cn_num = 0;
    int *id = (int *)malloc(sizeof(int));
    *id = cn_num++;
    return id;
}

static void clean_null_connection(void *ptr) {
    free(ptr);
    return;
}
```

stocklevel.tacf

```
/*
 * Copyright (C) 1991, 1990 Transarc Corporation
 * All Rights Reserved
 */
/*
 * stocklevel.tacf -- attribute configuration file for tpcc server.
 * used for transparent binding
 *
 * $Revision: 1.1 $
 * $Date: 1998/11/06 21:10:16 $
 * $Log:          tpcc.tacf,v $
 *
 * $TALog: stocklevel.tacf,v $
 * Revision 1.1  1998/11/06  21:10:16  dongfeng
 * - Move all files common to client and server to tpcc/common
 *   directory
 * [added by delta dongfeng-23677-TPCC-new-directory-structures, r1.1]
 *
 * Revision 1.2  1998/10/08  18:03:04  gerstl
 * Changes to allow configurations where some servers only service
 * specific transaction types. Split transaction interfaces by type.
 * [added by delta gerstl-23515-TPCC-allow-separate-online-transaction-interfaces, r1.1]
 *
 *
 *
 */

[implicit_handle (mon_handle_t handle)]
interface stocklevel
{
}
```

stocklevel.tidl

```
/*
 * id: $id: $
 *
 * component_name: encina benchmarks
 *
 * the following functions list may not be complete.
 * functions defined by/via macros may not be included.
 *
 * functions:
 *     <fill_me_in>
 *
 * origins: transarc corp.
 *
 * (c) copyright transarc corp. 1995, 1993
 * all rights reserved
 * licensed materials - property of transarc
 *
 * us government users restricted rights - use, duplication or
 * disclosure restricted by gsa adp schedule contract with transarc corp
 */
/*
 * history
 * $talog: $
 */
/*
 * stocklevel.tidl -- interface definition file for tpccserver.
 *
 * $revision: 1.0 $
 * $date: 1995/10/20 21:55:05 $
 * $log:          tpcc.tidl,v $
 */
[
    uuid(1dda58c8-5e05-11d2-bd18-9e621208aa77),
    version(1.0)
]
interface stocklevel
{
import "tpm/mon/mon_handle.idl";
import "tpcc_type.idl";

[nontransactional] void
                    impTPCCStockLevel([in,out] stockLevel_data_t *dataP,
```

```
                                        [out] trpc_status_t  * trpcStatus);
}
```

tpcc.h

```
#if !defined(TPCC_H_INCLUDED)
#define TPCC_H_INCLUDED
/*****************************************************************************/
/*                                                                           */
/*     File: tpcc.h                                                          */
/*     created: 8-26-91                                                      */
/*                                                                           */
/*     program description:                                                  */
/*                                                                           */
/*     This module contains global variables and data definitions            */
/*     for the tpcc application.                                             */
/*                                                                           */
/*****************************************************************************/

#include "../../common/tpcc_type.h"

#define TPCCH

/*-------------------------------------------------------*/
/*            Global numbers, constants,...              */
/*-------------------------------------------------------*/

#define INVALID_ITEM            100
#define TRAN_OK                 0
#define REMOTE_WAREHOUSE        17

#define FORM_DATE               1
#define FORM_DATETIME           2

#define MAX_ITEMS 15

/*-------------------------------------------------------*/
/*            transaction structures                     */
/*-------------------------------------------------------*/

typedef orderStatus_data_t OrderStatus_data;
typedef newOrder_data_t NewOrder_data;
typedef stockLevel_data_t StockLevel_data;
typedef delivery_data_t Delivery_data;
typedef payment_data_t Payment_data;

/*****************************************************************************
 Compatibility for older .sqc files
 *****************************************************************************/
#define s_C_BALANCE c_balance
#define s_C_CITY c_city
#define s_C_CREDIT c_credit
#define s_C_CREDIT_LIM c_credit_lim
#define s_C_DATA c_data
#define s_C_DISCOUNT c_discount
#define s_C_D_ID c_d_id
#define s_C_FIRST c_first
#define s_C_ID c_id
#define s_C_LAST c_last
#define s_C_MIDDLE c_middle
#define s_C_PHONE c_phone
#define s_C_SINCE c_date
#define s_C_STATE c_state
#define s_C_STREET_1 c_street_1
#define s_C_STREET_2 c_street_2
#define s_C_W_ID c_w_id
#define s_C_ZIP c_zip
#define s_D_CITY d_city
#define s_D_ID d_id
#define s_D_STATE d_state
#define s_D_STREET_1 d_street_1
#define s_D_STREET_2 d_street_2
#define s_D_TAX d_tax
#define s_D_ZIP d_zip
#define s_H_AMOUNT h_amount
#define s_H_DATE pay_date
#define s_I_NAME name_i
#define s_I_PRICE price
#define s_OL_AMOUNT ol_amount
#define s_OL_DELIVERY_D delivery_date
#define s_OL_I_ID ol_i_id
#define s_OL_QUANTITY ol_quantity
#define s_OL_SUPPLY_W_ID ol_supply_w_id
#define s_O_CARRIER_ID o_carrier_id
#define s_O_ENTRY_D entry_date
#define s_O_ID o_id
#define s_O_OL_CNT o_ol_cnt
#define s_S_QUANTITY s_quantity
#define S_QUANTITY quantity
#define s_W_CITY w_city
#define s_W_ID w_id
#define s_W_STATE w_state
#define s_W_STREET_1 w_street_1
#define s_W_STREET_2 w_street_2
#define s_W_TAX w_tax
#define s_W_ZIP w_zip
#define s_all_local o_all_local
#define s_brand_generic brand_generic
#define s_exec_status exec_status
#define s_low_stock stock_count
#define s_ol_cnt o_ol_cnt
#define s_queued_time queued_time
#define s_status_line statusline
#define s_threshold threshold
#define s_total_amount total
#define s_transtatus header.returncode

#if 0
#define NEWORDER_SERVICE    "NEWORD"
#define PAYMENT_SERVICE     "PAYMENT"
#define DELIVERY_SERVICE    "DELIVERY"
#define STOCKLEVEL_SERVICE  "STOCKLEV"
#define ORDERSTATUS_SERVICE "ORDSTAT"
#else
#define NEWORDER_SERVICE    "neword_sql"
#define PAYMENT_SERVICE     "payment_sql"
#define DELIVERY_SERVICE    "delivery_sql"
#define STOCKLEVEL_SERVICE  "stocklev_sql"
#define ORDERSTATUS_SERVICE "ordstat_sql"
#endif

#endif /* TPCC_H_INCLUDED */
```

tpcc.tacf

```
/*
 * Copyright (C) 1991, 1990 Transarc Corporation
 * All Rights Reserved
 */
/*
 *  tpcc.tacf -- attribute configuration file for tpcc server.
 * used for transparent binding
 *
 * $Revision: 1.1 $
 * $Date: 1998/11/06 21:10:17 $
 * $Log:         tpcc.tacf,v $
Revision 4.2  95/05/16  10:55:49  10:55:49  tpcc (TPCC Benchmark)
Added necessary RCS ident strings

 */

[implicit_handle (mon_handle_t handle)]
interface tpccTransactions
{
}
```

tpcc_trans.tacf

```
/*
 * Copyright (C) 1991, 1990 Transarc Corporation
 * All Rights Reserved
 */
/*
 *  neworder.tacf -- attribute configuration file for tpcc server.
 * used for transparent binding
 *
 * $Revision: 1.1 $
 * $Date: 1998/11/06 21:10:17 $
 * $Log:         tpcc.tacf,v $
 *
 * $TALog: tpcc_trans.tacf,v $
 * Revision 1.1  1998/11/06  21:10:17  dongfeng
 * - Move all files common to client and server to tpcc/common
 *   directory
 * [added by delta dongfeng-23677-TPCC-new-directory-structures, r1.1]
 *
 * Revision 1.1  1997/06/16  22:04:48  oz
 * - Integration with Data Dependent Routing: Phase 1
 *   Separated the all the binding related code into its own files.
 * - Added mon_client_utils.[ch] that export binding related calls.
 * - Added a TPCC_USE_DDR compile time switch
 * - Added tpcc_trans.tidl: All the functions in one interface.
 * [added by delta oz-20170-TPCC-add-data-dependent-routing, r1.1]
 *
 *
 */

[implicit_handle (mon_handle_t handle)]
interface tpccTrans
{
}
```

tpcc_trans.tidl

```
/*
 * id: $id: $
 *
 * component_name: encina benchmarks
 *
```

```
* the following functions list may not be complete.
* functions defined by/via macros may not be included.
*
* functions:
*    <fill_me_in>
*
* origins: transarc corp.
*
* (c) copyright transarc corp. 1995, 1993
* all rights reserved
* licensed materials - property of transarc
*
* us government users restricted rights - use, duplication or
* disclosure restricted by gsa adp schedule contract with transarc corp
*/
/*
* history
* $talog: $
*/

/*
* tpcc_trans.tidl -- interface definition file for tpccserver.
*
* $revision: 1.11 $
* $date: 1995/10/20 21:55:05 $
* $log:          tpcc.tidl,v $
*/

[uuid(955d7288-e672-11d0-bcef-9e621234aa77), version(1.0)]

interface tpccTrans
{
import "tpm/mon/mon_handle.idl";
import "tpcc_type.idl";

[nontransactional] void
                impTPCCNewOrder([in,out] newOrder_data_t *dataP,
                                        [out] trpc_status_t  * trpcStatus);

[nontransactional] void
                impTPCCPayment([in,out] payment_data_t *dataP,
                                        [out] trpc_status_t  * trpcStatus);

[nontransactional] void
                impTPCCOrderStatus([in,out] orderStatus_data_t *dataP,
                                        [out] trpc_status_t  * trpcStatus);

[nontransactional] void
                impTPCCStockLevel([in,out] stockLevel_data_t *dataP,
                                        [out] trpc_status_t  * trpcStatus);


[nontransactional] void
        impTPCCNOInfo([out] dbInfo_data_t *dataP,
                [out] trpc_status_t  * trpcStatus);

}
```

tpcc_type.idl

```
/*
*                tpcc_type.idl
*
* $Revision: 1.2 $
* $Date: 1998/12/08 18:55:21 $
* $Log:             $
*
*
* $TALog: tpcc_type.idl,v $
* Revision 1.2  1998/12/08  18:55:21  wenjian
* Add "int stats" to data_header structure
* [from r1.1 by delta wenjian-23785-TPCC-pass-statsFrequency-from-client-to-server, r1.1]
*
* Revision 1.1  1998/11/06  21:10:17  dongfeng
* - Move all files common to client and server to tpcc/common
*   directory
* [added by delta dongfeng-23677-TPCC-new-directory-structures, r1.1]
*
* Revision 1.11  1998/01/24  14:17:07  oz
* - User server name to identify server and name delivery file
* - Use env variable HOME instead of /home/encina if HOME is set
*
* - Added const ONLINE_INTERFACES
* [from r1.10 by delta oz-21687-TPCC-use-server-name-to-identify-process, r1.1]
*
* Revision 1.10  1998/01/23  15:09:11  oz
* - Updated the SP TPCC directory to the latest files used
*   during the SP tpcc audit.
* [from r1.9 by delta oz-20774-TPCC-update-to-latest-SP-version-11-27, r1.1]
*
*
*
*/
[
uuid(008c6338-2b0a-1001-a9ab-02608c2f015a), version(1)
]
interface tpcc_types {

const long NAME_LENGTH = 32;

const long NEWO_INTERFACE =       0x01;
const long PAYMENT_INTERFACE =    0x02;
const long ORDER_STAT_INTERFACE = 0x04;
const long DELIVERY_INTERFACE =   0x08;
const long STOCK_INTERFACE =      0x10;
const long ONLINE_INTERFACES = NEWO_INTERFACE | PAYMENT_INTERFACE |
ORDER_STAT_INTERFACE | STOCK_INTERFACE;
const long ALL_INTERFACE =      0xffff;

const long NEWO_TRANS = 1;
const long PAYMENT_TRANS = 2;
const long ORDER_STAT_TRANS = 3;
const long DELIVERY_TRANS = 4;
const long STOCK_TRANS = 5;
const long MAX_TRAN_TYPE = 5;

typedef struct {
                long int sec;
                long int usec;
} time_type;

typedef struct  {
        short int  dtype;
        short int  returncode;
                long int   sql_code;
                long int   isam_code;
        long int   num_rms;

        short int  stats;       /*  For instrument only */
                time_type  start_time;          /*  For Debug Purposes only  */
                time_type  end_time;            /*  For Debug Purposes only  */
} data_header;

/* Definitions for payment transaction
 *
 *  payment_data_t
 *
 *  An in-out structure for payment transaction.
 *  It contains all the input parameters as well as the output parameters.
 */
typedef struct {
        data_header header;
        short int w_id;
        short int d_id;
        short int c_id;
        short int c_w_id;
        short int c_d_id;
        short int byname;
        double    h_amount;
        char      pay_date[20];

        char      w_name[11];
        char      w_street_1[21];
        char      w_street_2[21];
        char      w_city[21];
        char      w_state[3];
        char      w_zip[10];

        char      d_name[11];
        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]; /* was C_LAST_LEN already includes +1 */
        char      c_middle[3];
        char      c_last[17];
        char      c_phone[17];
        char      c_credit[3];
        char      c_street_1[21];
        char      c_street_2[21];
        char      c_city[21];
        char      c_state[3];
        char      c_zip[10];
        double    c_credit_lim;
        double    c_balance;
        double    c_discount;
        double    c_ytd_payment;
        short int c_payment_cnt;
        char      c_date[20];
        char      c_data[201];
} payment_data_t;

/* Definitions for new order transaction */

typedef struct {
        short int  ol_supply_w_id;
        short int  ol_quantity;
        short int  s_quantity;
        long  int  ol_i_id;
        char       name_i[25];
        char       brand_generic[2];
        double     price;
        double     ol_amount;
                long int   s_idx;
                char       s_dist[25];
```

```
} OL_TABLE, newOrder_item_t;

typedef struct {
                data_header     header;
                short int       w_id;
                short int       d_id;
                short int       c_id;
                short int       o_ol_cnt;
                short int       o_all_local;
                short int       items_valid; /* true if all valid */
                short int           total_items;
                long int        o_id;
        double          w_tax;
                double          d_tax;
                double          total;
                double          c_discount;
                char            entry_date[20];
                char            c_last[17];
                char            c_credit[3];
                char                statusline[26];
                OL_TABLE    item[15];
} newOrder_data_t;

/* Definitions for order status transaction */

typedef struct {
  long int  ol_i_id;
  short int  ol_supply_w_id;
  short int  ol_quantity;
  double     ol_amount;
  char       delivery_date[20];
} orderStatusItem_t;

typedef struct {
        data_header header;
        short int w_id;
        short int d_id;
        short int c_id;
        short int o_id;
        short int o_ol_cnt;
        short int byname;
        short     o_carrier_id;
        char      c_last[17];
        char      c_first[17];
        char      c_middle[3];
        char      entry_date[20];
        double    c_balance;
        orderStatusItem_t item[15];
} orderStatus_data_t;

/* Definitions for stock level transaction */

typedef struct {
  data_header header;
  short int w_id;
  short int d_id;
  short int threshold;
  long int  stock_count;
} stockLevel_data_t;

/* Definitions for delivery transaction */

typedef struct {
  data_header header;
  short int w_id;
  short int o_carrier_id;
  long int queued_time;
  short status;
  char exec_status[50];
  double start_queue;
} delivery_data_t;

typedef struct {
  long int first_wh;
  long int last_wh;
  long int server_id;
} dbInfo_data_t;

/*
 *  A union of all the transactions
 */
typedef union switch(long int tran_type) data {
  case NEWO_TRANS:            newOrder_data_t    new_order;
  case PAYMENT_TRANS:     payment_data_t     payment;
  case ORDER_STAT_TRANS:  orderStatus_data_t order_status;
  case DELIVERY_TRANS:    delivery_data_t    delivery;
  case STOCK_TRANS:           stockLevel_data_t  stock_level;
} tpcc_data_t;


}
```

tpcc_utils.c

```
/*
 *
 *      tpcc_utils.c
 *
 * $Revision: 1.2 $
 * $Date: 1998/12/14 20:27:57 $
 * $Log:        $
 *
 *
 *
 *
 * $TALog: tpcc_utils.c,v $
 * Revision 1.2  1998/12/14  20:27:57  wenjian
 * Made corresponding changes due to data structure change of tran_info_t.
 *
 * - Add header file winsock.h for NT platform
 * [from r1.1 by delta wenjian-23788-TPCC-use-single-stats-var-for-each-client-and-server, r1.3]
 *
 * Revision 1.1  1998/12/11  16:37:58  wenjian
 * Move some common functions from client/client_utils.c to common/tpcc_utils.c.
 * In this version, we only move time_diff_ms(). Need some work in order to
 * move other functions like ERROUT.
 *
 * - A file including utility functions for both client and server
 * [added by delta wenjian-23788-TPCC-use-single-stats-var-for-each-client-and-server, r1.2]
 *
 *
 *
 *    tpcc_utils.c
 *      Generic utilities used by the client and server processes
 */

#include <stdio.h>
#include <time.h>
#include <string.h>
#include <stdarg.h>

#if defined (solaris)
#include <dce/pthread.h>
#else   /* solaris */
#include <pthread.h>
#endif

#include "databuf.h"
#include "do_tpcc.h"
#include "tpcc_type.h"

#ifdef WIN32
#include <winsock.h>
#endif

/*
 *  time_diff_ms
 *      Return the difference in miliseconds between two times
 */
int time_diff_ms(t2, t1)
  struct timeval *t2, *t1;
{
    int t_diff;

    t_diff = (t2->tv_usec + 1000000 - t1->tv_usec + 500) / 1000 +
            (t2->tv_sec - t1->tv_sec - 1) * 1000;

    return(t_diff);
}
```

util.h

```
#ifndef LOCAL_UTIL_H
#define LOCAL_UTIL_H

#include "util_token.h"

#define UTIL_ALLOC(ptr, type, size)                     \
    ptr = (type)malloc(size);                                                   \
    if (ptr==NULL) {                                                                    \
                fprintf(stderr, "UTIL_ALLOC failed\n");                 \
                exit(1);                                                                \
    }

#endif
```

util_alloc.h

```
/*
 * util_alloc.h
 *
 * $Revision: 1.1 $
 * $Date: 1998/11/06 21:10:18 $
 * $Log:        util_alloc.h,v $
 * Revision 4.2  95/05/16  10:55:43  10:55:43  tpcc (TPCC Benchmark)
 * Added necessary RCS ident strings
 *
 *
 */

#ifndef TRANSARC_UTIL_ALLOC_H
#define TRANSARC_UTIL_ALLOC_H
```

```
/*
 * UTIL_[ALLOC, REALLOC, NEW, FREE] -- macros that wrap calls to
 * malloc, realloc, free. The allocation macros check the return
 * value, a NULL pointer is converted into a fatal error.
 */
#define UTIL_ALLOC_ROBUST(ptr, type, size)                                      \
   ((ptr) = (type) malloc(size))

#define UTIL_ALLOC(ptr, type, size)                                             \
do {                                                                            \
   if (UTIL_ALLOC_ROBUST(ptr, type, size) == 0)                                 \
                util_MemoryError("UTIL_ALLOC", __FILE__, __LINE__);             \
} while (0)

#define UTIL_REALLOC_ROBUST(ptr, type, size)                                    \
   (ptr = (type) realloc((void *) ptr, size))

#define UTIL_REALLOC(ptr, type, size)                                           \
do {                                                                            \
   if (UTIL_REALLOC_ROBUST(ptr, type, size) == 0)                               \
                util_MemoryError("UTIL_REALLOC", __FILE__, __LINE__);           \
} while (0)

#define UTIL_FREE(ptr)                                                                  \
do {                                                                                    \
   if (!ptr) {                                                                          \
                util_MemoryError("UTIL_FREE", __FILE__, __LINE__); \
   }                                                                                    \
   free((void *) (ptr));                                                                \
   ptr = 0;     /* Make all free'd pointers zero. */                                    \
} while (0)

#define         UTIL_ALLOC_ARRAY_ROBUST(ptr, type, number)                      \
   ((ptr) = (type *)malloc(sizeof(type) * (number)))

#define         UTIL_ALLOC_ARRAY(ptr, type, number)                             \
do {                                                                            \
   if (UTIL_ALLOC_ARRAY_ROBUST(ptr, type, number) == 0)                         \
                util_MemoryError("UTIL_ALLOC_ARRAY", __FILE__, __LINE__); \
} while (0)

#define         UTIL_COPY_STRING_ROBUST(to,from)                                \
   (((to) = (char *)malloc(strlen((char *)(from))+1)) ?         \
    strcpy((char *)(to), (char *)(from)) : 0)

#define         UTIL_COPY_STRING(to, from)                                              \
do {                                                                                    \
   if (UTIL_COPY_STRING_ROBUST(to, from) == 0)                                          \
                util_MemoryError("UTIL_COPY_STRING", __FILE__, __LINE__); \
} while (0)


#endif /* TRANSARC_UTIL_ALLOC_H */
```

util_token.h

```
/*
* ID: $Id: util_token.h,v 1.1 1998/11/06 21:10:18 dongfeng Exp $
*
* COMPONENT_NAME: Encina Toolkit Executive
*
* The following functions list may not be complete.
* Functions defined by/via macros may not be included.
*
* FUNCTIONS:
*
* ORIGINS: Transarc Corp.
*
* (C) COPYRIGHT Transarc Corp. 1995, 1994, 1993, 1990
* All Rights Reserved
* Licensed Materials - Property of Transarc
*
* US Government Users Restricted Rights - Use, duplication or
* disclosure restricted by GSA ADP Schedule Contract with Transarc Corp
*/
/*
* HISTORY
* $TALog: util_token.h,v $
* Revision 1.1  1998/11/06  21:10:18  dongfeng
* - Move all files common to client and server to tpcc/common
*   directory
* [added by delta dongfeng-23677-TPCC-new-directory-structures, r1.1]
*
* Revision 1.7  1995/01/30  12:50:13  barry
* Update copyrights for Encina 1.2.
* [from r1.6 by delta barry-0000-update-copyrights-for-1.2, r1.1]
*
* Revision 1.6  1995/01/13  14:12:51  psu
* fix comment to conform to coding standards.
* [from r1.5 by delta psu-13196-client-interoperate-with-oracle-pro-c-2, r1.3]
*
* Revision 1.5  1995/01/12  20:34:22  psu
* put comment on ## fix in the code
*
* try to make sure people don't change the use of ##
* [from r1.4 by delta psu-13196-client-interoperate-with-oracle-pro-c-2, r1.2]
*
* Revision 1.4  1995/01/12  15:48:28  psu
* fix use of ## to make pro*c happy
*
* pro*c 2.0 can't deal with a ## b ## c, change to a ## b##c.
* [from r1.3 by delta psu-13196-client-interoperate-with-oracle-pro-c-2, r1.1]
*
* Revision 1.3  1994/02/04  17:22:22  pinaki
* Update copyright.
* [from r1.2 by delta pinaki-0000-update-copyright-for-1.1, r1.1]
*
* Revision 1.2  1993/12/18  22:06:57  mwyoung
* [from r1.1 by delta mwyoung-10043-util-always-offer-UTIL_IDENT, r1.1]
*
* Revision 1.1  1993/12/03  22:00:04  mwyoung
* Split the various features into separate files, so that they can
* be included separately.
* [added by delta mwyoung-9848-utils-split-util.h-into-separately-usable-parts, r1.1]
*
*/
#ifndef TRANSARC_UTIL_TOKEN_H
#define TRANSARC_UTIL_TOKEN_H

#include <encina/c_prologue.h>

/* UTIL_IDENT -- the identity function */
#define UTIL_IDENT(a)                   a

/*
 * UTIL_[STRING, CONCAT, CONCAT3] -- macros for converting into, and
 * concatenating together, strings.
 */

/* Note, the a ## b##c is needed to make some broken cpp's work correctly.
 * This was originally put here for Oracle Pro*C 2.0, but other compilers
 * may have similar problems.
*/

#if             ENCINA_C_ANSI_STRING_TOKEN_SUPPORT
#define UTIL_STRING(a)     # a
#define UTIL_CONCAT(a, b)               a ## b
#define         UTIL_CONCAT3(a,b,c)     a ## b##c
#else           /* ENCINA_C_ANSI_STRING_TOKEN_SUPPORT */
#define UTIL_STRING(a)                  "a"
#define UTIL_CONCAT(a, b)               UTIL_IDENT(a)b
#define         UTIL_CONCAT3(a,b,c)     UTIL_CONCAT(a,b)c
#endif          /* ENCINA_C_ANSI_STRING_TOKEN_SUPPORT */

#include <encina/c_epilogue.h>
#endif /* TRANSARC_UTIL_TOKEN_H */
```

utilities.h

```
/*
 * ID: $Id: utilities.h,v 1.1 1998/11/06 21:10:19 dongfeng Exp $
 *
 * COMPONENT_NAME: Encina Toolkit Server Core
 *
 * ORIGINS: Transarc Corp.
 *
 * (C) COPYRIGHT Transarc Corp. 1995
 * All Rights Reserved
 * Licensed Materials - Property of Transarc
 *
 * US Government Users Restricted Rights - Use, duplication or
 * disclosure restricted by GSA ADP Schedule Contract with Transarc Corp
 * $Revision: 1.1 $
 * $Log:        utilities.h,v $
 *
 *
 * $TALog: utilities.h,v $
 * Revision 1.1  1998/11/06  21:10:19  dongfeng
 * - Move all files common to client and server to tpcc/common
 *   directory
 * [added by delta dongfeng-23677-TPCC-new-directory-structures, r1.1]
 *
 * Revision 1.7  1998/10/27  14:57:52  dongfeng
 * Change enc_status to a data structure that has fields:
 *   - Status code
 *   - Line Number
 *   - File Name
 *   - Encina Error Code
 *   - Error Msg
 * Remove statusMsgs in web_tpcc.c
 * [from r1.6 by delta dongfeng-23067-TPCC-add-web-based-tpcc-client, r1.6]
 *
 * Revision 1.6  1998/10/22  19:18:37  dongfeng
 * [from r1.5 by delta dongfeng-23067-TPCC-add-web-based-tpcc-client, r1.2]
 *
 * Revision 1.5  1998/01/23  15:09:16  oz
 * - Updated the SP TPCC directory to the latest files used
```

```
*   during the SP tpcc audit.
* [from r1.4 by delta oz-20774-TPCC-update-to-latest-SP-version-11-27, r1.1]
*
*
*/

/*
* utilities.h -- holds declarations, macros, and constants used by the
* telshop/merchandise client-server program.
*
* $Date: 1998/11/06 21:10:19 $
*/

#ifndef _UTILITIES_H_
#define _UTILITIES_H_

#include <dce/rpc.h>
#include <dce/dce_error.h>
#include <encina/encina.h>
#include <stdlib.h>

#include <utils/trace.h>
#include "util_alloc.h"

/*  Boolean type, and its constants  */

#define FALSE 0
#define TRUE  1

#if       ENCINA_C_ANSI_STRING_TOKEN_SUPPORT
#define UTIL_STRING(a)          # a
#define UTIL_CONCAT(a, b)       a ## b
#define UTIL_CONCAT3(a,b,c)     a ## b##c
#else   /* ENCINA_C_ANSI_STRING_TOKEN_SUPPORT */
#define UTIL_STRING(a)          "a"
#define UTIL_CONCAT(a, b)       UTIL_IDENT(a)b
#define UTIL_CONCAT3(a,b,c)     UTIL_CONCAT(a,b)c
#endif  /* ENCINA_C_ANSI_STRING_TOKEN_SUPPORT */

/*  ENCINA_CALL:  Make fail-fast calls on the various services.  */

/*  Macro delimiters  */

#define BEGIN_MACRO do {

#define END_MACRO } while (0)

/*  FATAL --  Failure.  Print error message and exit the program  */

void exit_program();

#ifndef FATAL
#define FATAL(args)
\
BEGIN_MACRO
                \
   printf args;                                                                 \
   exit(1);
\
END_MACRO
#endif

/*  ENCINA_CALL:  Make fail-fast calls on the various services.  */

#define ENCINA_CALL_RC(proc_name,call,rc)                       \
BEGIN_MACRO                                             \
   char _errorMsg[ENCINA_MAX_STATUS_STRING_SIZE];                               \
   rc = (call);                                                                 \
   if (rc)  {                                                   \
      encina_StatusToString(rc, ENCINA_MAX_STATUS_STRING_SIZE,          \
                                                _errorMsg);
\
      err_printf( "%x \n", rc);                                                 \
      err_printf( "%s \n", _errorMsg);                                          \
      err_printf( "%s \n", proc_name);                                          \
   }
                \
END_MACRO

#define ENCINA_CALL(proc_name,call)                     \
BEGIN_MACRO                                                             \
   unsigned long _status;                                       \
   ENCINA_CALL_RC(proc_name,call,_status);                      \
   if (_status) exit_program(_status);                          \
END_MACRO

typedef enum {
   action_exit,
   action_continue
} error_action_t;

#define CHECK_DCE_STATUS(_status, _msg, _action)                \
{                                                       \
   int error_stat;                                              \
   unsigned long _rc = (_status);                               \
   unsigned char error_string[dce_c_error_string_len];          \
   if ((_status) != rpc_s_ok) {                                 \
                dce_error_inq_text(_rc, error_string, &error_stat);         \
                err_printf("%s failed, error: %s (%d)\n", _msg, error_string, _rc);\
                if ((_action) == action_exit)                           \
                   exit(-1);                                    \
   }                                                    \
}

#define DCE_CALL(call, args)                            \
{                                               \
   call args;                                   \
   CHECK_DCE_STATUS(status, UTIL_STRING(call), action_exit);\
}



/*  MALLOC_CHECK --  Make sure there is memory to be allocated;
 *  fail if there is not.  */

#define MALLOC_CHECK(memP)                                                                              \
BEGIN_MACRO                                                                                                     \
   if (!(memP))                                                                                 \
      FATAL(("Out of memory.\n"));                              \
END_MACRO

/*  ASSERT --  internal checks that assure the program is running correctly.
 *  Use to check program correctness, not user input.  */

#ifndef ASSERT
#define ASSERT(condition)                                                                                       \
BEGIN_MACRO
                \
   if (!(condition))
\
      FATAL(("%s (%d):  Assertion failed.\n", __FILE__, __LINE__));     \
END_MACRO
#endif

#define RAND(lim1, lim2)  ((int)(drand48()*((lim2)-(lim1)+1)) + (lim1))

#ifndef BAD_STATUS
#define BAD_STATUS(call, status)                                \
   BEGIN_MACRO                                                  \
      char _errorMsg[ENCINA_MAX_STATUS_STRING_SIZE];                    \
      encina_StatusToString(status, ENCINA_MAX_STATUS_STRING_SIZE,      \
                        _errorMsg);                             \
      logprintf("%s: %s (%d)\n", UTIL_STRING(call), _errorMsg, status);  \
      exit(1);                                                  \
   END_MACRO
#endif

#ifndef boolean_t
#define boolean_t int
#endif

#ifndef EXPORT
#define EXPORT
#endif

#ifndef IMPORT
#define IMPORT extern
#endif

/* For web_tpcc_client */
#define CHK_STATUS(st, val, _errMsg)                    \
BEGIN_MACRO                                             \
    if(st) {                                            \
      enc_status.status=val;                            \
      strcpy(enc_status.file, __FILE__);                \
      enc_status.line= __LINE__;                        \
      enc_status.encinaError = st;                      \
      if(_errMsg)strcpy(enc_status.errorMsg, _errMsg);  \
      if(st!=1) return;  \
    }                                                   \
END_MACRO

#endif /*  _UTILITIES_H_  */
```

A.2 Client Transaction Code

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
```

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;
```

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;
```

pldel.c

```
#ifdef RCSID
static char *RCSid =
   "$Header: /afs/transarc.com/project/encina/rcs/test/src/benchmarks/tpcc/server/ora8.1_mt/RCS/pldel.c,v
1.2 1999/04/15 12:16:51 oz Exp $ Copyr (c) 1994 Oracle";
```

```
#endif /* RCSID */

/*+=====================================================================+
|       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.
+=====================================================================*/

#include "tpcc.h"
#include "plora.h"
#ifdef TUX
#include <userlog.h>
#endif

#include "tpccflags.h"

#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 PLSQLDEL
#define SQLTXT "BEGIN delivery.deliver (:w_id, :carrier_id, :order_id,\
 :retry); END;"
#else
# 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 "
# else
#define SQLTXT1A "\
SELECT /*+ USE_NL(NEW_ORDER ORDERS) ORDERED */ 1, no_o_id, new_order.rowid, o_c_id,
orders.rowid \
FROM new_order, orders \
WHERE no_w_id = :w_id AND no_d_id = 1 AND o_w_id = :w_id AND o_d_id = 1 AND \
  o_id = no_o_id AND rownum <= 1 UNION ALL \
"

#define SQLTXT1B "\
SELECT /*+ USE_NL(NEW_ORDER ORDERS) ORDERED */ 2, no_o_id, new_order.rowid, o_c_id,
orders.rowid \
FROM new_order, orders \
WHERE no_w_id = :w_id AND no_d_id = 2 AND o_w_id = :w_id AND o_d_id = 2 AND \
  o_id = no_o_id AND rownum <= 1 UNION ALL \
"

#define SQLTXT1C "\
SELECT /*+ USE_NL(NEW_ORDER ORDERS) ORDERED */ 3, no_o_id, new_order.rowid, o_c_id,
orders.rowid \
FROM new_order, orders \
WHERE no_w_id = :w_id AND no_d_id = 3 AND o_w_id = :w_id AND o_d_id = 3 AND \
  o_id = no_o_id AND rownum <= 1 UNION ALL \
"

#define SQLTXT1D "\
SELECT /*+ USE_NL(NEW_ORDER ORDERS) ORDERED */ 4, no_o_id, new_order.rowid, o_c_id,
orders.rowid \
FROM new_order, orders \
WHERE no_w_id = :w_id AND no_d_id = 4 AND o_w_id = :w_id AND o_d_id = 4 AND \
  o_id = no_o_id AND rownum <= 1 UNION ALL \
"

#define SQLTXT1E "\
SELECT /*+ USE_NL(NEW_ORDER ORDERS) ORDERED */ 5, no_o_id, new_order.rowid, o_c_id,
orders.rowid \
FROM new_order, orders \
WHERE no_w_id = :w_id AND no_d_id = 5 AND o_w_id = :w_id AND o_d_id = 5 AND \
  o_id = no_o_id AND rownum <= 1 UNION ALL \
"

#define SQLTXT1F "\
SELECT /*+ USE_NL(NEW_ORDER ORDERS) ORDERED */ 6, no_o_id, new_order.rowid, o_c_id,
orders.rowid \
FROM new_order, orders \
WHERE no_w_id = :w_id AND no_d_id = 6 AND o_w_id = :w_id AND o_d_id = 6 AND \
  o_id = no_o_id AND rownum <= 1 UNION ALL \
"

#define SQLTXT1G "\
SELECT /*+ USE_NL(NEW_ORDER ORDERS) ORDERED */ 7, no_o_id, new_order.rowid, o_c_id,
orders.rowid \
FROM new_order, orders \
WHERE no_w_id = :w_id AND no_d_id = 7 AND o_w_id = :w_id AND o_d_id = 7 AND \
  o_id = no_o_id AND rownum <= 1 UNION ALL \
"

#define SQLTXT1H "\
SELECT /*+ USE_NL(NEW_ORDER ORDERS) ORDERED */ 8, no_o_id, new_order.rowid, o_c_id,
orders.rowid \
FROM new_order, orders \
WHERE no_w_id = :w_id AND no_d_id = 8 AND o_w_id = :w_id AND o_d_id = 8 AND \
  o_id = no_o_id AND rownum <= 1 UNION ALL \
"

#define SQLTXT1I "\
SELECT /*+ USE_NL(NEW_ORDER ORDERS) ORDERED */ 9, no_o_id, new_order.rowid, o_c_id,
orders.rowid \
FROM new_order, orders \
WHERE no_w_id = :w_id AND no_d_id = 9 AND o_w_id = :w_id AND o_d_id = 9 AND \
  o_id = no_o_id AND rownum <= 1 UNION ALL \
"

#define SQLTXT1J "\
SELECT /*+ USE_NL(NEW_ORDER ORDERS) ORDERED */ 10, no_o_id, new_order.rowid, o_c_id,
orders.rowid \
FROM new_order, orders \
WHERE no_w_id = :w_id AND no_d_id = 10 AND o_w_id = :w_id AND o_d_id = 10 AND \
  o_id = no_o_id AND rownum <= 1"

#define SQLTXT2 "DELETE FROM new_order WHERE rowid = :no_rowid"
#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 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 "
#else
#define SQLTXT4 "UPDATE 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"

#define SQLTXT5A "\
SELECT :d_id1, SUM(ol_amount) FROM order_line WHERE ol_w_id = :w_id AND \
 ol_d_id = :d_id1 AND ol_o_id = :o_id1 UNION ALL \
SELECT :d_id2, SUM(ol_amount) FROM order_line WHERE ol_w_id = :w_id AND \
 ol_d_id = :d_id2 AND ol_o_id = :o_id2 UNION ALL \
"

#define SQLTXT5B "\
SELECT :d_id3, SUM(ol_amount) FROM order_line WHERE ol_w_id = :w_id AND \
 ol_d_id = :d_id3 AND ol_o_id = :o_id3 UNION ALL \
SELECT :d_id4, SUM(ol_amount) FROM order_line WHERE ol_w_id = :w_id AND \
 ol_d_id = :d_id4 AND ol_o_id = :o_id4 UNION ALL \
"

#define SQLTXT5C "\
SELECT :d_id5, SUM(ol_amount) FROM order_line WHERE ol_w_id = :w_id AND \
 ol_d_id = :d_id5 AND ol_o_id = :o_id5 UNION ALL \
SELECT :d_id6, SUM(ol_amount) FROM order_line WHERE ol_w_id = :w_id AND \
 ol_d_id = :d_id6 AND ol_o_id = :o_id6 UNION ALL \
"

#define SQLTXT5D "\
SELECT :d_id7, SUM(ol_amount) FROM order_line WHERE ol_w_id = :w_id AND \
 ol_d_id = :d_id7 AND ol_o_id = :o_id7 UNION ALL \
SELECT :d_id8, SUM(ol_amount) FROM order_line WHERE ol_w_id = :w_id AND \
 ol_d_id = :d_id8 AND ol_o_id = :o_id8 UNION ALL \
"

#define SQLTXT5E "\
SELECT :d_id9, SUM(ol_amount) FROM order_line WHERE ol_w_id = :w_id AND \
 ol_d_id = :d_id9 AND ol_o_id = :o_id9 UNION ALL \
SELECT :d_id10, SUM(ol_amount) FROM order_line WHERE ol_w_id = :w_id AND \
 ol_d_id = :d_id10 AND ol_o_id = :o_id10"

#endif
#endif /* PLSQLDEL */

#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 NDISTS 10
#define ROWIDLEN 20


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;
#else
  ub2 del_o_id_len[NDISTS];
  ub2 c_id_len[NDISTS];
#endif

  ub2 cons_len[NDISTS];
  ub2 w_id_len[NDISTS];
  ub2 d_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];
  int amt[NDISTS];
  ub4 del_o_id_rcnt;
  int retry;
  OCIRowid *no_rowid_ptr[NDISTS];
  OCIRowid *o_rowid_ptr[NDISTS];
  OCIDate del_date[NDISTS];
#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_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];
  OCIBind *retry_bp;
  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; */

#ifdef DMLRETDEL
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];
};
typedef struct amtctx amtctx;
/* amtctx *actx; */

#endif


#ifdef DMLRETDEL
extern sb4 no_data();

sb4 TPC_oid_data(dvoid *ctxp, OCIBind *bp, ub4 iter, ub4 index,
             dvoid **bufpp, ub4 **alenp, ub1 *piecep,
             dvoid **indpp, ub2 **rcodepp)
{
  delctx *dctx = (delctx *)ctxp;
  *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)
{
  delctx *dctx = (delctx *)ctxp;
  *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


tkvcdinit (ora_cn_data_t *ora_SlotDataP)

{

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

  delctx *dctx;
  amtctx *actx;
  global_delivery_t *delP;
  OCIEnv *tpcenv = ora_SlotDataP->tpcenv;
  OCIServer *tpcsrv = ora_SlotDataP->tpcsrv;
  OCIError *errhp = ora_SlotDataP->errhp;
  OCISvcCtx *tpcsvc = ora_SlotDataP->tpcsvc;
  OCISession *tpcusr = ora_SlotDataP->tpcusr;
  OCIStmt *curi = ora_SlotDataP->curi;

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

  ora_SlotDataP->dctx = (void *)dctx;
  delP = (global_delivery_t *)malloc(sizeof(global_delivery_t));
  memset(delP, (char)0, sizeof(global_delivery_t));
  ora_SlotDataP->delP = delP;

#ifdef DMLRETDEL
  actx = (amtctx *) malloc (sizeof(amtctx));
  memset(actx,(char)0,sizeof(amtctx));
  ora_SlotDataP->actx = (void *)actx;
#else
  for(i=0;i<NDISTS;i++) {
   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));
  }
#endif

#if defined(ISO) || defined(ISO5) || defined(ISO6) || defined(ISO8)
  OCIHandleAlloc(tpcenv, (dvoid **)(&dctx->curd0), OCI_HTYPE_STMT, 0, (dvoid**)0);
  sprintf ((char *) 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

/* If PLSQLDEL and ISO? are both defined, then they both try to use
  curd0! This could cause a problem. Will try to fix later - VMM 12/30/97 */

#ifdef PLSQLDEL
  OCIHandleAlloc(tpcenv, (dvoid **)(&dctx->curd0), OCI_HTYPE_STMT,
             0, (dvoid**)0);
  sprintf ((char *) stmbuf, SQLTXT);
  OCIStmtPrepare(dctx->curd0, errhp, stmbuf, strlen((char *)stmbuf),
              OCI_NTV_SYNTAX, OCI_DEFAULT);
  OCIBND(dctx->curd0, dctx->w_id_bp , errhp,":w_id",ADR(delP->w_id),SIZ(int),
       SQLT_INT);
  OCIBND(dctx->curd0, dctx->carrier_id_bp , errhp,":carrier_id",
       ADR(dctx->carrier_id), SIZ(int), SQLT_INT);

  OCIBNDRAA(dctx->curd0, dctx->o_id_bp, errhp, ":order_id",
         dctx->del_o_id,SIZ(int),SQLT_INT, dctx->del_o_id_ind,
         dctx->del_o_id_len,dctx->del_o_id_rcode,NDISTS,
         &dctx->del_o_id_rcnt);
  OCIBND(dctx->curd0, dctx->retry_bp , errhp,":retry",ADR(dctx->retry),
       SIZ(int),SQLT_INT);
#else
# ifdef DMLRETDEL
  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,
          (dvoid *)dctx,no_data,TPC_oid_data);
# else

  OCIHandleAlloc(tpcenv, (dvoid **)(&dctx->curd1), OCI_HTYPE_STMT, 0, (dvoid**)0);
  sprintf ((char *) stmbuf, "%s%s%s%s%s%s%s%s%s%s",    SQLTXT1A,

SQLTXT1B,

SQLTXT1C,

SQLTXT1D,

SQLTXT1E,

SQLTXT1F,

SQLTXT1G,

SQLTXT1H,

SQLTXT1I,

SQLTXT1J
                );
  OCIStmtPrepare(dctx->curd1, errhp, stmbuf, strlen((char *)stmbuf),OCI_NTV_SYNTAX,
OCI_DEFAULT);

  OCIERROR(errhp,
    OCIAttrSet(dctx->curd1,OCI_HTYPE_STMT,(dvoid*)&dctx->norow,0,
           OCI_ATTR_PREFETCH_ROWS,errhp));



  /* bind variables */

  OCIBNDRA(dctx->curd1, dctx->w_id_bp,errhp,":w_id",ADR(delP->w_id),SIZ(int),SQLT_INT);

  OCIDFNRA(dctx->curd1, dctx->d_id_dp,errhp,1,dctx->d_id,SIZ(int),
       SQLT_INT, dctx->d_id_ind,dctx->d_id_len,dctx->d_id_rcode);
  OCIDFNRA(dctx->curd1, dctx->del_o_id_dp,errhp,2,dctx->del_o_id,
       SIZ(int), SQLT_INT,dctx->del_o_id_ind,
       dctx->del_o_id_len, dctx->del_o_id_rcode);
  OCIDFNRA(dctx->curd1, dctx->no_rowid_dp,errhp,3,dctx->no_rowid_ptr,
       SIZ(OCIRowid *), SQLT_RDD,dctx->no_rowid_ind,
       dctx->no_rowid_len, dctx->no_rowid_rcode);
  OCIDFNRA(dctx->curd1, dctx->c_id_dp,errhp,4,dctx->c_id,SIZ(dctx->c_id[0]),
       SQLT_INT, dctx->c_id_ind,dctx->c_id_len,dctx->c_id_rcode);
  OCIDFNRA(dctx->curd1, dctx->o_rowid_dp,errhp,5,dctx->o_rowid_ptr,
       SIZ(OCIRowid *), SQLT_RDD,dctx->o_rowid_ind,
       dctx->o_rowid_len, dctx->o_rowid_rcode);

  /* open second cursor */

  OCIHandleAlloc(tpcenv, (dvoid **)(&dctx->curd2), OCI_HTYPE_STMT, 0, (dvoid**)0);
  sprintf ((char *) stmbuf, SQLTXT2);
  OCIStmtPrepare(dctx->curd2, errhp, stmbuf, strlen((char *)stmbuf),
                       OCI_NTV_SYNTAX, OCI_DEFAULT);

  /* bind variables */
  OCIBNDRA(dctx->curd2, dctx->no_rowid_bp,errhp,":no_rowid",&(dctx->no_rowid_ptr[0]),
            SIZ(dctx->no_rowid_ptr[0]),SQLT_RDD,dctx->no_rowid_ind,
            dctx->no_rowid_len,dctx->no_rowid_rcode);

# endif /*DMLRETDEL*/

  /* 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(int),
        SQLT_INT, NULL, NULL, NULL);
  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,(dvoid *)dctx,no_data, cid_data);
# else

  OCIBNDRA(dctx->curd3, dctx->o_rowid_bp,errhp,":o_rowid",&(dctx->o_rowid_ptr[0]),
            SIZ(dctx->o_rowid_ptr[0]),SQLT_RDD,dctx->o_rowid_ind,
            dctx->o_rowid_ptr_len,dctx->o_rowid_rcode);
#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(OCIDate), SQLT_ODT);
# ifdef DMLRETDEL
  OCIBNDRAD(dctx->curd4, dctx->olamt_bp, errhp, ":ol_amount",
         SIZ(int), SQLT_INT,NULL, actx,no_data,amt_data);
# else



  /* open fifth cursor */

  OCIHandleAlloc(tpcenv, (dvoid **)(&dctx->curd5), OCI_HTYPE_STMT, 0, (dvoid**)0);
  sprintf ((char *) stmbuf, "%s%s%s%s%s", SQLTXT5A,
                                                                SQLTXT5B,
                                                                SQLTXT5C,
                                                                SQLTXT5D,
                                                                SQLTXT5E
  );
  OCIStmtPrepare(dctx->curd5, errhp, stmbuf, strlen((char *)stmbuf),
                       OCI_NTV_SYNTAX, OCI_DEFAULT);

  OCIERROR(errhp,
    OCIAttrSet(dctx->curd5,OCI_HTYPE_STMT,(dvoid*)&dctx->norow,0,
           OCI_ATTR_PREFETCH_ROWS,errhp));

  /* bind variables */

  OCIBND(dctx->curd5,dctx->w_id_bp,errhp,":w_id",ADR(delP->w_id),SIZ(delP->w_id),SQLT_INT);
  for (i = 0; i < NDISTS; i++) {
    sprintf (bstr1, ":d_id%d", i + 1);
    sprintf (bstr2, ":o_id%d", i + 1);
    OCIBNDRA(dctx->curd5,dctx->bstr1_bp[i],errhp,bstr1,ADR(dctx->d_id[i]),
                SIZ(dctx->d_id[0]),SQLT_INT, &(dctx->d_id_ind[i]),
                &(dctx->d_id_len[i]),&(dctx->d_id_rcode[i]));
    OCIBNDRA(dctx->curd5,dctx->bstr2_bp[i],errhp,bstr2,ADR(dctx->del_o_id[i]),
                SIZ(dctx->del_o_id[0]),SQLT_INT, &(dctx->del_o_id_ind[i]),
                &(dctx->del_o_id_len[i]),&(dctx->del_o_id_rcode[i]));
  }

  OCIDFNRA(dctx->curd5,dctx->cons_dp,errhp,1,dctx->cons,SIZ(dctx->cons[0]),SQLT_INT,
```

```
        dctx->cons_ind,dctx->cons_len,dctx->cons_rcode);
  OCIDFNRA(dctx->curd5,dctx->amt_dp,errhp,2,dctx->amt,SIZ(dctx->amt[0]),SQLT_INT,
        dctx->amt_ind,dctx->amt_len,dctx->amt_rcode);
#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);
#endif
  return (0);

}


void shiftdata(delctx *dctx,int from)
{
  int i;
  for (i=from;i<NDISTS-1; i++)
  {
    dctx->del_o_id_ind[i] = dctx->del_o_id_ind[i+1];
    dctx->del_o_id[i] = dctx->del_o_id[i+1];
    dctx->w_id[i] = dctx->w_id[i+1];
    dctx->d_id[i] = dctx->d_id[i+1];
    dctx->carrier_id[i] = dctx->carrier_id[i+1];
  }
}


tkvcd (ora_cn_data_t *ora_SlotDataP)

{

  int i, j,v;
  int rpc,rcount,count;
  int invalid;
  int tmp_id;
  int tmp_amt;

  delctx *dctx = (delctx *)ora_SlotDataP->dctx;
#ifdef DMLRETDEL /* VMM 1/13/98 */
  amtctx *actx = (amtctx *)ora_SlotDataP->actx;
#endif /* DMLRETDEL */
  global_delivery_t *delP = ora_SlotDataP->delP;
  OCIEnv *tpcenv = ora_SlotDataP->tpcenv;
  OCIServer *tpcsrv = ora_SlotDataP->tpcsrv;
  OCIError *errhp = ora_SlotDataP->errhp;
  OCISvcCtx *tpcsvc = ora_SlotDataP->tpcsvc;
  OCISession *tpcusr = ora_SlotDataP->tpcusr;
  OCIStmt *curi = ora_SlotDataP->curi;

#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);
  printf ("Delivery started at %s on node %s\n", sdate, dctx->inum);
#endif
#ifdef PLSQLDEL
  for (i = 0; i < NDISTS; i++)
  {
    dctx->del_o_id_ind[i] = TRUE;
    dctx->del_o_id_len[i] = sizeof(int);
  }

  OCIERROR(errhp,
    OCIStmtExecute(tpcsvc,dctx->curd0,errhp,1,0,0,0,OCI_DEFAULT));

  for (i = 0; i < NDISTS; i++)
  {
    delP->del_o_id[i] = 0;
    if (dctx->del_o_id_ind[i] == 0)
    {
      delP->del_o_id[i] = dctx->del_o_id[i];
    }
  }
#else

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->o_rowid_ptr_len[i] = SIZ(dctx->o_rowid_ptr[0]);
    dctx->no_rowid_ptr_len[i] = SIZ(dctx->no_rowid_ptr[0]);

    dctx->w_id[i] = delP->w_id;
    dctx->d_id[i] = i+1;
    dctx->carrier_id[i] = delP->o_carrier_id;
    memcpy(&dctx->del_date[i],&delP->cr_date,sizeof(OCIDate));
  }

#ifdef DMLRETDEL /* VMM 1/13/98 */
  memset(actx,(char)0,sizeof(amtctx));
#endif /* DMLRETDEL */
  /* array select from new_order and orders tables */

  delP->execstatus=OCIStmtExecute(tpcsvc,dctx->curd1,errhp,NDISTS,0,0,0,OCI_DEFAULT);
  if((delP->execstatus != OCI_SUCCESS) && (delP->execstatus != OCI_NO_DATA)) {
    OCITransRollback(tpcsvc,errhp,OCI_DEFAULT);
    delP->errcode = OCIERROR(errhp,delP->execstatus);
    if(delP->errcode == NOT_SERIALIZABLE) {
      delP->retries++;
      goto retry;
    } else if (delP->errcode == RECOVERR) {
      delP->retries++;
      goto retry;
    } else {
      return -1;
    }
  }
  /* mark districts with no new order */
  OCIAttrGet(dctx->curd1,OCI_HTYPE_STMT,&rcount,0,OCI_ATTR_ROW_COUNT,errhp);
  rpc = rcount;
#ifdef DMLRETDEL   /* we have to compress the array here */
  if (rcount != NDISTS )
  {
    int j = 0;
    for (i=0;i < NDISTS; i++)
    {
    if (dctx->del_o_id_ind[j] == 0) /* there is data here */
      j++;
    else
      shiftdata(dctx, j);
    }
  }
#else
  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;
  }
#endif

#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)
        printf ("Delivery [dist %d] found no new order at %s\n", i, sdate);
    }
    if (reread) {
```

```
      sleep (60);
      sysdate (sdate);
      printf ("Delivery wake up at %s\n", sdate);
      reread = 0;
      goto iso;
    }
  }
#endif

#ifndef DMLRETDEL
  /* array delete of new_order table */
  delP->execstatus=OCIStmtExecute(tpcsvc,dctx->curd2,errhp,rpc,0,0,0,OCI_DEFAULT);
  if(delP->execstatus != OCI_SUCCESS) {
    OCITransRollback(tpcsvc,errhp,OCI_DEFAULT);
    delP->errcode = OCIERROR(errhp,delP->execstatus);
    if(delP->errcode == NOT_SERIALIZABLE) {
      delP->retries++;
      goto retry;
    } else if (delP->errcode == RECOVERR) {
      delP->retries++;
      goto retry;
    } else {
      return -1;
    }
  }

  /* mark districts with no new order */
  OCIAttrGet(dctx->curd2,OCI_HTYPE_STMT,&rcount,0,OCI_ATTR_ROW_COUNT,errhp);

  if (rcount != rpc) {
#ifdef TUX
    userlog ("Error in TPC-C server %d: %d rows selected, %d rows deleted\n",
            proc_no, rpc, dctx->curd2.rpc);
#else
    fprintf (stderr,
            "Error in TPC-C server %d: %d rows selected, %d rows deleted\n",
            proc_no, rpc, rcount);
#endif /* TUX */
    OCITransRollback(tpcsvc,errhp,OCI_DEFAULT);
    return (DEL_ERROR);
  }
#endif /* DMLRETDEL */

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

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

  if (rcount != rpc) {
#ifdef TUX
    userlog ("Error in TPC-C server %d: %d rows selected, %d ords updated\n",
            proc_no, 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 */
  delP->execstatus=OCIStmtExecute(tpcsvc,dctx->curd4,errhp,rpc,0,0,0,OCI_DEFAULT);
  if(delP->execstatus != OCI_SUCCESS) {
    OCITransRollback(tpcsvc,errhp,OCI_DEFAULT);
    delP->errcode = OCIERROR(errhp,delP->execstatus);
    if(delP->errcode == NOT_SERIALIZABLE) {
      delP->retries++;
      goto retry;
    } else if (delP->errcode == RECOVERR) {
      delP->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) {
    userlog ("Error in TPC-C server %d: %d ordnrs updated, %d ordl updated\n",
            proc_no, rpc, rcount);
  }
#else
  /* array select from order_line table */
  delP->execstatus=OCIStmtExecute(tpcsvc,dctx->curd5,errhp,rpc,0,0,0,OCI_DEFAULT);
  if((delP->execstatus != OCI_SUCCESS) && (delP->execstatus != OCI_NO_DATA)) {
    OCITransRollback(tpcsvc,errhp,OCI_DEFAULT);
    delP->errcode = OCIERROR(errhp,delP->execstatus);
    if(delP->errcode == NOT_SERIALIZABLE) {
      delP->retries++;
      goto retry;
    } else if (delP->errcode == RECOVERR) {
      delP->retries++;
      goto retry;
    } else {
      return -1;
    }
  }

  OCIAttrGet(dctx->curd5,OCI_HTYPE_STMT,&rcount,0,OCI_ATTR_ROW_COUNT,errhp);
  if (rcount != rpc) {
#ifdef TUX
    userlog ("Error in TPC-C server %d: %d rows selected, %d ordl selected\n",
            proc_no, rpc, rcount);
#else
    fprintf (stderr,
            "Error in TPC-C server %d: %d rows selected, %d ordl selected\n",
            proc_no, rpc, rcount);
#endif
    OCITransRollback(tpcsvc,errhp,OCI_DEFAULT);
    return (-1);
  }

  /* reorder amount selected if necessary */

  for (i = 0; i < rpc; i++) {
    if (dctx->cons[i] != dctx->d_id[i]) {
#ifdef TUX
      userlog ("TPC-C server %d: reordering amount\n", proc_no);
#else
      fprintf (stderr, "TPC-C server %d: reordering amount\n", proc_no);
#endif
      for (j = i + 1; j < rpc; j++) {
        if (dctx->cons[j] == dctx->d_id[i]) {
          tmp_id = dctx->cons[i];
          dctx->cons[i] = dctx->cons[j];
          dctx->cons[j] = tmp_id;
          tmp_amt = dctx->amt[i];
          dctx->amt[i] = dctx->amt[j];
          dctx->amt[j] = tmp_amt;
          break;
        }
      }
      if (j >= rpc) {
#ifdef TUX
        userlog ("Error in TPC-C server %d: missing ordl?\n", proc_no);
#else
        fprintf (stderr,
                "Error in TPC-C server %d: missing ordl?\n", proc_no);
#endif
                OCITransRollback(tpcsvc,errhp,OCI_DEFAULT);
        return (-1);
      }
    }
  }
#endif
#if defined(ISO5) || defined(ISO6)
  printf ("d_id:amount\n");
  for (i = 0; i < rpc; i++)
    printf ("%d:%.2f ", dctx->d_id[i], (float)dctx->amt[i]/100);
  printf ("\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
  delP->execstatus=OCIStmtExecute(tpcsvc,dctx->curd6,errhp,rpc,0,0,0,
                        OCI_COMMIT_ON_SUCCESS | OCI_DEFAULT);
#endif

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

```
  }

  OCIAttrGet(dctx->curd6,OCI_HTYPE_STMT,&rcount,0,OCI_ATTR_ROW_COUNT,errhp);

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

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

#ifdef ISO6
  printf("Delivery ISO6 Rolling back.\n");
  OCITransRollback(tpcsvc,errhp,OCI_DEFAULT);
#endif

#ifdef ISO5
  OCITransCommit(tpcsvc, errhp, OCI_DEFAULT);
#endif

#if defined(ISO5) || defined(ISO6)
  sysdate (sdate);
  printf ("Delivery completed at: %s\n", sdate);
#endif

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

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

  return (0);

}



void tkvcddone (ora_cn_data_t *ora_SlotDataP)

{
  delctx *dctx = (delctx *)ora_SlotDataP->dctx;
  global_delivery_t *delP = ora_SlotDataP->delP;

  if (dctx)
  {
#if defined(ISO) || defined(ISO5) || defined(ISO6) || defined(ISO8)
    OCIHandleFree((dvoid *)dctx->curd0,OCI_HTYPE_STMT);
#endif
#ifdef PLSQLDEL
    OCIHandleFree((dvoid *)dctx->curd0,OCI_HTYPE_STMT);
#else
    /* Again the above will cause a problem if both PSQLDEL and ISO are
                defined - VMM 12/30/97 */
    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);
#endif
    free (dctx);
    ora_SlotDataP->dctx = NULL;
  }

  if (delP) {
    free(delP);
    ora_SlotDataP->delP = NULL;
  }
}
```

plnew.c

```
#ifdef RCSID
static char *RCSid =
  "$Header: /afs/transarc.com/project/encina/rcs/test/src/benchmarks/tpcc/server/ora8.1_mt/RCS/plnew.c,v
1.3 1999/05/26 16:29:56 wenjian Exp $ Copyr (c) 1994 Oracle";
#endif /* RCSID */
/*+============================================================+
 |      Copyright (c) 1996 , 1997, 1998 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 "tpcc.h"
#include "plora.h"
#ifdef TUX
#include <userlog.h>
#endif
#include "tpccflags.h"

extern void err_printf(char *format, ...);

#define PLSQLNO

#ifdef PLSQLNO
#define SQLTXT2 "BEGIN initnew.new_init(:idx1arr); END;"
#else
#define SQLTXT2 "UPDATE stock SET s_order_cnt = s_order_cnt + 1, \
  s_ytd = s_ytd + :ol_quantity, s_remote_cnt = s_remote_cnt + :s_remote, \
  s_quantity = :s_quantity \
  WHERE rowid = :s_rowid"

#define SQLTXT3 "\
SELECT 0,stock.rowid,i_price,i_name,i_data,s_dist_%02d,s_data,s_quantity \
FROM item,stock WHERE i_id = :10 AND s_w_id = :30 AND s_i_id = i_id UNION ALL \
SELECT 1,stock.rowid,i_price,i_name,i_data,s_dist_%02d,s_data,s_quantity \
FROM item,stock WHERE i_id = :11 AND s_w_id = :31 AND s_i_id = i_id UNION ALL \
SELECT 2,stock.rowid,i_price,i_name,i_data,s_dist_%02d,s_data,s_quantity \
FROM item,stock WHERE i_id = :12 AND s_w_id = :32 AND s_i_id = i_id UNION ALL \
SELECT 3,stock.rowid,i_price,i_name,i_data,s_dist_%02d,s_data,s_quantity \
FROM item,stock WHERE i_id = :13 AND s_w_id = :33 AND s_i_id = i_id UNION ALL \
SELECT 4,stock.rowid,i_price,i_name,i_data,s_dist_%02d,s_data,s_quantity \
FROM item,stock WHERE i_id = :14 AND s_w_id = :34 AND s_i_id = i_id UNION ALL \
SELECT 5,stock.rowid,i_price,i_name,i_data,s_dist_%02d,s_data,s_quantity \
FROM item,stock WHERE i_id = :15 AND s_w_id = :35 AND s_i_id = i_id UNION ALL \
SELECT 6,stock.rowid,i_price,i_name,i_data,s_dist_%02d,s_data,s_quantity \
FROM item,stock WHERE i_id = :16 AND s_w_id = :36 AND s_i_id = i_id UNION ALL \
SELECT 7,stock.rowid,i_price,i_name,i_data,s_dist_%02d,s_data,s_quantity \
FROM item,stock WHERE i_id = :17 AND s_w_id = :37 AND s_i_id = i_id UNION ALL \
SELECT 8,stock.rowid,i_price,i_name,i_data,s_dist_%02d,s_data,s_quantity \
FROM item,stock WHERE i_id = :18 AND s_w_id = :38 AND s_i_id = i_id UNION ALL \
SELECT 9,stock.rowid,i_price,i_name,i_data,s_dist_%02d,s_data,s_quantity \
FROM item,stock WHERE i_id = :19 AND s_w_id = :39 AND s_i_id = i_id UNION ALL \
SELECT 10,stock.rowid,i_price,i_name,i_data,s_dist_%02d,s_data,s_quantity \
FROM item,stock WHERE i_id = :20 AND s_w_id = :40 AND s_i_id = i_id UNION ALL \
SELECT 11,stock.rowid,i_price,i_name,i_data,s_dist_%02d,s_data,s_quantity \
FROM item,stock WHERE i_id = :21 AND s_w_id = :41 AND s_i_id = i_id UNION ALL \
SELECT 12,stock.rowid,i_price,i_name,i_data,s_dist_%02d,s_data,s_quantity \
FROM item,stock WHERE i_id = :22 AND s_w_id = :42 AND s_i_id = i_id UNION ALL \
SELECT 13,stock.rowid,i_price,i_name,i_data,s_dist_%02d,s_data,s_quantity \
FROM item,stock WHERE i_id = :23 AND s_w_id = :43 AND s_i_id = i_id UNION ALL \
SELECT 14,stock.rowid,i_price,i_name,i_data,s_dist_%02d,s_data,s_quantity \
FROM item,stock WHERE i_id = :24 AND s_w_id = :44 AND s_i_id = i_id"


#define SQLTXT4 "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, :null_date, :ol_i_id, :ol_supply_w_id, :ol_quantity, \
  :ol_amount, :ol_dist_info)"
#endif  /* PLSQLNO */

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

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);
}
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];
#ifdef PLSQLNO
  sb2 s_bg_ind[NITEMS];
#endif

  ub2 nol_i_id_len[NITEMS];
  ub2 nol_supply_w_id_len[NITEMS];
  ub2 nol_quantity_len[NITEMS];
  ub2 nol_amount_len[NITEMS];
  ub2 s_quantity_len[NITEMS];
  ub2 i_name_len[NITEMS];
  ub2 i_price_len[NITEMS];
  ub2 i_data_len[NITEMS];
  ub2 s_dist_info_len[NITEMS];
  ub2 s_data_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 ol_dist_info_len[NITEMS];
  ub2 null_date_len[NITEMS];
#ifdef PLSQLNO
  ub2 s_bg_len[NITEMS];
#endif

  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_rcode[NITEMS];
#ifdef PLSQLNO
  ub2 s_bg_rcode[NITEMS];
#endif

  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];
  OCIDate null_date[NITEMS]; /* base date for null date entry */
  OCIStmt *curn1;
#ifdef PLSQLNO
  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;
#endif
  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;

 /* context holders */
  int i_name_ctx;
  int i_data_ctx;
  int i_price_ctx;
  int s_data_ctx;
  int s_dist_info_ctx;
  int s_quantity_ctx;
 };
```

```
typedef struct newctx newctx;

/* newctx *nctx; */

tkvcninit (ora_cn_data_t *ora_SlotDataP)
{

 int i, j;
 text stmbuf[16*1024];
 char id[4];
 char sd[4];

 newctx *nctx;
 OCIEnv *tpcenv = ora_SlotDataP->tpcenv;
 OCIServer *tpcsrv = ora_SlotDataP->tpcsrv;
 OCIError *errhp = ora_SlotDataP->errhp;
 OCISvcCtx *tpcsvc = ora_SlotDataP->tpcsvc;
 OCISession *tpcusr = ora_SlotDataP->tpcusr;
 OCIStmt *curi = ora_SlotDataP->curi;
 global_newOrder_t *newP;

 nctx = (newctx *) malloc (sizeof(newctx));
 memset(nctx,(char)0,sizeof(newctx));
 ora_SlotDataP->nctx = (void *)nctx;

 ora_SlotDataP->globals = (global_newOrder_t *)malloc(sizeof(global_newOrder_t));
 memset(ora_SlotDataP->globals,(char)0,sizeof(global_newOrder_t));
 newP = ora_SlotDataP->globals;

 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(newP->w_id);
 nctx->d_id_ind = TRUE;
 nctx->d_id_len = sizeof(newP->d_id);
 nctx->c_id_ind = TRUE;
 nctx->c_id_len = sizeof(newP->c_id);
 nctx->o_all_local_ind = TRUE;
 nctx->o_all_local_len = sizeof(newP->o_all_local);
 nctx->o_ol_cnt_ind = TRUE;
 nctx->o_ol_cnt_len = sizeof(newP->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(newP->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(newP->retries);
 nctx->cr_date_ind = TRUE;
 nctx->cr_date_len = sizeof(newP->cr_date);

 /* open first cursor */
 OCIERROR(errhp,OCIHandleAlloc(tpcenv,(dvoid **)(&nctx->curn1),
        OCI_HTYPE_STMT, 0, (dvoid**)0));
#ifdef PLSQLNO
 sqlfile("tkvcpnew.sql",stmbuf);
#else
 sqlfile("tkvcbnew.sql",stmbuf);
#endif
 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(newP->w_id),SIZ(newP->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(newP->d_id),SIZ(newP->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(newP->c_id),SIZ(newP->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(newP->o_all_local), SIZ(newP->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(newP->o_ol_cnt),
       SIZ(newP->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(newP->w_tax),SIZ(newP->w_tax),
       SQLT_FLT, &nctx->w_tax_ind, &nctx->w_tax_len, &nctx->w_tax_rc);
 OCIBNDR(nctx->curn1, nctx->d_tax_bp, errhp, ":d_tax",ADR(newP->d_tax),SIZ(newP->d_tax),
       SQLT_FLT, &nctx->d_tax_ind, &nctx->d_tax_len, &nctx->d_tax_rc);
 OCIBNDR(nctx->curn1, nctx->o_id_bp, errhp, ":o_id",ADR(newP->o_id),SIZ(newP->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(newP->c_discount), SIZ(newP->c_discount),SQLT_FLT,
    &nctx->c_discount_ind, &nctx->c_discount_len, &nctx->c_discount_rc);
 OCIBNDR(nctx->curn1, nctx->c_credit_bp, errhp, ":c_credit",newP->c_credit,
       SIZ(newP->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",newP->c_last,SIZ(newP->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(newP->retries),
       SIZ(newP->retries),SQLT_INT,
    &nctx->retries_ind, &nctx->retries_len, &nctx->retries_rc);
 OCIBNDR(nctx->curn1, nctx->cr_date_bp, errhp, ":cr_date",&newP->cr_date,SIZ(OCIDate),
 SQLT_ODT, &nctx->cr_date_ind, &nctx->cr_date_len, &nctx->cr_date_rc);

#ifdef PLSQLNO
 OCIBNDRAA(nctx->curn1, nctx->ol_i_id_bp,errhp,":ol_i_id",newP->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",
        newP->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",newP->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",newP->i_price,SIZ(float),
        SQLT_FLT, 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",newP->i_name,
        SIZ(newP->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",newP->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",newP->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",newP->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;
                newP->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);

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

 /* 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));



 /* bind variables */

 OCIBNDRA(nctx->curn2, nctx->s_quantity_bp,errhp,":s_quantity",newP->s_quantity,
        SIZ(int), SQLT_INT,nctx->s_quant_ind,nctx->s_quant_len,
        nctx->s_quant_rcode);
 OCIBNDRA(nctx->curn2, nctx->s_rowid_bp, errhp, ":s_rowid",nctx->s_rowid_ptr,
        sizeof(nctx->s_rowid_ptr[0]),SQLT_RDD,nctx->s_rowid_ind,
                nctx->s_rowid_len,nctx->s_rowid_rcode);
 OCIBNDRA(nctx->curn2, nctx->ol_quantity_bp,errhp,":ol_quantity",newP->nol_quantity,
                SIZ(int),SQLT_INT,nctx->nol_quantity_ind,nctx->nol_quantity_len,
```

```
                nctx->nol_quantity_rcode);
OCIBNDRA(nctx->curn2, 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);

/* open third cursor and bind variables */

for (i = 0; i < 10; i++)
{
 j = i + 1;
 OCIERROR(errhp,OCIHandleAlloc(tpcenv, (dvoid **)&((nctx->curn3)[i]),
                                                        OCI_HTYPE_STMT, 0, (dvoid**)0));

 sprintf ((char *) stmbuf, SQLTXT3, j, j, j, j, j, j, j, j, j, j, j,
                  j, j, j);

 OCIERROR(errhp,OCIStmtPrepare((nctx->curn3)[i], errhp, stmbuf,
                        strlen((char *)stmbuf),OCI_NTV_SYNTAX,
                                                        OCI_DEFAULT));
 OCIERROR(errhp,
       OCIAttrSet(nctx->curn3[i],OCI_HTYPE_STMT,(dvoid*)&nctx->norow,0,
            OCI_ATTR_PREFETCH_ROWS,errhp));
 for (j = 0; j < NITEMS; j++)
 {
  sprintf (id, ":%d", j + 10);
  sprintf (sd, ":%d", j + 30);
  OCIBNDRA((nctx->curn3)[i],(nctx->id_bp)[i][j],errhp,id,ADR(newP->nol_i_id[j]),
                  SIZ(int),SQLT_INT,
                  &nctx->nol_i_id_ind[j],&nctx->nol_i_id_len[j],
                  &nctx->nol_i_id_rcode[j]);
  OCIBNDRA((nctx->curn3)[i],(nctx->sd_bp)[i][j],errhp,sd,
                  ADR(nol_supply_w_id[j]),SIZ(int),SQLT_INT,
                  &nctx->nol_supply_w_id_ind[j],&nctx->nol_supply_w_id_len[j],
                  &nctx->nol_supply_w_id_rcode[j]);
  nctx->nol_i_id_ind[j] = NA;
  nctx->nol_supply_w_id_ind[j] = NA;
  nctx->nol_i_id_len[j] = sizeof(int);
  nctx->nol_supply_w_id_len[j] = sizeof(int);
 }

 OCIDEF((nctx->curn3)[i],(nctx->Dcons)[i],errhp,1,&(nctx->cons[0]),
                SIZ(nctx->cons[0]),SQLT_INT);
 OCIDEF((nctx->curn3)[i], (nctx->Ds_rowid)[i],errhp,2,
        nctx->s_rowid_ptr, sizeof(nctx->s_rowid_ptr[0]), SQLT_RDD);
 OCIDEF((nctx->curn3)[i], (nctx->Di_price)[i],errhp,3,newP->i_price,SIZ(int),
        SQLT_INT);

 OCIDFNRA((nctx->curn3)[i], (nctx->Di_name)[i],errhp,4,newP->i_name,
        SIZ(i_name[0]),SQLT_STR, nctx->i_name_ind,nctx->i_name_len,
        nctx->i_name_rcode);
 OCIDFNRA((nctx->curn3)[i], (nctx->Di_data)[i],errhp,5,nctx->i_data,
                SIZ(nctx->i_data[0]), SQLT_STR, NULL,nctx->i_data_len,NULL);
 OCIDFNRA((nctx->curn3)[i], (nctx->Ds_dist_info)[i],errhp,6,
        nctx->s_dist_info, SIZ(nctx->s_dist_info[0]),SQLT_STR,
        NULL,nctx->s_dist_info_len, NULL);
 OCIDFNRA((nctx->curn3)[i],(nctx->Ds_data)[i],errhp,7,nctx->s_data,
                SIZ(nctx->s_data[0]),SQLT_STR,NULL,nctx->s_data_len,NULL);
 OCIDEF((nctx->curn3)[i],(nctx->Ds_quantity)[i],errhp,8,newP->s_quantity,
                SIZ(int),SQLT_INT);

}

/* open fourth cursor */
OCIHandleAlloc(tpcenv, (dvoid **)(&nctx->curn4), OCI_HTYPE_STMT, 0,
          (dvoid**)0);
sprintf ((char *) stmbuf, SQLTXT4);
OCIStmtPrepare(nctx->curn4, errhp, stmbuf, strlen((char *)stmbuf),
                                OCI_NTV_SYNTAX, OCI_DEFAULT);
/* bind variables */

OCIBNDRA(nctx->curn4, nctx->ol_o_id_bp,errhp,":ol_o_id",nctx->ol_o_id,
        SIZ(int),SQLT_INT, NULL,nctx->ol_o_id_len,
        NULL);
OCIBNDRA(nctx->curn4, nctx->ol_d_id_bp,errhp,":ol_d_id",nctx->ol_d_id,
        SIZ(int),SQLT_INT, NULL,nctx->ol_d_id_len,
        NULL);
OCIBNDRA(nctx->curn4, nctx->ol_w_id_bp,errhp,":ol_w_id",nctx->ol_w_id,
        SIZ(int),SQLT_INT, NULL,nctx->ol_w_id_len,
        NULL);
OCIBNDRA(nctx->curn4, nctx->ol_number_bp,errhp,":ol_number",nctx->ol_number,
        SIZ(int),SQLT_INT, NULL,nctx->ol_number_len,
        NULL);
OCIBNDRA(nctx->curn4, nctx->ol_i_id_bp4,errhp,":ol_i_id",newP->nol_i_id,SIZ(int),
        SQLT_INT, NULL,nctx->nol_i_id_len, NULL);
OCIBNDRA(nctx->curn4, nctx->ol_supply_w_id_bp4,errhp,":ol_supply_w_id",
        newP->nol_supply_w_id,SIZ(int),SQLT_INT, NULL,
        nctx->nol_supply_w_id_len, NULL);
OCIBNDRA(nctx->curn4, nctx->ol_quantity_bp4,errhp,":ol_quantity",newP->nol_quantity,
        SIZ(int),SQLT_INT, NULL,nctx->nol_quantity_len,
                NULL);
OCIBNDRA(nctx->curn4, nctx->ol_amount_bp,errhp,":ol_amount",newP->nol_amount,
        SIZ(int),SQLT_INT, NULL,nctx->nol_amount_len,
        NULL);
OCIBNDRA(nctx->curn4, nctx->ol_dist_info_bp,errhp,":ol_dist_info",
        nctx->s_dist_info, SIZ(nctx->s_dist_info[0]),SQLT_AFC,
        NULL, nctx->ol_dist_info_len,
        NULL);
OCIBNDRA(nctx->curn4, nctx->null_date_bp,errhp,":null_date",nctx->null_date,
        SIZ(OCIDate), SQLT_ODT,NULL,
                nctx->null_date_len, NULL);

 /* set up the null date Null date is 15-sep-11 */
 for (i=0;i<NITEMS;i++)
 {
   OCIDateSetDate(&nctx->null_date[i],(sb2)1811,(ub1)9,(ub1)15);
 }
#endif

 return (0);

}



tkvcn (ora_cn_data_t *ora_SlotDataP)
{

  int i, j, k;
  int rpc, rpc3, rowoff, iters,rcount;
  ub4 flags;
  int failed = 0;

 OCIEnv *tpcenv = ora_SlotDataP->tpcenv;
 OCIServer *tpcsrv = ora_SlotDataP->tpcsrv;
 OCIError *errhp = ora_SlotDataP->errhp;
 OCISvcCtx *tpcsvc = ora_SlotDataP->tpcsvc;
 OCISession *tpcusr = ora_SlotDataP->tpcusr;
 OCIStmt *curi = ora_SlotDataP->curi;
 global_newOrder_t *newP = ora_SlotDataP->globals;
 newctx *nctx = (newctx *)ora_SlotDataP->nctx;

retry:

  newP->status = 0;                    /* number of invalid items */

  /* get number of order lines, and check if all are local */

  newP->o_ol_cnt = NITEMS;
  newP->o_all_local = 1;
  for (i = 0; i < NITEMS; i++) {
    if (newP->nol_i_id[i] == 0) {
      newP->o_ol_cnt = i;
      break;
    }
    if (newP->nol_supply_w_id[i] != newP->w_id) {
      nctx->s_remote[i] = 1;
      newP->o_all_local = 0;
    }
    else
      nctx->s_remote[i] = 0;
  }

  nctx->w_id_ind = TRUE;
  nctx->w_id_len = sizeof(newP->w_id);
  nctx->d_id_ind = TRUE;
  nctx->d_id_len = sizeof(newP->d_id);
  nctx->c_id_ind = TRUE;
  nctx->c_id_len = sizeof(newP->c_id);
  nctx->o_all_local_ind = TRUE;
  nctx->o_all_local_len = sizeof(newP->o_all_local);
  nctx->o_ol_cnt_ind = TRUE;
  nctx->o_ol_cnt_len = sizeof(newP->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(newP->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(newP->retries);
  nctx->cr_date_ind = TRUE;
  nctx->cr_date_len = sizeof(newP->cr_date);
#ifdef PLSQLNO
  /* this is the row count */
  rcount = newP->o_ol_cnt;
  nctx->nol_i_count = newP->o_ol_cnt;
  nctx->nol_q_count = newP->o_ol_cnt;
  nctx->nol_s_count = newP->o_ol_cnt;
  nctx->s_remote_count = newP->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 = newP->o_ol_cnt;
  nctx->i_data_count = newP->o_ol_cnt;

  /* initialization for array operations */
  for (i = 0; i < newP->o_ol_cnt; i++) {
    nctx->ol_w_id[i] = newP->w_id;
```

```
    nctx->ol_d_id[i] = newP->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 = newP->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;
  }

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


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

#ifdef PLSQLNO
  /* did the txn succeed ? */
  if (rcount != newP->o_ol_cnt)
  {
    newP->status = rcount - newP->o_ol_cnt;
    newP->o_ol_cnt = rcount;
  }
#endif

#ifdef DEBUG
  err_printf("tkvcn (NO): w_id = %d, d_id = %d, c_id = %d\n",w_id, d_id, c_id);
#endif


#ifndef PLSQLNO
  /* 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] = TRUE;
    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_quant_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_quant_len[i] = sizeof(int);
    nctx->s_rowid_len[i] = sizeof(nctx->s_rowid_ptr[0]);
    nctx->cons_len[i] = sizeof(int);
  }
  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_quant_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->s_quant_len[i] = 0;
    nctx->s_rowid_len[i] = 0;
    nctx->cons_len[i] = 0;
  }

  rpc3 = SelItemStk (nctx, newP, tpcsvc, errhp);
  if (rpc3 == -2)
    goto retry;
  else if (rpc3 == -1)
    return (-1);

  /* compute order line amounts, total amount and stock quantities */

  total_amount = 0.0;
  for (i = 0; i < newP->o_ol_cnt; i++)
    {
    nctx->ol_o_id[i] = newP->o_id;
    if (nctx->nol_i_id_ind[i] != NA) {
      newP->s_quantity[i] -= newP->nol_quantity[i];
      if (newP->s_quantity[i] < 10)
```

```
          newP->s_quantity[i] += 91;
        newP->nol_amount[i] = (newP->nol_quantity[i] * newP->i_price[i]);
        newP->total_amount += newP->nol_amount[i];
        if (strstr (nctx->i_data[i], "ORIGINAL") &&
            strstr (nctx->s_data[i], "ORIGINAL"))
          newP->brand_gen[i] = 'B';
        else
          newP->brand_gen[i] = 'G';
      }

    }
  total_amount *= ((float)(10000 - c_discount)/10000) * (1.0 + ((float)(d_tax)/10000) +
((float)(w_tax)/10000));
  newP->total_amount = newP->total_amount/100;

  rpc = UpdStk2 (nctx, newP, tpcsvc, errhp);
  if (rpc == -2)
    goto retry;
  else if (rpc == -1)
    return (-1);

  /* error processing - will keep it separated for readablity */
  /* number of items selected != number of stock updated */

  if (rpc3 != rpc) {
    userlog ("Error in TPC-C server %d: %d rows of item read, ",
             newP->proc_no, rpc3);
    userlog ("                          but %d rows of stock updated\n", rpc);
    /* rollback */
    OCITransRollback(tpcsvc,errhp,OCI_DEFAULT);
    return (-1);
  }


/* common code for insert into order_line */
  for (i=0; i< newP->o_ol_cnt; i++)  /* move district info in place */
  {
    nctx->ol_dist_info_len[i]=nctx->s_dist_info_len[i];
  }

  /* array insert into order line table */
  flags= (newP->status ? OCI_DEFAULT : (OCI_DEFAULT|OCI_COMMIT_ON_SUCCESS));
  if ((newP->o_ol_cnt - newP->status) > 0)
  {
    newP->execstatus = OCIStmtExecute(tpcsvc,nctx->curn4,errhp,newP->o_ol_cnt - newP->status,
                          0,0,0,flags);
    if(newP->execstatus != OCI_SUCCESS) {
      OCITransRollback(tpcsvc,errhp,OCI_DEFAULT);
      newP->errcode = OCIERROR(errhp,execstatus);
      if(newP->errcode == NOT_SERIALIZABLE) {
        newP->retries++;
        goto retry;
      } else if (newP->errcode == RECOVERR) {
        newP->retries++;
        goto retry;
      } else {
        return -1;
      }
    }
    OCIAttrGet(nctx->curn4,OCI_HTYPE_STMT,&rcount,NULL,
                                    OCI_ATTR_ROW_COUNT, errhp);
    if (rcount != (newP->o_ol_cnt - newP->status))
    {
     userlog ("Error in TPC-C server %d: array insert failed\n",
                                    newP->proc_no);
     /* rollback */
     OCITransRollback(tpcsvc,errhp,OCI_DEFAULT);
     return (-1);
    }
  }

  /* commit if no invalid item */

  if (newP->status) {
    OCITransRollback(tpcsvc,errhp,OCI_DEFAULT);
    fflush(stdout);
  }

#else
  newP->total_amount = 0.0;
  for (i = 0; i < newP->o_ol_cnt; i++)
  {
    if (nctx->nol_i_id_ind[i] != NA) {
      newP->total_amount += newP->nol_amount[i];
    }
  }
  newP->total_amount *= ((float)(10000 - newP->c_discount)/10000) * (1.0 + ((float)(newP->d_tax)/
10000) + ((float)(newP->w_tax)/10000));
  newP->total_amount = newP->total_amount/100;
#endif
  return (0);

}



void tkvcndone (ora_cn_data_t *ora_SlotDataP)

{
  int i;
  newctx *nctx = (newctx *)ora_SlotDataP->nctx;
  global_newOrder_t *newP = ora_SlotDataP->globals;

  if (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);
    free (nctx);
  }
  if (newP) {
    err_printf("free_handles> newP: 0x%x\n", newP);
    free(newP);
    ora_SlotDataP->globals = NULL;
  }
}

/* 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 */

shiftitemstock (i, j, nctx, newP)

int i, j;
newctx *nctx;
global_newOrder_t *newP;
{
  /* shift up the values for the stock table */
   nctx->s_remote[i] =  nctx->s_remote[j];

  /* shift up the order_line values */

  nctx->nol_i_id_ind[i]=nctx->nol_i_id_ind[j];
  newP->nol_i_id[i] = newP->nol_i_id[j];

  nctx->nol_quantity_ind[i] =  nctx->nol_quantity_ind[j];
  newP->nol_quantity[i] = newP->nol_quantity[j];

  nctx->nol_supply_w_id_ind [i] =  nctx->nol_supply_w_id_ind[j];
  newP->nol_supply_w_id[i] = newP->nol_supply_w_id[j];
}

#if 0
/* TODO - this routine is not ever called. So, no changes for now */

swapitemstock (i, j)

int i, j;

{

  int k;
  int tempi;
  int tempf;
  char tempstr[52];
  ub2 tempub2;
  sb2 tempsb2;
  OCIRowid  *tmprid;

  tempsb2 = nctx->cons_ind[i];
  nctx->cons_ind[i] = nctx->cons_ind[j];
  nctx->cons_ind[j] = tempsb2;
  tempub2 = nctx->cons_len[i];
  nctx->cons_len[i] = nctx->cons_len[j];
  nctx->cons_len[j] = tempub2;
  tempub2 = nctx->cons_rcode[i];
  nctx->cons_rcode[i] = nctx->cons_rcode[j];
  nctx->cons_rcode[j] = tempub2;
  tempi = nctx->cons[i];
  nctx->cons[i] = nctx->cons[j];
  nctx->cons[j] = tempi;

  tempsb2 = nctx->s_rowid_ind[i];
  nctx->s_rowid_ind[i] = nctx->s_rowid_ind[j];
  nctx->s_rowid_ind[j] = tempsb2;
  tempub2 = nctx->s_rowid_len[i];
  nctx->s_rowid_len[i] = nctx->s_rowid_len[j];
  nctx->s_rowid_len[j] = tempub2;
  tempub2 = nctx->s_rowid_rcode[i];
  nctx->s_rowid_rcode[i] = nctx->s_rowid_rcode[j];
  nctx->s_rowid_rcode[j] = tempub2;
  tmprid = nctx->s_rowid_ptr[i];
  nctx->s_rowid_ptr[i]= nctx->s_rowid_ptr[j];
  nctx->s_rowid_ptr[j]=tmprid;

  tempsb2 = nctx->i_price_ind[i];
  nctx->i_price_ind[i] = nctx->i_price_ind[j];
  nctx->i_price_ind[j] = tempsb2;
  tempub2 = nctx->i_price_len[i];
  nctx->i_price_len[i] = nctx->i_price_len[j];
  nctx->i_price_len[j] = tempub2;
  tempub2 = nctx->i_price_rcode[i];
  nctx->i_price_rcode[i] = nctx->i_price_rcode[j];
  nctx->i_price_rcode[j] = tempub2;
  tempf = i_price[i];
```

```
  i_price[i] = i_price[j];
  i_price[j] = tempf;

  tempsb2 = nctx->i_name_ind[i];
  nctx->i_name_ind[i] = nctx->i_name_ind[j];
  nctx->i_name_ind[j] = tempsb2;
  tempub2 = nctx->i_name_len[i];
  nctx->i_name_len[i] = nctx->i_name_len[j];
  nctx->i_name_len[j] = tempub2;
  tempub2 = nctx->i_name_rcode[i];
  nctx->i_name_rcode[i] = nctx->i_name_rcode[j];
  nctx->i_name_rcode[j] = tempub2;
  strncpy (tempstr, i_name[i], 25);
  strncpy (i_name[i], i_name[j], 25);
  strncpy (i_name[j], tempstr, 25);

  tempsb2 = nctx->i_data_ind[i];
  nctx->i_data_ind[i] = nctx->i_data_ind[j];
  nctx->i_data_ind[j] = tempsb2;
  tempub2 = nctx->i_data_len[i];
  nctx->i_data_len[i] = nctx->i_data_len[j];
  nctx->i_data_len[j] = tempub2;
  tempub2 = nctx->i_data_rcode[i];
  nctx->i_data_rcode[i] = nctx->i_data_rcode[j];
  nctx->i_data_rcode[j] = tempub2;
  strncpy (tempstr, nctx->i_data[i], 51);
  strncpy (nctx->i_data[i], nctx->i_data[j], 51);
  strncpy (nctx->i_data[j], tempstr, 51);

  tempsb2 = nctx->s_quantity_ind[i];
  nctx->s_quantity_ind[i] = nctx->s_quantity_ind[j];
  nctx->s_quantity_ind[j] = tempsb2;
  tempub2 = nctx->s_quantity_len[i];
  nctx->s_quantity_len[i] = nctx->s_quantity_len[j];
  nctx->s_quantity_len[j] = tempub2;
  tempub2 = nctx->s_quantity_rcode[i];
  nctx->s_quantity_rcode[i] = nctx->s_quantity_rcode[j];
  nctx->s_quantity_rcode[j] = tempub2;
  tempi = s_quantity[i];
  s_quantity[i] = s_quantity[j];
  s_quantity[j] = tempi;

  tempsb2 = nctx->s_dist_info_ind[i];
  nctx->s_dist_info_ind[i] = nctx->s_dist_info_ind[j];
  nctx->s_dist_info_ind[j] = tempsb2;
  tempub2 = nctx->s_dist_info_len[i];
  nctx->s_dist_info_len[i] = nctx->s_dist_info_len[j];
  nctx->s_dist_info_len[j] = tempub2;
  tempub2 = nctx->s_dist_info_rcode[i];
  nctx->s_dist_info_rcode[i] = nctx->s_dist_info_rcode[j];
  nctx->s_dist_info_rcode[j] = tempub2;
  strncpy (tempstr, nctx->s_dist_info[i], 25);
  strncpy (nctx->s_dist_info[i], nctx->s_dist_info[j], 25);
  strncpy (nctx->s_dist_info[j], tempstr, 25);

  tempsb2 = nctx->s_data_ind[i];
  nctx->s_data_ind[i] = nctx->s_data_ind[j];
  nctx->s_data_ind[j] = tempsb2;
  tempub2 = nctx->s_data_len[i];
  nctx->s_data_len[i] = nctx->s_data_len[j];
  nctx->s_data_len[j] = tempub2;
  tempub2 = nctx->s_data_rcode[i];
  nctx->s_data_rcode[i] = nctx->s_data_rcode[j];
  nctx->s_data_rcode[j] = tempub2;
  strncpy (tempstr, nctx->s_data[i], 51);
  strncpy (nctx->s_data[i], nctx->s_data[j], 51);
  strncpy (nctx->s_data[j], tempstr, 51);

}
#endif


SelItemStk (nctx, newP, tpcsvc, errhp)
newctx *nctx;
global_newOrder_t *newP;
OCISvcCtx *tpcsvc;
OCIError *errhp;
{

  int i, j, rpc3,rcount;

  /* array select from item and stock tables */
  newP->execstatus=OCIStmtExecute(tpcsvc,(nctx->curn3)[newP->d_id-1],errhp,newP->o_ol_cnt,
                                  0,0,0,OCI_DEFAULT);
  if((newP->execstatus != OCI_SUCCESS) && (newP->execstatus != OCI_NO_DATA)) {
    newP->errcode = OCIERROR(errhp,newP->execstatus);
    if(newP->errcode == NOT_SERIALIZABLE) {
      newP->retries++;
      OCITransRollback(tpcsvc,errhp,OCI_DEFAULT);
      return (-2);
    } else if (newP->errcode == RECOVERR) {
    /* In case of NO_DATA this should NOT return, but simply fall through */
      OCITransRollback(tpcsvc,errhp,OCI_DEFAULT);
      newP->retries++;
      return (-2);
    } else {
      OCITransRollback(tpcsvc,errhp,OCI_DEFAULT);
      return (-1);
    }
  }
  /* mark invalid items */
  OCIAttrGet((nctx->curn3)[newP->d_id-1], OCI_HTYPE_STMT,&rcount,NULL,
                        OCI_ATTR_ROW_COUNT, errhp);
  rpc3 = rcount;

  /* the result is in order, so we have to shift up to fill    */
  /* the slot for the line with the invalid item.              */
  /* If more than one item is wrong, this is not an simulated  */
  /* error and we'll blow off */

  if ((newP->status = newP->o_ol_cnt - rcount) >1)
  {
    userlog ("TPC-C server %d: more than 1 invalid item?\n", proc_no);
    return (rpc3);
  }
  if (newP->status == 0) return (rpc3);

  /* find the invalid item, transfer the rowid information */

  for (i = 0; i < newP->o_ol_cnt; i++) {
    if (nctx->cons[i] != i) break;   /* this item is invalid */
  }


        userlog ("TPC-C server %d: reordering items and stocks\n",
                proc_no);

  /* not the last item - shift up */

  for (j = i; j < newP->o_ol_cnt-1; j++)
  {
    shiftitemstock (j, j+1, nctx, newP);
  }
  /* zero the last item */
    i = newP->o_ol_cnt-1;
    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->null_date_ind[i]= NA;
    nctx->ol_number_ind[i] = NA;
    nctx->ol_dist_info_ind[i] = NA;
    nctx->s_remote_ind[i] = NA;
    nctx->s_quant_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_ind[i] = 0;
    nctx->s_remote_len[i] = 0;
    nctx->s_quant_len[i] = 0;

  return (rpc3);

}



UpdStk2 (nctx, newP, tpcsvc, errhp)
newctx *nctx;
global_newOrder_t *newP;
OCISvcCtx *tpcsvc;
OCIError *errhp;
{

  int rpc, rowoff, iters,rcount;

  /* array update of stock table */

  newP->execstatus = OCIStmtExecute(tpcsvc,nctx->curn2,errhp,newP->o_ol_cnt-newP->status,0,0,0,
                                    OCI_DEFAULT);
  if(newP->execstatus != OCI_SUCCESS) {
    OCITransRollback(tpcsvc,errhp,OCI_DEFAULT);
    newP->errcode = OCIERROR(errhp,newP->execstatus);
    if(newP->errcode == NOT_SERIALIZABLE) {
      newP->retries++;
                return (-2);
    } else if (newP->errcode == RECOVERR) {
      newP->retries++;
                return (-2);
    } else {
      return -1;
    }
  }
  OCIAttrGet(nctx->curn2,OCI_HTYPE_STMT,&rcount,NULL, OCI_ATTR_ROW_COUNT, errhp);
  rpc = rcount;

  if (rpc != (newP->o_ol_cnt - newP->status)) {
    userlog ("Error in TPC-C server %d: array update failed\n",
```

```
            newP->proc_no);
    OCITransRollback(tpcsvc,errhp,OCI_DEFAULT);
    return (-1);
  }

  return (rpc);

}
```

plora.h

```
#ifndef TPCC_PLORA_H
#define TPCC_PLORA_H

#include "tpcc.h"
#include "tpcc_info.h"

#define NEWO_TRANS (1)
#define PAYMENT_TRANS (2)
#define ORDER_STAT_TRANS (3)
#define DELIVERY_TRANS (4)
#define STOCK_TRANS (5)
#define MAX_TRAN_TYPE (5)

/* struct to copy-in/out neworder vars */
struct global_newOrder_t {
  int w_id;
  int d_id;
  int c_id;
  int nol_i_id[15];
  int nol_supply_w_id[15];
  int nol_quantity[15];
  int retries;
  ub4  datelen;
  text o_entry_d[20];
  int o_id;
  int o_ol_cnt;
  char c_last[17];
  char c_credit[3];
  float c_discount;
  float w_tax;
  float d_tax;
  float total_amount;
  char i_name[15][25];
  int s_quantity[15];
  char brand_gen[15];
  float i_price[15];
  int nol_amount[15];
  int status;
  int o_all_local;
  int errcode;
  int execstatus;
  int proc_no;
  char brand_generic[15][1];
  int tracelevel;
  OCIDate cr_date;
  OCIDate c_since;
  OCIDate o_entry_d_base;
  OCIDate ol_d_base[15];
};

typedef struct global_newOrder_t global_newOrder_t;

struct global_payment_t {
  int w_id;
  int d_id;
  int c_id;
  char c_last[17];
  char c_first[17];
  char c_middle[3];
  double c_balance;
  int retries;
  int bylastname;
  OCIDate c_since;
  int execstatus;
  int errcode;
  int c_w_id;
  int c_d_id;
  int h_amount;
  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_street_1[21];
  char c_street_2[21];
  char c_city[21];
  char c_state[3];
  char c_zip[10];
  char c_phone[17];
  ub4  sincelen;
  text c_since_d[11];
  float c_discount;
  char c_credit[3];
  int c_credit_lim;
  char c_data[201];
  ub4 hlen;
  text h_date[20];
  OCIDate cr_date;
};

typedef struct global_payment_t global_payment_t;

struct global_order_t {
  OCIDate ol_d_base[15];
  int w_id;
  int d_id;
  int c_id;
  char c_last[17];
  char c_first[17];
  char c_middle[3];
  double c_balance;
  int o_id;
  int o_carrier_id;
  int o_ol_cnt;
  int ol_supply_w_id[15];
  int ol_i_id[15];
  unsigned char o_entry_d_base[7];
  int ol_quantity[15];
  ub4  ol_del_len[15];
  text ol_delivery_d[15][11];
  int ol_amount[15];
  int errcode;
  int execstatus;
  int retries;
  int bylastname;
  char o_entry_d[20];
};

typedef struct global_order_t global_order_t;

struct global_delivery_t {
  int w_id;
  int o_carrier_id;
  int retries;
  int del_o_id[10];
  int errcode;
  int execstatus;
  int proc_no;
  OCIDate cr_date;
};
typedef struct global_delivery_t global_delivery_t;

struct global_stock_t {
  int w_id;
  int d_id;
  int threshold;
  int retries;
  int low_stock;
  int errcode;
  int execstatus;
};

typedef struct global_stock_t global_stock_t;


/* Oracle handles and rest of thread specific vars(thread slot data ) */

struct ora_cn_data_t {
  OCIEnv *tpcenv;
  OCIServer *tpcsrv;
  OCIError *errhp;
  OCISvcCtx *tpcsvc;
  OCISession *tpcusr;
  OCIStmt *curi;
  dvoid *xmem;

  global_newOrder_t *globals;
  global_payment_t *payP;
  global_order_t *ordP;
  global_delivery_t *delP;
  global_stock_t *stoP;
  void *nctx;
  void *pctx;
  void *octx;
  void *sctx;
  void *dctx;
  void *actx;  /* for #ifdef DMLRETDEL */
  void *cbctx; /* for orderstatus */
  void *ctxp_octx; /* for orderstatus */
};

typedef struct ora_cn_data_t ora_cn_data_t;

#endif /* TPCC_PLORA_H */
```

plord.c

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

```
 "$Header: /afs/transarc.com/project/encina/rcs/test/src/benchmarks/tpcc/server/ora8.1_mt/RCS/plord.c,v
1.2 1999/04/15 12:16:51 oz Exp $ Copyr (c) 1994 Oracle";
#endif /* RCSID */

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

#include "tpcc.h"
#include "plora.h"  /*  */
#include "tpccflags.h"

#ifdef PLSQLORD
#define SQLTXT "BEGIN orderstatus.getstatus (: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;"
#else

#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_last, c_d_id, c_w_id, c_first"

#define SQLCUR1 "SELECT c_id, c_balance, c_first, c_middle, c_last, \
                o_id, o_entry_d, o_carrier_id, o_ol_cnt \
                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_c_id, o_d_id, o_w_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 \
                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_c_id, o_d_id, o_w_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"

#define SQLCUR4 "SELECT count(c_last) FROM customer \
                WHERE c_d_id = :d_id AND c_w_id = :w_id AND c_last = :c_last "
#endif



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;

  ub4 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;
  OCIBind *w_id_bp0;
  OCIBind *d_id_bp0;
  OCIBind *c_id_bp;
  OCIBind *c_last_bp;
#ifdef PLSQLORD
  OCIBind *byln_bp;
  OCIBind *c_first_bp;
  OCIBind *c_middle_bp;
  OCIBind *c_balance_bp;
  OCIBind *o_entry_d_bp;
  OCIBind *o_cr_id_bp;
  OCIBind *o_ol_cnt_bp;
  OCIBind *ol_i_id_bp;
  OCIBind *ol_supply_w_id_bp;
  OCIBind *ol_quantity_bp;
  OCIBind *ol_amount_bp;
  OCIBind *ol_d_base_bp;
  ub4 ol_i_id_cnt;
  ub4 ol_sup_cnt;
  ub4 ol_qty_cnt;
  ub4 ol_amt_cnt;
  ub4 ol_del_d_cnt;
#else
  OCIStmt *curo1;
  OCIStmt *curo2;
  OCIStmt *curo3;
  OCIStmt *curo4;
  OCIBind *w_id_bp2;
  OCIBind *w_id_bp3;
  OCIBind *w_id_bp4;
  OCIBind *d_id_bp2;
  OCIBind *d_id_bp3;
  OCIBind *d_id_bp4;
  OCIBind *c_last_bp4;
  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_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;
  OCIDefine *c_count_dp;
  OCIRowid *c_rowid_ptr[100];
  int cs;
  int cust_idx;
  int norow;
  int rcount;
  int somerows;
#endif
};

typedef struct ordctx ordctx;

struct defctx
{
 boolean reexec;
 ub4 count;
};
typedef struct defctx defctx;

struct defctx_ordctx {
    defctx *ctxp;
    ordctx *octx;
};
typedef struct defctx_ordctx defctx_ordctx;

/* ordctx *octx; */

/* defctx cbctx; */

#ifndef PLSQLORD
sb4 rid_data(dvoid *ctxp_octx, OCIDefine *dp, ub4 iter,
```

```
            dvoid **bufpp, ub4 **alenp, ub1 *piecep,
            dvoid **indpp, ub2 **rcodepp)
{
 ub4 i;
 defctx *ctxp = ((defctx_ordctx *)ctxp_octx)->ctxp;
 ordctx *octx = ((defctx_ordctx *)ctxp_octx)->octx;
 if (((defctx*)ctxp)->reexec)/* if this is the second execute - use entry 0 */
 {
   i = 0;
   ((defctx*)ctxp)->count--;   /* count down */
 }
 else
   i = iter;
 *bufpp = octx->c_rowid_ptr[i];
 *indpp= &octx->c_rowid_ind[i];
 *alenp= &octx->c_rowid_len[i];
 *rcodepp = &octx->c_rowid_rcode[i];
 *piecep =OCI_ONE_PIECE;
 return (OCI_CONTINUE);
}
#endif

tkvcoinit (ora_cn_data_t *ora_SlotDataP)

{

  int i;
  text stmbuf[SQL_BUF_SIZE];

  ordctx *octx;
  defctx *cbctx;
  global_order_t *ordP;
  OCIEnv *tpcenv = ora_SlotDataP->tpcenv;
  OCIServer *tpcsrv = ora_SlotDataP->tpcsrv;
  OCIError *errhp = ora_SlotDataP->errhp;
  OCISvcCtx *tpcsvc = ora_SlotDataP->tpcsvc;
  OCISession *tpcusr = ora_SlotDataP->tpcusr;
  OCIStmt *curi = ora_SlotDataP->curi;
  defctx_ordctx *ctxp_octx;

  octx = (ordctx *) malloc (sizeof(ordctx));
  memset(octx,(char)0,sizeof(ordctx));
  ora_SlotDataP->octx = (void *)octx;  /*  */

  cbctx = (defctx *) malloc (sizeof(defctx));
  memset(cbctx,(char)0,sizeof(defctx));
  ora_SlotDataP->cbctx = (void *)cbctx;  /*  */

  /* allocate the space */
  ctxp_octx = (defctx_ordctx *)malloc(sizeof(defctx_ordctx));
  ora_SlotDataP->ctxp_octx = (void *)ctxp_octx;

  ora_SlotDataP->ordP = (global_order_t *)malloc(sizeof(global_order_t));
  memset(ora_SlotDataP->ordP,(char)0,sizeof(global_order_t));
  ordP = ora_SlotDataP->ordP;

#ifndef PLSQLORD
  octx->cs = 1;
  octx->norow = 0;
  octx->somerows = 10;
/* 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));
  }
#endif


  OCIERROR(errhp,
    OCIHandleAlloc(tpcenv,(dvoid**)&octx->curo0,OCI_HTYPE_STMT,0,(dvoid**)0));
  OCIERROR(errhp,
    OCIHandleAlloc(tpcenv,(dvoid**)&octx->curo0,OCI_HTYPE_STMT,0,(dvoid**)0));
#ifndef PLSQLORD
  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));
  OCIERROR(errhp,
    OCIHandleAlloc(tpcenv,(dvoid**)&octx->curo4,OCI_HTYPE_STMT,0,(dvoid**)0));
#endif

#ifdef PLSQLORD
  sprintf((char *) stmbuf, SQLTXT);
  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_STMT,(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_STMT,(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_STMT,(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_STMT,(dvoid*)&octx->norow,0,
            OCI_ATTR_PREFETCH_ROWS,errhp));

  sprintf((char *) stmbuf, SQLCUR4);
  OCIERROR(errhp,
    OCIStmtPrepare(octx->curo4,errhp,stmbuf,strlen((char *)stmbuf),
                                  OCI_NTV_SYNTAX,OCI_DEFAULT));
  OCIERROR(errhp,
    OCIAttrSet(octx->curo4,OCI_HTYPE_STMT,(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(ordP->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 PLSQLORD

  OCIBND(octx->curo0, octx->w_id_bp0, errhp,":w_id",ADR(ordP->w_id),
       SIZ(int),SQLT_INT);
  OCIBND(octx->curo0, octx->d_id_bp0, errhp,":d_id",ADR(ordP->d_id),
       SIZ(int), SQLT_INT);
  OCIBND(octx->curo0, octx->c_id_bp , errhp,":c_id",ADR(ordP->c_id),
       SIZ(c_id),SQLT_INT);
  OCIBND(octx->curo0, octx->byln_bp , errhp,":byln",ADR(ordP->bylastname),
       SIZ(int),SQLT_INT);
  OCIBND(octx->curo0, octx->c_last_bp , errhp,":c_last",ordP->c_last,
       SIZ(ordP->c_last),SQLT_STR);
  OCIBND(octx->curo0, octx->c_first_bp , errhp,":c_first",ordP->c_first,
       SIZ(ordP->c_first),SQLT_STR);
  OCIBND(octx->curo0, octx->c_middle_bp , errhp,":c_middle",ordP->c_middle,
       SIZ(ordP->c_middle),SQLT_STR);
  OCIBND(octx->curo0, octx->c_balance_bp , errhp,":c_balance",
       ADR(ordP->c_balance),SIZ (float),SQLT_FLT);
  OCIBND(octx->curo0, octx->c_id_bp , errhp,":o_id",ADR(ordP->o_id),
       SIZ(int),SQLT_INT);
  OCIBND(octx->curo0, octx->o_entry_d_bp , errhp,":o_entry_d",ordP->o_entry_d,
       SIZ(ordP->o_entry_d),SQLT_STR);
  OCIBND(octx->curo0, octx->o_cr_id_bp , errhp,":o_cr_id",ADR(ordP->o_carrier_id),
       SIZ(int), SQLT_INT);
  OCIBND(octx->curo0, octx->o_ol_cnt_bp , errhp,":o_ol_cnt",ADR(ordP->o_ol_cnt),
       SIZ(int),SQLT_INT);

  OCIBNDRAA(octx->curo0, octx->ol_i_id_bp, errhp, ":ol_i_id",
        ordP->ol_i_id,SIZ(int),SQLT_INT,
        octx->ol_i_id_ind,octx->ol_i_id_len,
        octx->ol_i_id_rcode,NITEMS,&octx->ol_i_id_cnt);
  OCIBNDRAA(octx->curo0,octx->ol_supply_w_id_bp,errhp,":ol_s_w_id",
        ordP->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,&octx->ol_sup_cnt);
  OCIBNDRAA(octx->curo0, octx->ol_quantity_bp,errhp,":ol_quantity",
        ordP->ol_quantity,SIZ(int),SQLT_INT,
```

```
        octx->ol_quantity_ind,octx->ol_quantity_len,
        octx->ol_quantity_rcode,NITEMS,&octx->ol_qty_cnt);
  OCIBNDRAA(octx->curo0,octx->ol_amount_bp,errhp,":ol_amount",ordP->ol_amount,
        SIZ(float),SQLT_FLT,octx->ol_amount_ind,
        octx->ol_amount_len, octx->ol_amount_rcode,NITEMS,
        &octx->ol_amt_cnt);
  OCIBNDRAA(octx->curo0,octx->ol_d_base_bp,errhp,":ol_d_d",ordP->ol_d_base,
        SIZ(OCIDate),SQLT_ODT,octx->ol_delivery_d_ind,
        octx->ol_delivery_d_len, octx->ol_delivery_d_rcode,NITEMS,
        &octx->ol_del_d_cnt);

#else

  /* c_id (customer id) is not known */
  OCIBND(octx->curo0,octx->w_id_bp0,errhp,":w_id",ADR(ordP->w_id),SIZ(int),SQLT_INT);
  OCIBND(octx->curo0,octx->d_id_bp0,errhp,":d_id",ADR(ordP->d_id),SIZ(int),SQLT_INT);
  OCIBND(octx->curo0,octx->c_last_bp,errhp,":c_last",ordP->c_last,SIZ(ordP->c_last),
      SQLT_STR);
  ctxp_octx->ctxp = cbctx;
  ctxp_octx->octx = octx;
  OCIDFNDYN(octx->curo0,octx->c_rowid_dp,errhp,1,octx->c_rowid_ptr,
       SIZ(OCIRowid*), SQLT_RDD, octx->c_rowid_ind, (dvoid *)ctxp_octx, rid_data);

  OCIBND(octx->curo1,octx->c_rowid_bp,errhp,":cust_rowid",
      &octx->c_rowid_ptr[octx->cust_idx],
      sizeof( octx->c_rowid_ptr[0]),SQLT_RDD);
  OCIDEF(octx->curo1,octx->c_id_dp,errhp,1,ADR(ordP->c_id),SIZ(int),SQLT_INT);
  OCIDEF(octx->curo1,octx->c_balance_dp1,errhp,2,ADR(ordP->c_balance),
       SIZ(double),SQLT_FLT);
  OCIDEF(octx->curo1,octx->c_first_dp1,errhp,3,ordP->c_first,SIZ(ordP->c_first)-1,
       SQLT_CHR);
  OCIDEF(octx->curo1,octx->c_middle_dp1,errhp,4,ordP->c_middle,
       SIZ(ordP->c_middle)-1,SQLT_AFC);
  OCIDEF(octx->curo1,octx->c_last_dp1,errhp,5,ordP->c_last,SIZ(ordP->c_last)-1,
       SQLT_CHR);
  OCIDEF(octx->curo1,octx->o_id_dp1,errhp,6,ADR(ordP->o_id),SIZ(int),SQLT_INT);
  OCIDEF(octx->curo1,octx->o_entry_d_dp1,errhp,7,
       &ordP->o_entry_d_base,SIZ(OCIDate),SQLT_ODT);
  OCIDEF(octx->curo1,octx->o_cr_id_dp1,errhp,8,ADR(ordP->o_carrier_id),
       SIZ(int),SQLT_INT);
  OCIDEF(octx->curo1,octx->o_ol_cnt_dp1,errhp,9,ADR(ordP->o_ol_cnt),
       SIZ(int),SQLT_INT);

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

/* Bind for last cursor */

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

  OCIDFNRA(octx->curo3, octx->ol_i_id_dp, errhp, 1, ordP->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, ordP->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, ordP->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,ordP->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,ordP->ol_d_base,SIZ(OCIDate),
       SQLT_ODT, octx->ol_delivery_d_ind,octx->ol_delivery_d_len,
                octx->ol_delivery_d_rcode);

  OCIBND(octx->curo4,octx->w_id_bp4,errhp,":w_id",ADR(ordP->w_id),SIZ(int),SQLT_INT);
  OCIBND(octx->curo4,octx->d_id_bp4,errhp,":d_id",ADR(ordP->d_id),SIZ(int),SQLT_INT);
  OCIBND(octx->curo4,octx->c_last_bp4,errhp,":c_last",ordP->c_last,SIZ(ordP->c_last),
      SQLT_STR);
  OCIDEF(octx->curo4,octx->c_count_dp,errhp,1,ADR(octx->rcount),SIZ(int),
      SQLT_INT);


#endif
  return (0);

}



tkvco (ora_cn_data_t *ora_SlotDataP)
{

  int i;
  int rcount;

  /*  */
  ordctx *octx = (ordctx *)ora_SlotDataP->octx;
  defctx *cbctx = (defctx *)ora_SlotDataP->cbctx;
  global_order_t *ordP = ora_SlotDataP->ordP;
  OCIEnv *tpcenv = ora_SlotDataP->tpcenv;
  OCIServer *tpcsrv = ora_SlotDataP->tpcsrv;
  OCIError *errhp = ora_SlotDataP->errhp;
  OCISvcCtx *tpcsvc = ora_SlotDataP->tpcsvc;
  OCISession *tpcusr = ora_SlotDataP->tpcusr;
  OCIStmt *curi = ora_SlotDataP->curi;

  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(OCIDate);
  }
  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 PLSQLORD
  octx->ol_i_id_cnt = 0;
  octx->ol_sup_cnt = 0;
  octx->ol_qty_cnt = 0;
  octx->ol_amt_cnt = 0;
  octx->ol_del_d_cnt = 0;
  OCIERROR(errhp,
     OCIStmtExecute(tpcsvc,octx->curo0,errhp,1,0,0,0,OCI_DEFAULT));
#else
retry:
  if(ordP->bylastname)
  {
    cbctx->reexec = FALSE;
    ordP->execstatus=OCIStmtExecute(tpcsvc,octx->curo0,errhp,100,0,0,0,OCI_DEFAULT);
    /* will get OCI_NO_DATA if <100 found */
    if ((ordP->execstatus != OCI_NO_DATA) && (ordP->execstatus != OCI_SUCCESS))
    {
      ordP->errcode=OCIERROR(errhp, ordP->execstatus);
      if((ordP->errcode == NOT_SERIALIZABLE) || (ordP->errcode == RECOVERR))
      {
        OCITransCommit(tpcsvc,errhp,OCI_DEFAULT);
        ordP->retries++;
        goto retry;
      } else {
        return -1;
      }
    }
    if (ordP->execstatus == OCI_NO_DATA) /* there are no more rows */
    {
      /* get rowcount, find middle one */
      OCIAttrGet(octx->curo0,OCI_HTYPE_STMT,&rcount,NULL,OCI_ATTR_ROW_COUNT,errhp);
      if (rcount <1)
      {
        userlog("ORDERSTATUS  rcount=%d\n",rcount);
        return (-1);
      }
      octx->cust_idx=(rcount+1)/2 ;
    }
    else
    {
      /* count the number of rows */
      ordP->execstatus=OCIStmtExecute(tpcsvc,octx->curo4,errhp,1,0,0,0,OCI_DEFAULT);
      if ((ordP->execstatus != OCI_NO_DATA) && (ordP->execstatus != OCI_SUCCESS))
      {
        if ((ordP->errcode == NOT_SERIALIZABLE) || (ordP->errcode == RECOVERR))
        {
          OCITransCommit(tpcsvc,errhp,OCI_DEFAULT);
          ordP->retries++;
          goto retry;
        } else {
          return -1;
        }
      }
      if (octx->rcount+1 < 2*10 )
        octx->cust_idx=(octx->rcount+1)/2 ;
      else          /* */
      {
        cbctx->reexec = TRUE;
        cbctx->count = (octx->rcount+1)/2 ;
        ordP->execstatus=OCIStmtExecute(tpcsvc,octx->curo0,errhp,cbctx->count,
                        0,0,0,OCI_DEFAULT);
        /* will get OCI_NO_DATA if <100 found */
        if (cbctx->count > 0)
        {
          userlog ("did not get all rows ");
```

```
        return (-1);
      }

      if ((ordP->execstatus != OCI_NO_DATA) && (ordP->execstatus != OCI_SUCCESS))
      {
        ordP->errcode=OCIERROR(errhp, ordP->execstatus);
        if((ordP->errcode == NOT_SERIALIZABLE) || (ordP->errcode == RECOVERR))
        {
          OCITransCommit(tpcsvc,errhp,OCI_DEFAULT);
          ordP->retries++;
          goto retry;
        } else {
        return -1;
        }
      }
      octx->cust_idx=0 ;
    }
  }

  ordP->execstatus=OCIStmtExecute(tpcsvc,octx->curo1,errhp,1,0,0,0,OCI_DEFAULT);
  if (ordP->execstatus |= OCI_SUCCESS)
  {
    ordP->errcode=OCIERROR(errhp,ordP->execstatus);
    OCITransCommit(tpcsvc,errhp,OCI_DEFAULT);
    if((ordP->errcode == NOT_SERIALIZABLE) || (ordP->errcode == RECOVERR))
    {
      ordP->retries++;
      goto retry;
      } else {
      return -1;
    }
  }
 }
 else
 {
  ordP->execstatus=OCIStmtExecute(tpcsvc,octx->curo2,errhp,1,0,0,0,OCI_DEFAULT);
  if (ordP->execstatus |= OCI_SUCCESS)
  {
    ordP->errcode=OCIERROR(errhp,ordP->execstatus);
    OCITransCommit(tpcsvc,errhp,OCI_DEFAULT);
    if((ordP->errcode == NOT_SERIALIZABLE) || (ordP->errcode == RECOVERR))
    {
      ordP->retries++;
      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);

 ordP->execstatus = OCIStmtExecute(tpcsvc,octx->curo3,errhp,ordP->o_ol_cnt,0,0,0,
              OCI_DEFAULT | OCI_COMMIT_ON_SUCCESS);
 if (ordP->execstatus |= OCI_SUCCESS )
 {
  ordP->errcode=OCIERROR(errhp,ordP->execstatus);
  OCITransCommit(tpcsvc,errhp,OCI_DEFAULT);
  if((ordP->errcode == NOT_SERIALIZABLE) || (ordP->errcode == RECOVERR))
  {
    ordP->retries++;
    goto retry;
  }
  else
  {
    return -1;
  }

 }
#endif
 /* clean up and convert the delivery dates */
 for (i = 0; i < ordP->o_ol_cnt; i++)
 {
  if (octx->ol_delivery_d_ind[i] == -1) /* null date in field */
              strncpy((char*)ordP->ol_delivery_d[i],"01-01-1811",10);
  else
  {
    ordP->ol_del_len[i]=sizeof(ordP->ol_delivery_d[i]);
    OCIERROR(errhp,OCIDateToText(errhp,&ordP->ol_d_base[i],

(text*)SHORTDATE,strlen(SHORTDATE),(text*)0,0,&ordP->ol_del_len[i],ordP->ol_delivery_d[i]));
  }
/*
              cvtdmy(ol_d_base[i],ol_delivery_d[i]);
*/
  }

 return (0);

}
```

```
void tkvcodone (ora_cn_data_t *ora_SlotDataP)

{
 /*  TODO:  Should we free the cursor handles??  */

 if (ora_SlotDataP->octx) {
   free (ora_SlotDataP->octx);
   ora_SlotDataP->octx = NULL;
 }
 if (ora_SlotDataP->ordP) {
   free(ora_SlotDataP->ordP);
   ora_SlotDataP->ordP = NULL;
 }
}
```

plpay.c

```
#ifdef RCSID
static char *RCSid =
  "$Header: /afs/transarc.com/project/encina/rcs/test/src/benchmarks/tpcc/server/ora8.1_mt/RCS/plpay.c,v
1.3 1999/05/26 16:29:58 wenjian Exp $ Copyr (c) 1994 Oracle";
#endif /* RCSID */

/*================================================================+
|       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 <oci.h>
#include "tpcc.h"
#include "plora.h"   /*  */
#include "tpccflags.h"

#define SQLTXT_INIT "BEGIN initpay.pay_init; END;"
#define SQLTXT_STP  "begin payment.dopayment(:w_id,:d_id,:c_w_id,:c_d_id,     \
                    :c_id,:by_lname,:h_amount,:c_last,:w_street_1,:w_street_2,\
                    :w_city,:w_state,:w_zip,:d_street_1,:d_street_2,:d_city,  \
                    :d_state,:d_zip,:c_first,:c_middle,: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,   \
                    :cr_date,:retry); end;"


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 *by_lname_bp;

  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; */

tkvcpinit (ora_cn_data_t *ora_SlotDataP)

{
  /*  */
  char *ora_home = getenv("ORACLE_HOME");
  char sql_file_name[256];
  payctx *pctx;
  global_payment_t *payP;
  OCIEnv *tpcenv = ora_SlotDataP->tpcenv;
  OCIServer *tpcsrv = ora_SlotDataP->tpcsrv;
  OCIError *errhp = ora_SlotDataP->errhp;
  OCISvcCtx *tpcsvc = ora_SlotDataP->tpcsvc;
  OCISession *tpcusr = ora_SlotDataP->tpcusr;
  OCIStmt *curi = ora_SlotDataP->curi;

  text stmbuf[SQL_BUF_SIZE];

  if (!ora_home) {
    err_printf("Cannot find env variable ORACLE_HOME\n");
    exit(13);
  }

  pctx = (payctx *)malloc(sizeof(payctx));
```

```
  memset(pctx,(char)0,sizeof(payctx));
  ora_SlotDataP->pctx = (void *)pctx;

  ora_SlotDataP->payP = (global_payment_t *)malloc(sizeof(global_payment_t));
  memset(ora_SlotDataP->payP,(char)0,sizeof(global_payment_t));
  payP = ora_SlotDataP->payP;

/* 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));
#ifdef PLSQLPAY
  /*   prepare the stub for calling plsql stored procedure */
  sprintf ((char*)stmbuf, SQLTXT_STP);
  OCIERROR(errhp,OCIStmtPrepare(pctx->curp0, errhp, stmbuf,
          strlen((char *)stmbuf), OCI_NTV_SYNTAX, OCI_DEFAULT));
#else

  /* customer id !=  0, go by last name */

  sqlfile("paynz.sql",stmbuf);
  OCIERROR(errhp,OCIStmtPrepare(pctx->curp0, errhp, stmbuf,
          strlen((char *)stmbuf), OCI_NTV_SYNTAX, OCI_DEFAULT));

  /* customer id ==  0, go by last name */

  sqlfile("payz.sql",stmbuf); /* sqlfile opens $O/bench/.../blocks/... */
  OCIERROR(errhp,OCIStmtPrepare(pctx->curp1, errhp, stmbuf,
          strlen((char *)stmbuf), OCI_NTV_SYNTAX, OCI_DEFAULT));

#endif
  pctx->w_id_ind = TRUE;
  pctx->w_id_len = SIZ(payP->w_id);
  pctx->d_id_ind = TRUE;
  pctx->d_id_len = SIZ(payP->d_id);
  pctx->c_w_id_ind = TRUE;
  pctx->c_w_id_len = SIZ(payP->c_w_id);
  pctx->c_d_id_ind = TRUE;
  pctx->c_d_id_len = SIZ(payP->c_d_id);
  pctx->c_id_ind = TRUE;
  pctx->c_id_len = 0;
  pctx->h_amount_len = SIZ(payP->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(payP->w_id),SIZ(int),
          SQLT_INT, &pctx->w_id_ind, NULL, NULL);
   OCIBNDR(pctx->curp0, pctx->d_id_bp, errhp,":d_id",ADR(payP->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(payP->c_w_id),SIZ(int),
          SQLT_INT);
   OCIBND(pctx->curp0, pctx->c_d_id_bp, errhp,":c_d_id",ADR(payP->c_d_id),SIZ(int),
          SQLT_INT);
   OCIBND(pctx->curp0, pctx->c_id_bp, errhp,":c_id",ADR(payP->c_id),SIZ(int),
          SQLT_INT);
  #ifdef PLSQLPAY
   OCIBND(pctx->curp0, pctx->by_lname_bp, errhp,":by_lname",ADR(payP->bylastname),
          SIZ(int), SQLT_INT);
  #endif
   OCIBNDR(pctx->curp0, pctx->h_amount_bp, errhp,":h_amount",ADR(payP->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",payP->c_last,SIZ(payP->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",payP->w_street_1,
          SIZ(payP->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",payP->w_street_2,
          SIZ(payP->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",payP->w_city,SIZ(payP->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",payP->w_state,SIZ(payP->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",payP->w_zip,SIZ(payP->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",payP->d_street_1,
          SIZ(payP->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",payP->d_street_2,
          SIZ(payP->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",payP->d_city,SIZ(payP->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",payP->d_state,SIZ(payP->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",payP->d_zip,SIZ(payP->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",payP->c_first,SIZ(payP->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",payP->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",payP->c_street_1,
          SIZ(payP->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",payP->c_street_2,
          SIZ(payP->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",payP->c_city,SIZ(payP->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",payP->c_state,SIZ(payP->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",payP->c_zip,SIZ(payP->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",payP->c_phone,SIZ(payP->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",&payP->c_since,
          SIZ(OCIDate), SQLT_ODT, &pctx->c_since_ind, &pctx->c_since_len,
          &pctx->c_since_rc);
   OCIBNDR(pctx->curp0, pctx->c_credit_bp, errhp,":c_credit",payP->c_credit,
          SIZ(payP->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(payP->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(payP->c_discount),SIZ(float), SQLT_FLT, &pctx->c_discount_ind,
          &pctx->c_discount_len, &pctx->c_discount_rc);
   OCIBNDR(pctx->curp0, pctx->c_balance_bp, errhp,":c_balance",ADR(payP->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",payP->c_data,SIZ(payP->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",payP->h_date,SIZ(payP->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(payP->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(payP->cr_date),
        SIZ(OCIDate),SQLT_ODT, &pctx->cr_date_ind, &pctx->cr_date_len,
        &pctx->cr_date_rc);
#ifndef PLSQLPAY

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


  OCIBNDR(pctx->curp1, pctx->w_id_bp1, errhp,":w_id",ADR(payP->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(payP->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(payP->c_w_id),SIZ(int),
        SQLT_INT);
  OCIBND(pctx->curp1, pctx->c_d_id_bp1, errhp,":c_d_id",ADR(payP->c_d_id),SIZ(int),
        SQLT_INT);
  OCIBNDR(pctx->curp1, pctx->c_id_bp1, errhp,":c_id",ADR(payP->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(payP->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",payP->c_last,SIZ(payP->c_last),
        SQLT_STR);
  OCIBNDR(pctx->curp1, pctx->w_street_1_bp1, errhp,":w_street_1",payP->w_street_1,
        SIZ(payP->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",payP->w_street_2,
        SIZ(payP->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",payP->w_city,SIZ(payP->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",payP->w_state,SIZ(payP->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",payP->w_zip,SIZ(payP->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",payP->d_street_1,
        SIZ(payP->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",payP->d_street_2,
        SIZ(payP->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",payP->d_city,SIZ(payP->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",payP->d_state,
        SIZ(payP->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",payP->d_zip,SIZ(payP->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",payP->c_first,
        SIZ(payP->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",payP->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",payP->c_street_1,
        SIZ(payP->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",payP->c_street_2,
        SIZ(payP->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",payP->c_city,SIZ(payP->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",payP->c_state,SIZ(payP->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",payP->c_zip,SIZ(payP->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",payP->c_phone,SIZ(payP->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",&payP->c_since,
        SIZ(OCIDate), SQLT_ODT, &pctx->c_since_ind, &pctx->c_since_len,
        &pctx->c_since_rc);
  OCIBNDR(pctx->curp1, pctx->c_credit_bp1, errhp,":c_credit",payP->c_credit,
        SIZ(payP->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(payP->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(payP->c_discount),SIZ(int), SQLT_FLT, &pctx->c_discount_ind,
        &pctx->c_discount_len, &pctx->c_discount_rc);
  OCIBNDR(pctx->curp1, pctx->c_balance_bp1, errhp,":c_balance",ADR(payP->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",payP->c_data,SIZ(payP->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",payP->h_date,SIZ(payP->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(payP->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(payP->cr_date),
        SIZ(OCIDate),SQLT_ODT, &pctx->cr_date_ind, &pctx->cr_date_len,
        &pctx->cr_date_rc);
#endif

   return (0);

}



tkvcp (ora_cn_data_t *ora_SlotDataP)

{
  /*  */
  payctx *pctx = ora_SlotDataP->pctx;
  global_payment_t *payP = ora_SlotDataP->payP;
  OCIEnv *tpcenv = ora_SlotDataP->tpcenv;
  OCIServer *tpcsrv = ora_SlotDataP->tpcsrv;
  OCIError *errhp = ora_SlotDataP->errhp;
  OCISvcCtx *tpcsvc = ora_SlotDataP->tpcsvc;
  OCISession *tpcusr = ora_SlotDataP->tpcusr;
  OCIStmt *curi = ora_SlotDataP->curi;

retry:

  pctx->w_id_ind = TRUE;
  pctx->w_id_len = SIZ(payP->w_id);
  pctx->d_id_ind = TRUE;
  pctx->d_id_len = SIZ(payP->d_id);
  pctx->c_w_id_ind = TRUE;
  pctx->c_w_id_len = 0;
  pctx->c_d_id_ind = TRUE;
  pctx->c_d_id_len = 0;
  pctx->c_id_ind = TRUE;
  pctx->c_id_len = 0;
  pctx->h_amount_len = SIZ(payP->h_amount);
  pctx->h_amount_ind = TRUE;
  pctx->c_last_ind = TRUE;
  pctx->c_last_len = SIZ(payP->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;

#ifdef PLSQLPAY

payP->execstatus=OCIStmtExecute(tpcsvc,pctx->curp0,errhp,1,0,0,0,OCI_DEFAULT|OCI_COMMIT_ON
_SUCCESS);
#else
  if(payP->bylastname) {
```

```
payP->execstatus=OCIStmtExecute(tpcsvc,pctx->curp1,errhp,1,0,0,0,OCI_DEFAULT|OCI_COMMIT_ON
_SUCCESS);
 } else {

payP->execstatus=OCIStmtExecute(tpcsvc,pctx->curp0,errhp,1,0,0,0,OCI_DEFAULT|OCI_COMMIT_ON
_SUCCESS);
 }
#endif

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



void tkvcpdone (ora_cn_data_t *ora_SlotDataP)

{
 /*  TODO:  Should we free the cursor handles??  */
 if(ora_SlotDataP->pctx) {
   free(ora_SlotDataP->pctx);
   ora_SlotDataP->pctx = NULL;
 }
 if (ora_SlotDataP->payP) {
   free(ora_SlotDataP->payP);
   ora_SlotDataP->payP = NULL;
 }
}
```

plsto.c

```
#ifdef RCSID
static char *RCSid =
  "$Header: /afs/transarc.com/project/encina/rcs/test/src/benchmarks/tpcc/server/ora8.1_mt/RCS/plsto.c,v
1.2 1999/04/15 12:16:52 oz Exp $ Copyr (c) 1994 Oracle";
#endif /* RCSID */

/*+====================================================================+
 |       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 "tpcc.h"
#include "plora.h"  /*  */
#include "tpccflags.h"

#ifdef PLSQLSTO
#define SQLTXT "BEGIN stocklevel.getstocklevel (:w_id, :d_id, :threshold, \
  :low_stock); END;"
#else
#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)"
/* query using functional index */
/*
#define SQLTXT "SELECT 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_o_id BETWEEN (d_next_o_id - 20) AND (d_next_o_id - 1) AND \
               decode(SIGN(s_quantity -21) , -1, s_w_id*100000 + s_i_id, NULL) \
                                    = ol_w_id*100000 + ol_i_id  AND \
               s_quantity < :threshold;"

*/

#endif

struct stoctx {
  OCIStmt *curs;
  OCIBind *w_id_bp;
  OCIBind *d_id_bp;
  OCIBind *threshold_bp;
#ifdef PLSQLSTO
  OCIBind *low_stock_bp;
#else
  OCIDefine *low_stock_bp;
#endif
  int norow;
};

typedef struct stoctx stoctx;

/* stoctx *sctx; */


tkvcsinit (ora_cn_data_t *ora_SlotDataP)

{

  /*  */
  stoctx *sctx;
  global_stock_t *stoP;
  OCIEnv *tpcenv = ora_SlotDataP->tpcenv;
  OCIServer *tpcsrv = ora_SlotDataP->tpcsrv;
  OCIError *errhp = ora_SlotDataP->errhp;
  OCISvcCtx *tpcsvc = ora_SlotDataP->tpcsvc;
  OCISession *tpcusr = ora_SlotDataP->tpcusr;
  OCIStmt *curi = ora_SlotDataP->curi;

  text stmbuf[SQL_BUF_SIZE];

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

  ora_SlotDataP->stoP = (global_stock_t *)malloc(sizeof(global_stock_t));
  memset(ora_SlotDataP->stoP,(char)0,sizeof(global_stock_t));
  stoP = ora_SlotDataP->stoP;

  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));
#ifndef PLSQLSTO
  OCIERROR(errhp,
    OCIAttrSet(sctx->curs,OCI_HTYPE_STMT,(dvoid*)&sctx->norow,0,
          OCI_ATTR_PREFETCH_ROWS,errhp));
#endif

  /* bind variables */

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

  return (0);

}



tkvcs (ora_cn_data_t *ora_SlotDataP)

{
 stoctx *sctx = (stoctx *)ora_SlotDataP->sctx;
 global_stock_t *stoP = ora_SlotDataP->stoP;
 OCIEnv *tpcenv = ora_SlotDataP->tpcenv;
 OCIServer *tpcsrv = ora_SlotDataP->tpcsrv;
 OCIError *errhp = ora_SlotDataP->errhp;
 OCISvcCtx *tpcsvc = ora_SlotDataP->tpcsvc;
 OCISession *tpcusr = ora_SlotDataP->tpcusr;
 OCIStmt *curi = ora_SlotDataP->curi;

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

```
 return (0);
}



void tkvcsdone (ora_cn_data_t *ora_SlotDataP)

{
 /*  */
 stoctx *sctx = (stoctx *)ora_SlotDataP->sctx;
 if (sctx) {
   free(sctx);
   ora_SlotDataP->sctx = NULL;
 }
 if (ora_SlotDataP->stoP) {
   free(ora_SlotDataP->stoP);
   ora_SlotDataP->stoP = NULL;
 }

}
```

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_dist                                          distarray;
 idx1arr                        intarray;
 s_remote                       intarray;
 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('01-01-1811', 'MM-DD-YYYY');
   idx1arr := idxarr;
 END new_init;
END initnew;
/
show errors
exit
```

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);

      -- copying :d_id in local variable .
      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;

-- cache the no of rows processed
      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
-- doesnt hurt if we insert entries for invalid item too
       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 there are no errors, then just return without COMMITing
--The COMMIT is done on the driver side by OCI
-- If there are errors, then rollback and set o_ol_cnt to the processed value
                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;
```

tpcc.h

```
/*
 * $Header: /afs/transarc.com/project/encina/rcs/test/src/benchmarks/tpcc/server/ora8.1_mt/RCS/tpcc.h,v 1.1
1999/04/14 19:03:06 wenjian Exp $ 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

#ifndef FALSE
# define FALSE 0
#endif

#ifndef TRUE
# define TRUE 1
#endif

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

#include <oratypes.h>
#include <oci.h>
#include <ocidfn.h>
/*
#ifdef __STDC__
#include "ociapr.h"
#else
#include "ocikpr.h"
#endif
*/

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 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

#define FULLDATE "dd-mon-yy.hh:mi:ss"
#define SHORTDATE "dd-mm-yyyy"



#define DELRT 80.0

extern int tkvcninit ();
extern int tkvcpnit ();
extern int tkvcoinit ();
extern int tkvcdinit ();
extern int tkvcsinit ();

extern int tkvcn ();
extern int tkvcp ();
extern int tkvco ();
extern int tkvcd ();
extern int tkvcs ();

extern void tkvcndone ();
extern void tkvcpdone ();
extern void tkvcodone ();
extern void tkvcddone ();
extern void tkvcsdone ();

extern int tkvcss (); /* for alter session to get memory size and trace */
extern boolean multitranx;
extern int ord_init;


extern errrpt ();
extern int ocierror(char *fname, int lineno,OCIError *errhp, sword status);
extern int sqlfile(char *fname, text *linebuf);

extern FILE *lfp;
extern FILE *fopen ();
extern int proc_no;
extern int doid[];

#if 0
extern int execstatus;
extern int errcode;

extern OCIEnv *tpcenv;
extern OCIServer *tpcsrv;
extern OCIError *errhp;
extern OCISvcCtx *tpcsvc;
extern OCISession *tpcusr;
extern OCIStmt *curntest;
/* The bind and define handles for each transaction are
   included in their respective header files. */



/* for stock-level transaction */

extern int w_id;
extern int d_id;
extern int c_id;
extern int threshold;
extern int low_stock;

/* for delivery transaction */

extern int del_o_id[10];
extern int carrier_id;
extern int retries;

/* for order-status transaction */

extern int bylastname;
extern char c_last[17];
extern char c_first[17];
extern char c_middle[3];
extern double c_balance;
extern int o_id;
extern text o_entry_d[20];
extern int o_carrier_id;
extern int o_ol_cnt;
extern int ol_supply_w_id[15];
extern int ol_i_id[15];
extern int ol_quantity[15];
extern int ol_amount[15];
ub4    ol_del_len[15];
extern text ol_delivery_d[15][11];

/* for payment transaction */

extern int c_w_id;
extern int c_d_id;
extern int h_amount;
extern char w_street_1[21];
extern char w_street_2[21];
extern char w_city[21];
extern char w_state[3];
extern char w_zip[10];
extern char d_street_1[21];
extern char d_street_2[21];
extern char d_city[21];
extern char d_state[3];
extern char d_zip[10];
extern char c_street_1[21];
extern char c_street_2[21];
extern char c_city[21];
extern char c_state[3];
extern char c_zip[10];
extern char c_phone[17];
extern text c_since_d[11];
extern char c_credit[3];
extern int c_credit_lim;
extern float c_discount;
extern char c_data[201];
extern text h_date[20];

/* for new order transaction */

extern int nol_i_id[15];
extern int nol_supply_w_id[15];
extern int nol_quantity[15];
extern int nol_quanti10[15];
extern int nol_quanti91[15];
extern int nol_ytdqty[15];
extern int nol_amount[15];
extern int o_all_local;
extern float w_tax;
extern float d_tax;
```

```
extern float total_amount;
extern char i_name[15][25];
extern int i_name_strlen[15];
extern ub2 i_name_strlen_len[15];
extern ub2 i_name_strlen_rcode[15];
extern ub4 i_name_strlen_csize;
extern int s_quantity[15];
extern char brand_gen[15];
extern ub2 brand_gen_len[15];
extern ub2 brand_gen_rcode[15];
extern ub4 brand_gen_csize;
extern int i_price[15];
extern char brand_generic[15][1];
extern int status;
extern int tracelevel;

/* Miscellaneous */
extern OCIDate cr_date;
extern OCIDate c_since;
extern OCIDate o_entry_d_base;
extern OCIDate ol_d_base[15];
#endif

#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 */
#define SNAPSHOT_TOO_OLD  1555  /* ORA-01555: snapshot too old */

#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 min(x,y)  (((x) < (y)) ? (x) : (y))

#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 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));


#define OCIBNDRAD(stmp,bndp,errp,sqlvar,progvl,ftype,indp,ctxp,cbf_nodata,cbf_data) \
     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)),0,(progvl),(ftype), \
                indp,0,0,0,0,OCI_DATA_AT_EXEC)); \
     ocierror(__FILE__,__LINE__,(errp), \
        OCIBindDynamic((bndp),(errp),(ctxp),(cbf_nodata),(ctxp),(cbf_data)));



#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));

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

#define OCIDFNDYN(stmp,dfnp,errp,pos,progv,progvl,ftype,indp,ctxp,cbf_data) \
     ocierror(__FILE__,__LINE__,(errp), \
     OCIHandleAlloc((stmp),(dvoid**)&(dfnp),OCI_HTYPE_DEFINE,0,\
                                                  (dvoid**)0));\
     ocierror(__FILE__,__LINE__,(errp), \
     OCIDefineByPos((stmp),&(dfnp),(errp),(pos),(progv), (progvl),(ftype),\
                          (indp),NULL,NULL, OCI_DYNAMIC_FETCH));\
     ocierror(__FILE__,__LINE__,(errp), \
     OCIDefineDynamic((dfnp),(errp),(ctxp), (cbf_data)));


#if 0

/* New order */

struct newinstruct {
  int w_id;
  int d_id;
  int c_id;
  int ol_i_id[15];
  int ol_supply_w_id[15];
  int ol_quantity[15];
};

struct newoutstruct {
  int terror;
  int o_id;
  int o_ol_cnt;
  char c_last[17];
  char c_credit[3];
  float c_discount;
  float w_tax;
  float d_tax;
  char o_entry_d[20];
  float total_amount;
  char i_name[15][25];
  int s_quantity[15];
  char brand_generic[15];
  float i_price[15];
  float ol_amount[15];
  char status[26];
  int retry;
};

struct newstruct {
  struct newinstruct newin;
  struct newoutstruct newout;
};


/* Payment */

struct payinstruct {
  int w_id;
  int d_id;
  int c_w_id;
  int c_d_id;
  int c_id;
  int bylastname;
  int h_amount;
  char c_last[17];
};

struct payoutstruct {
  int terror;
  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];
  int  c_id;
  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[11];
  char c_credit[3];
  double c_credit_lim;
  float c_discount;
  double c_balance;
  char c_data[201];
  char h_date[20];
  int retry;
};

struct paystruct {
  struct payinstruct payin;
  struct payoutstruct payout;
};


/* Order status */

struct ordinstruct {
  int w_id;
  int d_id;
  int c_id;
  int bylastname;
  char c_last[17];
};

struct ordoutstruct {
  int terror;
  int c_id;
  char c_last[17];
  char c_first[17];
  char c_middle[3];
  double c_balance;
  int o_id;
  char o_entry_d[20];
  int o_carrier_id;
  int o_ol_cnt;
  int ol_supply_w_id[15];
  int ol_i_id[15];
  int ol_quantity[15];
  float ol_amount[15];
  char ol_delivery_d[15][11];
  int retry;
};

struct ordstruct {
  struct ordinstruct ordin;
  struct ordoutstruct ordout;
};


/* Delivery */

struct delinstruct {
  int w_id;
  int o_carrier_id;
  double qtime;
  int in_timing_int;
};

struct deloutstruct {
  int terror;
  int retry;
};

struct delstruct {
  struct delinstruct delin;
  struct deloutstruct delout;
};


/* Stock level */

struct stoinstruct {
  int w_id;
  int d_id;
  int threshold;
};

struct stooutstruct {
  int terror;
  int low_stock;
  int retry;
};

struct stostruct {
  struct stoinstruct stoin;
  struct stooutstruct stoout;
};

#endif

#endif
```

tpcc_info.h

```
/*
 * $Header:
/afs/transarc.com/project/encina/rcs/test/src/benchmarks/tpcc/server/ora8.1_mt/RCS/tpcc_info.h,v 1.1
1999/04/14 19:03:06 wenjian Exp $ 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_INFO_H
#define TPCC_INFO_H


/* New order */

struct newinstruct {
   int w_id;
   int d_id;
   int c_id;
   int ol_i_id[15];
   int ol_supply_w_id[15];
   int ol_quantity[15];
};

struct newoutstruct {
   int terror;
   int o_id;
   int o_ol_cnt;
   char c_last[17];
   char c_credit[3];
   float c_discount;
   float w_tax;
   float d_tax;
   char o_entry_d[20];
   float total_amount;
   char i_name[15][25];
   int s_quantity[15];
   char brand_generic[15];
   float i_price[15];
   float ol_amount[15];
   char status[26];
   int retry;
};

struct newstruct {
   struct newinstruct newin;
   struct newoutstruct newout;
};


/* Payment */

struct payinstruct {
   int w_id;
   int d_id;
   int c_w_id;
   int c_d_id;
   int c_id;
   int bylastname;
   int h_amount;
   char c_last[17];
};

struct payoutstruct {
   int terror;
   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];
   int  c_id;
   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[11];
   char c_credit[3];
   double c_credit_lim;
   float c_discount;
```

```
  double c_balance;
  char c_data[201];
  char h_date[20];
  int retry;
};

struct paystruct {
  struct payinstruct payin;
  struct payoutstruct payout;
};


/* Order status */

struct ordinstruct {
  int w_id;
  int d_id;
  int c_id;
  int bylastname;
  char c_last[17];
};

struct ordoutstruct {
  int terror;
  int c_id;
  char c_last[17];
  char c_first[17];
  char c_middle[3];
  double c_balance;
  int o_id;
  char o_entry_d[20];
  int o_carrier_id;
  int o_ol_cnt;
  int ol_supply_w_id[15];
  int ol_i_id[15];
  int ol_quantity[15];
  float ol_amount[15];
  char ol_delivery_d[15][11];
  int retry;
};

struct ordstruct {
  struct ordinstruct ordin;
  struct ordoutstruct ordout;
};


/* Delivery */

struct delinstruct {
  int w_id;
  int o_carrier_id;
  double qtime;
  int in_timing_int;
};

struct deloutstruct {
  int terror;
  int retry;
};

struct delstruct {
  struct delinstruct delin;
  struct deloutstruct delout;
};


/* Stock level */

struct stoinstruct {
  int w_id;
  int d_id;
  int threshold;
};

struct stooutstruct {
  int terror;
  int low_stock;
  int retry;
};

struct stostruct {
  struct stoinstruct stoin;
  struct stooutstruct stoout;
};

#endif
```

tpccflags.h

```
/* #define DMLRETNO */
#define PLSOLNO
#define DMLRETDEL
/* #define PLSQLORD */
```

tpccpl.c

```
#ifdef RCSID
static char *RCSid =
   "$Header: /afs/transarc.com/project/encina/rcs/test/src/benchmarks/tpcc/server/ora8.1_mt/RCS/tpccpl.c,v
1.7 1999/05/26 16:29:59 wenjian Exp $ Copyr (c) 1994 Oracle";
#endif /* RCSID */

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

#include <stdio.h>
#include <time.h>
#include "tpcc.h"
#ifdef TUX
#include <userlog.h>
#else
#include <stdarg.h>
#endif
#ifdef MULTI_THREADED
#include <dce/pthread.h>
#endif
#include "plora.h"


#define SQLTXT "alter session set isolation_level = serializable"
#define SQLTXTTRC "alter session set sql_trace = true"
#define SQLTXTTIM "alter session set timed_statistics = true"

int proc_no;
static char *db_uid;
static char *db_pwd;

/** Delivery file infomation: Global.
  * One output file for deliveries for the server
  */
static char delivery_file_name[100];

#ifdef MULTI_THREADED
pthread_mutex_t dvry_log_lock;
#define DVRY_LOCK pthread_mutex_lock(&dvry_log_lock);
#define DVRY_UNLOCK pthread_mutex_unlock(&dvry_log_lock);
#define DVRY_LOCK_INIT pthread_mutex_init(&dvry_log_lock, pthread_mutexattr_default);
#else
#define DVRY_LOCK
#define DVRY_UNLOCK
#define DVRY_LOCK_INIT
#endif
FILE *lfp;
FILE *fopen ();

#ifdef ORA_NT
extern double dpbtimef();
#define gettime dpbtimef
#else
double gettime ();
#endif

/** Initialization of one connection  */
static void initOCIhandles(ora_cn_data_t *cn_dataP, char* uid, char *pwd);

static int init_cn_data(ora_cn_data_t *dataP);

extern char oracle_home[256];

/* NewOrder Binding stuff */

#ifndef TUX
void userlog (char* fmtp, ...)
{
  va_list va;
  va_start(va,fmtp);
  vfprintf(stderr,fmtp,va);
  va_end(va);
}
#endif

/* 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:
   fprintf(stderr,"Module %s Line %d\n", fname, lineno);
   fprintf(stderr,"Error - OCI_SUCCESS_WITH_INFO\n");
   lstat = OCIErrorGet (errhp, recno++, (text *) NULL, &errcode, errbuf,
                        (ub4) sizeof(errbuf), OCI_HTYPE_ERROR);
   fprintf(stderr,"Error - %s\n", errbuf);
   break;
 case OCI_NEED_DATA:
   fprintf(stderr,"Module %s Line %d\n", fname, lineno);
   fprintf(stderr,"Error - OCI_NEED_DATA\n");
   return (IRRECERR);
 case OCI_NO_DATA:
   fprintf(stderr,"Module %s Line %d\n", fname, lineno);
   fprintf(stderr,"Error - OCI_NO_DATA\n");
   return (IRRECERR);
 case OCI_ERROR:
   lstat = OCIErrorGet (errhp, (ub4) 1,
                                   (text *) NULL, &errcode, errbuf,
                                                   (ub4) sizeof(errbuf), OCI_HTYPE_ERROR);
   if (errcode == NOT_SERIALIZABLE) return (errcode);
   while (lstat != OCI_NO_DATA)
   {
     fprintf(stderr,"Module %s Line %d\n", fname, lineno);
     fprintf(stderr,"Error - %s\n", errbuf);
     lstat = OCIErrorGet (errhp, recno++, (text *) NULL, &errcode, errbuf,
                        (ub4) sizeof(errbuf), OCI_HTYPE_ERROR);
   }
   return (errcode);
/* vmm313    TPCexit(1); */
/* vmm313    exit(1); */
 case OCI_INVALID_HANDLE:
   fprintf(stderr,"Module %s Line %d\n", fname, lineno);
   fprintf(stderr,"Error - OCI_INVALID_HANDLE\n");
   TPCexit(1);
   exit(-1);
 case OCI_STILL_EXECUTING:
   fprintf(stderr,"Module %s Line %d\n", fname, lineno);
   fprintf(stderr,"Error - OCI_STILL_EXECUTE\n");
   return (IRRECERR);
 case OCI_CONTINUE:
   fprintf(stderr,"Module %s Line %d\n", fname, lineno);
   fprintf(stderr,"Error - OCI_CONTINUE\n");
   return (IRRECERR);
 default:
   fprintf(stderr,"Module %s Line %d\n", fname, lineno);
   fprintf(stderr,"Status - %s\n", status);
   return (IRRECERR);
 }
 return (RECOVERR);
}


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;
char realfile[512];

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

    sprintf(realfile,"%s/bench/tpc/tpcc/blocks/%s",oracle_home,fnam);
    fd = vopen(realfile,"r");
    while (fgets((char *)linebuf+nulpt, SQL_BUF_SIZE,fd))
    {
        nulpt = strlen((char *)linebuf);
    }
    return(nulpt);
}

#ifdef NOT
void vgetdate (unsigned char *oradt)
{
 struct tm *loctime;
 time_t  int_time;
 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 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\0",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\0",
                  day,month,year,hour,min,sec);

      return;
}
#endif


TPCexit ()

{
  if (lfp) {
    fclose (lfp);
    lfp = NULL;
  }
}

/*  clean_connection
 *
 *  Called to clean a connection.
 *  When using pthread this is registered during pthread_create
 *  and called automatically by pthread when the thread exits.
 */
void clean_connection(void *ptr)
{

  /* free trans specific cursor handles first and later the ora handles */
  ora_cn_data_t *cn_dataP = (ora_cn_data_t *)ptr;

  if (cn_dataP != NULL) {
      OCIServer *tpcsrv;
                OCISession *tpcusr;
                OCIEnv *tpcenv;
                OCIError *errhp;
                OCISvcCtx *tpcsvc;

      fprintf(stderr, "clean_connection, Freeing OCI handles\n");
      tkvcndone(cn_dataP);
      tkvcpdone(cn_dataP);
      tkvcodone(cn_dataP);
      tkvcddone(cn_dataP);
      tkvcsdone(cn_dataP);

      /* free OCI handles */
      if (tpcusr = cn_dataP->tpcusr) {
                        fprintf(stderr, "free_handles> OCIHandleFree tpcusr\n");
                        OCIHandleFree((dvoid *)tpcusr, OCI_HTYPE_SESSION);
                }
                if (tpcsvc = cn_dataP->tpcsvc) {
                        fprintf(stderr, "free_handles> OCIHandleFree tpcsvc\n");
                        OCIHandleFree((dvoid *)tpcsvc, OCI_HTYPE_SVCCTX);
                }
                if (errhp = cn_dataP->errhp) {
                        fprintf(stderr, "free_handles> OCIHandleFree errhp\n");
                        OCIHandleFree((dvoid *)errhp, OCI_HTYPE_ERROR);
                }
                if (tpcsrv = cn_dataP->tpcsrv) {
                        fprintf(stderr, "free_handles> OCIHandleFree tpcsrv\n");
                        OCIHandleFree((dvoid *)tpcsrv, OCI_HTYPE_SERVER);
                }
                if (tpcenv = cn_dataP->tpcenv) {
                        fprintf(stderr, "free_handles> OCIHandleFree tpcenv\n");
                        OCIHandleFree((dvoid *)tpcenv, OCI_HTYPE_ENV);
                }

      fprintf(stderr, "free_handles> free cn_dataP\n");
  }
}


TPCinit (id, uid, pwd, dvryFileName)
int id;
char *uid;
char *pwd;
char *dvryFileName;
{

  int i;
  text stmbuf[100];

  fprintf(stderr, "TPCinit id %d, uid %s pwd %s\n", id, uid, pwd);

  DVRY_LOCK_INIT;

  proc_no = id;
  db_uid = (char *)calloc(strlen(uid) + 1, sizeof(char));
  strcpy(db_uid, uid);
  db_pwd = (char *)calloc(strlen(pwd) + 1, sizeof(char));
  strcpy(db_pwd, pwd);

  err_printf("dvryFileName is %s\n", dvryFileName);
  sprintf (delivery_file_name, "%s.%d", dvryFileName, proc_no);
  err_printf("delivery_file_name is %s\n", delivery_file_name);
#ifdef USE_ORACLE_WAY
  if ((lfp = fopen (delivery_file_name, "w")) == NULL) {
#ifdef TUX
    userlog ("Error in TPC-C server %d: Failed to open %s\n",
          proc_no, delivery_file_name);
#else
    fprintf (stderr, "Error in TPC-C server %d: Failed to open %s\n",
          proc_no, delivery_file_name);
#endif
    return (-1);
  }
#endif

  OCIInitialize(OCI_DEFAULT|OCI_OBJECT,(dvoid *)0,0,0,0); /* check tpccpl.c */

  return (0);

}

static void initOCIhandles(ora_cn_data_t *cn_dataP, char *uid, char *pwd)
{
  int tracelevel = 0;  /* new define */
  OCIDate cr_date;
  text stmbuf[100];
  OCIEnv *tpcenv;
  OCIServer *tpcsrv;
  OCIError *errhp;
  OCISvcCtx *tpcsvc;
  OCISession *tpcusr;
  OCIStmt *curi;

  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_SERVER,
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_SESSION, 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);


/*
This is done in cvdrv.c
  if (tracelevel == 2) {
    OCIHandleAlloc(tpcenv, (dvoid **)&curi, OCI_HTYPE_STMT, 0, (dvoid**)0);
    memset(stmbuf,0,100);
    sprintf ((char *) stmbuf, SQLTXTTRC);
    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);
  }
  */
  if (tracelevel == 3) {
    OCIHandleAlloc(tpcenv, (dvoid **)&curi, OCI_HTYPE_STMT, 0, (dvoid**)0);
    memset(stmbuf,0,100);
    sprintf ((char *) stmbuf, SQLTXTTIM);
    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);
  }


  OCIERROR(errhp,OCIDateSysDate(errhp,&cr_date));

  /*  Store the handles just initialized in the thread slot
   */
  cn_dataP->tpcenv = tpcenv;
  cn_dataP->tpcsrv = tpcsrv;
  cn_dataP->errhp  = errhp;
  cn_dataP->tpcsvc = tpcsvc;
  cn_dataP->tpcusr = tpcusr;
  cn_dataP->curi   = curi;
}

/*
 *  init_cn_data
 *      Initializes all the transactions for a single connection
 */
static int init_cn_data(ora_cn_data_t *cnP)
{
    int status;

    initOCIhandles(cnP, db_uid, db_pwd);

    if (status = tkvcninit (cnP)) {  /* new order */
                fprintf(stderr, "tkvcninit failed: %d\n", status);
                TPCexit ();
                return (status);
```

```
  }

  if (status = tkvcpinit (cnP)) {   /* payment */
                fprintf(stderr, "tkvcpinit failed: %d\n", status);
                TPCexit ();
                return (status);
  }

  if (status = tkvcoinit (cnP)) {   /* order status */
                fprintf(stderr, "tkvcoinit failed: %d\n", status);
                TPCexit ();
                return (status);
  }

  if (status = tkvcdinit (cnP)) {   /* delivery */
                fprintf(stderr, "tkvcdinit failed: %d\n", status);
                TPCexit ();
                return (status);
  }

  if (status = tkvcsinit (cnP)) {   /* stock level */
                fprintf(stderr, "tkvcsinit failed: %d\n", status);
                TPCexit ();
                return (status);
  }
  return 0;
}

void *create_ora_connection() {
  ora_cn_data_t *cnP = (ora_cn_data_t *)malloc(sizeof(ora_cn_data_t));
  init_cn_data(cnP);
  return (void *)cnP;
}

/*****   The Transaction Code  *****/

TPCnew (cnP, str)
   void *cnP;
   struct newstruct *str;
{
  int i;
  ora_cn_data_t *cn_dataP = (ora_cn_data_t *)cnP;
  global_newOrder_t *newP = cn_dataP->globals;
  OCIError *errhp = cn_dataP->errhp;

  newP->w_id = str->newin.w_id;
  newP->d_id = str->newin.d_id;
  newP->c_id = str->newin.c_id;
  for (i = 0; i < 15; i++) {
    newP->nol_i_id[i] = str->newin.ol_i_id[i];
    newP->nol_supply_w_id[i] = str->newin.ol_supply_w_id[i];
    newP->nol_quantity[i] = str->newin.ol_quantity[i];
  }
  newP->retries = 0;
/*
  vgetdate(newP->cr_date); */

  OCIERROR(errhp,OCIDateSysDate(errhp,&newP->cr_date));

  if (str->newout.terror = tkvcn (cn_dataP)) {
    if (str->newout.terror != RECOVERR)
      str->newout.terror = IRRECERR;
    str->newout.retry = newP->retries;
    return (-1);
  }

  /* fill in date for o_entry_d from time in beginning of txn*/
/*
  cvtdmyhms(newP->cr_date,newP->o_entry_d);
*/
   newP->datelen = sizeof(newP->o_entry_d);
   OCIERROR(errhp,
      OCIDateToText(errhp,&newP->cr_date,(text*)FULLDATE,SIZ(FULLDATE),(text*)0,0,
                &newP->datelen,newP->o_entry_d));

  str->newout.terror = NOERR;
  str->newout.o_id = newP->o_id;
  str->newout.o_ol_cnt = newP->o_ol_cnt;
  strncpy (str->newout.c_last, newP->c_last, 17);
  strncpy (str->newout.c_credit, newP->c_credit, 3);
  str->newout.c_discount = newP->c_discount;
  str->newout.w_tax = newP->w_tax;
  str->newout.d_tax = newP->d_tax;
  strncpy (str->newout.o_entry_d, (char*)newP->o_entry_d, 20);
  str->newout.total_amount = newP->total_amount;
  for (i = 0; i < newP->o_ol_cnt; i++) {
    strncpy (str->newout.i_name[i], newP->i_name[i], 25);
    str->newout.s_quantity[i] = newP->s_quantity[i];
    str->newout.brand_generic[i] = newP->brand_gen[i];
    str->newout.i_price[i] = (float)(newP->i_price[i])/100;
    str->newout.ol_amount[i] = (float)(newP->nol_amount[i])/100;
  }
  if (newP->status)
    strcpy (str->newout.status, "Item number is not valid");
  else
    str->newout.status[0] = '\0';
  str->newout.retry = newP->retries;

  return (0);
}



TPCpay (cnP, str)
void *cnP;
struct paystruct *str;

{
  ora_cn_data_t *cn_dataP = (ora_cn_data_t *)cnP;
  global_payment_t *payP = cn_dataP->payP;
  OCIError *errhp = cn_dataP->errhp;

  payP->w_id = str->payin.w_id;
  payP->d_id = str->payin.d_id;
  payP->c_w_id = str->payin.c_w_id;
  payP->c_d_id = str->payin.c_d_id;
  payP->h_amount = str->payin.h_amount;
  payP->bylastname = str->payin.bylastname;

/*
  vgetdate(payP->cr_date);  */
  OCIERROR(errhp,OCIDateSysDate(errhp,&payP->cr_date));

  if (payP->bylastname) {
    payP->c_id = 0;
    strncpy (payP->c_last, str->payin.c_last, 17);
  }
  else {
    payP->c_id = str->payin.c_id;
    strcpy (payP->c_last, " ");
  }
  payP->retries = 0;

  if (str->payout.terror = tkvcp (cn_dataP)) {
    if (str->payout.terror != RECOVERR)
      str->payout.terror = IRRECERR;
    return (-1);
  }

/*
  cvtdmyhms(cr_date,h_date);
*/
       payP->hlen=SIZ(payP->h_date);
       OCIERROR(errhp,OCIDateToText(errhp,&payP->cr_date,
            (text*)FULLDATE,strlen(FULLDATE),(text*)0,0,&payP->hlen,payP->h_date));

/*
  cvtdmy(c_since,c_since_d);
*/
       payP->sincelen=SIZ(payP->c_since_d);
       OCIERROR(errhp,OCIDateToText(errhp,&payP->c_since,
         (text*)SHORTDATE,strlen(SHORTDATE),(text*)0,0,&payP->sincelen,payP->c_since_d));



  str->payout.terror = NOERR;
  strncpy (str->payout.w_street_1, payP->w_street_1, 21);
  strncpy (str->payout.w_street_2, payP->w_street_2, 21);
  strncpy (str->payout.w_city, payP->w_city, 21);
  strncpy (str->payout.w_state, payP->w_state, 3);
  strncpy (str->payout.w_zip, payP->w_zip, 10);
  strncpy (str->payout.d_street_1, payP->d_street_1, 21);
  strncpy (str->payout.d_street_2, payP->d_street_2, 21);
  strncpy (str->payout.d_city, payP->d_city, 21);
  strncpy (str->payout.d_state, payP->d_state, 3);
  strncpy (str->payout.d_zip, payP->d_zip, 10);
  str->payout.c_id = payP->c_id;
  strncpy (str->payout.c_first, payP->c_first, 17);
  strncpy (str->payout.c_middle, payP->c_middle, 3);
  strncpy (str->payout.c_last, payP->c_last, 17);
  strncpy (str->payout.c_street_1, payP->c_street_1, 21);
  strncpy (str->payout.c_street_2, payP->c_street_2, 21);
  strncpy (str->payout.c_city, payP->c_city, 21);
  strncpy (str->payout.c_state, payP->c_state, 3);
  strncpy (str->payout.c_zip, payP->c_zip, 10);
  strncpy (str->payout.c_phone, payP->c_phone, 17);
  strncpy (str->payout.c_since, (char*)payP->c_since_d, 11);
  strncpy (str->payout.c_credit, payP->c_credit, 3);
  str->payout.c_credit_lim = (float)(payP->c_credit_lim)/100;
  str->payout.c_discount = payP->c_discount;
  str->payout.c_balance = (float)(payP->c_balance)/100;
  strncpy (str->payout.c_data, payP->c_data, 201);
  strncpy (str->payout.h_date, (char*)payP->h_date, 20);
  str->payout.retry = payP->retries;

  return (0);

}



TPCord (cnP, str)
void *cnP;
struct ordstruct *str;

{
  ora_cn_data_t *cn_dataP = (ora_cn_data_t *)cnP;
```

```
  global_order_t *ordP = cn_dataP->ordP;
  int i;

  ordP->w_id = str->ordin.w_id;
  ordP->d_id = str->ordin.d_id;
  ordP->bylastname = str->ordin.bylastname;
  if (ordP->bylastname) {
    ordP->c_id = 0;
    strncpy (ordP->c_last, str->ordin.c_last, 17);
  }
  else {
    ordP->c_id = str->ordin.c_id;
    strcpy (ordP->c_last, " ");
  }
  ordP->retries = 0;

  if (str->ordout.terror = tkvco (cn_dataP)) {
    if (str->ordout.terror != RECOVERR)
      str->ordout.terror = IRRECERR;
    return (-1);
  }

  str->ordout.terror = NOERR;
  str->ordout.c_id = ordP->c_id;
  strncpy (str->ordout.c_last, ordP->c_last, 17);
  strncpy (str->ordout.c_first, ordP->c_first, 17);
  strncpy (str->ordout.c_middle, ordP->c_middle, 3);
  str->ordout.c_balance = ordP->c_balance/100;
  str->ordout.o_id = ordP->o_id;
  strncpy (str->ordout.o_entry_d, (char*)ordP->o_entry_d, 20);
  if ( ordP->o_carrier_id == 11 )
     str->ordout.o_carrier_id = 0;
  else
     str->ordout.o_carrier_id = ordP->o_carrier_id;
  str->ordout.o_ol_cnt = ordP->o_ol_cnt;
  for (i = 0; i < ordP->o_ol_cnt; i++) {
    ordP->ol_delivery_d[i][10] = '\0';
    if ( !strcmp((char*)ordP->ol_delivery_d[i],"01-01-1811") )
                  strncpy((char*)ordP->ol_delivery_d[i],"NOT DELIVR",10);
    str->ordout.ol_supply_w_id[i] = ordP->ol_supply_w_id[i];
    str->ordout.ol_i_id[i] = ordP->ol_i_id[i];
    str->ordout.ol_quantity[i] = ordP->ol_quantity[i];
    str->ordout.ol_amount[i] = (float)(ordP->ol_amount[i])/100;
    strncpy (str->ordout.ol_delivery_d[i], (char*)ordP->ol_delivery_d[i], 11);
  }
  str->ordout.retry = ordP->retries;

  return (0);
}



TPCdel (cnP, str)
void *cnP;
struct delstruct *str;

{
  ora_cn_data_t *cn_dataP = (ora_cn_data_t *)cnP;
  global_delivery_t *delP = cn_dataP->delP;
  OCIError *errhp = cn_dataP->errhp;
  double tr_end, tr_begin;
  int i, skipped;
  struct timeval cur_time;
  static int tran_cntr=0;
  int pos, len;
  int queue_time, start_time, end_time;
  char stdout_buf[1024];

  /*  Open the delivery log file if needed  */
  if (lfp == NULL) {
    DVRY_LOCK;
    if (lfp == NULL) {
                  err_printf("TPCdel: delivery_file_name is %s\n", delivery_file_name);
      if ((lfp = fopen (delivery_file_name, "w")) == NULL) {
        fprintf (stderr, "Error in TPC-C server: Failed to open %s\n",
                 delivery_file_name);
        DVRY_UNLOCK;
        return(-1);
      }
      err_printf("Opened delivery file %s\n", delivery_file_name);
    }
    DVRY_UNLOCK;
  }

#ifndef USE_ORACLE_DVRY_FORMAT
  gettimeofday(&cur_time, NULL);
  tr_begin = (double)cur_time.tv_sec + 1.0e-6 * (double)cur_time.tv_usec;
  start_time = cur_time.tv_sec;
#endif

  delP->w_id = str->delin.w_id;
  delP->o_carrier_id = str->delin.o_carrier_id;
  delP->retries = 0;
/*
  vgetdate(cr_date);  */
  OCIERROR(errhp,OCIDateSysDate(errhp,&delP->cr_date));

  if (str->delout.terror = tkvcd (cn_dataP)) {
    if(str->delout.terror == DEL_ERROR)
      return DEL_ERROR;
    if (str->delout.terror != RECOVERR)
      str->delout.terror = IRRECERR;
    return (-1);
  }

#ifdef USE_ORACLE_DVRY_FORMAT
  tr_end = gettime ();
  DVRY_LOCK;
  fprintf (lfp, "%d %d %f %f %d %d", str->delin.in_timing_int,
           (tr_end - str->delin.qtime) <= DELRT ? 1 : 0,
           str->delin.qtime, tr_end, delP->w_id, delP->o_carrier_id);
  for (i = 0; i < 10; i++) {
    fprintf (lfp, " %d %d", i + 1, delP->del_o_id[i]);
    if (delP->del_o_id[i] <= 0) {
#ifdef TUX
        userlog ("DELIVERY: no new order for w_id: %d, d_id %d\n",
                 delP->w_id, i + 1);
#else
        fprintf (stderr, "DELIVERY: no new order for w_id: %d, d_id %d\n",
                 delP->w_id, i + 1);
#endif
    }
  }
  fprintf (lfp, " %d\n", delP->retries);

#else  /* not USE_ORACLE_DVRY_FORMAT */
  gettimeofday(&cur_time, NULL);
  tr_end = (double)cur_time.tv_sec + 1.0e-6 * (double)cur_time.tv_usec;
  end_time = cur_time.tv_sec;

  queue_time = str->delin.qtime;
  pos = 0;

  DVRY_LOCK;
  ++tran_cntr;

  pos += sprintf(&stdout_buf[pos], "--Tran %d Queue %.3f Start %.3f\n",
                 tran_cntr, str->delin.qtime, tr_begin);
  pos += sprintf(&stdout_buf[pos], "W_ID: %d, CARRIER_ID: %d",
                 str->delin.w_id, str->delin.o_carrier_id);

  if (str->delout.terror == DEL_ERROR) {
    pos += sprintf(&stdout_buf[pos],
                   "\nDelivery transaction failed (DEL_ERROR)\n");
  } else if (str->delout.terror != 0) {
    pos += sprintf(&stdout_buf[pos], "Delivery transaction failed (%d)",
                   str->delout.terror);
  } else {
    int skipped[10];
    int num_skipped = 0;
    for (i = 0; i < 10; i++) {
      if (delP->del_o_id[i] <= 0) {
        skipped[i] = 1;
        num_skipped ++;
      } else {
        skipped[i] = 0;
      }
      pos += sprintf(&stdout_buf[pos], " %d", delP->del_o_id[i]);
    }
    pos += sprintf(&stdout_buf[pos], "\n");
    if (num_skipped > 0) {
      for (i=0; i<10; i++) {
        if (skipped[i] == 1) {
          pos += sprintf(&stdout_buf[pos],
                         "D_ID %d has no new orders.\n", i+1);
        }
      }
    }
  }

  fprintf(lfp, "%send-time: %.3f\n", stdout_buf, tr_end);
  fflush (lfp);
#endif /* USE_ORACLE_DVRY_FORMAT */

  DVRY_UNLOCK;
  str->delout.terror = NOERR;
  str->delout.retry = delP->retries;

  return (0);

}



TPCsto (cnP, str)
void *cnP;
struct stostruct *str;

{
  ora_cn_data_t *cn_dataP = (ora_cn_data_t *)cnP;
  global_stock_t *stoP = cn_dataP->stoP;

  stoP->w_id = str->stoin.w_id;
  stoP->d_id = str->stoin.d_id;
  stoP->threshold = str->stoin.threshold;
  stoP->retries = 0;

  if (str->stoout.terror = tkvcs (cn_dataP)) {
```

```
    if (str->stoout.terror != RECOVERR)
       str->stoout.terror = IRRECERR;
    return (-1);
  }

  str->stoout.terror = NOERR;
  str->stoout.low_stock = stoP->low_stock;
  str->stoout.retry = stoP->retries;

  return (0);

}
```

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: Tunable Parameters

B.1 Database Parameters

```
# $Header: p_run.ora 7030100.1 95/07/14 18:49:15 plai Generic<base> $ Copyr (c) 1993 Oracle
#
#===============================================================+
#       Copyright (c) 1995  Oracle Corp, Redwood Shores, CA     |
#             OPEN SYSTEMS PERFORMANCE GROUP                    |
#                All Rights Reserved                            |
#===============================================================+
# FILENAME
#      p_run.ora
# DESCRIPTION
#      Oracle parameter file for running TPC-C.
#================================================================
#
control_files = /dev/rlvtpcc_cntl1, /dev/rlvtpcc_cntl2, /dev/rlvtpcc_cntl3

java_pool_size          = 1M
disk_asynch_io          = TRUE
db_writer_processes     = 10    # orignal 3
recovery_parallelism    = 48
Parallel_max_servers    = 600
Enqueue_resources       = 30000
compatible              = 8.1.6.0.0
db_name                 = tpcc
db_files                = 1000
db_block_size           = 4096
dml_locks               = 500

hash_join_enabled                                       = FALSE

log_archive_start       = FALSE
log_checkpoint_interval  = 0
log_checkpoints_to_alert = TRUE
gc_releasable_locks     = 0
max_rollback_segments   = 1250
max_dump_file_size      = 1000
open_cursors            = 1000
sessions                = 2250
transactions            = 4500
distributed_transactions = 0
transactions_per_rollback_segment = 1

cursor_space_for_time   = TRUE
replication_dependency_tracking = FALSE
processes               = 1500
shared_pool_size        = 120000000
shared_pool_reserved_size= 30000000
large_pool_size         = 28500000

db_block_lru_latches    = 270

buffer_pool_keep        = (buffers:16289585,lru_latches:220) # 76% of db db_block_buffers
buffer_pool_recycle     = (buffers:52173,lru_latches:30)
log_buffer              = 25165824

db_block_buffers        = 21433664 #81.76GB

_enable_list_io         = FALSE
_spin_count             = 40000
_disable_incremental_checkpoints = TRUE

lock_sga = TRUE

# DB Writer inportant parameters
fast_start_io_target                    = 0
db_block_max_dirty_target = 10716832 # db_block_buffers/2
_db_block_hash_buckets          = 42867328 # db_block_buffers * 2
_db_aging_stay_count            = 1
_db_percent_hot_keep            = 50
_db_percent_hot_recycle         = 50
####

Parallel_automatic_tuning       = TRUE
transaction_auditing=false
db_file_multiblock_read_count=1
_db_file_noncontig_mblock_read_count=1
_log_simultaneous_copies=96

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,t24,t25,t26,t27,t28,t29,t30, \
t31,t32,t33,t34,t35,t36,t37,t38,t39,t40,t41,t42,t43,t44,t45, \
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,t107,t108,t109,t110,t111,t112,t113,t114,t115,t116, \
t117,t118,t119,t120,t121,t122,t123,t124,t125,t126,t127,t128, \
t129,t130,t131,t132,t133,t134,t135,t136,t137,t138,t139,t140, \
t141,t142,t143,t144,t145,t146,t147,t148,t149,t150,t151,t152, \
t153,t154,t155,t156,t157,t158,t159,t160,t161,t162,t163,t164,t165,t166,\
t167,t168,t169,t170,t171,t172,t173,t174,t175,t176,t177,t178,t179,t180,\
t181,t182,t183,t184,t185,t186,t187,t188,t189,t190,t191,t192,t193,t194, \
t195,t196,t197,t198,t199,t200,t201,t202,t203,t204,t205,t206,t207,t208, \
t209,t210,t211,t212,t213,t214,t215,t216,t217,t218,t219,t220,t221,t222, \
t223,t224,t225,t226,t227,t228,t229,t230,t231,t232,t233,t234,t235,t236, \
t237,t238,t239,t240,t241,t242,t243,t244,t245,t246,t247,t248,t249,t250, \
t251,t252,t253,t254,t255,t256,t257,t258,t259,t260,t261,t262,t263,t264, \
t265,t266,t267,t268,t269,t270,t271,t272,t273,t274,t275,t276,t277,t278, \
t279,t280,t281,t282,t283,t284,t285,t286,t287,t288,t289,t290,t291,t292, \
t293,t294,t295,t296,t297,t298,t299,t300,t301,t302,t302,t303,t304,t305,t306, \
t307,t308,t309,t310,t311,t312,t313,t314,t315,t316,t317,t318,t319,t320, \
t321,t322,t323,t324,t325,t326,t327,t328,t329,t330,t331,t332,t333,t334, \
t335,t336,t337,t338,t339,t340,t341,t342,t343,t344,t345,t346,t347,t348, \
t349,t350,t351,t352,t353,t354,t355,t356,t357,t358,t359,t360,t361,t362, \
t363,t364,t365,t366,t367,t368,t369,t370,t371,t372,t373,t374,t375,t376, \
t377,t378,t379,t380,t381,t382,t383,t384,t385,t386,t387,t388,t389,t390, \
t391,t392,t393,t394,t395,t396,t397,t398,t399,t400,t401,t402,t403,t404,t405, \
t406,t407,t408,t409,t410,t411,t412,t413,t414,t415,t416,t417,t418,t419,t420, \
t421,t422,t423,t424,t425,t426,t427,t428,t429,t430,t431,t432,t433,t434, \
t435,t436,t437,t438,t439,t440,t441,t442,t443,t444,t445,t446,t447,t448, \
t449,t450,t451,t452,t453,t454,t455,t456,t457,t458,t459,t460,t461,t462, \
t463,t464,t465,t466,t467,t468,t469,t470,t471,t472,t473,t474,t475,t476, \
t477,t478,t479,t480,t481,t482,t483,t484,t485,t486,t487,t488,t489,t490, \
t491,t492,t493,t494,t495,t496,t497,t498,t499,t500,t501,t502,t503,t504,t505, \
t506,t507,t508,t509,t510,t511,t512,t513,t514,t515,t516,t517,t518,t519,t520, \
t521,t522,t523,t524,t525,t526,t527,t528,t529,t530,t531,t532,t533,t534, \
t535,t536,t537,t538,t539,t540,t541,t542,t543,t544,t545,t546,t547,t548, \
t549,t550,t551,t552,t553,t554,t555,t556,t557,t558,t559,t560,t561,t562, \
t563,t564,t565,t566,t567,t568,t569,t570,t571,t572,t573,t574,t575,t576, \
t577,t578,t579,t580,t581,t582,t583,t584,t585,t586,t587,t588,t589,t590, \
t591,t592,t593,t594,t595,t596,t597,t598,t599,t600,t601,t602,t603,t604,t605,  \
t606,t607,t608,t609,t610,t611,t612,t613,t614,t615,t616,t617,t618,t619,t620, \
t621,t622,t623,t624,t625,t626,t627,t628,t629,t630,t631,t632,t633,t634, \
t635,t636,t637,t638,t639,t640,t641,t642,t643,t644,t645,t646,t647,t648, \
t649,t650,t651,t652,t653,t654,t655,t656,t657,t658,t659,t660,t661,t662, \
t663,t664,t665,t666,t667,t668,t669,t670,t671,t672,t673,t674,t675,t676, \
t677,t678,t679,t680,t681,t682,t683,t684,t685,t686,t687,t688,t689,t690, \
t691,t692,t693,t694,t695,t696,t697,t698,t699,t700,t701,t702,t702,t704, \
t705,t706,t707,t708,t709,t710,t711,t712,t713,t714,t715,t716,t717,t718, \
t719,t720,t721,t722,t723,t724,t725,t726,t727,t728,\
t729,t730,t731,t732,t733,t734,t735,t736,t737,t738,t739,t740,t741,\
t742,t743,t744,t745,t746,t747,t748,t749,t750,t751,t752,t753,t754,\
t755,t756,t757,t758,t759,t760,t761,t762,t763,t764,t765,t766,t767,\
t768,t769,t770,t771,t772,t773,t774,t775,t776,t777,t778,t779,t780,\
t781,t782,t783,t784,t785,t786,t787,t788,t789,t790,t791,t792,t793,\
t794,t795,t796,t797,t798,t799,t800,t801,t802,t803,t804,t805,t806,\
t807,t808,t809,t810,t811,t812,t813,t814,t815,t816,t817,t818,t819,\
t820,t821,t822,t823,t824,t825,t826,t827,t828,t829,t830,t831,t832,\
t833,t834,t835,t836,t837,t838,t839,t840,t841,t842,t843,t844,t845,\
t846,t847,t848,t849,t850,t851,t852,t853,t854,t855,t856,t857,t858,\
t859,t860,t861,t862,t863,t864,t865,t866,t867,t868,t869,t870,t871,\
t872,t873,t874,t875,t876,t877,t878,t879,t880,t881,t882,t883,t884,\
t885,t886,t887,t888,t889,t890,t891,t892,t893,t894,t895,t896,t897,\
t898,t899,t900,t901,t902,t903,t904,t905,t906,t907,t908,t909,t910,\
t911,t912,t913,t914,t915,t916,t917,t918,t919,t920,t921,t922,t923,\
t924,t925,t926,t927,t928,t929,t930,t931,t932,t933,t934,t935,t936,\
t937,t938,t939,t940,t941,t942,t943,t944,t945,t946,t947,t948,t949,\
t950,t951,t952,t953,t954,t955,t956,t957,t958,t959,t960,t961,t962,\
t963,t964,t965,t966,t967,t968,t969,t970,t971,t972,t973,t974,t975,\
t976,t977,t978,t979,t980,t981,t982,t983,t984,t985,t986,t987,t988,\
t989,t990,t991,t992,t993,t994,t995,t996,t997,t998,t999,t1000,t1001,\
t1002,t1003,t1004,t1005,t1006,t1007,t1008,t1009,t1010,t1011,t1012,t1013,t1014,\
t1015,t1016,t1017,t1018,t1019,t1020,t1021,t1022,t1023,t1024,t1025,t1026,t1027,\
t1028,t1029,t1030,t1031,t1032,t1033,t1034,t1035,t1036,t1037,t1038,t1039,t1040,\
t1041,t1042,t1043,t1044,t1045,t1046,t1047,t1048,t1049,t1050,t1051,t1052,t1053,\
t1054,t1055,t1056,t1057,t1058,t1059,t1060,t1061,t1062,t1063,t1064,t1065,t1066,\
t1067,t1068,t1069,t1070,t1071,t1072,t1073,t1074,t1075,t1076,t1077,t1078,t1079,\
t1080,t1081,t1082,t1083,t1084,t1085,t1086,t1087,t1088,t1089,t1090,t1091,t1092,\
t1093,t1094,t1095,t1096,t1097,t1098,t1099,t1100,t1101,t1102,t1103,t1104,t1105,\
t1106,t1107,t1108,t1109,t1110,t1111,t1112,t1113,t1114,t1115,t1116,t1117,t1118,\
t1119,t1120,t1121,t1122,t1123,t1124,t1125,t1126,t1127,t1128,t1129,t1130,t1131,\
t1132,t1133,t1134,t1135,t1136,t1137,t1138,t1139,t1140,t1141,t1142,t1143,t1144,\
t1145,t1146,t1147,t1148,t1149,t1150,t1151,t1152,t1153,t1154,t1155,t1156,t1157,\
t1158,t1159,t1160,t1161,t1162,t1163,t1164,t1165,t1166,t1167,t1168,t1169,t1170,\
t1171,t1172,t1173,t1174,t1175,t1176,t1177,t1178,t1179,t1180,t1181,t1182,t1183,\
t1184,t1185,t1186,t1187,t1188,t1189,t1190,t1191,t1192,t1193,t1194,t1195,t1196,\
t1197,t1198,t1199,t1200,t1201,t1202,t1203,t1204,t1205,t1206,t1207,t1208,t1209,\
t1210,t1211,t1212,t1213,t1214,t1215,t1216,t1217)
```

B.2 Transaction Monitor Parameters

.tpccrc

```
CellLogVolume ecmlog
CellDataVolume ecmdata
NodeLogVolume enmlog
TpccApplicationDirectory /home/encina
TpccDbServer oratpcc
StatsFrequency 10
Version 1.0
Servers:delivery PAS 5 Threads 3 Name del IFS ---D- Dvry 2
Servers:1online PAS 43 Threads 1 Name on1 IFS NPO-S Dvry 0
Servers:2online PAS 43 Threads 1 Name on2 IFS NPO-S Dvry 0
```

.enc_env

```
setenv ENCINA_BINDING_PREFER_LOCAL_SERVERS 1
setenv ENCINA_RECLAIM_BIND_CACHE 300
setenv ORACLE_HOME /home/oracle815/app/oracle/product/8.1.5
setenv ENCINA_TRACE all=none
setenv ENCINA_BINDING_MAX_CONCURRENT_RPCS_PER_PA 3
setenv ENCINA_TPM_HANDLE_REFRESH_INTERVAL 36000
setenv IENCINA_TPM_HANDLE_REFRESH_INTERVAL 36000
setenv ENCINA_MON_INTERNAL_TPOOL_SIZE 180
setenv ENCINA_TPOOL_SIZE 90
setenv TEMP /tmp
setenv ENCINA_TPM_CELL `/home/encina/scripts/encina_cell`
setenv ENCINA_OS_USER_ID encina
setenv OS_DEFAULT_GROUP staff
setenv TPCCRC /home/encina/.tpccrc
setenv TPCC_BIN_DIR /home/encina/bin
```

B.3 AIX Parameters

BULL ESCALA EPC2450

OS PARAMETERS

```
keylock      normal                                State of system keylock at boot time            False
maxbuf       20                                    Maximum number of pages in block I/O BUFFER CACHE
True
maxmbuf      0                                     Maximum Kbytes of real memory allowed for MBUFS
True
maxuproc     10000                                 Maximum number of PROCESSES allowed per user
True
autorestart  false                                 Automatically REBOOT system after a crash       True
iostat       false                                 Continuously maintain DISK I/O history          True
realmem      100663296                             Amount of usable physical memory in Kbytes      False
conslogin    enable                                System Console Login                            False
fwversion    IBM,H9900199                          Firmware version and revision levels            False
maxpout      0                                     HIGH water mark for pending write I/Os per file True
minpout      0                                     LOW water mark for pending write I/Os per file  True
fullcore     false                                 Enable full CORE dump                           True
pre430core   false                                 Use pre-430 style CORE dump                     True
rtasversion  1                                     Open Firmware RTAS version                      False
modelname    IBM,7017-S85                          False
systemid     IBM,vpd property exists but SE field does not exist Hardware system identifier
False
boottype     disk                                  N/A                                             False
SW_dist_intr false                                 Enable SW distribution of interrupts            True
cpuguard     disable                               CPU Guard                                       True
```

Appendix C: Database Setup Code

C.1 Database Creation Scripts

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
  set echo on
  alter tablespace $1 add datafile '$2' size $3 reuse;
  exit;
!

if [ -d ./outdir ]
then
  echo `date` >> ./outdir/${FILE}.addf
fi
```

addfs.sh

```
#!/bin/ksh
#=============================================================+
#       Copyright (c) 1996  Oracle Corp, Redwood Shores, CA   |
#                OPEN SYSTEMS PERFORMANCE GROUP               |
#                   All Rights Reserved                       |
#=============================================================+
# FILENAME
#     addfs.sh
# DESCRIPTION
#     Add tablespace to database.
# USAGE
#     addfs.sh <tablespace> <data file> <size> <# of files>
#=============================================================*/

. setenv

tablespace=$1
datafile=$2
size=$3
nfiles=$4
let total=$nfiles+1

i=2
while [ $i -le $total ]
do
   j=1
   while [ $j -le 20 ]
   do
      if [ $i -le $total ]
      then
         echo "addfile.sh $tablespace ${datafile}$i $size"
         addfile.sh $tablespace ${datafile}$i $size &
         let i=$i+1
         let j=$j+1
      else
         j=21
      fi
   done
   wait
done
```

addroll.sh

```
#!/bin/ksh
#=============================================================+
#       Copyright (c) 1996  Oracle Corp, Redwood Shores, CA   |
#                OPEN SYSTEMS PERFORMANCE GROUP               |
#                   All Rights Reserved                       |
#=============================================================+
# FILENAME
#     addts.sh
# DESCRIPTION
#     Add tablespace to database.
# USAGE
#     addts.sh <tablespace> <data file> <size>
#=============================================================*/
echo 'ORACLE_HOME=' $ORACLE_HOME
echo 'ORACLE_SID=' $ORACLE_SID

FILE=`basename $1`

if [ -d ./outdir ]
then
  echo `date` > ./outdir/${FILE}.addts
fi

#   create tablespace roll datafile '$1' size $2 reuse extent management local uniform size 40K nologging ;

svrmgrl <<!
  connect internal
  create tablespace roll datafile '$1' size $2 reuse;

  exit;
!

if [ -d ./outdir ]
then
  echo `date` >> ./outdir/${FILE}.addts
fi
```

addts.sh

```
#!/bin/ksh
#=============================================================+
#       Copyright (c) 1996  Oracle Corp, Redwood Shores, CA   |
#                OPEN SYSTEMS PERFORMANCE GROUP               |
#                   All Rights Reserved                       |
#=============================================================+
# FILENAME
#     addts.sh
# DESCRIPTION
#     Add tablespace to database.
# USAGE
#     addts.sh <tablespace> <data file> <size>
#=============================================================*/

FILE=`basename $2`

if [ -d ./outdir ]
then
  echo `date` > ./outdir/${FILE}.addts
fi

svrmgrl <<!
  connect internal
  set echo on
  create tablespace $1 datafile '$2' size $3 reuse extent management local uniform size $4 nologging ;

  exit;
!

if [ -d ./outdir ]
then
  echo `date` >> ./outdir/${FILE}.addts
fi
```

alter_temp.sh

```
#!/bin/ksh

# alter_temp 80301 98/7/7 15:45 vmakhija
# Copyright (c) 1998 Oracle
#
#
#=============================================================+
#       Copyright (c) 1998  Oracle Corp, Redwood Shores, CA   |
#                OPEN SYSTEMS PERFORMANCE GROUP               |
#                   All Rights Reserved                       |
#=============================================================+
# NAME
#      alter_temp
# DESCRIPTION
#      Usage: alter_temp.sh [options]
#=============================================================
#
```

```
. setenv

sqlplus system/manager <<!
  alter user tpcc temporary tablespace temp;
  quit;
!

svrmgrl <<!
  connect internal
  alter tablespace temp
    default storage (initial 20M next 20M pctincrease 0);
  exit;
!
!
```

benchdb.sh

```
#!/bin/ksh
#
# benchdb.sh 8030100 98/7/7 15:45 vmakhija
# Copyr (c) 1998 Oracle
#

#
#=====================================================================+
#       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
#=====================================================================
#
. setenv


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 1000
          datafile '/dev/rlvsys1' size 1503M reuse
          logfile  '/dev/rlvlog1rd' size 6399M reuse,
                   '/dev/rlvlog2rd' size 6399M reuse;
       exit
!

#
# Create more rollback segments
#

svrmgrl <<!
  connect internal
  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);
  shutdown;
  exit;
!
fi

#
#  Startup database with params file that includes new rollback segments
#

svrmgrl <<!
       connect internal
       startup pfile=$TPCC_ADMIN/p_build.ora;
       connect system/manager
       create tablespace temp datafile
         '/dev/rlvtemp1'   size   3135M reuse
         default storage
         (initial 20M next 20M pctincrease 0 maxextents unlimited);
       exit;
!

#
#      Add tablespaces in parallel
#
addroll.sh      /dev/rlvroll1     575M &
addts.sh hist   /dev/rlvhist1    8671M 1734M &
addts.sh ware   /dev/rlvware      511M    1M &
addts.sh cust   /dev/rlvcust1    4127M 1375M &
addts.sh items  /dev/rlvitem       63M   10M &
addts.sh ord    /dev/rlvord1     9247M 1849M &
addts.sh nord   /dev/rlvnord1    1055M 1054M &
addts.sh ordl   /dev/rlvordl1    9471M 1894M &
addts.sh stocks /dev/rlvstock1   2687M 1343M &
addts.sh icust1 /dev/rlvi1cust1  4799M  239M &
addts.sh icust2 /dev/rlvi2cust1  3711M  185M &
addts.sh istk   /dev/rlvistk1    8703M  435M &
addts.sh iord1  /dev/rlvi1ord1   3999M  210M &
addts.sh iord2  /dev/rlvi2ord1   2975M  156M &
wait

#
#                   Add datafiles to tablespaces in parallel
#
addfs.sh roll /dev/rlvroll 575M 4
wait

addfs.sh hist /dev/rlvhist 8671M 7
wait

addfs.sh cust /dev/rlvcust 4127M 149
wait

addfs.sh ord /dev/rlvord 9247M 5
wait

addfs.sh nord /dev/rlvnord 1055M 5
wait

addfs.sh ordl /dev/rlvordl 9471M 107
wait

addfs.sh stocks /dev/rlvstock 2687M 279
wait

addfs.sh icust1 /dev/rlvi1cust 4799M 3
wait

addfs.sh icust2 /dev/rlvi2cust 3711M 7
wait

addfs.sh istk /dev/rlvistk 8703M 5
wait

addfs.sh iord1 /dev/rlvi1ord 3999M 7
wait

addfs.sh iord2 /dev/rlvi2ord 2975M 15
wait

addfs.sh temp /dev/rlvtemp 3135M 59
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
```

benchsetup.sh

```
#!/bin/ksh

# benchsetup 80301 98/7/7 15:45 vmakhija
# Copyright (c) 1998 Oracle
#
#
#=====================================================================+
#       Copyright (c) 1998  Oracle Corp, Redwood Shores, CA       |
#                  OPEN SYSTEMS PERFORMANCE GROUP                 |
#                     All Rights Reserved                         |
#=====================================================================+
# NAME
#      benchsetup
# DESCRIPTION
#      Usage: benchsetup.sh [options]
#=====================================================================
#
. setenv

STEP=0
START=0
END=0
CONTINUE=1
PROGNAME=$0


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      Create rollback segments."
  echo "              12      Load New-order."
  echo "              13      Load History."
  echo "              14      Load Order/Orderline."
  echo "              15      Load Warehouse."
  echo "              16      Load District."
  echo "              17      Load Item."
  echo "              18      Load Customer."
  echo "              19      Load Stock"
  echo "              20      Alter temp space."
  echo "              21      Create Warehouse index."
  echo "              22      Create District index."
  echo "              23      Create Item index."
  echo "              24      Create Customer index."
  echo "              25      Create Customer2 index."
  echo "              26      Create Stock index."
  echo "              27      Create Orders index."
  echo "              28      Create Orders2 index."
  echo "              29      Create New-order index."
  echo "              30      Create Orderline index."
  echo "              31      Re-alter temp space."
  echo "              32      Analyze."
  echo "              33      Create TPC-C reports tables."
  echo "              34      Create stored procs."
  echo "              35      Space rpts / etc."
  echo "              36      Alter extents and Lock tables."
  echo "              37      Run catalog scripts."
  echo "              38      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

date

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
  echo "Creating user ..."
${LOAD_SCRIPTS}/create_user.sh > ${OUTDIR}/create_user.out 2>&1
fi

if runnable
then
  echo "Creating warehouse ..."
${LOAD_SCRIPTS}/create_ware.sh > ${OUTDIR}/create_ware.out 2>&1
fi

if runnable
then
  echo "Creating district ..."
${LOAD_SCRIPTS}/create_dist.sh > ${OUTDIR}/create_dist.out 2>&1
fi

if runnable
then
  echo "Creating history ..."
${LOAD_SCRIPTS}/create_hist.sh > ${OUTDIR}/create_hist.out 2>&1
fi
```

```
if runnable
then
  echo "Creating orders ..."
${LOAD_SCRIPTS}/create_ordr.sh > ${OUTDIR}/create_ordr.out 2>&1
fi

if runnable
then
  echo "Creating new-order ..."
${LOAD_SCRIPTS}/create_nord.sh > ${OUTDIR}/create_nord.out 2>&1
fi

if runnable
then
  echo "Creating order-line ..."
${LOAD_SCRIPTS}/create_ordl.sh > ${OUTDIR}/create_ordl.out 2>&1
fi

if runnable
then
  echo "Creating item ..."
${LOAD_SCRIPTS}/create_item.sh > ${OUTDIR}/create_item.out 2>&1
fi

if runnable
then
  echo "Creating customer ..."
${LOAD_SCRIPTS}/create_cust.sh > ${OUTDIR}/create_cust.out 2>&1 &
fi

if runnable
then
  echo "Creating stock ..."
${LOAD_SCRIPTS}/create_stok.sh > ${OUTDIR}/create_stok.out 2>&1 &
fi

wait

if runnable
then
  echo "Creating rollback segment ..."
${LOAD_SCRIPTS}/tpcc_rol.sh > ${OUTDIR}/tpcc_rol.out 2>&1 &
fi

echo "Switching Logs ..."
${TPCC_UTILS}/switchlog.sh >> ${OUTDIR}/switchlog.out 2>&1

if runnable
then
  echo "Loading new-order ..."
${LOAD_SCRIPTS}/load_nord.sh > ${OUTDIR}/load_nord.out 2>&1
fi

if runnable
then
  echo "Loading history ..."
${LOAD_SCRIPTS}/load_hist.sh > ${OUTDIR}/load_hist.out 2>&1
fi

if runnable
then
  echo "Loading orders and order-line ..."
${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
  echo "Loading warehouse ..."
${LOAD_SCRIPTS}/load_ware.sh > ${OUTDIR}/load_ware.out 2>&1
fi

if runnable
then
  echo "Loading district ..."
${LOAD_SCRIPTS}/load_dist.sh > ${OUTDIR}/load_dist.out 2>&1
fi

if runnable
then
  echo "Loading item ..."
${LOAD_SCRIPTS}/load_item.sh > ${OUTDIR}/load_item.out 2>&1
fi

if runnable
then
  echo "Loading customer ..."
${LOAD_SCRIPTS}/load_cust.sh > ${OUTDIR}/load_cust.out 2>&1
fi

if runnable
then
  echo "Loading stock ..."
${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
  echo "Alter temp ..."
${LOAD_SCRIPTS}/alter_temp.sh > ${OUTDIR}/alter_temp.out 2>&1
fi

if runnable
then
  echo "Creating warehouse index ..."
${LOAD_SCRIPTS}/create_iware.sh > ${OUTDIR}/create_iware.out 2>&1
fi

if runnable
then
  echo "Creating district index ..."
${LOAD_SCRIPTS}/create_idist.sh > ${OUTDIR}/create_idist.out 2>&1
fi

if runnable
then
  echo "Creating item index ..."
${LOAD_SCRIPTS}/create_iitem.sh > ${OUTDIR}/create_iitem.out 2>&1
fi

if runnable
then
  echo "Creating customer index ..."
${LOAD_SCRIPTS}/create_icust.sh > ${OUTDIR}/create_icust.out 2>&1
fi

if runnable
then
  echo "Creating customer2 index ..."
${LOAD_SCRIPTS}/create_icust2.sh > ${OUTDIR}/create_icust2.out 2>&1
fi

if runnable
then
  echo "Creating stock index ..."
${LOAD_SCRIPTS}/create_istok.sh > ${OUTDIR}/create_istok.out 2>&1
fi

if runnable
then
  echo "Creating orders index ..."
${LOAD_SCRIPTS}/create_iordr.sh > ${OUTDIR}/create_iordr.out 2>&1
fi

if runnable
then
  echo "Creating orders2 index ..."
${LOAD_SCRIPTS}/create_iordr2.sh > ${OUTDIR}/create_iordr2.out 2>&1
fi

if runnable
then
echo "No need to create inord"
#${LOAD_SCRIPTS}/create_inord.sh > ${OUTDIR}/create_inord.out 2>&1
fi

if runnable
then
echo "No need to create iordl"
#${LOAD_SCRIPTS}/create_iordl.sh > ${OUTDIR}/create_iordl.out 2>&1
fi
if runnable
then
  echo "Re-alter temp ..."
${LOAD_SCRIPTS}/realter_temp.sh > ${OUTDIR}/realter_temp.out 2>&1
fi


if runnable
then
  echo "Analyze ..."
sqlplus tpcc/tpcc @$TPCC_SQL/tpcc_ana > ${OUTDIR}/tpcc_ana.out 2>&1
fi

if runnable
then
  echo "Creating report tables ..."
${LOAD_SCRIPTS}/tpcc_reports.sh > ${OUTDIR}/tpcc_reports.out 2>&1
fi

if runnable
then
  echo "Creating stored procs ..."
${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
  echo "Space rpts / etc. ..."
```

```
${LOAD_SCRIPTS}/tpcc_misc.sh > ${OUTDIR}/tpcc_misc.out 2>&1
fi

if runnable
then
  echo "Alter extents and lock ..."
#${LOAD_SCRIPTS}/alter.sh > ${OUTDIR}/alter.out 2>&1
${LOAD_SCRIPTS}/altundef.sh > ${OUTDIR}/altundef.out 2>&1
${TPCC_UTILS}/dml.sh > ${OUTDIR}/dml.out 2>&1
fi

if runnable
then
  echo "Running catalog scripts ..."
${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

date
```

cat.sh

```
#!/bin/ksh

# benchsetup 80301 98/7/7 15:45 vmakhija
# Copyright (c) 1998 Oracle
#
#
#=============================================================+
#       Copyright (c) 1998  Oracle Corp, Redwood Shores, CA   |
#                  OPEN SYSTEMS PERFORMANCE GROUP             |
#                      All Rights Reserved                    |
#=============================================================+
# NAME
#      benchsetup
# DESCRIPTION
#      Usage: benchsetup.sh [options]
#============================================================
#
. setenv

svrmgrl <<!
   set echo off;
   connect sys/change_on_install;
   @?/rdbms/admin/catparr;
   exit;
!
```

create_cust.sh

```
#!/bin/ksh

#
# load_<obj>.sh 80301 98/7/7 15:45 vmakhija
# Copyright (c) 1998 Oracle Corp.
#
#=============================================================+
#       Copyright (c) 1998  Oracle Corp, Redwood Shores, CA   |
#                  OPEN SYSTEMS PERFORMANCE GROUP             |
#                      All Rights Reserved                    |
#=============================================================+
# FILENAME
#      create_<obj>.sh
# DESCRIPTION
#      Usage: create_<obj>.sh [options]
#             -mu <multiplier>     (# of warehouses)
#=============================================================
#
. setenv

sqlplus tpcc/tpcc @cust
```

create_dist.sh

```
#!/bin/ksh

#
# load_<obj>.sh 80301 98/7/7 15:45 vmakhija
# Copyright (c) 1998 Oracle Corp.
#
#=============================================================+
#       Copyright (c) 1998  Oracle Corp, Redwood Shores, CA   |
#                  OPEN SYSTEMS PERFORMANCE GROUP             |
#                      All Rights Reserved                    |
#=============================================================+
# FILENAME
#      create_<obj>.sh
# DESCRIPTION
#      Usage: create_<obj>.sh [options]
#             -mu <multiplier>     (# of warehouses)
#=============================================================
#
. setenv

sqlplus tpcc/tpcc @dist
```

create_hist.sh

```
#!/bin/ksh

#
# load_<obj>.sh 80301 98/7/7 15:45 vmakhija
# Copyright (c) 1998 Oracle Corp.
#
#=============================================================+
#       Copyright (c) 1998  Oracle Corp, Redwood Shores, CA   |
#                  OPEN SYSTEMS PERFORMANCE GROUP             |
#                      All Rights Reserved                    |
#=============================================================+
# FILENAME
#      create_<obj>.sh
# DESCRIPTION
#      Usage: create_<obj>.sh [options]
#             -mu <multiplier>     (# of warehouses)
#=============================================================
#
. setenv

sqlplus tpcc/tpcc @hist
```

create_icust.sh

```
#!/bin/ksh

#
# load_<obj>.sh 80301 98/7/7 15:45 vmakhija
# Copyright (c) 1998 Oracle Corp.
#
#=============================================================+
#       Copyright (c) 1998  Oracle Corp, Redwood Shores, CA   |
#                  OPEN SYSTEMS PERFORMANCE GROUP             |
#                      All Rights Reserved                    |
#=============================================================+
# FILENAME
#      create_<obj>.sh
# DESCRIPTION
#      Usage: create_<obj>.sh [options]
#             -mu <multiplier>     (# of warehouses)
#=============================================================
#
. setenv

sqlplus tpcc/tpcc @icust
```

create_icust2.sh

```
#!/bin/ksh

#
# load_<obj>.sh 80301 98/7/7 15:45 vmakhija
# Copyright (c) 1998 Oracle Corp.
#
#=============================================================+
#       Copyright (c) 1998  Oracle Corp, Redwood Shores, CA   |
#                  OPEN SYSTEMS PERFORMANCE GROUP             |
#                      All Rights Reserved                    |
#=============================================================+
# FILENAME
#      create_<obj>.sh
# DESCRIPTION
#      Usage: create_<obj>.sh [options]
#             -mu <multiplier>     (# of warehouses)
#=============================================================
#
. setenv

sqlplus tpcc/tpcc @icust2
```

create_idist.sh

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

```
#
# load_<obj>.sh 80301 98/7/7 15:45 vmakhija
# Copyright (c) 1998 Oracle Corp.
#
#============================================================+
#       Copyright (c) 1998  Oracle Corp, Redwood Shores, CA      |
#                OPEN SYSTEMS PERFORMANCE GROUP                  |
#                   All Rights Reserved                          |
#============================================================+
# FILENAME
#      create_<obj>.sh
# DESCRIPTION
#      Usage: create_<obj>.sh [options]
#           -mu <multiplier>    (# of warehouses)
#============================================================
#
. setenv

sqlplus tpcc/tpcc @idist
```

create_iitem.sh

```
#!/bin/ksh

#
# load_<obj>.sh 80301 98/7/7 15:45 vmakhija
# Copyright (c) 1998 Oracle Corp.
#
#============================================================+
#       Copyright (c) 1998  Oracle Corp, Redwood Shores, CA      |
#                OPEN SYSTEMS PERFORMANCE GROUP                  |
#                   All Rights Reserved                          |
#============================================================+
# FILENAME
#      create_<obj>.sh
# DESCRIPTION
#      Usage: create_<obj>.sh [options]
#           -mu <multiplier>    (# of warehouses)
#============================================================
#
. setenv

sqlplus tpcc/tpcc @iitem
```

create_iordr.sh

```
#!/bin/ksh

#
# load_<obj>.sh 80301 98/7/7 15:45 vmakhija
# Copyright (c) 1998 Oracle Corp.
#
#============================================================+
#       Copyright (c) 1998  Oracle Corp, Redwood Shores, CA      |
#                OPEN SYSTEMS PERFORMANCE GROUP                  |
#                   All Rights Reserved                          |
#============================================================+
# FILENAME
#      create_<obj>.sh
# DESCRIPTION
#      Usage: create_<obj>.sh [options]
#           -mu <multiplier>    (# of warehouses)
#============================================================
#
. setenv

sqlplus tpcc/tpcc @iordr
```

create_iordr2.sh

```
#!/bin/ksh

#
# load_<obj>.sh 80301 98/7/7 15:45 vmakhija
# Copyright (c) 1998 Oracle Corp.
#
#============================================================+
#       Copyright (c) 1998  Oracle Corp, Redwood Shores, CA      |
#                OPEN SYSTEMS PERFORMANCE GROUP                  |
#                   All Rights Reserved                          |
#============================================================+
# FILENAME
#      create_<obj>.sh
# DESCRIPTION
#      Usage: create_<obj>.sh [options]
#           -mu <multiplier>    (# of warehouses)
#============================================================
#
. setenv

sqlplus tpcc/tpcc @iordr2
```

create_istok.sh

```
#!/bin/ksh

#
# load_<obj>.sh 80301 98/7/7 15:45 vmakhija
# Copyright (c) 1998 Oracle Corp.
#
#============================================================+
#       Copyright (c) 1998  Oracle Corp, Redwood Shores, CA      |
#                OPEN SYSTEMS PERFORMANCE GROUP                  |
#                   All Rights Reserved                          |
#============================================================+
# FILENAME
#      create_<obj>.sh
# DESCRIPTION
#      Usage: create_<obj>.sh [options]
#           -mu <multiplier>    (# of warehouses)
#============================================================
#
. setenv

sqlplus tpcc/tpcc @istok
```

create.item.sh

```
#!/bin/ksh

#
# load_<obj>.sh 80301 98/7/7 15:45 vmakhija
# Copyright (c) 1998 Oracle Corp.
#
#============================================================+
#       Copyright (c) 1998  Oracle Corp, Redwood Shores, CA      |
#                OPEN SYSTEMS PERFORMANCE GROUP                  |
#                   All Rights Reserved                          |
#============================================================+
# FILENAME
#      create_<obj>.sh
# DESCRIPTION
#      Usage: create_<obj>.sh [options]
#           -mu <multiplier>    (# of warehouses)
#============================================================
#
. setenv

sqlplus tpcc/tpcc @item
```

create_iware.sh

```
#!/bin/ksh

#
# load_<obj>.sh 80301 98/7/7 15:45 vmakhija
# Copyright (c) 1998 Oracle Corp.
#
#============================================================+
#       Copyright (c) 1998  Oracle Corp, Redwood Shores, CA      |
#                OPEN SYSTEMS PERFORMANCE GROUP                  |
#                   All Rights Reserved                          |
#============================================================+
# FILENAME
#      create_<obj>.sh
# DESCRIPTION
#      Usage: create_<obj>.sh [options]
#           -mu <multiplier>    (# of warehouses)
#============================================================
#
. setenv

sqlplus tpcc/tpcc @iware
```

create_nord.sh

```
#!/bin/ksh

#
# load_<obj>.sh 80301 98/7/7 15:45 vmakhija
# Copyright (c) 1998 Oracle Corp.
#
#============================================================+
#       Copyright (c) 1998  Oracle Corp, Redwood Shores, CA      |
#                OPEN SYSTEMS PERFORMANCE GROUP                  |
#                   All Rights Reserved                          |
#============================================================+
# FILENAME
#      create_<obj>.sh
# DESCRIPTION
#      Usage: create_<obj>.sh [options]
#           -mu <multiplier>    (# of warehouses)
#============================================================
#
. setenv
```

```
sqlplus tpcc/tpcc @nord
```

create_ordl.sh

```
#!/bin/ksh

#
# load_<obj>.sh 80301 98/7/7 15:45 vmakhija
# Copyright (c) 1998 Oracle Corp.
#
#=============================================================+
#       Copyright (c) 1998  Oracle Corp, Redwood Shores, CA   |
#                OPEN SYSTEMS PERFORMANCE GROUP               |
#                   All Rights Reserved                       |
#=============================================================+
# FILENAME
#      create_<obj>.sh
# DESCRIPTION
#      Usage: create_<obj>.sh [options]
#           -mu <multiplier>    (# of warehouses)
#============================================================
#
. setenv

sqlplus tpcc/tpcc @ordl
```

create_ordr.sh

```
#!/bin/ksh

#
# load_<obj>.sh 80301 98/7/7 15:45 vmakhija
# Copyright (c) 1998 Oracle Corp.
#
#=============================================================+
#       Copyright (c) 1998  Oracle Corp, Redwood Shores, CA   |
#                OPEN SYSTEMS PERFORMANCE GROUP               |
#                   All Rights Reserved                       |
#=============================================================+
# FILENAME
#      create_<obj>.sh
# DESCRIPTION
#      Usage: create_<obj>.sh [options]
#           -mu <multiplier>    (# of warehouses)
#============================================================
#
. setenv

sqlplus tpcc/tpcc @ordr
```

create_stok.sh

```
#!/bin/ksh

#
# load_<obj>.sh 80301 98/7/7 15:45 vmakhija
# Copyright (c) 1998 Oracle Corp.
#
#=============================================================+
#       Copyright (c) 1998  Oracle Corp, Redwood Shores, CA   |
#                OPEN SYSTEMS PERFORMANCE GROUP               |
#                   All Rights Reserved                       |
#=============================================================+
# FILENAME
#      create_<obj>.sh
# DESCRIPTION
#      Usage: create_<obj>.sh [options]
#           -mu <multiplier>    (# of warehouses)
#============================================================
#
. setenv

sqlplus tpcc/tpcc @stok
```

create_user.sh

```
#!/bin/ksh

#
# load_<obj>.sh 80301 98/7/7 15:45 vmakhija
# Copyright (c) 1998 Oracle Corp.
#
#=============================================================+
#       Copyright (c) 1998  Oracle Corp, Redwood Shores, CA   |
#                OPEN SYSTEMS PERFORMANCE GROUP               |
#                   All Rights Reserved                       |
#=============================================================+
# FILENAME
#      create_<obj>.sh
# DESCRIPTION
#      Usage: create_<obj>.sh [options]
#           -mu <multiplier>    (# of warehouses)
#============================================================
#
. setenv

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;
!
```

create_ware.sh

```
#!/bin/ksh

#
# load_<obj>.sh 80301 98/7/7 15:45 vmakhija
# Copyright (c) 1998 Oracle Corp.
#
#=============================================================+
#       Copyright (c) 1998  Oracle Corp, Redwood Shores, CA   |
#                OPEN SYSTEMS PERFORMANCE GROUP               |
#                   All Rights Reserved                       |
#=============================================================+
# FILENAME
#      create_<obj>.sh
# DESCRIPTION
#      Usage: create_<obj>.sh [options]
#           -mu <multiplier>    (# of warehouses)
#============================================================
#
. setenv

sqlplus tpcc/tpcc @ware
```

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;
!
```

load_cust.sh

```
#!/bin/ksh

# load_<obj>.sh 80301 98/7/7 15:45 vmakhija
# Copyright (c) 1998 Oracle
#
#
#=============================================================+
#       Copyright (c) 1998  Oracle Corp, Redwood Shores, CA   |
#                OPEN SYSTEMS PERFORMANCE GROUP               |
#                   All Rights Reserved                       |
#=============================================================+
# NAME
#      load_<obj>.sh
```

```
# DESCRIPTION
#       Usage: load_<obj>.sh [options]
#================================================================
#
. setenv



#
#  Load customer table (in parallel with loading stock table)
#

I=1
SW=1
INC=100
let EW=$SW+$INC-1
J=1
X=$J
while [ $J -le 20 ]
do
   let X=$J*10
   while [ $I -le $X ]
   do
echo "j = $J, x = $X, sw = $SW, ew = $EW"
      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
   J=`expr $J + 1`
done

wait
```

load_dist.sh

```
#!/bin/ksh

# load_<obj>.sh 80301 98/7/7 15:45 vmakhija
# Copyright (c) 1998 Oracle
#
#
#================================================================+
#       Copyright (c) 1998  Oracle Corp, Redwood Shores, CA      |
#                OPEN SYSTEMS PERFORMANCE GROUP                  |
#                    All Rights Reserved                         |
#================================================================+
# NAME
#       load_<obj>.sh
# DESCRIPTION
#       Usage: load_<obj>.sh [options]
#================================================================
#
. setenv


tpccload -M $MULT -d
```

load_hist.sh

```
#!/bin/ksh

#
# load_<obj>.sh 80301 98/7/7 15:45 vmakhija
# Copyright (c) 1998 Oracle Corp.
#
#================================================================+
#       Copyright (c) 1998  Oracle Corp, Redwood Shores, CA      |
#                OPEN SYSTEMS PERFORMANCE GROUP                  |
#                    All Rights Reserved                         |
#================================================================+
# FILENAME
#       pload.sh
# DESCRIPTION
#       Usage: load_<obj>.sh [options]
#            -mu <multiplier>     (# of warehouses)
#================================================================
#
. setenv

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
SW=1
INC=100
let EW=$SW+$INC-1
J=1
X=$J
while [ $J -le 10 ]
do
  let X=$J*20
  while [ $I -le $X ]
  do
echo "j = $J, x = $X, sw = $SW, ew = $EW"
     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
  wait
  J=`expr $J + 1`
done
wait
```

load_item.sh

```
#!/bin/ksh

# load_<obj>.sh 80301 98/7/7 15:45 vmakhija
# Copyright (c) 1998 Oracle
#
#
#================================================================+
#       Copyright (c) 1998  Oracle Corp, Redwood Shores, CA      |
#                OPEN SYSTEMS PERFORMANCE GROUP                  |
#                    All Rights Reserved                         |
#================================================================+
# NAME
#       load_<obj>.sh
# DESCRIPTION
#       Usage: load_<obj>.sh [options]
#================================================================
#
. setenv

tpccload -M $MULT -i
```

load_nord.sh

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

#
# load_<obj>.sh 80301 98/7/7 15:45 vmakhija
# Copyright (c) 1998 Oracle Corp.
#
#=============================================================================+
#       Copyright (c) 1998  Oracle Corp, Redwood Shores, CA       |
#                  OPEN SYSTEMS PERFORMANCE GROUP                 |
#                       All Rights Reserved                       |
#=============================================================================+
# FILENAME
#      pload.sh
# DESCRIPTION
#      Usage: load_<obj>.sh [options]
#             -mu <multiplier>     (# of warehouses)
#=============================================================
#
. setenv

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
SW=1
INC=100
let EW=$SW+$INC-1
J=1
X=$J
while [ $J -le 10 ]
do
  let X=$J*20
  while [ $I -le $X ]
  do
echo "j = $J, x = $X, sw = $SW, ew = $EW"
    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
  wait
  J=`expr $J + 1`
done
wait
```

load_ordr.sh

```
#!/bin/ksh

#
# load_<obj>.sh 80301 98/7/7 15:45 vmakhija
# Copyright (c) 1998 Oracle Corp.
#
#=============================================================================+
#       Copyright (c) 1998  Oracle Corp, Redwood Shores, CA       |
#                  OPEN SYSTEMS PERFORMANCE GROUP                 |
#                       All Rights Reserved                       |
#=============================================================================+
# FILENAME
#      pload.sh
# DESCRIPTION
#      Usage: load_<obj>.sh [options]
#             -mu <multiplier>     (# of warehouses)
#=============================================================
#
. setenv

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
SW=1
INC=100
let EW=$SW+$INC-1
J=1
X=$J
while [ $J -le 10 ]
do
  let X=$J*20
  while [ $I -le $X ]
  do
echo "j = $J, x = $X, sw = $SW, ew = $EW"
    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
  echo New block
  wait
  J=`expr $J + 1`
done

wait
```

load_stok.sh

```
#!/bin/ksh

# load_<obj> 80301 98/7/7 15:45 vmakhija
# Copyright (c) 1998 Oracle
#
#
#=================================================================+
#       Copyright (c) 1998  Oracle Corp, Redwood Shores, CA       |
#                OPEN SYSTEMS PERFORMANCE GROUP                   |
#                    All Rights Reserved                          |
#=================================================================+
# NAME
#      load_<obj>.sh
# DESCRIPTION
#      Usage: load_<obj>.sh [options]
#=================================================================
#
. setenv

#
#  Load stock table (in parallel with loading customer table)
#

I=1
SI=1
EI=200
INC=200
J=1
X=$J
while [ $J -le 10 ]
do
  let X=$J*50
  while [ $I -le $X ]
  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
  J=`expr $J + 1`
done

wait
```

load_ware.sh

```
#!/bin/ksh

# load_<obj> 80301 98/7/7 15:45 vmakhija
# Copyright (c) 1998 Oracle
#
#
#=================================================================+
#       Copyright (c) 1998  Oracle Corp, Redwood Shores, CA       |
#                OPEN SYSTEMS PERFORMANCE GROUP                   |
#                    All Rights Reserved                          |
#=================================================================+
# NAME
#      load_<obj>.sh
# DESCRIPTION
#      Usage: load_<obj>.sh [options]
#=================================================================
#
. setenv

tpccload -M $MULT -w
```

realter_temp.sh

```
#!/bin/ksh

# realter_temp 80301 98/7/7 15:45 vmakhija
# Copyright (c) 1998 Oracle
#
#
#=================================================================+
#       Copyright (c) 1998  Oracle Corp, Redwood Shores, CA       |
#                OPEN SYSTEMS PERFORMANCE GROUP                   |
#                    All Rights Reserved                          |
#=================================================================+
# NAME
#      realter_temp
# DESCRIPTION
#      Usage: realter_temp.sh [options]
#=================================================================
#
. setenv


svrmgrl <<!
  connect internal
  alter tablespace temp
    default storage (initial 20K next 20K pctincrease 50);
  exit;
!
```

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;
!
```

tpcc_rol.sh

```
#!/bin/ksh
#
#
#=================================================================+
#       Copyright (c) 1998  Oracle Corp, Redwood Shores, CA       |
#                OPEN SYSTEMS PERFORMANCE GROUP                   |
#                    All Rights Reserved                          |
#=================================================================+
# FILENAME
#      tpccrol.sh
# DESCRIPTION
#      Script file for creating the roll;back segments.
#=================================================================
#
. setenv

svrmgrl <<!
  connect internal;
  @$LOAD_SCRIPTS/tpcc_rol;
  exit;
!
```

tpcc_rol.sql

```
rem
rem =================================================================+
rem       Copyright (c) 1996  Oracle Corp, Redwood Shores, CA       |
rem                OPEN SYSTEMS PERFORMANCE GROUP                   |
rem                    All Rights Reserved                          |
rem =================================================================+
```

```
rem  FILENAME
rem       tpcc_rol.sql
rem  DESCRIPTION
rem       Create rollback segments for TPCC database.
rem ================================================================
Rem


 set timing on;

 host date;

CREATE ROLLBACK SEGMENT t1
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t2
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t3
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t4
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t5
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t6
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t7
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t8
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t9
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t10
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t11
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t12
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t13
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t14
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t15
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t16
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t17
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t18
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t19
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t20
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t21
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t22
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t23
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t24
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t25
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t26
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t27
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t28
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t29
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t30
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t31
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t32
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t33
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t34
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t35
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t36
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t37
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t38
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t39
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t40
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t41
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t42
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t43
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t44
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t45
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t46
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t47
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t48
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t49
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t50
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t51
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t52
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t53
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t54
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t55
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t56
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t57
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t58
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t59
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t60
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t61
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t62
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t63
```

```
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t64
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t65
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t66
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t67
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t68
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t69
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t70
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t71
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t72
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t73
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t74
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t75
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t76
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t77
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t78
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t79
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t80
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t81
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t82
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t83
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t84
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t85
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t86
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t87
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t88
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t89
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t90
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t91
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t92
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t93
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t94
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t95
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t96
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t97
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t98
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t99
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t100
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t101
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t102
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t103
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t104
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t105
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t106
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t107
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t108
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t109
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t110
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t111
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t112
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t113
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t114
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t115
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t116
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t117
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t118
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t119
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t120
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t121
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t122
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t123
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t124
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t125
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t126
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t127
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t128
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t129
```

```
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t130
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t131
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t132
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t133
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t134
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t135
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t136
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t137
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t138
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t139
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t140
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t141
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t142
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t143
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t144
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t145
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t146
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t147
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t148
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t149
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t150
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t151
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t152
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t153
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t154
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t155
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t156
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t157
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t158
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t159
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t160
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t161
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t162
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t163
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t164
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t165
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t166
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t167
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t168
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t169
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t170
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t171
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t172
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t173
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t174
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t175
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t176
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t177
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t178
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t179
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t180
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t181
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t182
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t183
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t184
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t185
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t186
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t187
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t188
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t189
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t190
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t191
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t192
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t193
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t194
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t195
```

```
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t196
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t197
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t198
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t199
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t200
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t201
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t202
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t203
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t204
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t205
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t206
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t207
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t208
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t209
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t210
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t211
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t212
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t213
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t214
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t215
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t216
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t217
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t218
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t219
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t220
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t221
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t222
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t223
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t224
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t225
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t226
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t227
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t228
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t229
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t230
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t231
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t232
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t233
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t234
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t235
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t236
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t237
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t238
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t239
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t240
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t241
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t242
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t243
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t244
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t245
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t246
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t247
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t248
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t249
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t250
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t251
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t252
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t253
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t254
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t255
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t256
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t257
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t258
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t259
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t260
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t261
```

```
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t262
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t263
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t264
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t265
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t266
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t267
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t268
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t269
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t270
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t271
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t272
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t273
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t274
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t275
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t276
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t277
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t278
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t279
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t280
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t281
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t282
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t283
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t284
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t285
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t286
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t287
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t288
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t289
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t290
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t291
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t292
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t293
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t294
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t295
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t296
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t297
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t298
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t299
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t300
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t301
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t302
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t303
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t304
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t305
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t306
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t307
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t308
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t309
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t310
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t311
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t312
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t313
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t314
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t315
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t316
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t317
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t318
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t319
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t320
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t321
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t322
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t323
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t324
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t325
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t326
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t327
```

```
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t328
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t329
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t330
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t331
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t332
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t333
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t334
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t335
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t336
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t337
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t338
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t339
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t340
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t341
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t342
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t343
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t344
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t345
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t346
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t347
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t348
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t349
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t350
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t351
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t352
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t353
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t354
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t355
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t356
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t357
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t358
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t359
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t360
```

```
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t361
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t362
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t363
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t364
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t365
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t366
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t367
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t368
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t369
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t370
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t371
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t372
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t373
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t374
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t375
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t376
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t377
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t378
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t379
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t380
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t381
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t382
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t383
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t384
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t385
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t386
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t387
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t388
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t389
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t390
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t391
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t392
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t393
```

```
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t394
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t395
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t396
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t397
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t398
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t399
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t400
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t401
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t402
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t403
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t404
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t405
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t406
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t407
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t408
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t409
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t410
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t411
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t412
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t413
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t414
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t415
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t416
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t417
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t418
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t419
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t420
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t421
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t422
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t423
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t424
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t425
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t426
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t427
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t428
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t429
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t430
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t431
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t432
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t433
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t434
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t435
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t436
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t437
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t438
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t439
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t440
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t441
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t442
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t443
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t444
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t445
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t446
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t447
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t448
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t449
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t450
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t451
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t452
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t453
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t454
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t455
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t456
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t457
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t458
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t459
```

```
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t460
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t461
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t462
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t463
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t464
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t465
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t466
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t467
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t468
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t469
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t470
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t471
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t472
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t473
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t474
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t475
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t476
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t477
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t478
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t479
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t480
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t481
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t482
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t483
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t484
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t485
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t486
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t487
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t488
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t489
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t490
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t491
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t492
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t493
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t494
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t495
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t496
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t497
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t498
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t499
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t500
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t501
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t502
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t503
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t504
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t505
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t506
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t507
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t508
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t509
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t510
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t511
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t512
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t513
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t514
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t515
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t516
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t517
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t518
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t519
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t520
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t521
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t522
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t523
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t524
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t525
```

```
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t526
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t527
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t528
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t529
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t530
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t531
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t532
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t533
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t534
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t535
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t536
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t537
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t538
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t539
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t540
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t541
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t542
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t543
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t544
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t545
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t546
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t547
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t548
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t549
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t550
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t551
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t552
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t553
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t554
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t555
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t556
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t557
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t558
```

```
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t559
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t560
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t561
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t562
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t563
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t564
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t565
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t566
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t567
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t568
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t569
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t570
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t571
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t572
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t573
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t574
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t575
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t576
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t577
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t578
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t579
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t580
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t581
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t582
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t583
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t584
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t585
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t586
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t587
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t588
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t589
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t590
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t591
```

```
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t592
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t593
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t594
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t595
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t596
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t597
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t598
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t599
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t600
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t601
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t602
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t603
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t604
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t605
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t606
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t607
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t608
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t609
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t610
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t611
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t612
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t613
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t614
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t615
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t616
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t617
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t618
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t619
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t620
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t621
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t622
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t623
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t624
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t625
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t626
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t627
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t628
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t629
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t630
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t631
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t632
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t633
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t634
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t635
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t636
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t637
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t638
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t639
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t640
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t641
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t642
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t643
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t644
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t645
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t646
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t647
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t648
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t649
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t650
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t651
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t652
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t653
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t654
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t655
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t656
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t657
```

```
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t658
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t659
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t660
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t661
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t662
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t663
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t664
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t665
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t666
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t667
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t668
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t669
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t670
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t671
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t672
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t673
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t674
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t675
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t676
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t677
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t678
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t679
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t680
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t681
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t682
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t683
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t684
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t685
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t686
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t687
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t688
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t689
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t690
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t691
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t692
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t693
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t694
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t695
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t696
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t697
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t698
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t699
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t700
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t701
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t702
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t703
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t704
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t705
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t706
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t707
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t708
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t709
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t710
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t711
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t712
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t713
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t714
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t715
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t716
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t717
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t718
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t719
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t720
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t721
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t722
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t723
```

```
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t724
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t725
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t726
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t727
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t728
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t729
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t730
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t731
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t732
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t733
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t734
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t735
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t736
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t737
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t738
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t739
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t740
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t741
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t742
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t743
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t744
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t745
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t746
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t747
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t748
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t749
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t750
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t751
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t752
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t753
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t754
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t755
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t756
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t757
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t758
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t759
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t760
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t761
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t762
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t763
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t764
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t765
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t766
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t767
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t768
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t769
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t770
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t771
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t772
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t773
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t774
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t775
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t776
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t777
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t778
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t779
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t780
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t781
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t782
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t783
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t784
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t785
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t786
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t787
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t788
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t789
```

```
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t790
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t791
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t792
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t793
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t794
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t795
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t796
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t797
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t798
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t799
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t800
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t801
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t802
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t803
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t804
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t805
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t806
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t807
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t808
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t809
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t810
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t811
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t812
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t813
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t814
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t815
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t816
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t817
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t818
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t819
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t820
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t821
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t822
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t823
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t824
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t825
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t826
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t827
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t828
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t829
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t830
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t831
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t832
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t833
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t834
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t835
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t836
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t837
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t838
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t839
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t840
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t841
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t842
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t843
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t844
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t845
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t846
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t847
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t848
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t849
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t850
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t851
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t852
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t853
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t854
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t855
```

```
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t856
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t857
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t858
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t859
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t860
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t861
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t862
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t863
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t864
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t865
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t866
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t867
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t868
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t869
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t870
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t871
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t872
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t873
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t874
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t875
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t876
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t877
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t878
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t879
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t880
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t881
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t882
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t883
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t884
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t885
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t886
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t887
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t888
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t889
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t890
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t891
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t892
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t893
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t894
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t895
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t896
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t897
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t898
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t899
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t900
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t901
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t902
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t903
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t904
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t905
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t906
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t907
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t908
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t909
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t910
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t911
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t912
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t913
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t914
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t915
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t916
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t917
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t918
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t919
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t920
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t921
```

```
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t922
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t923
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t924
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t925
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t926
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t927
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t928
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t929
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t930
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t931
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t932
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t933
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t934
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t935
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t936
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t937
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t938
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t939
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t940
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t941
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t942
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t943
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t944
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t945
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t946
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t947
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t948
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t949
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t950
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t951
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t952
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t953
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t954
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t955
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t956
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t957
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t958
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t959
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t960
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t961
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t962
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t963
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t964
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t965
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t966
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t967
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t968
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t969
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t970
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t971
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t972
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t973
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t974
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t975
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t976
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t977
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t978
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t979
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t980
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t981
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t982
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t983
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t984
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t985
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t986
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t987
```

```
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t988
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t989
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t990
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t991
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t992
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t993
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t994
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t995
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t996
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t997
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t998
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t999
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1000
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1001
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1002
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1003
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1004
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1005
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1006
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1007
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1008
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1009
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1010
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1011
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1012
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1013
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1014
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1015
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1016
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1017
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1018
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1019
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1020
```

```
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1021
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1022
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1023
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1024
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1025
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1026
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1027
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1028
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1029
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1030
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1031
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1032
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1033
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1034
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1035
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1036
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1037
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1038
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1039
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1040
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1041
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1042
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1043
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1044
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1045
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1046
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1047
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1048
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1049
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1050
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1051
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1052
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1053
```

```
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1054
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1055
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1056
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1057
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1058
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1059
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1060
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1061
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1062
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1063
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1064
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1065
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1066
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1067
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1068
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1069
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1070
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1071
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1072
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1073
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1074
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1075
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1076
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1077
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1078
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1079
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1080
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1081
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1082
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1083
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1084
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1085
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1086
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1087
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1088
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1089
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1090
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1091
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1092
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1093
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1094
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1095
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1096
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1097
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1098
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1099
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1100
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1101
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1102
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1103
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1104
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1105
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1106
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1107
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1108
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1109
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1110
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1111
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1112
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1113
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1114
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1115
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1116
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1117
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1118
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1119
```

```
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1120
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1121
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1122
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1123
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1124
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1125
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1126
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1127
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1128
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1129
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1130
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1131
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1132
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1133
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1134
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1135
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1136
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1137
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1138
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1139
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1140
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1141
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1142
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1143
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1144
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1145
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1146
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1147
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1148
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1149
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1150
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1151
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1152
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1153
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1154
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1155
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1156
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1157
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1158
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1159
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1160
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1161
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1162
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1163
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1164
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1165
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1166
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1167
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1168
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1169
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1170
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1171
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1172
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1173
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1174
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1175
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1176
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1177
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1178
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1179
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1180
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1181
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1182
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1183
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1184
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1185
```

```
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1186
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1187
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1188
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1189
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1190
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1191
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1192
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1193
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1194
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1195
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1196
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1197
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1198
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1199
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1200
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1201
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1202
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1203
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1204
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1205
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1206
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1207
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1208
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1209
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1210
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1211
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1212
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1213
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1214
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1215
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1216
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1217
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1218
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1219
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1220
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1221
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1222
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1223
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1224
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1225
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1226
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1227
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1228
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1229
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1230
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1231
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1232
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1233
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1234
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1235
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1236
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1237
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1238
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1239
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1240
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1241
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1242
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1243
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1244
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1245
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1246
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1247
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1248
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1249
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1250
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
  host date;
```

```
 exit;
```

tpcc_stored_proc.sh

```
#!/bin/ksh

# tpcc_stored_proc 80301 98/7/7 15:45 vmakhija
# Copyright (c) 1998 Oracle
#
#
#=====================================================================+
#       Copyright (c) 1998  Oracle Corp, Redwood Shores, CA      |
#                  OPEN SYSTEMS PERFORMANCE GROUP                |
#                     All Rights Reserved                        |
#=====================================================================+
# NAME
#       tpcc_stored_proc
# DESCRIPTION
#       Usage: tpcc_stored_proc.sh [options]
#=====================================================================
#
. setenv


sqlplus tpcc/tpcc @$TPCC_BLOCKS/views
#sqlplus tpcc/tpcc @$TPCC_BLOCKS/pay
#sqlplus tpcc/tpcc @$TPCC_BLOCKS/payz
sqlplus tpcc/tpcc @$TPCC_BLOCKS/initpay
sqlplus tpcc/tpcc @$TPCC_BLOCKS/tkvcinin
```

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;
```

C.2 SQL Scripts

addroll1125.sql

```
rem
rem ============================================================+
rem       Copyright (c) 1996  Oracle Corp, Redwood Shores, CA    |
rem                OPEN SYSTEMS PERFORMANCE GROUP                |
rem                   All Rights Reserved                        |
rem ============================================================+
rem  FILENAME
rem      tpcc_rol.sql
rem  DESCRIPTION
rem      Create rollback segments for TPCC database.
rem ================================================================
rem


 set timing on;

 host date;

 CREATE ROLLBACK SEGMENT t1
   TABLESPACE roll
   STORAGE (initial 1200K next 1200K minextents 2);
 CREATE ROLLBACK SEGMENT t2
   TABLESPACE roll
   STORAGE (initial 1200K next 1200K minextents 2);
 CREATE ROLLBACK SEGMENT t3
   TABLESPACE roll
   STORAGE (initial 1200K next 1200K minextents 2);
 CREATE ROLLBACK SEGMENT t4
   TABLESPACE roll
   STORAGE (initial 1200K next 1200K minextents 2);
 CREATE ROLLBACK SEGMENT t5
   TABLESPACE roll
   STORAGE (initial 1200K next 1200K minextents 2);
 CREATE ROLLBACK SEGMENT t6
   TABLESPACE roll
   STORAGE (initial 1200K next 1200K minextents 2);
 CREATE ROLLBACK SEGMENT t7
   TABLESPACE roll
   STORAGE (initial 1200K next 1200K minextents 2);
 CREATE ROLLBACK SEGMENT t8
   TABLESPACE roll
   STORAGE (initial 1200K next 1200K minextents 2);
 CREATE ROLLBACK SEGMENT t9
   TABLESPACE roll
   STORAGE (initial 1200K next 1200K minextents 2);
 CREATE ROLLBACK SEGMENT t10
   TABLESPACE roll
   STORAGE (initial 1200K next 1200K minextents 2);
 CREATE ROLLBACK SEGMENT t11
   TABLESPACE roll
   STORAGE (initial 1200K next 1200K minextents 2);
 CREATE ROLLBACK SEGMENT t12
   TABLESPACE roll
   STORAGE (initial 1200K next 1200K minextents 2);
 CREATE ROLLBACK SEGMENT t13
   TABLESPACE roll
   STORAGE (initial 1200K next 1200K minextents 2);
 CREATE ROLLBACK SEGMENT t14
   TABLESPACE roll
   STORAGE (initial 1200K next 1200K minextents 2);
 CREATE ROLLBACK SEGMENT t15
   TABLESPACE roll
   STORAGE (initial 1200K next 1200K minextents 2);
 CREATE ROLLBACK SEGMENT t16
   TABLESPACE roll
   STORAGE (initial 1200K next 1200K minextents 2);
 CREATE ROLLBACK SEGMENT t17
   TABLESPACE roll
   STORAGE (initial 1200K next 1200K minextents 2);
 CREATE ROLLBACK SEGMENT t18
   TABLESPACE roll
   STORAGE (initial 1200K next 1200K minextents 2);
 CREATE ROLLBACK SEGMENT t19
   TABLESPACE roll
   STORAGE (initial 1200K next 1200K minextents 2);
 CREATE ROLLBACK SEGMENT t20
   TABLESPACE roll
   STORAGE (initial 1200K next 1200K minextents 2);
 CREATE ROLLBACK SEGMENT t21
   TABLESPACE roll
   STORAGE (initial 1200K next 1200K minextents 2);
 CREATE ROLLBACK SEGMENT t22
   TABLESPACE roll
   STORAGE (initial 1200K next 1200K minextents 2);
 CREATE ROLLBACK SEGMENT t23
   TABLESPACE roll
   STORAGE (initial 1200K next 1200K minextents 2);
 CREATE ROLLBACK SEGMENT t24
   TABLESPACE roll
   STORAGE (initial 1200K next 1200K minextents 2);
 CREATE ROLLBACK SEGMENT t25
   TABLESPACE roll
   STORAGE (initial 1200K next 1200K minextents 2);
 CREATE ROLLBACK SEGMENT t26
   TABLESPACE roll
   STORAGE (initial 1200K next 1200K minextents 2);
 CREATE ROLLBACK SEGMENT t27
   TABLESPACE roll
   STORAGE (initial 1200K next 1200K minextents 2);
 CREATE ROLLBACK SEGMENT t28
   TABLESPACE roll
   STORAGE (initial 1200K next 1200K minextents 2);
 CREATE ROLLBACK SEGMENT t29
   TABLESPACE roll
   STORAGE (initial 1200K next 1200K minextents 2);
 CREATE ROLLBACK SEGMENT t30
   TABLESPACE roll
   STORAGE (initial 1200K next 1200K minextents 2);
 CREATE ROLLBACK SEGMENT t31
   TABLESPACE roll
   STORAGE (initial 1200K next 1200K minextents 2);
 CREATE ROLLBACK SEGMENT t32
   TABLESPACE roll
   STORAGE (initial 1200K next 1200K minextents 2);
 CREATE ROLLBACK SEGMENT t33
   TABLESPACE roll
   STORAGE (initial 1200K next 1200K minextents 2);
 CREATE ROLLBACK SEGMENT t34
   TABLESPACE roll
   STORAGE (initial 1200K next 1200K minextents 2);
 CREATE ROLLBACK SEGMENT t35
   TABLESPACE roll
   STORAGE (initial 1200K next 1200K minextents 2);
 CREATE ROLLBACK SEGMENT t36
   TABLESPACE roll
   STORAGE (initial 1200K next 1200K minextents 2);
 CREATE ROLLBACK SEGMENT t37
   TABLESPACE roll
   STORAGE (initial 1200K next 1200K minextents 2);
 CREATE ROLLBACK SEGMENT t38
   TABLESPACE roll
   STORAGE (initial 1200K next 1200K minextents 2);
 CREATE ROLLBACK SEGMENT t39
   TABLESPACE roll
   STORAGE (initial 1200K next 1200K minextents 2);
 CREATE ROLLBACK SEGMENT t40
   TABLESPACE roll
   STORAGE (initial 1200K next 1200K minextents 2);
 CREATE ROLLBACK SEGMENT t41
   TABLESPACE roll
   STORAGE (initial 1200K next 1200K minextents 2);
 CREATE ROLLBACK SEGMENT t42
   TABLESPACE roll
   STORAGE (initial 1200K next 1200K minextents 2);
 CREATE ROLLBACK SEGMENT t43
   TABLESPACE roll
   STORAGE (initial 1200K next 1200K minextents 2);
 CREATE ROLLBACK SEGMENT t44
   TABLESPACE roll
   STORAGE (initial 1200K next 1200K minextents 2);
 CREATE ROLLBACK SEGMENT t45
   TABLESPACE roll
   STORAGE (initial 1200K next 1200K minextents 2);
 CREATE ROLLBACK SEGMENT t46
   TABLESPACE roll
   STORAGE (initial 1200K next 1200K minextents 2);
 CREATE ROLLBACK SEGMENT t47
   TABLESPACE roll
   STORAGE (initial 1200K next 1200K minextents 2);
 CREATE ROLLBACK SEGMENT t48
   TABLESPACE roll
   STORAGE (initial 1200K next 1200K minextents 2);
 CREATE ROLLBACK SEGMENT t49
   TABLESPACE roll
   STORAGE (initial 1200K next 1200K minextents 2);
 CREATE ROLLBACK SEGMENT t50
   TABLESPACE roll
   STORAGE (initial 1200K next 1200K minextents 2);
 CREATE ROLLBACK SEGMENT t51
   TABLESPACE roll
   STORAGE (initial 1200K next 1200K minextents 2);
 CREATE ROLLBACK SEGMENT t52
   TABLESPACE roll
   STORAGE (initial 1200K next 1200K minextents 2);
 CREATE ROLLBACK SEGMENT t53
   TABLESPACE roll
   STORAGE (initial 1200K next 1200K minextents 2);
 CREATE ROLLBACK SEGMENT t54
   TABLESPACE roll
   STORAGE (initial 1200K next 1200K minextents 2);
 CREATE ROLLBACK SEGMENT t55
   TABLESPACE roll
   STORAGE (initial 1200K next 1200K minextents 2);
 CREATE ROLLBACK SEGMENT t56
   TABLESPACE roll
   STORAGE (initial 1200K next 1200K minextents 2);
```

```
CREATE ROLLBACK SEGMENT t57
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t58
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t59
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t60
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t61
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t62
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t63
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t64
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t65
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t66
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t67
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t68
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t69
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t70
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t71
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t72
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t73
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t74
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t75
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t76
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t77
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t78
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t79
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t80
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t81
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t82
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t83
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t84
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t85
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t86
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t87
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t88
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t89
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t90
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t91
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t92
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t93
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t94
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t95
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t96
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t97
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t98
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t99
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t100
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t101
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t102
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t103
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t104
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t105
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t106
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t107
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t108
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t109
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t110
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t111
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t112
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t113
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t114
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t115
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t116
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t117
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t118
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t119
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t120
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t121
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t122
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
```

```
CREATE ROLLBACK SEGMENT t123
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t124
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t125
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t126
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t127
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t128
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t129
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t130
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t131
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t132
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t133
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t134
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t135
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t136
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t137
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t138
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t139
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t140
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t141
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t142
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t143
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t144
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t145
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t146
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t147
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t148
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t149
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t150
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t151
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t152
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t153
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t154
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t155
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t156
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t157
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t158
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t159
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t160
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t161
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t162
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t163
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t164
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t165
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t166
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t167
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t168
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t169
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t170
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t171
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t172
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t173
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t174
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t175
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t176
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t177
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t178
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t179
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t180
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t181
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t182
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t183
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t184
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t185
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t186
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t187
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t188
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
```

```
CREATE ROLLBACK SEGMENT t189
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t190
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t191
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t192
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t193
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t194
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t195
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t196
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t197
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t198
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t199
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t200
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t201
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t202
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t203
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t204
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t205
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t206
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t207
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t208
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t209
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t210
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t211
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t212
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t213
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t214
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t215
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t216
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t217
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t218
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t219
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t220
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t221
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t222
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t223
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t224
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t225
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t226
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t227
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t228
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t229
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t230
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t231
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t232
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t233
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t234
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t235
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t236
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t237
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t238
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t239
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t240
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t241
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t242
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t243
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t244
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t245
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t246
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t247
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t248
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t249
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t250
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t251
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t252
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t253
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t254
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
```

```
CREATE ROLLBACK SEGMENT t255
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t256
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t257
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t258
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t259
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t260
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t261
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t262
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t263
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t264
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t265
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t266
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t267
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t268
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t269
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t270
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t271
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t272
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t273
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t274
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t275
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t276
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t277
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t278
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t279
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t280
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t281
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t282
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t283
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t284
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t285
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t286
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t287
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t288
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t289
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t290
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t291
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t292
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t293
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t294
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t295
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t296
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t297
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t298
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t299
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t300
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t301
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t302
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t303
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t304
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t305
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t306
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t307
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t308
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t309
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t310
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t311
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t312
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t313
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t314
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t315
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t316
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t317
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t318
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t319
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t320
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
```

```
CREATE ROLLBACK SEGMENT t321
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t322
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t323
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t324
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t325
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t326
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t327
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t328
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t329
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t330
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t331
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t332
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t333
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t334
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t335
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t336
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t337
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t338
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t339
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t340
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t341
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t342
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t343
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t344
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t345
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t346
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t347
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t348
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t349
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t350
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t351
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t352
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t353
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t354
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t355
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t356
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t357
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t358
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t359
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t360
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t361
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t362
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t363
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t364
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t365
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t366
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t367
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t368
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t369
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t370
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t371
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t372
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t373
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t374
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t375
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t376
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t377
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t378
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t379
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t380
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t381
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t382
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t383
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t384
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t385
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t386
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
```

```
CREATE ROLLBACK SEGMENT t387
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t388
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t389
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t390
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t391
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t392
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t393
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t394
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t395
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t396
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t397
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t398
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t399
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t400
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t401
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t402
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t403
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t404
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t405
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t406
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t407
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t408
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t409
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t410
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t411
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t412
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t413
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t414
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t415
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t416
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t417
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t418
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t419
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t420
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t421
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t422
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t423
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t424
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t425
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t426
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t427
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t428
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t429
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t430
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t431
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t432
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t433
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t434
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t435
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t436
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t437
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t438
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t439
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t440
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t441
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t442
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t443
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t444
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t445
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t446
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t447
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t448
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t449
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t450
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t451
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t452
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
```

```
CREATE ROLLBACK SEGMENT t453
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t454
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t455
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t456
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t457
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t458
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t459
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t460
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t461
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t462
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t463
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t464
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t465
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t466
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t467
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t468
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t469
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t470
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t471
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t472
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t473
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t474
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t475
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t476
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t477
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t478
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t479
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t480
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t481
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t482
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t483
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t484
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t485
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t486
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t487
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t488
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t489
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t490
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t491
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t492
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t493
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t494
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t495
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t496
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t497
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t498
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t499
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t500
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t501
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t502
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t503
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t504
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t505
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t506
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t507
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t508
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t509
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t510
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t511
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t512
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t513
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t514
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t515
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t516
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t517
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t518
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
```

```
CREATE ROLLBACK SEGMENT t519
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t520
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t521
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t522
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t523
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t524
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t525
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t526
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t527
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t528
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t529
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t530
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t531
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t532
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t533
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t534
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t535
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t536
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t537
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t538
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t539
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t540
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t541
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t542
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t543
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t544
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t545
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t546
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t547
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t548
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t549
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t550
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t551
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t552
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t553
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t554
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t555
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t556
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t557
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t558
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t559
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t560
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t561
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t562
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t563
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t564
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t565
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t566
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t567
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t568
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t569
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t570
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t571
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t572
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t573
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t574
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t575
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t576
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t577
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t578
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t579
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t580
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t581
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t582
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t583
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t584
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
```

```
CREATE ROLLBACK SEGMENT t585
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t586
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t587
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t588
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t589
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t590
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t591
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t592
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t593
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t594
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t595
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t596
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t597
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t598
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t599
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t600
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t601
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t602
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t603
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t604
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t605
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t606
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t607
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t608
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t609
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t610
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t611
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t612
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t613
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t614
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t615
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t616
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t617
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t618
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t619
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t620
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t621
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t622
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t623
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t624
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t625
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t626
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t627
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t628
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t629
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t630
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t631
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t632
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t633
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t634
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t635
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t636
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t637
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t638
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t639
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t640
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t641
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t642
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t643
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t644
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t645
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t646
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t647
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t648
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t649
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t650
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
```

```
CREATE ROLLBACK SEGMENT t651
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t652
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t653
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t654
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t655
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t656
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t657
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t658
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t659
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t660
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t661
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t662
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t663
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t664
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t665
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t666
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t667
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t668
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t669
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t670
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t671
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t672
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t673
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t674
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t675
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t676
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t677
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t678
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t679
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t680
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t681
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t682
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t683
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t684
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t685
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t686
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t687
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t688
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t689
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t690
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t691
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t692
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t693
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t694
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t695
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t696
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t697
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t698
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t699
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t700
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t701
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t702
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t703
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t704
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t705
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t706
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t707
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t708
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t709
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t710
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t711
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t712
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t713
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t714
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t715
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t716
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
```

```
CREATE ROLLBACK SEGMENT t717
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t718
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t719
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t720
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t721
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t722
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t723
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t724
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t725
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t726
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t727
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t728
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t729
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t730
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t731
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t732
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t733
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t734
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t735
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t736
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t737
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t738
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t739
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t740
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t741
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t742
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t743
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t744
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t745
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t746
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t747
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t748
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t749
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t750
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t751
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t752
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t753
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t754
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t755
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t756
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t757
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t758
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t759
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t760
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t761
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t762
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t763
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t764
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t765
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t766
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t767
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t768
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t769
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t770
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t771
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t772
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t773
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t774
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t775
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t776
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t777
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t778
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t779
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t780
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t781
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t782
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
```

```
CREATE ROLLBACK SEGMENT t783
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t784
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t785
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t786
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t787
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t788
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t789
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t790
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t791
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t792
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t793
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t794
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t795
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t796
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t797
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t798
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t799
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t800
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t801
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t802
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t803
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t804
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t805
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t806
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t807
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t808
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t809
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t810
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t811
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t812
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t813
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t814
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t815
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t816
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t817
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t818
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t819
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t820
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t821
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t822
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t823
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t824
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t825
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t826
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t827
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t828
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t829
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t830
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t831
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t832
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t833
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t834
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t835
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t836
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t837
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t838
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t839
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t840
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t841
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t842
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t843
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t844
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t845
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t846
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t847
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t848
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
```

```
CREATE ROLLBACK SEGMENT t849
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t850
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t851
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t852
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t853
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t854
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t855
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t856
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t857
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t858
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t859
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t860
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t861
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t862
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t863
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t864
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t865
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t866
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t867
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t868
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t869
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t870
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t871
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t872
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t873
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t874
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t875
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t876
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t877
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t878
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t879
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t880
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t881
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t882
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t883
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t884
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t885
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t886
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t887
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t888
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t889
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t890
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t891
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t892
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t893
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t894
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t895
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t896
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t897
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t898
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t899
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t900
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t901
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t902
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t903
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t904
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t905
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t906
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t907
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t908
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t909
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t910
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t911
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t912
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t913
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t914
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
```

```
CREATE ROLLBACK SEGMENT t915
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t916
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t917
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t918
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t919
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t920
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t921
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t922
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t923
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t924
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t925
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t926
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t927
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t928
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t929
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t930
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t931
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t932
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t933
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t934
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t935
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t936
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t937
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t938
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t939
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t940
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t941
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t942
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t943
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t944
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t945
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t946
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t947
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t948
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t949
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t950
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t951
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t952
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t953
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t954
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t955
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t956
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t957
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t958
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t959
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t960
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t961
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t962
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t963
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t964
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t965
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t966
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t967
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t968
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t969
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t970
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t971
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t972
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t973
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t974
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t975
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t976
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t977
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t978
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t979
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t980
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
```

```
CREATE ROLLBACK SEGMENT t981
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t982
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t983
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t984
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t985
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t986
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t987
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t988
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t989
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t990
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t991
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t992
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t993
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t994
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t995
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t996
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t997
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t998
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t999
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1000
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1001
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1002
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1003
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1004
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1005
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1006
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1007
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1008
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1009
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1010
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1011
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1012
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1013
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1014
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1015
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1016
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1017
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1018
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1019
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1020
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1021
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1022
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1023
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1024
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1025
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1026
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1027
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1028
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1029
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1030
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1031
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1032
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1033
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1034
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1035
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1036
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1037
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1038
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1039
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1040
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1041
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1042
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1043
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1044
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1045
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1046
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
```

```
CREATE ROLLBACK SEGMENT t1047
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1048
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1049
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1050
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1051
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1052
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1053
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1054
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1055
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1056
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1057
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1058
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1059
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1060
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1061
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1062
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1063
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1064
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1065
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1066
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1067
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1068
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1069
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1070
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1071
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1072
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1073
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1074
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1075
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1076
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1077
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1078
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1079
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1080
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1081
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1082
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1083
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1084
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1085
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1086
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1087
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1088
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1089
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1090
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1091
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1092
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1093
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1094
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1095
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1096
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1097
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1098
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1099
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1100
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1101
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1102
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1103
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1104
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1105
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1106
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1107
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1108
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1109
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1110
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1111
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1112
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
```

```
CREATE ROLLBACK SEGMENT t1113
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1114
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1115
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1116
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1117
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1118
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1119
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1120
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1121
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1122
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1123
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1124
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
CREATE ROLLBACK SEGMENT t1125
  TABLESPACE roll
  STORAGE (initial 1200K next 1200K minextents 2);
host date;

exit;
```

cust.sql

```
rem
rem +-------------------------------------------------------------------+
rem |       Copyright (c) 1996  Oracle Corp, Redwood Shores, CA         |
rem |                 OPEN SYSTEMS PERFORMANCE GROUP                    |
rem |                    All Rights Reserved                            |
rem +-------------------------------------------------------------------+
rem  FILENAME
rem      tpcc_tab2.sql
rem  DESCRIPTION
rem      Create customer table for TPC-C database.
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(5,0),
         c_d_id       number(2,0),
         c_w_id       number(5,0)
      )
                  single                              table
      hashkeys       600000000
      hash is        ((c_id * 200000) + (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(5,0),
      c_d_id         number(2,0),
      c_w_id         number(5,0),
      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;



rem
rem +-------------------------------------------------------------------+
rem |       Copyright (c) 1996  Oracle Corp, Redwood Shores, CA         |
rem |                 OPEN SYSTEMS PERFORMANCE GROUP                    |
rem |                    All Rights Reserved                            |
rem +-------------------------------------------------------------------+
rem  FILENAME
rem      dist.sql
rem  DESCRIPTION
rem      Create customer table for TPC-C database.
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_id          number(5,0),
                              d_id            number(2,0)
                  )
                  single                      table
                  hashkeys       200000
                  hash is                     (d_w_id) * 10 + d_id
                  size                        1536
                  initrans       3
                  pctfree                     0
      tablespace                  ware;

      create table district (
                  d_id           number(2,0),
                  d_w_id         number(5,0),
                  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;
```

hist.sql

```
rem
rem +-------------------------------------------------------------------+
rem |       Copyright (c) 1996  Oracle Corp, Redwood Shores, CA         |
rem |                 OPEN SYSTEMS PERFORMANCE GROUP                    |
rem |                    All Rights Reserved                            |
rem +-------------------------------------------------------------------+
rem  FILENAME
rem      hist.sql
rem  DESCRIPTION
rem      Create customer table for TPC-C database.
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 19  minextents 40
                                        buffer_pool recycle );

rem
rem done
rem

      exit;
```

icust.sql

```
rem
rem ================================================================+
rem       Copyright (c) 1996  Oracle Corp, Redwood Shores, CA      |
rem                  OPEN SYSTEMS PERFORMANCE GROUP                |
rem                      All Rights Reserved                       |
rem ================================================================+
rem  FILENAME
rem       icust2.sql
rem  DESCRIPTION
rem       Create customer index 2 for TPC-C database.
rem ================================================================
rem

rem
rem DROP all first
rem
                  alter table customer enable table lock;
      drop index icustomer2;

set timing on

rem
rem ICUST2 index
rem

     create unique index icustomer2 on customer(c_last, c_d_id, c_w_id, c_first)
      tablespace icust2
      initrans 3
                  parallel 18
      pctfree  1
      storage  (freelist groups 43 freelists 19);

rem
rem done
rem

      exit;
```

icust2.sql

```
rem
rem ================================================================+
rem       Copyright (c) 1996  Oracle Corp, Redwood Shores, CA      |
rem                  OPEN SYSTEMS PERFORMANCE GROUP                |
rem                      All Rights Reserved                       |
rem ================================================================+
rem  FILENAME
rem       icust2.sql
rem  DESCRIPTION
rem       Create customer index 2 for TPC-C database.
rem ================================================================
rem

rem
rem DROP all first
rem
                  alter table customer enable table lock;
      drop index icustomer2;

set timing on

rem
rem ICUST2 index
rem

     create unique index icustomer2 on customer(c_last, c_d_id, c_w_id, c_first)
      tablespace icust2
      initrans 3
                  parallel 18
      pctfree  1
      storage  (freelist groups 43 freelists 19);

rem
rem done
rem

      exit;
```

idist.sql

```
rem
rem ================================================================+
rem       Copyright (c) 1996  Oracle Corp, Redwood Shores, CA      |
rem                  OPEN SYSTEMS PERFORMANCE GROUP                |
rem                      All Rights Reserved                       |
rem ================================================================+
rem  FILENAME
rem       dist.sql
rem  DESCRIPTION
rem       Create customer table for TPC-C database.
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 2
      pctfree  5
      storage  (freelist groups 43 freelists 19);

rem
rem done
rem

      exit;
```

iitem.sql

```
rem
rem ================================================================+
rem       Copyright (c) 1996  Oracle Corp, Redwood Shores, CA      |
rem                  OPEN SYSTEMS PERFORMANCE GROUP                |
rem                      All Rights Reserved                       |
rem ================================================================+
rem  FILENAME
rem       item.sql
rem  DESCRIPTION
rem       Create customer table for TPC-C database.
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  (freelist groups 43 freelists 19
                buffer_pool keep);

rem
rem done
rem

      exit;
```

iord2.sql

```
rem
rem +--------------------------------------------------------------------+
rem |        Copyright (c) 1996  Oracle Corp, Redwood Shores, CA         |
rem |                  OPEN SYSTEMS PERFORMANCE GROUP                    |
rem |                       All Rights Reserved                          |
rem +--------------------------------------------------------------------+
rem  FILENAME
rem       iordr2.sql
rem  DESCRIPTION
rem       Create orders index 2 for TPC-C database.
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 32
       pctfree  25
       storage  (freelist groups 43 freelists 19 minextents 304);

rem
rem done
rem

       exit;
```

iordr.sql

```
rem
rem +--------------------------------------------------------------------+
rem |        Copyright (c) 1996  Oracle Corp, Redwood Shores, CA         |
rem |                  OPEN SYSTEMS PERFORMANCE GROUP                    |
rem |                       All Rights Reserved                          |
rem +--------------------------------------------------------------------+
rem  FILENAME
rem       iordr.sql
rem  DESCRIPTION
rem       Create orders index for TPC-C database.
rem ====================================================================
rem


rem
rem DROP all first
rem

set timing on
                  alter table orders enable table lock;
       drop index iorders;
rem
rem ORDERS index
rem

      create unique index iorders on orders(o_w_id, o_d_id, o_id)
       tablespace iord1
       initrans 3
                  parallel 32
       pctfree  1
       storage  (freelist groups 43 freelists 19 );

alter table orders disable table lock;
rem
rem done
rem

       exit;
```

iordr2.sql

```
rem
rem +--------------------------------------------------------------------+
rem |        Copyright (c) 1996  Oracle Corp, Redwood Shores, CA         |
rem |                  OPEN SYSTEMS PERFORMANCE GROUP                    |
rem |                       All Rights Reserved                          |
rem +--------------------------------------------------------------------+
rem  FILENAME
rem       iordr2.sql
rem  DESCRIPTION
rem       Create orders index 2 for TPC-C database.
rem ====================================================================
rem


rem
rem DROP all first
rem
                  alter table orders enable table lock;
       drop index iorders2;

set timing on

rem
rem ORDERS index 2
rem
rem    storage (initial 1015M next 1015M pctincrease 0
rem                              maxextents unlimited freelist groups 43 freelists 19)
rem    create unique index iorders2 on orders(o_w_id, o_d_id, o_c_id, o_id)

      create unique index iorders2 on orders(o_c_id, o_d_id, o_w_id, o_id)
       tablespace iord2
       initrans 4
                  parallel 25
       pctfree  25
       storage (freelist groups 43 freelists 19);

                  alter table orders disable table lock;
rem
rem done
rem

       exit;
```

istok.sql

```
rem
rem +--------------------------------------------------------------------+
rem |        Copyright (c) 1996  Oracle Corp, Redwood Shores, CA         |
rem |                  OPEN SYSTEMS PERFORMANCE GROUP                    |
rem |                       All Rights Reserved                          |
rem +--------------------------------------------------------------------+
rem  FILENAME
rem       istok.sql
rem  DESCRIPTION
rem       Create stock index for TPC-C database.
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 43 freelists 19);

rem
rem done
rem

       exit;
```

item.sql

```
rem
rem +--------------------------------------------------------------------+
rem |        Copyright (c) 1996  Oracle Corp, Redwood Shores, CA         |
rem |                  OPEN SYSTEMS PERFORMANCE GROUP                    |
rem |                       All Rights Reserved                          |
rem +--------------------------------------------------------------------+
rem  FILENAME
rem       item.sql
rem  DESCRIPTION
rem       Create ITEM table for TPC-C database.
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)
    )
                single                          table
    hashkeys      100000
    hash is       i_id
    size          120
    initrans      3
    pctfree       0
    tablespace    items
                storage (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;
```

iware.sql

```
rem
rem ================================================================+
rem       Copyright (c) 1996  Oracle Corp, Redwood Shores, CA     |
rem                OPEN SYSTEMS PERFORMANCE GROUP                 |
rem                   All Rights Reserved                         |
rem ================================================================+
rem  FILENAME
rem      iware.sql
rem  DESCRIPTION
rem      Create warehouse index for TPC-C database.
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;

rem
rem done
rem

    exit;
```

newroll.sql

```
alter rollback segment s1 online;
alter rollback segment s2 online;
alter rollback segment s3 online;
alter rollback segment s4 online;
alter rollback segment s5 online;
alter rollback segment s6 online;
alter rollback segment s7 online;
alter rollback segment s8 online;
alter rollback segment s9 online;
alter rollback segment s10 online;
alter rollback segment s11 online;
alter rollback segment s12 online;
alter rollback segment s13 online;
alter rollback segment s14 online;
alter rollback segment s15 online;
alter rollback segment s16 online;
alter rollback segment s17 online;
alter rollback segment s18 online;
alter rollback segment s19 online;
alter rollback segment s20 online;
alter rollback segment s21 online;
alter rollback segment s22 online;
alter rollback segment s23 online;
alter rollback segment s24 online;
alter rollback segment s25 online;
alter rollback segment s26 online;
alter rollback segment s27 online;
alter rollback segment s28 online;
alter rollback segment s29 online;
alter rollback segment s30 online;
exit
drop rollback segment s1;
drop rollback segment s2;
drop rollback segment s3;
drop rollback segment s4;
drop rollback segment s5;
drop rollback segment s6;
drop rollback segment s7;
drop rollback segment s8;
drop rollback segment s9;
drop rollback segment s10;
drop rollback segment s11;
drop rollback segment s12;
drop rollback segment s13;
drop rollback segment s14;
drop rollback segment s15;
drop rollback segment s16;
drop rollback segment s17;
drop rollback segment s18;
drop rollback segment s19;
drop rollback segment s20;
drop rollback segment s21;
drop rollback segment s22;
drop rollback segment s23;
drop rollback segment s24;
drop rollback segment s25;
drop rollback segment s26;
drop rollback segment s27;
drop rollback segment s28;
drop rollback segment s29;
drop rollback segment s30;

   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);

alter rollback segment s1 online;
alter rollback segment s2 online;
alter rollback segment s3 online;
alter rollback segment s4 online;
alter rollback segment s5 online;
alter rollback segment s6 online;
alter rollback segment s7 online;
alter rollback segment s8 online;
alter rollback segment s9 online;
alter rollback segment s10 online;
alter rollback segment s11 online;
alter rollback segment s12 online;
alter rollback segment s13 online;
alter rollback segment s14 online;
alter rollback segment s15 online;
alter rollback segment s16 online;
alter rollback segment s17 online;
alter rollback segment s18 online;
alter rollback segment s19 online;
alter rollback segment s20 online;
alter rollback segment s21 online;
alter rollback segment s22 online;
alter rollback segment s23 online;
alter rollback segment s24 online;
alter rollback segment s25 online;
alter rollback segment s26 online;
alter rollback segment s27 online;
alter rollback segment s28 online;
alter rollback segment s29 online;
```

```
alter rollback segment s30 online;
```

nord.sql

```
rem
rem +-------------------------------------------------------------------+
rem |        Copyright (c) 1996  Oracle Corp, Redwood Shores, CA        |
rem |                  OPEN SYSTEMS PERFORMANCE GROUP                   |
rem |                       All Rights Reserved                         |
rem +-------------------------------------------------------------------+
rem  FILENAME
rem       nord.sql
rem  DESCRIPTION
rem       Create customer table for TPC-C database.
rem ====================================================================
rem

rem
rem DROP all first
rem
rem                 alter table new_order enable table lock;
       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 19 minextents 6 );

rem              alter table new_order disable table lock;

rem
rem done
rem

       exit;
```

ordl.sql

```
rem
rem +-------------------------------------------------------------------+
rem |        Copyright (c) 1996  Oracle Corp, Redwood Shores, CA        |
rem |                  OPEN SYSTEMS PERFORMANCE GROUP                   |
rem |                       All Rights Reserved                         |
rem +-------------------------------------------------------------------+
rem  FILENAME
rem       ordr.sql
rem  DESCRIPTION
rem       Create customer table for TPC-C database.
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 19 minextents 538 );

rem
rem done
rem

       exit;
```

ordr.sql

```
rem
rem +-------------------------------------------------------------------+
rem |        Copyright (c) 1996  Oracle Corp, Redwood Shores, CA        |
rem |                  OPEN SYSTEMS PERFORMANCE GROUP                   |
rem |                       All Rights Reserved                         |
rem +-------------------------------------------------------------------+
rem  FILENAME
rem       ordr.sql
rem  DESCRIPTION
rem       Create customer table for TPC-C database.
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 19 minextents 30 );


rem
rem done
rem

       exit;
```

stok.sql

```
rem
rem +-------------------------------------------------------------------+
rem |        Copyright (c) 1996  Oracle Corp, Redwood Shores, CA        |
rem |                  OPEN SYSTEMS PERFORMANCE GROUP                   |
rem |                       All Rights Reserved                         |
rem +-------------------------------------------------------------------+
rem  FILENAME
rem       tpcc_tab3.sql
rem  DESCRIPTION
rem       Create stock table for TPC-C database.
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(6,0),
          s_w_id       number(5,0)
       )
                 single                          table
       hashkeys       2000000000
       hash is        (s_i_id * 20000 + s_w_id)
       size           350
       initrans       3
       pctfree        0
       tablespace     stocks
                 storage (freelist groups 43 freelists 19 buffer_pool keep);

       create table stock (
       s_i_id          number(6,0),
       s_w_id          number(5,0),
       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;
```

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;
analyze table new_order estimate statistics;
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;
```

ware.sql

```
rem
rem ============================================================+
rem       Copyright (c) 1996  Oracle Corp, Redwood Shores, CA     |
rem                OPEN SYSTEMS PERFORMANCE GROUP                 |
rem                   All Rights Reserved                         |
rem ============================================================+
rem  FILENAME
rem      ware.sql
rem  DESCRIPTION
rem      Create customer table for TPC-C database.
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_id                    number (5,0)
            )
                    single                          table
                    hashkeys                20000
                    hash is                         w_id
                    size                            1536
                    initrans                3
                    pctfree                         0
    tablespace              ware;

    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
```

temp.sql

```
create temporary tablespace temp tempfile '/dev/rlvalltemp0' size 319M  reuse,
extent management local uniform size 10M
/
```

C.3 Data Generation Code

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];
float 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];
float 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];
float 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];
#define FIRSTNAME_WITH_CLAST
#ifdef FIRSTNAME_WITH_CLAST
  char firstname_with_clast[100];
  sprintf(firstname_with_clast, "C_LAST=%d", CNUM1);
#endif /* FIRSTNAME_WITH_CLAST */


/*---------------------------------------------------------------+
 | 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_FLT, -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_FLT, -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_FLT, -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 %6.4f %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 %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 %6.4f 3001 %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);
#ifdef FIRSTNAME_WITH_CLAST
          if ((c_id[i] == 1) && (c_d_id[i] == 1) && (c_w_id[i] == 1 ))
             strcpy(c_first[i], firstname_with_clast);
          else
#endif

          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 %cC 5000000 %6.4f -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 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 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);

}
```

C4. 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                          integer 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)
)
```

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)
)
```

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 = FALSE)

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
)
```

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
)
```

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)

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)
)
```

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)
)
```

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)
)
```

Appendix D: RTE Scripts

D.1 RTE Parameters

```
/* For Oracle in the tpccload program C_LAST =1. C-Delta be the difference */
/*between C-LOAD and C-Run. C-Delta must be a value between 65..119 including the */
/* values of 65 and 119 and excluding the value of 96 and 112 */
#define MASTER_NUM1 1
#define MASTER_NUM2 0
#define MASTER_NUM3 0
#define MASTER_NUM4 0

#if MASTER_NUM1
MASTER "master1"
#elif MASTER_NUM2
MASTER "master2"
#elif MASTER_NUM3
MASTER "master3"
#elif MASTER_NUM4
MASTER "master4"
#endif
/*---- SUT ----------------------------------------------------------------------*/
SUT="condor"
/*-------------------------------------------------------------------------------*/

LASTC=86
MEASUREMENT="1"

WAREHOUSES=17500

/*---- SLAVES -------------------------------------------------------------------*/
#if MASTER_NUM1
SLAVES
driver1a,driver1b,driver2a,driver2b,driver3a,driver3b,driver4a,driver4b,driver5a,driver5b,driver6a,driver6b,d
river7a,driver7b,driver8a,driver8b,driver9a,driver9b,driver10a,driver10b,driver11a,driver11b,driver12a,drive
r12b,driver13a,driver13b,driver14a,driver14b,driver15a,driver15b
#elif MASTER_NUM2
SLAVES
driver16a,driver16b,driver17a,driver17b,driver18a,driver18b,driver19a,driver19b,driver20a,driver20b,driver
21a,driver21b,driver22a,driver22b,driver23a,driver23b,driver24a,driver24b,driver25a,driver25b,driver26a,dri
ver26b,driver27a,driver27b,driver28a,driver28b,driver29a,driver29b,driver30a,driver30b
#elif MASTER_NUM3
SLAVES
driver31a,driver31b,driver32a,driver32b,driver33a,driver33b,driver34a,driver34b,driver35a,driver35b,driver
36a,driver36b,driver37a,driver37b,driver38a,driver38b,driver39a,driver39b,driver40a,driver40b,driver41a,dri
ver41b,driver42a,driver42b,driver43a,driver43b,driver44a,driver44b,driver45a,driver45b
#elif MASTER_NUM4
SLAVES
driver46a,driver46b,driver47a,driver47b,driver48a,driver48b,driver49a,driver49b,driver50a,driver50b,driver
51a,driver51b,driver52a,driver52b,driver53a,driver53b,driver54a,driver54b,driver55a,driver55b
#endif
/*-------------------------------------------------------------------------------*/

/*---- CLIENTS ------------------------------------------------------------------*/
#if MASTER_NUM1
MAIN_CLIENT  = client1
CLIENT_REAL  = "client1 client2 client3"
#elif MASTER_NUM2
MAIN_CLIENT  = client4
CLIENT_REAL  = "client4 client5 client6"
#elif MASTER_NUM3
MAIN_CLIENT  = client7
CLIENT_REAL  = "client7 client8 client9"
#elif MASTER_NUM4
MAIN_CLIENT  = client10
CLIENT_REAL  = "client10 client11"
#endif
/*-------------------------------------------------------------------------------*/

/*---- more client stuff --------------------------------------------------------*/
#if MASTER_NUM1
CLIENT client11 oracle orif1db
CLIENT client12 oracle orif1db
CLIENT client13 oracle orif1db
CLIENT client14 oracle orif1db
CLIENT client15 oracle orif1db
CLIENT client16 oracle orif1db
CLIENT client17 oracle orif1db
CLIENT client18 oracle orif1db
CLIENT client19 oracle orif1db
CLIENT client110 oracle orif1db
CLIENT client111 oracle orif1db
CLIENT client112 oracle orif1db
CLIENT client113 oracle orif1db
CLIENT client114 oracle orif1db
CLIENT client115 oracle orif1db
CLIENT client116 oracle orif1db
CLIENT client117 oracle orif1db
CLIENT client118 oracle orif1db

CLIENT client21 oracle orif1db
CLIENT client22 oracle orif1db
CLIENT client23 oracle orif1db
CLIENT client24 oracle orif1db
CLIENT client25 oracle orif1db
CLIENT client26 oracle orif1db
CLIENT client27 oracle orif1db
CLIENT client28 oracle orif1db
CLIENT client29 oracle orif1db
CLIENT client210 oracle orif1db
CLIENT client211 oracle orif1db
CLIENT client212 oracle orif1db
CLIENT client213 oracle orif1db
CLIENT client214 oracle orif1db
CLIENT client215 oracle orif1db
CLIENT client216 oracle orif1db
CLIENT client217 oracle orif1db
CLIENT client218 oracle orif1db

CLIENT client31 oracle orif1db
CLIENT client32 oracle orif1db
CLIENT client33 oracle orif1db
CLIENT client34 oracle orif1db
CLIENT client35 oracle orif1db
CLIENT client36 oracle orif1db
CLIENT client37 oracle orif1db
CLIENT client38 oracle orif1db
CLIENT client39 oracle orif1db
CLIENT client310 oracle orif1db
CLIENT client311 oracle orif1db
CLIENT client312 oracle orif1db
CLIENT client313 oracle orif1db
CLIENT client314 oracle orif1db
CLIENT client315 oracle orif1db
CLIENT client316 oracle orif1db
CLIENT client317 oracle orif1db
CLIENT client318 oracle orif1db
#elif MASTER_NUM2
CLIENT client41 oracle orif1db
CLIENT client42 oracle orif1db
CLIENT client43 oracle orif1db
CLIENT client44 oracle orif1db
CLIENT client45 oracle orif1db
CLIENT client46 oracle orif1db
CLIENT client47 oracle orif1db
CLIENT client48 oracle orif1db
CLIENT client49 oracle orif1db
CLIENT client410 oracle orif1db
CLIENT client411 oracle orif1db
CLIENT client412 oracle orif1db
CLIENT client413 oracle orif1db
CLIENT client414 oracle orif1db
CLIENT client415 oracle orif1db
CLIENT client416 oracle orif1db
CLIENT client417 oracle orif1db
CLIENT client418 oracle orif1db

CLIENT client51 oracle orif1db
CLIENT client52 oracle orif1db
CLIENT client53 oracle orif1db
CLIENT client54 oracle orif1db
CLIENT client55 oracle orif1db
CLIENT client56 oracle orif1db
CLIENT client57 oracle orif1db
CLIENT client58 oracle orif1db
CLIENT client59 oracle orif1db
CLIENT client510 oracle orif1db
CLIENT client511 oracle orif1db
CLIENT client512 oracle orif1db
CLIENT client513 oracle orif1db
CLIENT client514 oracle orif1db
CLIENT client515 oracle orif1db
CLIENT client516 oracle orif1db
CLIENT client517 oracle orif1db
CLIENT client518 oracle orif1db

CLIENT client61 oracle orif1db
CLIENT client62 oracle orif1db
CLIENT client63 oracle orif1db
CLIENT client64 oracle orif1db
CLIENT client65 oracle orif1db
CLIENT client66 oracle orif1db
CLIENT client67 oracle orif1db
CLIENT client68 oracle orif1db
CLIENT client69 oracle orif1db
CLIENT client610 oracle orif1db
CLIENT client611 oracle orif1db
CLIENT client612 oracle orif1db
CLIENT client613 oracle orif1db
CLIENT client614 oracle orif1db
CLIENT client615 oracle orif1db
CLIENT client616 oracle orif1db
CLIENT client617 oracle orif1db
CLIENT client618 oracle orif1db
#elif MASTER_NUM3
CLIENT client71 oracle orif1db
CLIENT client72 oracle orif1db
CLIENT client73 oracle orif1db
CLIENT client74 oracle orif1db
CLIENT client75 oracle orif1db
CLIENT client76 oracle orif1db
```

```
CLIENT client77 oracle orif1db
CLIENT client78 oracle orif1db
CLIENT client79 oracle orif1db
CLIENT client710 oracle orif1db
CLIENT client711 oracle orif1db
CLIENT client712 oracle orif1db
CLIENT client713 oracle orif1db
CLIENT client714 oracle orif1db
CLIENT client715 oracle orif1db
CLIENT client716 oracle orif1db
CLIENT client717 oracle orif1db
CLIENT client718 oracle orif1db

CLIENT client81 oracle orif1db
CLIENT client82 oracle orif1db
CLIENT client83 oracle orif1db
CLIENT client84 oracle orif1db
CLIENT client85 oracle orif1db
CLIENT client86 oracle orif1db
CLIENT client87 oracle orif1db
CLIENT client88 oracle orif1db
CLIENT client89 oracle orif1db
CLIENT client810 oracle orif1db
CLIENT client811 oracle orif1db
CLIENT client812 oracle orif1db
CLIENT client813 oracle orif1db
CLIENT client814 oracle orif1db
CLIENT client815 oracle orif1db
CLIENT client816 oracle orif1db
CLIENT client817 oracle orif1db
CLIENT client818 oracle orif1db

CLIENT client91 oracle orif1db
CLIENT client92 oracle orif1db
CLIENT client93 oracle orif1db
CLIENT client94 oracle orif1db
CLIENT client95 oracle orif1db
CLIENT client96 oracle orif1db
CLIENT client97 oracle orif1db
CLIENT client98 oracle orif1db
CLIENT client99 oracle orif1db
CLIENT client910 oracle orif1db
CLIENT client911 oracle orif1db
CLIENT client912 oracle orif1db
CLIENT client913 oracle orif1db
CLIENT client914 oracle orif1db
CLIENT client915 oracle orif1db
CLIENT client916 oracle orif1db
CLIENT client917 oracle orif1db
CLIENT client918 oracle orif1db
#elif MASTER_NUM4
CLIENT client101 oracle orif1db
CLIENT client102 oracle orif1db
CLIENT client103 oracle orif1db
CLIENT client104 oracle orif1db
CLIENT client105 oracle orif1db
CLIENT client106 oracle orif1db
CLIENT client107 oracle orif1db
CLIENT client108 oracle orif1db
CLIENT client109 oracle orif1db
CLIENT client1010 oracle orif1db
CLIENT client1011 oracle orif1db
CLIENT client1012 oracle orif1db
CLIENT client1013 oracle orif1db
CLIENT client1014 oracle orif1db
CLIENT client1015 oracle orif1db
CLIENT client1016 oracle orif1db
CLIENT client1017 oracle orif1db
CLIENT client1018 oracle orif1db

CLIENT client111 oracle orif1db
CLIENT client112 oracle orif1db
CLIENT client113 oracle orif1db
CLIENT client114 oracle orif1db
CLIENT client115 oracle orif1db
CLIENT client116 oracle orif1db
CLIENT client117 oracle orif1db
CLIENT client118 oracle orif1db
CLIENT client119 oracle orif1db
CLIENT client1110 oracle orif1db
CLIENT client1111 oracle orif1db
CLIENT client1112 oracle orif1db
CLIENT client1113 oracle orif1db
CLIENT client1114 oracle orif1db
CLIENT client1115 oracle orif1db
CLIENT client1116 oracle orif1db
CLIENT client1117 oracle orif1db
CLIENT client1118 oracle orif1db
#endif
/*---------------------------------------------------------------------------*/

TELNET telnet 23
SOCKET socket 199703

/*---- Sockets ------------------------------------------------------------*/
#if MASTER_NUM1
SOCKET_NETWORK socket1 6700 driver1a
SOCKET_NETWORK socket2 6701 driver1b
SOCKET_NETWORK socket3 6702 driver1a
SOCKET_NETWORK socket4 6703 driver1b
SOCKET_NETWORK socket5 6704 driver1a
SOCKET_NETWORK socket6 6705 driver1b
SOCKET_NETWORK socket7 6706 driver1a
SOCKET_NETWORK socket8 6707 driver1b
SOCKET_NETWORK socket9 6708 driver1a
SOCKET_NETWORK socket10 6709 driver1b
SOCKET_NETWORK socket11 6710 driver1a
SOCKET_NETWORK socket12 6711 driver1b
SOCKET_NETWORK socket13 6712 driver1a
SOCKET_NETWORK socket14 6713 driver1b
SOCKET_NETWORK socket15 6714 driver1a
SOCKET_NETWORK socket16 6715 driver1b

SOCKET_NETWORK socket17 6716 driver2a
SOCKET_NETWORK socket18 6717 driver2b
SOCKET_NETWORK socket19 6718 driver2a
SOCKET_NETWORK socket20 6719 driver2b

SOCKET_NETWORK socket21 6720 driver2a
SOCKET_NETWORK socket22 6721 driver2b
SOCKET_NETWORK socket23 6722 driver2a
SOCKET_NETWORK socket24 6723 driver2b
SOCKET_NETWORK socket25 6724 driver2a
SOCKET_NETWORK socket26 6725 driver2b
SOCKET_NETWORK socket27 6726 driver2a
SOCKET_NETWORK socket28 6727 driver2b

SOCKET_NETWORK socket29 6728 driver3a
SOCKET_NETWORK socket30 6729 driver3b
SOCKET_NETWORK socket31 6730 driver3a
SOCKET_NETWORK socket32 6731 driver3b
SOCKET_NETWORK socket33 6732 driver3a
SOCKET_NETWORK socket34 6733 driver3b
SOCKET_NETWORK socket35 6734 driver3a
SOCKET_NETWORK socket36 6735 driver3b
SOCKET_NETWORK socket37 6736 driver3a
SOCKET_NETWORK socket38 6737 driver3b
SOCKET_NETWORK socket39 6738 driver3a
SOCKET_NETWORK socket40 6739 driver3b
SOCKET_NETWORK socket41 6740 driver3a
SOCKET_NETWORK socket42 6741 driver3b
SOCKET_NETWORK socket43 6742 driver3a
SOCKET_NETWORK socket44 6743 driver3b

SOCKET_NETWORK socket45 6744 driver4a
SOCKET_NETWORK socket46 6745 driver4b
SOCKET_NETWORK socket47 6746 driver4a
SOCKET_NETWORK socket48 6747 driver4b
SOCKET_NETWORK socket49 6748 driver4a
SOCKET_NETWORK socket50 6749 driver4b
SOCKET_NETWORK socket51 6750 driver4a
SOCKET_NETWORK socket52 6751 driver4b
SOCKET_NETWORK socket53 6752 driver4a
SOCKET_NETWORK socket54 6753 driver4b
SOCKET_NETWORK socket55 6754 driver4a
SOCKET_NETWORK socket56 6755 driver4b

SOCKET_NETWORK socket57 6756 driver5a
SOCKET_NETWORK socket58 6757 driver5b
SOCKET_NETWORK socket59 6758 driver5a
SOCKET_NETWORK socket60 6759 driver5b
SOCKET_NETWORK socket61 6760 driver5a
SOCKET_NETWORK socket62 6761 driver5b
SOCKET_NETWORK socket63 6762 driver5a
SOCKET_NETWORK socket64 6763 driver5b
SOCKET_NETWORK socket65 6764 driver5a
SOCKET_NETWORK socket66 6765 driver5b
SOCKET_NETWORK socket67 6766 driver5a
SOCKET_NETWORK socket68 6767 driver5b
SOCKET_NETWORK socket69 6768 driver5a
SOCKET_NETWORK socket70 6769 driver5b
SOCKET_NETWORK socket71 6770 driver5a
SOCKET_NETWORK socket72 6771 driver5b

SOCKET_NETWORK socket73 6700 driver6a
SOCKET_NETWORK socket74 6701 driver6b
SOCKET_NETWORK socket75 6702 driver6a
SOCKET_NETWORK socket76 6703 driver6b
SOCKET_NETWORK socket77 6704 driver6a
SOCKET_NETWORK socket78 6705 driver6b
SOCKET_NETWORK socket79 6706 driver6a
SOCKET_NETWORK socket80 6707 driver6b
SOCKET_NETWORK socket81 6708 driver6a
SOCKET_NETWORK socket82 6709 driver6b
SOCKET_NETWORK socket83 6710 driver6a
SOCKET_NETWORK socket84 6711 driver6b
SOCKET_NETWORK socket85 6712 driver6a
SOCKET_NETWORK socket86 6713 driver6b
SOCKET_NETWORK socket87 6714 driver6a
SOCKET_NETWORK socket88 6715 driver6b

SOCKET_NETWORK socket89 6716 driver7a
SOCKET_NETWORK socket90 6717 driver7b
SOCKET_NETWORK socket91 6718 driver7a
SOCKET_NETWORK socket92 6719 driver7b
SOCKET_NETWORK socket93 6720 driver7a
SOCKET_NETWORK socket94 6721 driver7b
SOCKET_NETWORK socket95 6722 driver7a
```

```
SOCKET_NETWORK socket96 6723 driver7b
SOCKET_NETWORK socket97 6724 driver7a
SOCKET_NETWORK socket98 6725 driver7b
SOCKET_NETWORK socket99 6726 driver7a
SOCKET_NETWORK socket100 6727 driver7b

SOCKET_NETWORK socket101 6728 driver8a
SOCKET_NETWORK socket102 6729 driver8b
SOCKET_NETWORK socket103 6730 driver8a
SOCKET_NETWORK socket104 6731 driver8b
SOCKET_NETWORK socket105 6732 driver8a
SOCKET_NETWORK socket106 6733 driver8b
SOCKET_NETWORK socket107 6734 driver8a
SOCKET_NETWORK socket108 6735 driver8b
SOCKET_NETWORK socket109 6736 driver8a
SOCKET_NETWORK socket110 6737 driver8b
SOCKET_NETWORK socket111 6738 driver8a
SOCKET_NETWORK socket112 6739 driver8b
SOCKET_NETWORK socket113 6740 driver8a
SOCKET_NETWORK socket114 6741 driver8b
SOCKET_NETWORK socket115 6742 driver8a
SOCKET_NETWORK socket116 6743 driver8b

SOCKET_NETWORK socket117 6744 driver9a
SOCKET_NETWORK socket118 6745 driver9b
SOCKET_NETWORK socket119 6746 driver9a
SOCKET_NETWORK socket120 6747 driver9b
SOCKET_NETWORK socket121 6748 driver9a
SOCKET_NETWORK socket122 6749 driver9b
SOCKET_NETWORK socket123 6750 driver9a
SOCKET_NETWORK socket124 6751 driver9b
SOCKET_NETWORK socket125 6752 driver9a
SOCKET_NETWORK socket126 6753 driver9b
SOCKET_NETWORK socket127 6754 driver9a
SOCKET_NETWORK socket128 6755 driver9b

SOCKET_NETWORK socket129 6756 driver10a
SOCKET_NETWORK socket130 6757 driver10b
SOCKET_NETWORK socket131 6758 driver10a
SOCKET_NETWORK socket132 6759 driver10b
SOCKET_NETWORK socket133 6760 driver10a
SOCKET_NETWORK socket134 6761 driver10b
SOCKET_NETWORK socket135 6762 driver10a
SOCKET_NETWORK socket136 6763 driver10b
SOCKET_NETWORK socket137 6764 driver10a
SOCKET_NETWORK socket138 6765 driver10b
SOCKET_NETWORK socket139 6766 driver10a
SOCKET_NETWORK socket140 6767 driver10b
SOCKET_NETWORK socket141 6768 driver10a
SOCKET_NETWORK socket142 6769 driver10b
SOCKET_NETWORK socket143 6770 driver10a
SOCKET_NETWORK socket144 6771 driver10b

SOCKET_NETWORK socket145 6700 driver11a
SOCKET_NETWORK socket146 6701 driver11b
SOCKET_NETWORK socket147 6702 driver11a
SOCKET_NETWORK socket148 6703 driver11b
SOCKET_NETWORK socket149 6704 driver11a
SOCKET_NETWORK socket150 6705 driver11b
SOCKET_NETWORK socket151 6706 driver11a
SOCKET_NETWORK socket152 6707 driver11b
SOCKET_NETWORK socket153 6708 driver11a
SOCKET_NETWORK socket154 6709 driver11b
SOCKET_NETWORK socket155 6710 driver11a
SOCKET_NETWORK socket156 6711 driver11b
SOCKET_NETWORK socket157 6712 driver11a
SOCKET_NETWORK socket158 6713 driver11b
SOCKET_NETWORK socket159 6714 driver11a
SOCKET_NETWORK socket160 6715 driver11b

SOCKET_NETWORK socket161 6716 driver12a
SOCKET_NETWORK socket162 6717 driver12b
SOCKET_NETWORK socket163 6718 driver12a
SOCKET_NETWORK socket164 6719 driver12b
SOCKET_NETWORK socket165 6720 driver12a
SOCKET_NETWORK socket166 6721 driver12b
SOCKET_NETWORK socket167 6722 driver12a
SOCKET_NETWORK socket168 6723 driver12b
SOCKET_NETWORK socket169 6724 driver12a
SOCKET_NETWORK socket170 6725 driver12b
SOCKET_NETWORK socket171 6726 driver12a
SOCKET_NETWORK socket172 6727 driver12b

SOCKET_NETWORK socket173 6728 driver13a
SOCKET_NETWORK socket174 6729 driver13b
SOCKET_NETWORK socket175 6730 driver13a
SOCKET_NETWORK socket176 6731 driver13b
SOCKET_NETWORK socket177 6732 driver13a
SOCKET_NETWORK socket178 6733 driver13b
SOCKET_NETWORK socket179 6734 driver13a
SOCKET_NETWORK socket180 6735 driver13b
SOCKET_NETWORK socket181 6736 driver13a
SOCKET_NETWORK socket182 6737 driver13b
SOCKET_NETWORK socket183 6738 driver13a
SOCKET_NETWORK socket184 6739 driver13b
SOCKET_NETWORK socket185 6740 driver13a
SOCKET_NETWORK socket186 6741 driver13b
SOCKET_NETWORK socket187 6742 driver13a
SOCKET_NETWORK socket188 6743 driver13b
SOCKET_NETWORK socket189 6744 driver14a
SOCKET_NETWORK socket190 6745 driver14b
SOCKET_NETWORK socket191 6746 driver14a
SOCKET_NETWORK socket192 6747 driver14b
SOCKET_NETWORK socket193 6748 driver14a
SOCKET_NETWORK socket194 6749 driver14b
SOCKET_NETWORK socket195 6750 driver14a
SOCKET_NETWORK socket196 6751 driver14b
SOCKET_NETWORK socket197 6752 driver14a
SOCKET_NETWORK socket198 6753 driver14b
SOCKET_NETWORK socket199 6754 driver14a
SOCKET_NETWORK socket200 6755 driver14b

SOCKET_NETWORK socket201 6756 driver15a
SOCKET_NETWORK socket202 6757 driver15b
SOCKET_NETWORK socket203 6758 driver15a
SOCKET_NETWORK socket204 6759 driver15b
SOCKET_NETWORK socket205 6760 driver15a
SOCKET_NETWORK socket206 6761 driver15b
SOCKET_NETWORK socket207 6762 driver15a
SOCKET_NETWORK socket208 6763 driver15b
SOCKET_NETWORK socket209 6764 driver15a
SOCKET_NETWORK socket210 6765 driver15b
SOCKET_NETWORK socket211 6766 driver15a
SOCKET_NETWORK socket212 6767 driver15b
SOCKET_NETWORK socket213 6768 driver15a
SOCKET_NETWORK socket214 6769 driver15b
SOCKET_NETWORK socket215 6770 driver15a
SOCKET_NETWORK socket216 6771 driver15b
#elif MASTER_NUM2
SOCKET_NETWORK socket217 6700 driver16a
SOCKET_NETWORK socket218 6701 driver16b
SOCKET_NETWORK socket219 6702 driver16a
SOCKET_NETWORK socket220 6703 driver16b
SOCKET_NETWORK socket221 6704 driver16a
SOCKET_NETWORK socket222 6705 driver16b
SOCKET_NETWORK socket223 6706 driver16a
SOCKET_NETWORK socket224 6707 driver16b
SOCKET_NETWORK socket225 6708 driver16a
SOCKET_NETWORK socket226 6709 driver16b
SOCKET_NETWORK socket227 6710 driver16a
SOCKET_NETWORK socket228 6711 driver16b
SOCKET_NETWORK socket229 6712 driver16a
SOCKET_NETWORK socket230 6713 driver16b
SOCKET_NETWORK socket231 6714 driver16a
SOCKET_NETWORK socket232 6715 driver16b

SOCKET_NETWORK socket233 6716 driver17a
SOCKET_NETWORK socket234 6717 driver17b
SOCKET_NETWORK socket235 6718 driver17a
SOCKET_NETWORK socket236 6719 driver17b
SOCKET_NETWORK socket237 6720 driver17a
SOCKET_NETWORK socket238 6721 driver17b
SOCKET_NETWORK socket239 6722 driver17a
SOCKET_NETWORK socket240 6723 driver17b
SOCKET_NETWORK socket241 6724 driver17a
SOCKET_NETWORK socket242 6725 driver17b
SOCKET_NETWORK socket243 6726 driver17a
SOCKET_NETWORK socket244 6727 driver17b

SOCKET_NETWORK socket245 6728 driver18a
SOCKET_NETWORK socket246 6729 driver18b
SOCKET_NETWORK socket247 6730 driver18a
SOCKET_NETWORK socket248 6731 driver18b
SOCKET_NETWORK socket249 6732 driver18a
SOCKET_NETWORK socket250 6733 driver18b
SOCKET_NETWORK socket251 6734 driver18a
SOCKET_NETWORK socket252 6735 driver18b
SOCKET_NETWORK socket253 6736 driver18a
SOCKET_NETWORK socket254 6737 driver18b
SOCKET_NETWORK socket255 6738 driver18a
SOCKET_NETWORK socket256 6739 driver18b
SOCKET_NETWORK socket257 6740 driver18a
SOCKET_NETWORK socket258 6741 driver18b
SOCKET_NETWORK socket259 6742 driver18a
SOCKET_NETWORK socket260 6743 driver18b

SOCKET_NETWORK socket261 6744 driver19a
SOCKET_NETWORK socket262 6745 driver19b
SOCKET_NETWORK socket263 6746 driver19a
SOCKET_NETWORK socket264 6747 driver19b
SOCKET_NETWORK socket265 6748 driver19a
SOCKET_NETWORK socket266 6749 driver19b
SOCKET_NETWORK socket267 6750 driver19a
SOCKET_NETWORK socket268 6751 driver19b
SOCKET_NETWORK socket269 6752 driver19a
SOCKET_NETWORK socket270 6753 driver19b
SOCKET_NETWORK socket271 6754 driver19a
SOCKET_NETWORK socket272 6755 driver19b

SOCKET_NETWORK socket273 6756 driver20a
SOCKET_NETWORK socket274 6757 driver20b
SOCKET_NETWORK socket275 6758 driver20a
SOCKET_NETWORK socket276 6759 driver20b
SOCKET_NETWORK socket277 6760 driver20a
SOCKET_NETWORK socket278 6761 driver20b
SOCKET_NETWORK socket279 6762 driver20a
SOCKET_NETWORK socket280 6763 driver20b
```

```
SOCKET_NETWORK socket281 6764 driver20a
SOCKET_NETWORK socket282 6765 driver20b
SOCKET_NETWORK socket283 6766 driver20a
SOCKET_NETWORK socket284 6767 driver20b
SOCKET_NETWORK socket285 6768 driver20a
SOCKET_NETWORK socket286 6769 driver20b
SOCKET_NETWORK socket287 6770 driver20a
SOCKET_NETWORK socket288 6771 driver20b

SOCKET_NETWORK socket289 6700 driver21a
SOCKET_NETWORK socket290 6701 driver21b
SOCKET_NETWORK socket291 6702 driver21a
SOCKET_NETWORK socket292 6703 driver21b
SOCKET_NETWORK socket293 6704 driver21a
SOCKET_NETWORK socket294 6705 driver21b
SOCKET_NETWORK socket295 6706 driver21a
SOCKET_NETWORK socket296 6707 driver21b
SOCKET_NETWORK socket297 6708 driver21a
SOCKET_NETWORK socket298 6709 driver21b
SOCKET_NETWORK socket299 6710 driver21a
SOCKET_NETWORK socket300 6711 driver21b
SOCKET_NETWORK socket301 6712 driver21a
SOCKET_NETWORK socket302 6713 driver21b
SOCKET_NETWORK socket303 6714 driver21a
SOCKET_NETWORK socket304 6715 driver21b

SOCKET_NETWORK socket305 6716 driver22a
SOCKET_NETWORK socket306 6717 driver22b
SOCKET_NETWORK socket307 6718 driver22a
SOCKET_NETWORK socket308 6719 driver22b
SOCKET_NETWORK socket309 6720 driver22a
SOCKET_NETWORK socket310 6721 driver22b
SOCKET_NETWORK socket311 6722 driver22a
SOCKET_NETWORK socket312 6723 driver22b
SOCKET_NETWORK socket313 6724 driver22a
SOCKET_NETWORK socket314 6725 driver22b
SOCKET_NETWORK socket315 6726 driver22a
SOCKET_NETWORK socket316 6727 driver22b

SOCKET_NETWORK socket317 6728 driver23a
SOCKET_NETWORK socket318 6729 driver23b
SOCKET_NETWORK socket319 6730 driver23a
SOCKET_NETWORK socket320 6731 driver23b
SOCKET_NETWORK socket321 6732 driver23a
SOCKET_NETWORK socket322 6733 driver23b
SOCKET_NETWORK socket323 6734 driver23a
SOCKET_NETWORK socket324 6735 driver23b
SOCKET_NETWORK socket325 6736 driver23a
SOCKET_NETWORK socket326 6737 driver23b
SOCKET_NETWORK socket327 6738 driver23a
SOCKET_NETWORK socket328 6739 driver23b
SOCKET_NETWORK socket329 6740 driver23a
SOCKET_NETWORK socket330 6741 driver23b
SOCKET_NETWORK socket331 6742 driver23a
SOCKET_NETWORK socket332 6743 driver23b

SOCKET_NETWORK socket333 6744 driver24a
SOCKET_NETWORK socket334 6745 driver24b
SOCKET_NETWORK socket335 6746 driver24a
SOCKET_NETWORK socket336 6747 driver24b
SOCKET_NETWORK socket337 6748 driver24a
SOCKET_NETWORK socket338 6749 driver24b
SOCKET_NETWORK socket339 6750 driver24a
SOCKET_NETWORK socket340 6751 driver24b
SOCKET_NETWORK socket341 6752 driver24a
SOCKET_NETWORK socket342 6753 driver24b
SOCKET_NETWORK socket343 6754 driver24a
SOCKET_NETWORK socket344 6755 driver24b

SOCKET_NETWORK socket345 6756 driver25a
SOCKET_NETWORK socket346 6757 driver25b
SOCKET_NETWORK socket347 6758 driver25a
SOCKET_NETWORK socket348 6759 driver25b
SOCKET_NETWORK socket349 6760 driver25a
SOCKET_NETWORK socket350 6761 driver25b
SOCKET_NETWORK socket351 6762 driver25a
SOCKET_NETWORK socket352 6763 driver25b
SOCKET_NETWORK socket353 6764 driver25a
SOCKET_NETWORK socket354 6765 driver25b
SOCKET_NETWORK socket355 6766 driver25a
SOCKET_NETWORK socket356 6767 driver25b
SOCKET_NETWORK socket357 6768 driver25a
SOCKET_NETWORK socket358 6769 driver25b
SOCKET_NETWORK socket359 6770 driver25a
SOCKET_NETWORK socket360 6771 driver25b

SOCKET_NETWORK socket361 6700 driver26a
SOCKET_NETWORK socket362 6701 driver26b
SOCKET_NETWORK socket363 6702 driver26a
SOCKET_NETWORK socket364 6703 driver26b
SOCKET_NETWORK socket365 6704 driver26a
SOCKET_NETWORK socket366 6705 driver26b
SOCKET_NETWORK socket367 6706 driver26a
SOCKET_NETWORK socket368 6707 driver26b
SOCKET_NETWORK socket369 6708 driver26a
SOCKET_NETWORK socket370 6709 driver26b
SOCKET_NETWORK socket371 6710 driver26a
SOCKET_NETWORK socket372 6711 driver26b
SOCKET_NETWORK socket373 6712 driver26a
SOCKET_NETWORK socket374 6713 driver26b
SOCKET_NETWORK socket375 6714 driver26a
SOCKET_NETWORK socket376 6715 driver26b

SOCKET_NETWORK socket377 6716 driver27a
SOCKET_NETWORK socket378 6717 driver27b
SOCKET_NETWORK socket379 6718 driver27a
SOCKET_NETWORK socket380 6719 driver27b
SOCKET_NETWORK socket381 6720 driver27a
SOCKET_NETWORK socket382 6721 driver27b
SOCKET_NETWORK socket383 6722 driver27a
SOCKET_NETWORK socket384 6723 driver27b
SOCKET_NETWORK socket385 6724 driver27a
SOCKET_NETWORK socket386 6725 driver27b
SOCKET_NETWORK socket387 6726 driver27a
SOCKET_NETWORK socket388 6727 driver27b

SOCKET_NETWORK socket389 6728 driver28a
SOCKET_NETWORK socket390 6729 driver28b
SOCKET_NETWORK socket391 6730 driver28a
SOCKET_NETWORK socket392 6731 driver28b
SOCKET_NETWORK socket393 6732 driver28a
SOCKET_NETWORK socket394 6733 driver28b
SOCKET_NETWORK socket395 6734 driver28a
SOCKET_NETWORK socket396 6735 driver28b
SOCKET_NETWORK socket397 6736 driver28a
SOCKET_NETWORK socket398 6737 driver28b
SOCKET_NETWORK socket399 6738 driver28a
SOCKET_NETWORK socket400 6739 driver28b
SOCKET_NETWORK socket401 6740 driver28a
SOCKET_NETWORK socket402 6741 driver28b
SOCKET_NETWORK socket403 6742 driver28a
SOCKET_NETWORK socket404 6743 driver28b

SOCKET_NETWORK socket405 6744 driver29a
SOCKET_NETWORK socket406 6745 driver29b
SOCKET_NETWORK socket407 6746 driver29a
SOCKET_NETWORK socket408 6747 driver29b
SOCKET_NETWORK socket409 6748 driver29a
SOCKET_NETWORK socket410 6749 driver29b
SOCKET_NETWORK socket411 6750 driver29a
SOCKET_NETWORK socket412 6751 driver29b
SOCKET_NETWORK socket413 6752 driver29a
SOCKET_NETWORK socket414 6753 driver29b
SOCKET_NETWORK socket415 6754 driver29a
SOCKET_NETWORK socket416 6755 driver29b

SOCKET_NETWORK socket417 6756 driver30a
SOCKET_NETWORK socket418 6757 driver30b
SOCKET_NETWORK socket419 6758 driver30a
SOCKET_NETWORK socket420 6759 driver30b
SOCKET_NETWORK socket421 6760 driver30a
SOCKET_NETWORK socket422 6761 driver30b
SOCKET_NETWORK socket423 6762 driver30a
SOCKET_NETWORK socket424 6763 driver30b
SOCKET_NETWORK socket425 6764 driver30a
SOCKET_NETWORK socket426 6765 driver30b
SOCKET_NETWORK socket427 6766 driver30a
SOCKET_NETWORK socket428 6767 driver30b
SOCKET_NETWORK socket429 6768 driver30a
SOCKET_NETWORK socket430 6769 driver30b
SOCKET_NETWORK socket431 6770 driver30a
SOCKET_NETWORK socket432 6771 driver30b
#elif MASTER_NUM3
SOCKET_NETWORK socket433 6700 driver31a
SOCKET_NETWORK socket434 6701 driver31b
SOCKET_NETWORK socket435 6702 driver31a
SOCKET_NETWORK socket436 6703 driver31b
SOCKET_NETWORK socket437 6704 driver31a
SOCKET_NETWORK socket438 6705 driver31b
SOCKET_NETWORK socket439 6706 driver31a
SOCKET_NETWORK socket440 6707 driver31b
SOCKET_NETWORK socket441 6708 driver31a
SOCKET_NETWORK socket442 6709 driver31b
SOCKET_NETWORK socket443 6710 driver31a
SOCKET_NETWORK socket444 6711 driver31b
SOCKET_NETWORK socket445 6712 driver31a
SOCKET_NETWORK socket446 6713 driver31b
SOCKET_NETWORK socket447 6714 driver31a
SOCKET_NETWORK socket448 6715 driver31b

SOCKET_NETWORK socket449 6716 driver32a
SOCKET_NETWORK socket450 6717 driver32b
SOCKET_NETWORK socket451 6718 driver32a
SOCKET_NETWORK socket452 6719 driver32b
SOCKET_NETWORK socket453 6720 driver32a
SOCKET_NETWORK socket454 6721 driver32b
SOCKET_NETWORK socket455 6722 driver32a
SOCKET_NETWORK socket456 6723 driver32b
SOCKET_NETWORK socket457 6724 driver32a
SOCKET_NETWORK socket458 6725 driver32b
SOCKET_NETWORK socket459 6726 driver32a
SOCKET_NETWORK socket460 6727 driver32b

SOCKET_NETWORK socket461 6728 driver33a
SOCKET_NETWORK socket462 6729 driver33b
SOCKET_NETWORK socket463 6730 driver33a
SOCKET_NETWORK socket464 6731 driver33b
SOCKET_NETWORK socket465 6732 driver33a
```

```
SOCKET_NETWORK socket466 6733 driver33b
SOCKET_NETWORK socket467 6734 driver33a
SOCKET_NETWORK socket468 6735 driver33b
SOCKET_NETWORK socket469 6736 driver33a
SOCKET_NETWORK socket470 6737 driver33b
SOCKET_NETWORK socket471 6738 driver33a
SOCKET_NETWORK socket472 6739 driver33b
SOCKET_NETWORK socket473 6740 driver33a
SOCKET_NETWORK socket474 6741 driver33b
SOCKET_NETWORK socket475 6742 driver33a
SOCKET_NETWORK socket476 6743 driver33b

SOCKET_NETWORK socket477 6744 driver34a
SOCKET_NETWORK socket478 6745 driver34b
SOCKET_NETWORK socket479 6746 driver34a
SOCKET_NETWORK socket480 6747 driver34b
SOCKET_NETWORK socket481 6748 driver34a
SOCKET_NETWORK socket482 6749 driver34b
SOCKET_NETWORK socket483 6750 driver34a
SOCKET_NETWORK socket484 6751 driver34b
SOCKET_NETWORK socket485 6752 driver34a
SOCKET_NETWORK socket486 6753 driver34b
SOCKET_NETWORK socket487 6754 driver34a
SOCKET_NETWORK socket488 6755 driver34b

SOCKET_NETWORK socket489 6756 driver35a
SOCKET_NETWORK socket490 6757 driver35b
SOCKET_NETWORK socket491 6758 driver35a
SOCKET_NETWORK socket492 6759 driver35b
SOCKET_NETWORK socket493 6760 driver35a
SOCKET_NETWORK socket494 6761 driver35b
SOCKET_NETWORK socket495 6762 driver35a
SOCKET_NETWORK socket496 6763 driver35b
SOCKET_NETWORK socket497 6764 driver35a
SOCKET_NETWORK socket498 6765 driver35b
SOCKET_NETWORK socket499 6766 driver35a
SOCKET_NETWORK socket500 6767 driver35b
SOCKET_NETWORK socket501 6768 driver35a
SOCKET_NETWORK socket502 6769 driver35b
SOCKET_NETWORK socket503 6770 driver35a
SOCKET_NETWORK socket504 6771 driver35b

SOCKET_NETWORK socket505 6700 driver36a
SOCKET_NETWORK socket506 6701 driver36b
SOCKET_NETWORK socket507 6702 driver36a
SOCKET_NETWORK socket508 6703 driver36b
SOCKET_NETWORK socket509 6704 driver36a
SOCKET_NETWORK socket510 6705 driver36b
SOCKET_NETWORK socket511 6706 driver36a
SOCKET_NETWORK socket512 6707 driver36b
SOCKET_NETWORK socket513 6708 driver36a
SOCKET_NETWORK socket514 6709 driver36b
SOCKET_NETWORK socket515 6710 driver36a
SOCKET_NETWORK socket516 6711 driver36b
SOCKET_NETWORK socket517 6712 driver36a
SOCKET_NETWORK socket518 6713 driver36b
SOCKET_NETWORK socket519 6714 driver36a
SOCKET_NETWORK socket520 6715 driver36b

SOCKET_NETWORK socket521 6716 driver37a
SOCKET_NETWORK socket522 6717 driver37b
SOCKET_NETWORK socket523 6718 driver37a
SOCKET_NETWORK socket524 6719 driver37b
SOCKET_NETWORK socket525 6720 driver37a
SOCKET_NETWORK socket526 6721 driver37b
SOCKET_NETWORK socket527 6722 driver37a
SOCKET_NETWORK socket528 6723 driver37b
SOCKET_NETWORK socket529 6724 driver37a
SOCKET_NETWORK socket530 6725 driver37b
SOCKET_NETWORK socket531 6726 driver37a
SOCKET_NETWORK socket532 6727 driver37b

SOCKET_NETWORK socket533 6728 driver38a
SOCKET_NETWORK socket534 6729 driver38b
SOCKET_NETWORK socket535 6730 driver38a
SOCKET_NETWORK socket536 6731 driver38b
SOCKET_NETWORK socket537 6732 driver38a
SOCKET_NETWORK socket538 6733 driver38b
SOCKET_NETWORK socket539 6734 driver38a
SOCKET_NETWORK socket540 6735 driver38b
SOCKET_NETWORK socket541 6736 driver38a
SOCKET_NETWORK socket542 6737 driver38b
SOCKET_NETWORK socket543 6738 driver38a
SOCKET_NETWORK socket544 6739 driver38b
SOCKET_NETWORK socket545 6740 driver38a
SOCKET_NETWORK socket546 6741 driver38b
SOCKET_NETWORK socket547 6742 driver38a
SOCKET_NETWORK socket548 6743 driver38b

SOCKET_NETWORK socket549 6744 driver39a
SOCKET_NETWORK socket550 6745 driver39b
SOCKET_NETWORK socket551 6746 driver39a
SOCKET_NETWORK socket552 6747 driver39b
SOCKET_NETWORK socket553 6748 driver39a
SOCKET_NETWORK socket554 6749 driver39b
SOCKET_NETWORK socket555 6750 driver39a
SOCKET_NETWORK socket556 6751 driver39b
SOCKET_NETWORK socket557 6752 driver39a
SOCKET_NETWORK socket558 6753 driver39b
SOCKET_NETWORK socket559 6754 driver39a
SOCKET_NETWORK socket560 6755 driver39b

SOCKET_NETWORK socket561 6756 driver40a
SOCKET_NETWORK socket562 6757 driver40b
SOCKET_NETWORK socket563 6758 driver40a
SOCKET_NETWORK socket564 6759 driver40b
SOCKET_NETWORK socket565 6760 driver40a
SOCKET_NETWORK socket566 6761 driver40b
SOCKET_NETWORK socket567 6762 driver40a
SOCKET_NETWORK socket568 6763 driver40b
SOCKET_NETWORK socket569 6764 driver40a
SOCKET_NETWORK socket570 6765 driver40b
SOCKET_NETWORK socket571 6766 driver40a
SOCKET_NETWORK socket572 6767 driver40b
SOCKET_NETWORK socket573 6768 driver40a
SOCKET_NETWORK socket574 6769 driver40b
SOCKET_NETWORK socket575 6770 driver40a
SOCKET_NETWORK socket576 6771 driver40b

SOCKET_NETWORK socket577 6700 driver41a
SOCKET_NETWORK socket578 6701 driver41b
SOCKET_NETWORK socket579 6702 driver41a
SOCKET_NETWORK socket580 6703 driver41b
SOCKET_NETWORK socket581 6704 driver41a
SOCKET_NETWORK socket582 6705 driver41b
SOCKET_NETWORK socket583 6706 driver41a
SOCKET_NETWORK socket584 6707 driver41b
SOCKET_NETWORK socket585 6708 driver41a
SOCKET_NETWORK socket586 6709 driver41b
SOCKET_NETWORK socket587 6710 driver41a
SOCKET_NETWORK socket588 6711 driver41b
SOCKET_NETWORK socket589 6712 driver41a
SOCKET_NETWORK socket590 6713 driver41b
SOCKET_NETWORK socket591 6714 driver41a
SOCKET_NETWORK socket592 6715 driver41b

SOCKET_NETWORK socket593 6716 driver42a
SOCKET_NETWORK socket594 6717 driver42b
SOCKET_NETWORK socket595 6718 driver42a
SOCKET_NETWORK socket596 6719 driver42b
SOCKET_NETWORK socket597 6720 driver42a
SOCKET_NETWORK socket598 6721 driver42b
SOCKET_NETWORK socket599 6722 driver42a
SOCKET_NETWORK socket600 6723 driver42b
SOCKET_NETWORK socket601 6724 driver42a
SOCKET_NETWORK socket602 6725 driver42b
SOCKET_NETWORK socket603 6726 driver42a
SOCKET_NETWORK socket604 6727 driver42b

SOCKET_NETWORK socket605 6728 driver43a
SOCKET_NETWORK socket606 6729 driver43b
SOCKET_NETWORK socket607 6730 driver43a
SOCKET_NETWORK socket608 6731 driver43b
SOCKET_NETWORK socket609 6732 driver43a
SOCKET_NETWORK socket610 6733 driver43b
SOCKET_NETWORK socket611 6734 driver43a
SOCKET_NETWORK socket612 6735 driver43b
SOCKET_NETWORK socket613 6736 driver43a
SOCKET_NETWORK socket614 6737 driver43b
SOCKET_NETWORK socket615 6738 driver43a
SOCKET_NETWORK socket616 6739 driver43b
SOCKET_NETWORK socket617 6740 driver43a
SOCKET_NETWORK socket618 6741 driver43b
SOCKET_NETWORK socket619 6742 driver43a
SOCKET_NETWORK socket620 6743 driver43b

SOCKET_NETWORK socket621 6744 driver44a
SOCKET_NETWORK socket622 6745 driver44b
SOCKET_NETWORK socket623 6746 driver44a
SOCKET_NETWORK socket624 6747 driver44b
SOCKET_NETWORK socket625 6748 driver44a
SOCKET_NETWORK socket626 6749 driver44b
SOCKET_NETWORK socket627 6750 driver44a
SOCKET_NETWORK socket628 6751 driver44b
SOCKET_NETWORK socket629 6752 driver44a
SOCKET_NETWORK socket630 6753 driver44b
SOCKET_NETWORK socket631 6754 driver44a
SOCKET_NETWORK socket632 6755 driver44b

SOCKET_NETWORK socket633 6756 driver45a
SOCKET_NETWORK socket634 6757 driver45b
SOCKET_NETWORK socket635 6758 driver45a
SOCKET_NETWORK socket636 6759 driver45b
SOCKET_NETWORK socket637 6760 driver45a
SOCKET_NETWORK socket638 6761 driver45b
SOCKET_NETWORK socket639 6762 driver45a
SOCKET_NETWORK socket640 6763 driver45b
SOCKET_NETWORK socket641 6764 driver45a
SOCKET_NETWORK socket642 6765 driver45b
SOCKET_NETWORK socket643 6766 driver45a
SOCKET_NETWORK socket644 6767 driver45b
SOCKET_NETWORK socket645 6768 driver45a
SOCKET_NETWORK socket646 6769 driver45b
SOCKET_NETWORK socket647 6770 driver45a
SOCKET_NETWORK socket648 6771 driver45b
#elif MASTER_NUM4
SOCKET_NETWORK socket649 6700 driver46a
SOCKET_NETWORK socket650 6701 driver46b
```

```
SOCKET_NETWORK socket651 6702 driver46a
SOCKET_NETWORK socket652 6703 driver46b
SOCKET_NETWORK socket653 6704 driver46a
SOCKET_NETWORK socket654 6705 driver46b
SOCKET_NETWORK socket655 6706 driver46a
SOCKET_NETWORK socket656 6707 driver46b
SOCKET_NETWORK socket657 6708 driver46a
SOCKET_NETWORK socket658 6709 driver46b
SOCKET_NETWORK socket659 6710 driver46a
SOCKET_NETWORK socket660 6711 driver46b
SOCKET_NETWORK socket661 6712 driver46a
SOCKET_NETWORK socket662 6713 driver46b
SOCKET_NETWORK socket663 6714 driver46a
SOCKET_NETWORK socket664 6715 driver46b

SOCKET_NETWORK socket665 6716 driver47a
SOCKET_NETWORK socket666 6717 driver47b
SOCKET_NETWORK socket667 6718 driver47a
SOCKET_NETWORK socket668 6719 driver47b
SOCKET_NETWORK socket669 6720 driver47a
SOCKET_NETWORK socket670 6721 driver47b
SOCKET_NETWORK socket671 6722 driver47a
SOCKET_NETWORK socket672 6723 driver47b
SOCKET_NETWORK socket673 6724 driver47a
SOCKET_NETWORK socket674 6725 driver47b
SOCKET_NETWORK socket675 6726 driver47a
SOCKET_NETWORK socket676 6727 driver47b

SOCKET_NETWORK socket677 6728 driver48a
SOCKET_NETWORK socket678 6729 driver48b
SOCKET_NETWORK socket679 6730 driver48a
SOCKET_NETWORK socket680 6731 driver48b
SOCKET_NETWORK socket681 6732 driver48a
SOCKET_NETWORK socket682 6733 driver48b
SOCKET_NETWORK socket683 6734 driver48a
SOCKET_NETWORK socket684 6735 driver48b
SOCKET_NETWORK socket685 6736 driver48a
SOCKET_NETWORK socket686 6737 driver48b
SOCKET_NETWORK socket687 6738 driver48a
SOCKET_NETWORK socket688 6739 driver48b
SOCKET_NETWORK socket689 6740 driver48a
SOCKET_NETWORK socket690 6741 driver48b
SOCKET_NETWORK socket691 6742 driver48a
SOCKET_NETWORK socket692 6743 driver48b

SOCKET_NETWORK socket693 6744 driver49a
SOCKET_NETWORK socket694 6745 driver49b
SOCKET_NETWORK socket695 6746 driver49a
SOCKET_NETWORK socket696 6747 driver49b
SOCKET_NETWORK socket697 6748 driver49a
SOCKET_NETWORK socket698 6749 driver49b
SOCKET_NETWORK socket699 6750 driver49a
SOCKET_NETWORK socket700 6751 driver49b
SOCKET_NETWORK socket701 6752 driver49a
SOCKET_NETWORK socket702 6753 driver49b
SOCKET_NETWORK socket703 6754 driver49a
SOCKET_NETWORK socket704 6755 driver49b

SOCKET_NETWORK socket705 6756 driver50a
SOCKET_NETWORK socket706 6757 driver50b
SOCKET_NETWORK socket707 6758 driver50a
SOCKET_NETWORK socket708 6759 driver50b
SOCKET_NETWORK socket709 6760 driver50a
SOCKET_NETWORK socket710 6761 driver50b
SOCKET_NETWORK socket711 6762 driver50a
SOCKET_NETWORK socket712 6763 driver50b
SOCKET_NETWORK socket713 6764 driver50a
SOCKET_NETWORK socket714 6765 driver50b
SOCKET_NETWORK socket715 6766 driver50a
SOCKET_NETWORK socket716 6767 driver50b
SOCKET_NETWORK socket717 6768 driver50a
SOCKET_NETWORK socket718 6769 driver50b
SOCKET_NETWORK socket719 6770 driver50a
SOCKET_NETWORK socket720 6771 driver50b

SOCKET_NETWORK socket721 6700 driver51a
SOCKET_NETWORK socket722 6701 driver51b
SOCKET_NETWORK socket723 6702 driver51a
SOCKET_NETWORK socket724 6703 driver51b
SOCKET_NETWORK socket725 6704 driver51a
SOCKET_NETWORK socket726 6705 driver51b
SOCKET_NETWORK socket727 6706 driver51a
SOCKET_NETWORK socket728 6707 driver51b
SOCKET_NETWORK socket729 6708 driver51a
SOCKET_NETWORK socket730 6709 driver51b
SOCKET_NETWORK socket731 6710 driver51a
SOCKET_NETWORK socket732 6711 driver51b
SOCKET_NETWORK socket733 6712 driver51a
SOCKET_NETWORK socket734 6713 driver51b
SOCKET_NETWORK socket735 6714 driver51a
SOCKET_NETWORK socket736 6715 driver51b

SOCKET_NETWORK socket737 6716 driver52a
SOCKET_NETWORK socket738 6717 driver52b
SOCKET_NETWORK socket739 6718 driver52a
SOCKET_NETWORK socket740 6719 driver52b
SOCKET_NETWORK socket741 6720 driver52a
SOCKET_NETWORK socket742 6721 driver52b
SOCKET_NETWORK socket743 6722 driver52a
SOCKET_NETWORK socket744 6723 driver52b
SOCKET_NETWORK socket745 6724 driver52a
SOCKET_NETWORK socket746 6725 driver52b
SOCKET_NETWORK socket747 6726 driver52a
SOCKET_NETWORK socket748 6727 driver52b

SOCKET_NETWORK socket749 6728 driver53a
SOCKET_NETWORK socket750 6729 driver53b
SOCKET_NETWORK socket751 6730 driver53a
SOCKET_NETWORK socket752 6731 driver53b
SOCKET_NETWORK socket753 6732 driver53a
SOCKET_NETWORK socket754 6733 driver53b
SOCKET_NETWORK socket755 6734 driver53a
SOCKET_NETWORK socket756 6735 driver53b
SOCKET_NETWORK socket757 6736 driver53a
SOCKET_NETWORK socket758 6737 driver53b
SOCKET_NETWORK socket759 6738 driver53a
SOCKET_NETWORK socket760 6739 driver53b
SOCKET_NETWORK socket761 6740 driver53a
SOCKET_NETWORK socket762 6741 driver53b
SOCKET_NETWORK socket763 6742 driver53a
SOCKET_NETWORK socket764 6743 driver53b

SOCKET_NETWORK socket765 6744 driver54a
SOCKET_NETWORK socket766 6745 driver54b
SOCKET_NETWORK socket767 6746 driver54a
SOCKET_NETWORK socket768 6747 driver54b
SOCKET_NETWORK socket769 6748 driver54a
SOCKET_NETWORK socket770 6749 driver54b
SOCKET_NETWORK socket771 6750 driver54a
SOCKET_NETWORK socket772 6751 driver54b
SOCKET_NETWORK socket773 6752 driver54a
SOCKET_NETWORK socket774 6753 driver54b
SOCKET_NETWORK socket775 6754 driver54a
SOCKET_NETWORK socket776 6755 driver54b

SOCKET_NETWORK socket777 6756 driver55a
SOCKET_NETWORK socket778 6757 driver55b
SOCKET_NETWORK socket779 6758 driver55a
SOCKET_NETWORK socket780 6759 driver55b
SOCKET_NETWORK socket781 6760 driver55a
SOCKET_NETWORK socket782 6761 driver55b
SOCKET_NETWORK socket783 6762 driver55a
SOCKET_NETWORK socket784 6763 driver55b
SOCKET_NETWORK socket785 6764 driver55a
SOCKET_NETWORK socket786 6765 driver55b
SOCKET_NETWORK socket787 6766 driver55a
SOCKET_NETWORK socket788 6767 driver55b
SOCKET_NETWORK socket789 6768 driver55a
SOCKET_NETWORK socket790 6769 driver55b
SOCKET_NETWORK socket791 6770 driver55a
SOCKET_NETWORK socket792 6771 driver55b
#endif
/*---------------------------------------------------------------------------*/

OUTPUTNAME="condors85"

CPU=24

#if 1
BEGIN_WAIT=5:00
RAMPUP=42:30
RUNTIME=30:00
RAMPDOWN_WAIT=5:00
RAMPDOWN=10:00
#else
BEGIN_WAIT=10:00
RAMPUP=15:00
RUNTIME=30:00
RAMPDOWN_WAIT=2:00
RAMPDOWN=5:00
#endif
INTERVAL=1:00   /* Interval to calculate mix from */

LOGIN_MAX_LOAD       = 4
LOGIN_BEGIN          = 0  /* skip login state if set to 1 */
NOBEGIN              = 1
KEYSTROKE_PACKET_SIZE = 0

MAX_CONCURRENT_SPAWN  = 10
SPAWN_COUNT          = 4

MIN_PORT             = 8088
MAX_PORT             = 8089

/* User variables.  Think, Emulex Delay, %desired, %min, %max */
#if 1 /* Testing */
NEWORDER = "12.02, 0, 0"
PAYMENT  = "12.02, 0, 0, 43.03, 43.03, 43.03 "
ORDSTAT  = "10.01, 0, 0,  4.02,  4.02,  4.02 "
DELIVERY = "05.02, 0, 0,  4.02,  4.02,  4.02 "
STOCKLEV = "05.02, 0, 0,  4.02,  4.02,  4.02 "
#elif 0 /* From rteparams.null */
NEWORDER = "12.25, 0.42, 0.38"
PAYMENT  = "12.25, 0.19, 0.23, 43.2, 41.1, 45.3 "
ORDSTAT  = "10.50, 0.39, 0.21,  4.1,  3.9,  4.3 "
DELIVERY = "05.5,  0.19, 0.15,  4.1,  3.9,  4.3 "
STOCKLEV = "05.5,  0.25, 0.18,  4.1,  3.9,  4.3 "
#elif 0 /* From Pookeepsie */
```

```
NEWORDER = "16.25, 0.42, 0.38"
PAYMENT  = "16.25, 0.19, 0.23, 43.15, 43.15, 43.15 "
ORDSTAT  = "14.50, 0.39, 0.21,  4.03,  4.03,  4.03 "
DELIVERY = "09.50, 0.19, 0.15,  4.03,  4.03,  4.03 "
STOCKLEV = "09.50, 0.25, 0.18,  4.03,  4.03,  4.03 "
#endif

/*---- Starting users on sockets ------------------------------------------------*/
#if MASTER_NUM1

START_RANGE client11 socket1 240 0-24
START_RANGE client12 socket2 240 24-48
START_RANGE client13 socket3 250 48-73
START_RANGE client14 socket4 240 73-97
START_RANGE client11 socket5 240 97-121
START_RANGE client12 socket6 250 121-146
START_RANGE client13 socket7 240 146-170
START_RANGE client14 socket8 240 170-194
START_RANGE client11 socket9 250 194-219
START_RANGE client12 socket10 240 219-243
START_RANGE client13 socket11 240 243-267
START_RANGE client14 socket12 250 267-292
START_RANGE client11 socket13 240 292-316
START_RANGE client12 socket14 240 316-340
START_RANGE client13 socket15 250 340-365
START_RANGE client14 socket16 240 365-389
START_RANGE client15 socket17 240 389-413
START_RANGE client16 socket18 250 413-438
START_RANGE client17 socket19 240 438-462
START_RANGE client15 socket20 240 462-486
START_RANGE client16 socket21 250 486-511
START_RANGE client17 socket22 240 511-535
START_RANGE client15 socket23 240 535-559
START_RANGE client16 socket24 250 559-584
START_RANGE client17 socket25 240 584-608
START_RANGE client15 socket26 240 608-632
START_RANGE client16 socket27 250 632-657
START_RANGE client17 socket28 240 657-681
START_RANGE client18 socket29 240 681-705
START_RANGE client19 socket30 250 705-730
START_RANGE client110 socket31 240 730-754
START_RANGE client111 socket32 240 754-778
START_RANGE client18 socket33 250 778-803
START_RANGE client19 socket34 240 803-827
START_RANGE client110 socket35 240 827-851
START_RANGE client111 socket36 250 851-876
START_RANGE client18 socket37 240 876-900
START_RANGE client19 socket38 240 900-924
START_RANGE client110 socket39 250 924-949
START_RANGE client111 socket40 240 949-973
START_RANGE client18 socket41 240 973-997
START_RANGE client19 socket42 250 997-1022
START_RANGE client110 socket43 240 1022-1046
START_RANGE client111 socket44 240 1046-1070
START_RANGE client112 socket45 250 1070-1095
START_RANGE client113 socket46 240 1095-1119
START_RANGE client114 socket47 240 1119-1143
START_RANGE client112 socket48 250 1143-1168
START_RANGE client113 socket49 240 1168-1192
START_RANGE client114 socket50 240 1192-1216
START_RANGE client112 socket51 250 1216-1241
START_RANGE client113 socket52 240 1241-1265
START_RANGE client114 socket53 240 1265-1289
START_RANGE client112 socket54 250 1289-1314
START_RANGE client113 socket55 240 1314-1338
START_RANGE client114 socket56 240 1338-1362
START_RANGE client115 socket57 250 1362-1387
START_RANGE client116 socket58 240 1387-1411
START_RANGE client117 socket59 240 1411-1435
START_RANGE client118 socket60 250 1435-1460
START_RANGE client115 socket61 240 1460-1484
START_RANGE client116 socket62 240 1484-1508
START_RANGE client117 socket63 250 1508-1533
START_RANGE client118 socket64 240 1533-1557
START_RANGE client115 socket65 240 1557-1581
START_RANGE client116 socket66 250 1581-1606
START_RANGE client117 socket67 240 1606-1630
START_RANGE client118 socket68 240 1630-1654
START_RANGE client115 socket69 250 1654-1679
START_RANGE client116 socket70 240 1679-1703
START_RANGE client117 socket71 240 1703-1727
START_RANGE client118 socket72 250 1727-1752

START_RANGE client21 socket73 240 1752-1776
START_RANGE client22 socket74 240 1776-1800
START_RANGE client23 socket75 250 1800-1825
START_RANGE client24 socket76 240 1825-1849
START_RANGE client21 socket77 240 1849-1873
START_RANGE client22 socket78 250 1873-1898
START_RANGE client23 socket79 240 1898-1922
START_RANGE client24 socket80 240 1922-1946
START_RANGE client21 socket81 250 1946-1971
START_RANGE client22 socket82 240 1971-1995
START_RANGE client23 socket83 240 1995-2019
START_RANGE client24 socket84 250 2019-2044
START_RANGE client21 socket85 240 2044-2068
START_RANGE client22 socket86 240 2068-2092
START_RANGE client23 socket87 250 2092-2117
START_RANGE client24 socket88 240 2117-2141
START_RANGE client25 socket89 240 2141-2165
START_RANGE client26 socket90 250 2165-2190
START_RANGE client27 socket91 240 2190-2214
START_RANGE client25 socket92 240 2214-2238
START_RANGE client26 socket93 250 2238-2263
START_RANGE client27 socket94 240 2263-2287
START_RANGE client25 socket95 240 2287-2311
START_RANGE client26 socket96 250 2311-2336
START_RANGE client27 socket97 240 2336-2360
START_RANGE client25 socket98 240 2360-2384
START_RANGE client26 socket99 250 2384-2409
START_RANGE client27 socket100 240 2409-2433
START_RANGE client28 socket101 240 2433-2457
START_RANGE client29 socket102 250 2457-2482
START_RANGE client210 socket103 240 2482-2506
START_RANGE client211 socket104 240 2506-2530
START_RANGE client28 socket105 250 2530-2555
START_RANGE client29 socket106 240 2555-2579
START_RANGE client210 socket107 240 2579-2603
START_RANGE client211 socket108 250 2603-2628
START_RANGE client28 socket109 240 2628-2652
START_RANGE client29 socket110 240 2652-2676
START_RANGE client210 socket111 250 2676-2701
START_RANGE client211 socket112 240 2701-2725
START_RANGE client28 socket113 240 2725-2749
START_RANGE client29 socket114 250 2749-2774
START_RANGE client210 socket115 240 2774-2798
START_RANGE client211 socket116 240 2798-2822
START_RANGE client212 socket117 250 2822-2847
START_RANGE client213 socket118 240 2847-2871
START_RANGE client214 socket119 240 2871-2895
START_RANGE client212 socket120 250 2895-2920
START_RANGE client213 socket121 240 2920-2944
START_RANGE client214 socket122 240 2944-2968
START_RANGE client212 socket123 250 2968-2993
START_RANGE client213 socket124 240 2993-3017
START_RANGE client214 socket125 240 3017-3041
START_RANGE client212 socket126 250 3041-3066
START_RANGE client213 socket127 240 3066-3090
START_RANGE client214 socket128 240 3090-3114
START_RANGE client215 socket129 250 3114-3139
START_RANGE client216 socket130 240 3139-3163
START_RANGE client217 socket131 240 3163-3187
START_RANGE client218 socket132 250 3187-3212
START_RANGE client215 socket133 240 3212-3236
START_RANGE client216 socket134 240 3236-3260
START_RANGE client217 socket135 250 3260-3285
START_RANGE client218 socket136 240 3285-3309
START_RANGE client215 socket137 240 3309-3333
START_RANGE client216 socket138 250 3333-3358
START_RANGE client217 socket139 240 3358-3382
START_RANGE client218 socket140 240 3382-3406
START_RANGE client215 socket141 250 3406-3431
START_RANGE client216 socket142 240 3431-3455
START_RANGE client217 socket143 240 3455-3479
START_RANGE client218 socket144 250 3479-3504

START_RANGE client31 socket145 240 3504-3528
START_RANGE client32 socket146 240 3528-3552
START_RANGE client33 socket147 250 3552-3577
START_RANGE client34 socket148 240 3577-3601
START_RANGE client31 socket149 240 3601-3625
START_RANGE client32 socket150 250 3625-3650
START_RANGE client33 socket151 240 3650-3674
START_RANGE client34 socket152 240 3674-3698
START_RANGE client31 socket153 250 3698-3723
START_RANGE client32 socket154 240 3723-3747
START_RANGE client33 socket155 240 3747-3771
START_RANGE client34 socket156 250 3771-3796
START_RANGE client31 socket157 240 3796-3820
START_RANGE client32 socket158 240 3820-3844
START_RANGE client33 socket159 250 3844-3869
START_RANGE client34 socket160 240 3869-3893
START_RANGE client35 socket161 240 3893-3917
START_RANGE client36 socket162 250 3917-3942
START_RANGE client37 socket163 240 3942-3966
START_RANGE client35 socket164 240 3966-3990
START_RANGE client36 socket165 250 3990-4015
START_RANGE client37 socket166 240 4015-4039
START_RANGE client35 socket167 240 4039-4063
START_RANGE client36 socket168 250 4063-4088
START_RANGE client37 socket169 240 4088-4112
START_RANGE client35 socket170 240 4112-4136
START_RANGE client36 socket171 250 4136-4161
START_RANGE client37 socket172 240 4161-4185
START_RANGE client38 socket173 240 4185-4209
START_RANGE client39 socket174 250 4209-4234
START_RANGE client310 socket175 240 4234-4258
START_RANGE client311 socket176 240 4258-4282
START_RANGE client38 socket177 250 4282-4307
START_RANGE client39 socket178 240 4307-4331
START_RANGE client310 socket179 240 4331-4355
START_RANGE client311 socket180 250 4355-4380
START_RANGE client38 socket181 240 4380-4404
START_RANGE client39 socket182 240 4404-4428
START_RANGE client310 socket183 250 4428-4453
START_RANGE client311 socket184 240 4453-4477
START_RANGE client38 socket185 240 4477-4501
START_RANGE client39 socket186 250 4501-4526
```

```
START_RANGE client310 socket187 240 4526-4550
START_RANGE client311 socket188 240 4550-4574
START_RANGE client312 socket189 250 4574-4599
START_RANGE client313 socket190 240 4599-4623
START_RANGE client314 socket191 240 4623-4647
START_RANGE client312 socket192 250 4647-4672
START_RANGE client313 socket193 240 4672-4696
START_RANGE client314 socket194 240 4696-4720
START_RANGE client312 socket195 250 4720-4745
START_RANGE client313 socket196 240 4745-4769
START_RANGE client314 socket197 240 4769-4793
START_RANGE client312 socket198 250 4793-4818
START_RANGE client313 socket199 240 4818-4842
START_RANGE client314 socket200 240 4842-4866
START_RANGE client315 socket201 250 4866-4891
START_RANGE client316 socket202 240 4891-4915
START_RANGE client317 socket203 240 4915-4939
START_RANGE client318 socket204 250 4939-4964
START_RANGE client315 socket205 240 4964-4988
START_RANGE client316 socket206 240 4988-5012
START_RANGE client317 socket207 250 5012-5037
START_RANGE client318 socket208 240 5037-5061
START_RANGE client315 socket209 240 5061-5085
START_RANGE client316 socket210 250 5085-5110
START_RANGE client317 socket211 240 5110-5134
START_RANGE client318 socket212 240 5134-5158
START_RANGE client315 socket213 250 5158-5183
START_RANGE client316 socket214 240 5183-5207
START_RANGE client317 socket215 240 5207-5231
START_RANGE client318 socket216 250 5231-5256

#elif MASTER_NUM2
START_RANGE client41 socket217 240 5256-5280
START_RANGE client42 socket218 240 5280-5304
START_RANGE client43 socket219 250 5304-5329
START_RANGE client44 socket220 240 5329-5353
START_RANGE client41 socket221 240 5353-5377
START_RANGE client42 socket222 250 5377-5402
START_RANGE client43 socket223 240 5402-5426
START_RANGE client44 socket224 240 5426-5450
START_RANGE client41 socket225 250 5450-5475
START_RANGE client42 socket226 240 5475-5499
START_RANGE client43 socket227 240 5499-5523
START_RANGE client44 socket228 250 5523-5548
START_RANGE client41 socket229 240 5548-5572
START_RANGE client42 socket230 240 5572-5596
START_RANGE client43 socket231 250 5596-5621
START_RANGE client44 socket232 240 5621-5645
START_RANGE client45 socket233 240 5645-5669
START_RANGE client46 socket234 250 5669-5694
START_RANGE client47 socket235 240 5694-5718
START_RANGE client45 socket236 240 5718-5742
START_RANGE client46 socket237 250 5742-5767
START_RANGE client47 socket238 240 5767-5791
START_RANGE client45 socket239 240 5791-5815
START_RANGE client46 socket240 250 5815-5840
START_RANGE client47 socket241 240 5840-5864
START_RANGE client45 socket242 240 5864-5888
START_RANGE client46 socket243 250 5888-5913
START_RANGE client47 socket244 240 5913-5937
START_RANGE client48 socket245 240 5937-5961
START_RANGE client49 socket246 250 5961-5986
START_RANGE client410 socket247 240 5986-6010
START_RANGE client411 socket248 240 6010-6034
START_RANGE client48 socket249 250 6034-6059
START_RANGE client49 socket250 240 6059-6083
START_RANGE client410 socket251 240 6083-6107
START_RANGE client411 socket252 250 6107-6132
START_RANGE client48 socket253 240 6132-6156
START_RANGE client49 socket254 240 6156-6180
START_RANGE client410 socket255 250 6180-6205
START_RANGE client411 socket256 240 6205-6229
START_RANGE client48 socket257 240 6229-6253
START_RANGE client49 socket258 250 6253-6278
START_RANGE client410 socket259 240 6278-6302
START_RANGE client411 socket260 240 6302-6326
START_RANGE client412 socket261 250 6326-6351
START_RANGE client413 socket262 240 6351-6375
START_RANGE client414 socket263 240 6375-6399
START_RANGE client412 socket264 250 6399-6424
START_RANGE client413 socket265 240 6424-6448
START_RANGE client414 socket266 240 6448-6472
START_RANGE client412 socket267 250 6472-6497
START_RANGE client413 socket268 240 6497-6521
START_RANGE client414 socket269 240 6521-6545
START_RANGE client412 socket270 250 6545-6570
START_RANGE client413 socket271 240 6570-6594
START_RANGE client414 socket272 240 6594-6618
START_RANGE client415 socket273 250 6618-6643
START_RANGE client416 socket274 240 6643-6667
START_RANGE client417 socket275 240 6667-6691
START_RANGE client418 socket276 250 6691-6716
START_RANGE client415 socket277 240 6716-6740
START_RANGE client416 socket278 240 6740-6764
START_RANGE client417 socket279 250 6764-6789
START_RANGE client418 socket280 240 6789-6813
START_RANGE client415 socket281 240 6813-6837
START_RANGE client416 socket282 250 6837-6862
START_RANGE client417 socket283 240 6862-6886
START_RANGE client418 socket284 240 6886-6910
START_RANGE client415 socket285 250 6910-6935
START_RANGE client416 socket286 240 6935-6959
START_RANGE client417 socket287 240 6959-6983
START_RANGE client418 socket288 250 6983-7008

START_RANGE client51 socket289 240 7008-7032
START_RANGE client52 socket290 240 7032-7056
START_RANGE client53 socket291 250 7056-7081
START_RANGE client54 socket292 240 7081-7105
START_RANGE client51 socket293 240 7105-7129
START_RANGE client52 socket294 250 7129-7154
START_RANGE client53 socket295 240 7154-7178
START_RANGE client54 socket296 240 7178-7202
START_RANGE client51 socket297 250 7202-7227
START_RANGE client52 socket298 240 7227-7251
START_RANGE client53 socket299 240 7251-7275
START_RANGE client54 socket300 250 7275-7300
START_RANGE client51 socket301 240 7300-7324
START_RANGE client52 socket302 240 7324-7348
START_RANGE client53 socket303 250 7348-7373
START_RANGE client54 socket304 240 7373-7397
START_RANGE client55 socket305 240 7397-7421
START_RANGE client56 socket306 250 7421-7446
START_RANGE client57 socket307 240 7446-7470
START_RANGE client55 socket308 240 7470-7494
START_RANGE client56 socket309 250 7494-7519
START_RANGE client57 socket310 240 7519-7543
START_RANGE client55 socket311 240 7543-7567
START_RANGE client56 socket312 250 7567-7592
START_RANGE client57 socket313 240 7592-7616
START_RANGE client55 socket314 240 7616-7640
START_RANGE client56 socket315 250 7640-7665
START_RANGE client57 socket316 240 7665-7689
START_RANGE client58 socket317 240 7689-7713
START_RANGE client59 socket318 250 7713-7738
START_RANGE client510 socket319 240 7738-7762
START_RANGE client511 socket320 240 7762-7786
START_RANGE client58 socket321 250 7786-7811
START_RANGE client59 socket322 240 7811-7835
START_RANGE client510 socket323 240 7835-7859
START_RANGE client511 socket324 250 7859-7884
START_RANGE client58 socket325 240 7884-7908
START_RANGE client59 socket326 240 7908-7932
START_RANGE client510 socket327 250 7932-7957
START_RANGE client511 socket328 240 7957-7981
START_RANGE client58 socket329 240 7981-8005
START_RANGE client59 socket330 250 8005-8030
START_RANGE client510 socket331 240 8030-8054
START_RANGE client511 socket332 240 8054-8078
START_RANGE client512 socket333 250 8078-8103
START_RANGE client513 socket334 240 8103-8127
START_RANGE client514 socket335 240 8127-8151
START_RANGE client512 socket336 250 8151-8176
START_RANGE client513 socket337 240 8176-8200
START_RANGE client514 socket338 240 8200-8224
START_RANGE client512 socket339 250 8224-8249
START_RANGE client513 socket340 240 8249-8273
START_RANGE client514 socket341 240 8273-8297
START_RANGE client512 socket342 250 8297-8322
START_RANGE client513 socket343 240 8322-8346
START_RANGE client514 socket344 240 8346-8370
START_RANGE client515 socket345 250 8370-8395
START_RANGE client516 socket346 240 8395-8419
START_RANGE client517 socket347 240 8419-8443
START_RANGE client518 socket348 250 8443-8468
START_RANGE client515 socket349 240 8468-8492
START_RANGE client516 socket350 240 8492-8516
START_RANGE client517 socket351 250 8516-8541
START_RANGE client518 socket352 240 8541-8565
START_RANGE client515 socket353 240 8565-8589
START_RANGE client516 socket354 250 8589-8614
START_RANGE client517 socket355 240 8614-8638
START_RANGE client518 socket356 240 8638-8662
START_RANGE client515 socket357 250 8662-8687
START_RANGE client516 socket358 240 8687-8711
START_RANGE client517 socket359 240 8711-8735
START_RANGE client518 socket360 250 8735-8760

START_RANGE client61 socket361 240 8760-8784
START_RANGE client62 socket362 240 8784-8808
START_RANGE client63 socket363 250 8808-8833
START_RANGE client64 socket364 240 8833-8857
START_RANGE client61 socket365 240 8857-8881
START_RANGE client62 socket366 250 8881-8906
START_RANGE client63 socket367 240 8906-8930
START_RANGE client64 socket368 240 8930-8954
START_RANGE client61 socket369 250 8954-8979
START_RANGE client62 socket370 240 8979-9003
START_RANGE client63 socket371 240 9003-9027
START_RANGE client64 socket372 250 9027-9052
START_RANGE client61 socket373 240 9052-9076
START_RANGE client62 socket374 240 9076-9100
START_RANGE client63 socket375 250 9100-9125
START_RANGE client64 socket376 240 9125-9149
START_RANGE client65 socket377 240 9149-9173
START_RANGE client66 socket378 250 9173-9198
START_RANGE client67 socket379 240 9198-9222
START_RANGE client65 socket380 240 9222-9246
```

```
START_RANGE client66 socket381 250 9246-9271
START_RANGE client67 socket382 240 9271-9295
START_RANGE client65 socket383 240 9295-9319
START_RANGE client66 socket384 250 9319-9344
START_RANGE client67 socket385 240 9344-9368
START_RANGE client65 socket386 240 9368-9392
START_RANGE client66 socket387 250 9392-9417
START_RANGE client67 socket388 240 9417-9441
START_RANGE client68 socket389 240 9441-9465
START_RANGE client69 socket390 250 9465-9490
START_RANGE client610 socket391 240 9490-9514
START_RANGE client611 socket392 240 9514-9538
START_RANGE client68 socket393 250 9538-9563
START_RANGE client69 socket394 240 9563-9587
START_RANGE client610 socket395 240 9587-9611
START_RANGE client611 socket396 250 9611-9636
START_RANGE client68 socket397 240 9636-9660
START_RANGE client69 socket398 240 9660-9684
START_RANGE client610 socket399 250 9684-9709
START_RANGE client611 socket400 240 9709-9733
START_RANGE client68 socket401 240 9733-9757
START_RANGE client69 socket402 250 9757-9782
START_RANGE client610 socket403 240 9782-9806
START_RANGE client611 socket404 240 9806-9830
START_RANGE client612 socket405 250 9830-9855
START_RANGE client613 socket406 240 9855-9879
START_RANGE client614 socket407 240 9879-9903
START_RANGE client612 socket408 250 9903-9928
START_RANGE client613 socket409 240 9928-9952
START_RANGE client614 socket410 240 9952-9976
START_RANGE client612 socket411 250 9976-10001
START_RANGE client613 socket412 240 10001-10025
START_RANGE client614 socket413 240 10025-10049
START_RANGE client612 socket414 250 10049-10074
START_RANGE client613 socket415 240 10074-10098
START_RANGE client614 socket416 240 10098-10122
START_RANGE client615 socket417 250 10122-10147
START_RANGE client616 socket418 240 10147-10171
START_RANGE client617 socket419 240 10171-10195
START_RANGE client618 socket420 250 10195-10220
START_RANGE client615 socket421 240 10220-10244
START_RANGE client616 socket422 240 10244-10268
START_RANGE client617 socket423 250 10268-10293
START_RANGE client618 socket424 240 10293-10317
START_RANGE client615 socket425 240 10317-10341
START_RANGE client616 socket426 250 10341-10366
START_RANGE client617 socket427 240 10366-10390
START_RANGE client618 socket428 240 10390-10414
START_RANGE client615 socket429 250 10414-10439
START_RANGE client616 socket430 240 10439-10463
START_RANGE client617 socket431 240 10463-10487
START_RANGE client618 socket432 250 10487-10512

#elif MASTER_NUM3
START_RANGE client71 socket433 240 10512-10536
START_RANGE client72 socket434 240 10536-10560
START_RANGE client73 socket435 250 10560-10585
START_RANGE client74 socket436 240 10585-10609
START_RANGE client71 socket437 240 10609-10633
START_RANGE client72 socket438 250 10633-10658
START_RANGE client73 socket439 240 10658-10682
START_RANGE client74 socket440 240 10682-10706
START_RANGE client71 socket441 250 10706-10731
START_RANGE client72 socket442 240 10731-10755
START_RANGE client73 socket443 240 10755-10779
START_RANGE client74 socket444 250 10779-10804
START_RANGE client71 socket445 240 10804-10828
START_RANGE client72 socket446 240 10828-10852
START_RANGE client73 socket447 250 10852-10877
START_RANGE client74 socket448 240 10877-10901
START_RANGE client75 socket449 240 10901-10925
START_RANGE client76 socket450 250 10925-10950
START_RANGE client77 socket451 240 10950-10974
START_RANGE client75 socket452 240 10974-10998
START_RANGE client76 socket453 250 10998-11023
START_RANGE client77 socket454 240 11023-11047
START_RANGE client75 socket455 240 11047-11071
START_RANGE client76 socket456 250 11071-11096
START_RANGE client77 socket457 240 11096-11120
START_RANGE client75 socket458 240 11120-11144
START_RANGE client76 socket459 250 11144-11169
START_RANGE client77 socket460 240 11169-11193
START_RANGE client78 socket461 240 11193-11217
START_RANGE client79 socket462 250 11217-11242
START_RANGE client710 socket463 240 11242-11266
START_RANGE client711 socket464 240 11266-11290
START_RANGE client78 socket465 250 11290-11315
START_RANGE client79 socket466 240 11315-11339
START_RANGE client710 socket467 240 11339-11363
START_RANGE client711 socket468 250 11363-11388
START_RANGE client78 socket469 240 11388-11412
START_RANGE client79 socket470 240 11412-11436
START_RANGE client710 socket471 250 11436-11461
START_RANGE client711 socket472 240 11461-11485
START_RANGE client78 socket473 240 11485-11509
START_RANGE client79 socket474 250 11509-11534
START_RANGE client710 socket475 240 11534-11558
START_RANGE client711 socket476 240 11558-11582
START_RANGE client712 socket477 250 11582-11607
START_RANGE client713 socket478 240 11607-11631
START_RANGE client714 socket479 240 11631-11655
START_RANGE client712 socket480 250 11655-11680
START_RANGE client713 socket481 240 11680-11704
START_RANGE client714 socket482 240 11704-11728
START_RANGE client712 socket483 250 11728-11753
START_RANGE client713 socket484 240 11753-11777
START_RANGE client714 socket485 240 11777-11801
START_RANGE client712 socket486 250 11801-11826
START_RANGE client713 socket487 240 11826-11850
START_RANGE client714 socket488 240 11850-11874
START_RANGE client715 socket489 250 11874-11899
START_RANGE client716 socket490 240 11899-11923
START_RANGE client717 socket491 240 11923-11947
START_RANGE client718 socket492 250 11947-11972
START_RANGE client715 socket493 240 11972-11996
START_RANGE client716 socket494 240 11996-12020
START_RANGE client717 socket495 250 12020-12045
START_RANGE client718 socket496 240 12045-12069
START_RANGE client715 socket497 240 12069-12093
START_RANGE client716 socket498 250 12093-12118
START_RANGE client717 socket499 240 12118-12142
START_RANGE client718 socket500 240 12142-12166
START_RANGE client715 socket501 250 12166-12191
START_RANGE client716 socket502 240 12191-12215
START_RANGE client717 socket503 240 12215-12239
START_RANGE client718 socket504 250 12239-12264

START_RANGE client81 socket505 240 12264-12288
START_RANGE client82 socket506 240 12288-12312
START_RANGE client83 socket507 250 12312-12337
START_RANGE client84 socket508 240 12337-12361
START_RANGE client81 socket509 240 12361-12385
START_RANGE client82 socket510 250 12385-12410
START_RANGE client83 socket511 240 12410-12434
START_RANGE client84 socket512 240 12434-12458
START_RANGE client81 socket513 250 12458-12483
START_RANGE client82 socket514 240 12483-12507
START_RANGE client83 socket515 240 12507-12531
START_RANGE client84 socket516 250 12531-12556
START_RANGE client81 socket517 240 12556-12580
START_RANGE client82 socket518 240 12580-12604
START_RANGE client83 socket519 250 12604-12629
START_RANGE client84 socket520 240 12629-12653
START_RANGE client85 socket521 240 12653-12677
START_RANGE client86 socket522 250 12677-12702
START_RANGE client87 socket523 240 12702-12726
START_RANGE client85 socket524 240 12726-12750
START_RANGE client86 socket525 250 12750-12775
START_RANGE client87 socket526 240 12775-12799
START_RANGE client85 socket527 240 12799-12823
START_RANGE client86 socket528 250 12823-12848
START_RANGE client87 socket529 240 12848-12872
START_RANGE client85 socket530 240 12872-12896
START_RANGE client86 socket531 250 12896-12921
START_RANGE client87 socket532 240 12921-12945
START_RANGE client88 socket533 240 12945-12969
START_RANGE client89 socket534 250 12969-12994
START_RANGE client810 socket535 240 12994-13018
START_RANGE client811 socket536 240 13018-13042
START_RANGE client88 socket537 250 13042-13067
START_RANGE client89 socket538 240 13067-13091
START_RANGE client810 socket539 240 13091-13115
START_RANGE client811 socket540 250 13115-13140
START_RANGE client88 socket541 240 13140-13164
START_RANGE client89 socket542 240 13164-13188
START_RANGE client810 socket543 250 13188-13213
START_RANGE client811 socket544 240 13213-13237
START_RANGE client88 socket545 240 13237-13261
START_RANGE client89 socket546 250 13261-13286
START_RANGE client810 socket547 240 13286-13310
START_RANGE client811 socket548 240 13310-13334
START_RANGE client812 socket549 250 13334-13359
START_RANGE client813 socket550 240 13359-13383
START_RANGE client814 socket551 240 13383-13407
START_RANGE client812 socket552 250 13407-13432
START_RANGE client813 socket553 240 13432-13456
START_RANGE client814 socket554 240 13456-13480
START_RANGE client812 socket555 250 13480-13505
START_RANGE client813 socket556 240 13505-13529
START_RANGE client814 socket557 240 13529-13553
START_RANGE client812 socket558 250 13553-13578
START_RANGE client813 socket559 240 13578-13602
START_RANGE client814 socket560 240 13602-13626
START_RANGE client815 socket561 250 13626-13651
START_RANGE client816 socket562 240 13651-13675
START_RANGE client817 socket563 240 13675-13699
START_RANGE client818 socket564 250 13699-13724
START_RANGE client815 socket565 240 13724-13748
START_RANGE client816 socket566 240 13748-13772
START_RANGE client817 socket567 250 13772-13797
START_RANGE client818 socket568 240 13797-13821
START_RANGE client815 socket569 240 13821-13845
START_RANGE client816 socket570 250 13845-13870
START_RANGE client817 socket571 240 13870-13894
START_RANGE client818 socket572 240 13894-13918
START_RANGE client815 socket573 250 13918-13943
START_RANGE client816 socket574 240 13943-13967
START_RANGE client817 socket575 240 13967-13991
```

```
START_RANGE client818 socket576 250 13991-14016

START_RANGE client91 socket577 240 14016-14040
START_RANGE client92 socket578 240 14040-14064
START_RANGE client93 socket579 250 14064-14089
START_RANGE client94 socket580 240 14089-14113
START_RANGE client91 socket581 240 14113-14137
START_RANGE client92 socket582 250 14137-14162
START_RANGE client93 socket583 240 14162-14186
START_RANGE client94 socket584 240 14186-14210
START_RANGE client91 socket585 250 14210-14235
START_RANGE client92 socket586 240 14235-14259
START_RANGE client93 socket587 240 14259-14283
START_RANGE client94 socket588 250 14283-14308
START_RANGE client91 socket589 240 14308-14332
START_RANGE client92 socket590 240 14332-14356
START_RANGE client93 socket591 250 14356-14381
START_RANGE client94 socket592 240 14381-14405
START_RANGE client95 socket593 240 14405-14429
START_RANGE client96 socket594 250 14429-14454
START_RANGE client97 socket595 240 14454-14478
START_RANGE client95 socket596 240 14478-14502
START_RANGE client96 socket597 250 14502-14527
START_RANGE client97 socket598 240 14527-14551
START_RANGE client95 socket599 240 14551-14575
START_RANGE client96 socket600 250 14575-14600
START_RANGE client97 socket601 240 14600-14624
START_RANGE client95 socket602 240 14624-14648

START_RANGE client96 socket603 250 14648-14673
START_RANGE client97 socket604 240 14673-14697
START_RANGE client98 socket605 240 14697-14721
START_RANGE client99 socket606 250 14721-14746
START_RANGE client910 socket607 240 14746-14770
START_RANGE client911 socket608 240 14770-14794
START_RANGE client98 socket609 250 14794-14819
START_RANGE client99 socket610 240 14819-14843
START_RANGE client910 socket611 240 14843-14867
START_RANGE client911 socket612 250 14867-14892
START_RANGE client98 socket613 240 14892-14916
START_RANGE client99 socket614 240 14916-14940
START_RANGE client910 socket615 250 14940-14965
START_RANGE client911 socket616 240 14965-14989
START_RANGE client98 socket617 240 14989-15013
START_RANGE client99 socket618 250 15013-15038
START_RANGE client910 socket619 240 15038-15062
START_RANGE client911 socket620 240 15062-15086
START_RANGE client912 socket621 250 15086-15111
START_RANGE client913 socket622 240 15111-15135
START_RANGE client914 socket623 240 15135-15159
START_RANGE client912 socket624 250 15159-15184
START_RANGE client913 socket625 240 15184-15208
START_RANGE client914 socket626 240 15208-15232
START_RANGE client912 socket627 250 15232-15257
START_RANGE client913 socket628 240 15257-15281
START_RANGE client914 socket629 240 15281-15305
START_RANGE client912 socket630 250 15305-15330
START_RANGE client913 socket631 240 15330-15354
START_RANGE client914 socket632 240 15354-15378
START_RANGE client915 socket633 250 15378-15403
START_RANGE client916 socket634 240 15403-15427
START_RANGE client917 socket635 240 15427-15451
START_RANGE client918 socket636 250 15451-15476
START_RANGE client915 socket637 240 15476-15500
START_RANGE client916 socket638 240 15500-15524
START_RANGE client917 socket639 250 15524-15549
START_RANGE client918 socket640 240 15549-15573
START_RANGE client915 socket641 240 15573-15597
START_RANGE client916 socket642 250 15597-15622
START_RANGE client917 socket643 240 15622-15646
START_RANGE client918 socket644 240 15646-15670

START_RANGE client915 socket645 250 15670-15695
START_RANGE client916 socket646 240 15695-15719
START_RANGE client917 socket647 240 15719-15743
START_RANGE client918 socket648 250 15743-15768

#elif MASTER_NUM4
START_RANGE client101 socket649 240 15768-15792
START_RANGE client102 socket650 240 15792-15816
START_RANGE client103 socket651 250 15816-15841
START_RANGE client104 socket652 240 15841-15865
START_RANGE client101 socket653 240 15865-15889
START_RANGE client102 socket654 250 15889-15914
START_RANGE client103 socket655 240 15914-15938
START_RANGE client104 socket656 240 15938-15962
START_RANGE client101 socket657 250 15962-15987
START_RANGE client102 socket658 240 15987-16011
START_RANGE client103 socket659 240 16011-16035
START_RANGE client104 socket660 250 16035-16060
START_RANGE client101 socket661 240 16060-16084
START_RANGE client102 socket662 240 16084-16108
START_RANGE client103 socket663 250 16108-16133
START_RANGE client104 socket664 240 16133-16157
START_RANGE client105 socket665 240 16157-16181
START_RANGE client106 socket666 250 16181-16206
START_RANGE client107 socket667 240 16206-16230
START_RANGE client105 socket668 240 16230-16254
START_RANGE client106 socket669 250 16254-16279
START_RANGE client107 socket670 240 16279-16303
START_RANGE client105 socket671 240 16303-16327
START_RANGE client106 socket672 250 16327-16352
START_RANGE client107 socket673 240 16352-16376
START_RANGE client105 socket674 240 16376-16400
START_RANGE client106 socket675 250 16400-16425
START_RANGE client107 socket676 240 16425-16449
START_RANGE client108 socket677 240 16449-16473
START_RANGE client109 socket678 250 16473-16498
START_RANGE client1010 socket679 240 16498-16522
START_RANGE client1011 socket680 240 16522-16546
START_RANGE client108 socket681 250 16546-16571
START_RANGE client109 socket682 240 16571-16595
START_RANGE client1010 socket683 240 16595-16619
START_RANGE client1011 socket684 250 16619-16644
START_RANGE client108 socket685 240 16644-16668
START_RANGE client109 socket686 240 16668-16692
START_RANGE client1010 socket687 250 16692-16717
START_RANGE client1011 socket688 240 16717-16741
START_RANGE client108 socket689 240 16741-16765
START_RANGE client109 socket690 250 16765-16790
START_RANGE client1010 socket691 240 16790-16814
START_RANGE client1011 socket692 240 16814-16838
START_RANGE client1012 socket693 250 16838-16863
START_RANGE client1013 socket694 240 16863-16887
START_RANGE client1014 socket695 240 16887-16911
START_RANGE client1012 socket696 250 16911-16936
START_RANGE client1013 socket697 240 16936-16960
START_RANGE client1014 socket698 240 16960-16984
START_RANGE client1012 socket699 230 16984-17007
START_RANGE client1013 socket700 240 17007-17031
START_RANGE client1014 socket701 230 17031-17054
START_RANGE client1012 socket702 240 17054-17078
START_RANGE client1013 socket703 230 17078-17101
START_RANGE client1014 socket704 240 17101-17125
START_RANGE client1015 socket705 230 17125-17148
START_RANGE client1016 socket706 240 17148-17172
START_RANGE client1017 socket707 230 17172-17195
START_RANGE client1018 socket708 240 17195-17219
START_RANGE client1015 socket709 230 17219-17242
START_RANGE client1016 socket710 240 17242-17266
START_RANGE client1017 socket711 230 17266-17289
START_RANGE client1018 socket712 240 17289-17313
START_RANGE client1015 socket713 230 17313-17336
START_RANGE client1016 socket714 240 17336-17360
START_RANGE client1017 socket715 230 17360-17383
START_RANGE client1018 socket716 240 17383-17407
START_RANGE client1015 socket717 230 17407-17430
START_RANGE client1016 socket718 240 17430-17454
START_RANGE client1017 socket719 230 17454-17477
START_RANGE client1018 socket720 230 17477-17500


#endif
/*----------------------------------------------------------------------------*/

#define TES_FLAG_TRACE          0x00000010
#define TES_FLAG_KEYSTROKE_TIME 0x00000200
#define TES_FLAG_LOCAL_LOG      0x00000400
#define TES_FLAG_LOCAL_TRACE    0x00000800
#define TES_FLAG_LOCAL_IPRINT   0x00004000

#if 0
/* SETFLAG ALL TES_FLAG_TRACE */
SETFLAG ALL TES_FLAG_LOCAL_TRACE
SETFLAG ALL TES_FLAG_LOCAL_IPRINT
#endif

#if 0
SETFLAG client31 telnet 1 TES_FLAG_KEYSTROKE_TIME
#endif
```

D.2 user_master.C

```
/*****************************************************************************/
/* user_master.C                                Audit: 05/30/96 */
/*****************************************************************************/

static char *rcsid="$Id: user_master.C,v 1.1 1999/02/22 06:31:05 channui Exp $";

#include <iostream.h>
#include <stdio.h>
#include <string.h>
#include <stdlib.h>
#include <unistd.h>
#define _H_CUR01
#include <cur00.h>
#undef _H_CUR01
extern "C" {
#include "data/cur01.h"
int wrefresh (WINDOW *);
```

```
int wclrtoeol(WINDOW *);
int setupterm(char*,FILE*,int*);
int nodelay(int);
int keypad(int);
int wgetch(WINDOW *);
}
#include "data/rte.h"
#include "data/Stats.h"
#include "data/misc.h"
#include "user_tpcc.h"

struct header_s {
   int slave;
   int num;
   int type;
   int num_timestamps;
   int user_data_length;
   int data_type;
};


char *get_variable(char *name);
int get_variable(char *name, int *number);
int send_global_data(void);
int make_ratios (double *buffer);
extern int ramp_up_complete;
extern int interval_start_time, interval_stop_time;
extern "C" int strcasecmp(char *s1, char *s2);
extern "C" int strncasecmp(char *s1, char *s2, int n);

struct UserSpawnData {
   int Warehouse;
   int District;
};

/* user_master.C */
int user_statistics_print(void);
// int user_spawn(int *length, char *buffer);
int user_spawn(int min, int max, int number, int *length, char *buffer);
int user_finished(int length, char *buffer);

extern SlaveStatus slave_status[MAX_SLAVES];

extern Stats status[MAX_TRAN_TYPE][MAX_TIMES];
extern WINDOW *statistics_win;
extern UserGlobal *shmglobal;

/* Transaction mix parameters */
double ratio_desired[6], ratio_min[6], ratio_max[6], ratio_range[6];
char *ratio_names[] = { "RTE", "NEWORDER", "PAYMENT", "ORDSTAT", "DELIVERY",
                "STOCKLEV", NULL };
char *Status_Names[] = {"Menu", "Keying", "Response", "Think"};


char *transaction_names[] = { "RTE", "New Order", "Payment", "Order Stat",
                  "Delivery", "Stock Level", NULL };

static int current_status = 2, status_needs_refresh = 1;

int user_statistics_print(void) {
   int i;
   static int count = 0;
   double ratios[6];
   if (status_needs_refresh) {
                count = 0;
                status_needs_refresh = 0;
                wmove   (statistics_win, 0, 0);
                wprintw (statistics_win, "%11s %8s %8s %8s %8s %8s %6s %6s %6s",
                                Status_Names[current_status], "90%", "Avg", "Min", "Max",
                                "Samples", "Ratio", "Mix", "Think");
   }
   make_ratios(ratios);


   for (i = 1; i <= 5; i++) {
                /* The reason we do this is because calculating the percentiles
                  is expensive */
                if (count % 10 == 0) {
                   wmove   (statistics_win, i, 0);
                   wprintw (statistics_win, "%11s %8.2f",
                                   transaction_names[i], status[i][current_status].ninety()/1000.0);
                   count = 0;
                }
                wmove   (statistics_win, i, 21);
                wprintw (statistics_win, "%8.2f %8.2f %8.2f %8d %6.2f %6.2f %6.2f",
                                status[i][current_status].average()/1000.0,
                                status[i][current_status].min()/1000.0,
                                status[i][current_status].max()/1000.0,
                                status[i][current_status].samples(),
                                ratios[i], shmglobal->chances[i],
                                status[i][3].average()/1000.0);
   }
   wmove   (statistics_win, 7, 0);

   extern int runtime_counts[MAX_TRAN_TYPE];
   extern int begin_time, ramp_up, run_time;
   int start = interval_start_time;
   int stop  = interval_stop_time;
   double interval = ((double)(stop-start) / (1000*60));
   double samples = status[1][2].samples();
   if (interval <= 0 || samples <= 0) {
                wprintw (statistics_win, "TPM-C: %7s / ", "-------");
   } else {
                wprintw (statistics_win, "TPM-C: %7.2f / ", samples/interval);
   }
   samples = runtime_counts[1];
   if (samples > 0) {
                start = begin_time+((ramp_up>=0)?ramp_up:0);
                if (run_time > 0 && stop > begin_time + ramp_up + run_time) {
                   stop = begin_time + ramp_up + run_time;
                }
                interval = (double)(stop - start)/(1000.0*60.0);
                wprintw (statistics_win, "%7.2f", samples/interval);
   } else {
                wprintw (statistics_win, "-------");
   }

   count++;
   return RTE_OK;
}

extern int login_begin;
int login_max_load;

const int MAX_WAREHOUSES=20000;
/* All of this 10 stuff is district size.  Should be a constant.
  Maybe fix that later */
int num_warehouses = -1;
int warehouses[MAX_WAREHOUSES*10];
int user_spawn(int min, int max, int number, int *length, char *buffer) {
//int user_spawn(int number, int *length, char *buffer) {
   int i, min_index;
   int adj_wh = num_warehouses;                                 // adjusted warehouse number
   UserSpawnData *ptr = (UserSpawnData *)buffer;
   *length = sizeof(*ptr);

//    min_index = 0;
//    for (i = 1; i < (num_warehouses)*10 && i < MAX_WAREHOUSES*10; i++) {
//
//  if both min and max are zero, running START, otherwise running
//                START_RANGE.  Must also determine what the ending warehouse number
//                will be for said range
//

                if (min ==0 && max == 0) {
                        min++;
                        min_index =  0 ;
                } else {
                        adj_wh = max;   // inclusive range of wh-s
                        min = min * 10;
                        min_index = min;
                }
   for (i = min ; i < (adj_wh)*10 && i < MAX_WAREHOUSES*10; i++) {
                if (warehouses[i] < warehouses[min_index]) {
                   min_index = i;
                }
   }

   ptr->Warehouse = min_index / 10 + 1;
   ptr->District  = min_index % 10 + 1;
   warehouses[min_index]++;
/*     iprint (IPRINT_INFO, "Driver for Warehouse %d, District %d started.  warehouses[%d]++ = %d\n",
          ptr->Warehouse, ptr->District, min_index, warehouses[min_index]); */
   return RTE_OK;
}

int user_finished(int length, char *buffer) {
   UserSpawnData *ptr = (UserSpawnData *)buffer;
   int temp = (ptr->Warehouse-1)*10+ptr->District-1;
   warehouses[temp]--;
/*     iprint (IPRINT_INFO, "Driver for Warehouse %d, District %d died.  warehouses[%d]-- = %d\n",
          ptr->Warehouse, ptr->District, temp, warehouses[temp]); */
   return RTE_OK;
}


double limit(double min, double max, double val) {
   if (val < min)
                return min;
   if (val > max)
                return max;
   return val;
}


int make_ratios (double *buffer) {
   int neword   = status[NEWORDER][0].samples();
   int payment  = status[PAYMENT] [0].samples();
   int ordstat  = status[ORDSTAT] [0].samples();
   int delivery = status[DELIVERY][0].samples();
   int stocklev = status[STOCKLEV][0].samples();
   int total    = neword + payment + ordstat + delivery + stocklev;
   int i;

   if (total == 0) {
                buffer[NEWORDER] = 100.0;
                for (i = 2; i < 6; i++) {
                   buffer[i] = ratio_desired[i];
```

```
                buffer[NEWORDER] -= buffer[i];
            }
            return 0;
    }

    buffer[PAYMENT]  = (double)payment  / (double)total * 100.0;
    buffer[ORDSTAT]  = (double)ordstat  / (double)total * 100.0;
    buffer[DELIVERY] = (double)delivery / (double)total * 100.0;
    buffer[STOCKLEV] = (double)stocklev / (double)total * 100.0;
    buffer[NEWORDER] = 100.0- buffer[PAYMENT] - buffer[ORDSTAT] -
                                            buffer[DELIVERY] - buffer[STOCKLEV];

    return total;
}

int user_global_update(int *length, char *buffer) {
    UserGlobal *shmglobal = (UserGlobal *)buffer;
    static double last[6];
    static last_test_state = 0;
    static int users_last=-1;
    double ratios[6];
    double current[6];
    int i, different = 0;
    int desired = 0;
    int host_busy, all_zero;

    *length = sizeof(*shmglobal);

    make_ratios(ratios);

    /* Calculate ratios we want for next time */
    /* Note: we just keep on with the desired values until ramp-up is complete
           this at least starts us out without any humps or spikes in the
                graph */
    if (ramp_up_complete) {
            current[NEWORDER] = 100.0;
            for (i = 2; i < 6; i++) {
                if (ratio_desired[i] > ratios[i]) {
                        current[i] = ratio_max[i];
                } else {
                        current[i] = 2*ratio_desired[i] - ratios[i];
                        if (current[i] < ratio_min[i])
                            current[i] = ratio_min[i];
                }
                current[NEWORDER] -= current[i];
            }
    } else {
            for (i = 1; i < 6; i++) {
                current[i] = ratio_desired[i];
            }
    }

    /* Add up all the users */
    /* This needs to be changed to be more transparent */
    shmglobal->total_users = 0;
    for (i = 0; i < MAX_SLAVES; i++) {
            shmglobal->total_users += slave_status[i].active;
            desired                += slave_status[i].desired;
    }
    /* Count up number of warehouses we WANT to have */
    if (num_warehouses < 0) {
            num_warehouses = (desired-1)/10+1;
    }
    shmglobal->max_warehouses = num_warehouses;

    host_busy = 0;
    all_zero = 1;
    for (i = 1; i <= 5; i++) {
            if (status[i][current_status].average() != 0) {
                all_zero = 0;
            }
            if ( status[i][current_status].average()/1000.0 > login_max_load ) {
                host_busy = 1;
            }
    }
    if (shmglobal->host_busy && all_zero) {
            host_busy = 1;
    }

    if (host_busy != shmglobal->host_busy) {
            shmglobal->host_busy = host_busy;
            different = 1;
    }

    for (i = 2; i < 6; i++) {
            if (current[i] != last[i])
                different = 1;
    }

    if (last_test_state != shmglobal->test_state) {
            different = 1;
            last_test_state = shmglobal->test_state;
    }

    // Don't send if it's the same as last time
    if ( !different && shmglobal->total_users == users_last ) {
            return RTE_ERROR;
    }
    users_last = shmglobal->total_users;
    for (i = 1; i < 6; i++) {
            shmglobal->chances[i] = last[i] = current[i];
    }

    return RTE_OK;
}

int user_isbusy() {
    return shmglobal->host_busy;
}


int parse_array(char *string, int max, int *buffer) {
    int i, rc;
    char *ptr;
    char *temp = strdup(string);
    ptr = strtok(temp, ",");
    for (i = 0; ptr && i < max; i++) {
            rc = sscanf(ptr, "%d", &buffer[i]);
            if (rc < 1) {
                free(temp);
                return i;
            }
            ptr = strtok(NULL, ",");
    }
    free(temp);
    return i;
}

int parse_array(char *string, int max, double *buffer) {
    int i, rc;
    char *ptr;
    char *temp = strdup(string);
    ptr = strtok(temp, ",");
    for (i = 0; ptr && i < max; i++) {
            rc = sscanf(ptr, "%lf", &buffer[i]);
            if (rc < 1) {
                free(temp);
                return i;
            }
            ptr = strtok(NULL, ",");
    }
    free(temp);
    return i;
}


int user_init() {
    double  dbuffer[32];
    int   rc, i;
    char *ptr;

    if (get_variable("KEYSTROKE_SLEEP", &shmglobal->keystroke_sleep) != RTE_OK) {
            shmglobal->keystroke_sleep = 0;
    }
    if (get_variable("LOGIN_TIMEOUT", &shmglobal->login_timeout) != RTE_OK) {
            shmglobal->login_timeout = 120; /* 2 minutes */
    }
    if (get_variable("KEYSTROKE_PACKET_SIZE", &shmglobal->keystroke_packet_size) != RTE_OK) {
            shmglobal->keystroke_packet_size = 0;
    }
    shmglobal->login_timeout *= 1000;
    if (get_variable("LOGIN_MAX_LOAD", &login_max_load) != RTE_OK) {
            login_max_load = 2;
    }
    if (get_variable("WAREHOUSES", &num_warehouses) != RTE_OK) {
            num_warehouses = -1;
    }
    if (get_variable("LASTC", &shmglobal->lastc) != RTE_OK) {
            shmglobal->lastc = 193; /* 2 minutes */
    }
    iprint(IPRINT_INFO, "Login Timeout = %s\n", mstoa(shmglobal->login_timeout, 0));
    iprint(IPRINT_INFO, "Keystroke Sleep = %s\n", mstoa(shmglobal->keystroke_sleep*1000, 0));
    iprint(IPRINT_INFO, "Keystroke Packet Size= %d\n", shmglobal->keystroke_packet_size);
    if (num_warehouses >= 0) {
            iprint(IPRINT_INFO, "Fixed Warehouses to = %d\n", num_warehouses);
    }

    if (!(ptr = get_variable("NEWORDER"))) {
            iprint_error ("Error. NEWORDER variable not found\n");
            exit (1);
    }
    if (parse_array(ptr, 3, dbuffer)!=3) {
            iprint_error ("Error. NEWORDER should be think, emulex_menu, emulex_response");
            exit (1);
    }
    shmglobal->think          [NEWORDER] = dbuffer[0];
    shmglobal->emulex_menu    [NEWORDER] = dbuffer[1];
    shmglobal->emulex_response[NEWORDER] = dbuffer[2];
    shmglobal->test_state = 0;

    for (i = 2; i < 6; i++) {
            if (!(ptr = get_variable(ratio_names[i])) ||
                (parse_array(ptr, 6, dbuffer)!=6)) {
                iprint(__FILE__, __LINE__, IPRINT_ERROR,
                     "Error. %s should be think, emulex_menu, emulex_response, desired, min, max",
                            ratio_names[i]);
                exit (1);
```

```
                }
                shmglobal->think[i]          = dbuffer[0];
                shmglobal->emulex_menu[i]    = dbuffer[1];
                shmglobal->emulex_response[i] = dbuffer[2];
                ratio_desired[i]             = dbuffer[3];
                ratio_min[i]                 = dbuffer[4];
                ratio_max[i]                 = dbuffer[5];
                ratio_range[i]               = ratio_max[i]-ratio_min[i];
   }

   return RTE_OK;
}

int user_extra_data(header_s *header) {
   int i;
   int num_timestamps;

   if (header->data_type != RTE_ITEM_KEYSTROKE_TIMES)
                return RTE_OK;
   int *times = (int *)((char *)header+sizeof(struct header_s));
   num_timestamps = header->user_data_length / 4 - 1;

   iprint (IPRINT_TRACE, "Keystroke times = ");
   for (i = 0 ; i < num_timestamps; i++) {
                iprint (IPRINT_TRACE, "%d ", times[i]);
   }
   iprint (IPRINT_TRACE, "\n", times[i]);

   return RTE_OK;
}

int user_process_command(char *command) {
   char buffer[256], *ptr;
   int i, found, len;
   strncpy (buffer, command, 256);
   ptr = strtok (buffer, " \t");
   found = 0;
   printf ("user_process_command('%s')\n",ptr);
   if (!strcasecmp (ptr, "pause")) {
                shmglobal->test_state = 1;
   } else if (!strcasecmp (ptr, "warmup")) {
                shmglobal->test_state = 2;
   } else if (!strcasecmp (ptr, "notest")) {
                shmglobal->test_state = 0;
   } else if (!strcasecmp (ptr, "login_max_load?")) {
                iprint (IPRINT_WARNING, "Current LOGIN_MAX_LOAD = %d\n", login_max_load);
   } else if (!strncasecmp (command, "login_max_load=",15)) {
                login_max_load=atoi(command+15);
                iprint (IPRINT_WARNING, "Set LOGIN_MAX_LOAD = %d\n", login_max_load);
   } else if (!strcasecmp (ptr, "display")) {
      while (ptr && (ptr = strtok(NULL, " \t"))) {
         if (*ptr == '\0')
            continue;
         for (i = 0; i < 5; i++) {
            len = min(strlen(Status_Names[i]), strlen(ptr));
            if (!strncasecmp (ptr, Status_Names[i], len)) {
               status_needs_refresh = found = 1;
               current_status = i;
               return RTE_OK;
            }
         }
         iprint (IPRINT_WARNING, "Unknown type to display: %s\n", ptr);
      }
   } else {
                iprint (IPRINT_WARNING, "Unknown Command: '%s'\n", command);
                return RTE_ERROR;
   }
   return RTE_OK;
}

int transaction_process () {
   return RTE_OK;
}

int user_begin() {
   return RTE_OK;
}

void user_make_header(char *buffer) {
   int i;
   struct user_data_header *data = (struct user_data_header *)buffer;
}
```

D.3 user_slave.C

```
/*****************************************************************************/
/* user_slave.C                                  Audit: 05/30/96 */
/*****************************************************************************/

static char *rcsid="$Id: user_slave.C,v 1.1 1999/02/22 06:31:06 channui Exp $";

/*****************************************************************************/
/***                TPCC FILE FOR ALL USERS                        ***/
/*****************************************************************************/
#include <stdio.h>
#include <stdlib.h>
#include <unistd.h>
#include <string.h>
#include <sys/time.h>
#include "rte_slave.h"
#include "user_tpcc.h"

/* This MUST match the corresponding one in client's inout.h file! */
#define TRIGGER "\021"
//#define NOSLEEP
// Increased EXPECT_TIMEOUT from 600000 - oz 10/20/97
#define EXPECT_TIMEOUT 6000000
#define KEYWAIT_FUDGE  5000

extern SHM_Slave *shm;
extern TableEntrySlave *shmentry;
extern DriverStatus    *status;
extern echo_trace(char *);
extern echo_trace();
extern char *expect_save;

const char *SQL_TPERRNO_MESSAGE = "tperrno";
const char *SQL_RTN_MESSAGE =     "rtn:";
const char *SQL_FATAL_MESSAGE =   "SQL Fatal Error";
const char *ROLLBACK_MESSAGE =    "Item number is not valid";

int            WHSEID;                        /* warehouse number for each users */

/*****************************************************************************/
/* The "uniform()" function has range of the absolute value of the       */
/* difference between the min. and the max values upto 2147483647.      */
/*****************************************************************************/
/*-----------------------------------------------------------*/
/* NURand                                */
/*-----------------------------------------------------------*/
/* A: 255 for C_LAST, 1023 for C_ID, 8191 for OL_I_ID   */
/* x: 0 for C_LAST, 1 for C_ID and OL_I_ID              */
/* y: 999 for C_LAST, 3000 for C_ID, 100000 for OL_I_ID */
/*-----------------------------------------------------------*/
long
NURand(int A, int x, int y, long cval)
{
   return ((((long) uniform((long) 0, (long) A) | (long) uniform((long) x, (long) y)) + cval) % (y - x + 1)) + x;
}

/*-----------------------------------------------------------*/
/* getname                               */
/*-----------------------------------------------------------*/
/* generates a random number from 0 to 999 inclusive    */
/* a random name is generated by associating a random   */
/* string with each digit of the generated number       */
/* three strings are concatenated to generate lastname  */
/*-----------------------------------------------------------*/
char           *
getname()
{
   char           *last_name_parts[] =
   {
    "BAR",
    "OUGHT",
    "ABLE",
    "PRI",
    "PRES",
    "ESE",
    "ANTI",
    "CALLY",
    "ATION",
    "EING"
   };
   static char     lastname[128];
   int             random_num;

#if 1
   random_num = NURand(255, 0, 999, shmglobal->lastc);
#else
   random_num = NURand(255, 0, 999, LASTC);
#endif
   strcpy(lastname, last_name_parts[random_num / 100]);
   random_num %= 100;
   strcat(lastname, last_name_parts[random_num / 10]);
   random_num %= 10;
   strcat(lastname, last_name_parts[random_num]);
   return (lastname);
}

typedef struct gen_tran_s {
   int invalid;
   void *data;
   long len;
   long keywait;
   long type;
   char *menu;
   char *request;
} gen_tran_t;

int generic_transaction( gen_tran_t *data ) {
   char buffer[2048];
   static int consecutive_errs = 0;
   int rc;
   set_typing_delay(0);
```

```
    iprint(IPRINT_TRACE, "> generic_transaction sleep (%d)\n", data->type);
#ifndef NOSLEEP
    if (shmglobal->test_state == 0)
                transaction_sleep_do();
#endif

#ifdef EXPECT_TIMEOUT
    int timeout = EXPECT_TIMEOUT;
#else
    int timeout = 0;
#endif

    // Start the transaction (MENU)
    iprint(IPRINT_TRACE, "> generic_transaction start (%d)\n", data->type);
    transaction_start(data->type, data->len, data->data);

    iprint(IPRINT_TRACE, "> transmit data->menu\n");
    transmit(data->menu);
    echo_trace ("Waiting for Menu (DELIVERY)");
    if (expect(TRIGGER, timeout) == ERROR) {
                iprint (IPRINT_ERROR, "Slave %d: Failed to receive %s screen\n",
                        shmentry->num, data->menu);
                return (ERROR);
    }
#ifndef NOSLEEP
    usleep(shmglobal->emulex_menu[data->type]*1000000.0+0.9);
#endif

    // Send our request (KEYING)
    transaction_mark(WHERE_NOW);
    echo_trace ("Keying");

#ifndef NOSLEEP
    usleep(data->keywait*1000000+KEYWAIT_FUDGE); // Keying delay
#endif
    // Wait for response (RESPONSE)
    transaction_mark(WHERE_NOW);

    iprint(IPRINT_TRACE, "> transmit data->request\n");
    transmit(data->request);

    echo_trace ("Wait for Response");
    if (expect(TRIGGER, timeout) == ERROR) {
                iprint (IPRINT_ERROR, "Slave %d: Failed to receive %s response\n",
                                shmentry->num, data->menu);
                return (ERROR);
    }
#ifndef NOSLEEP
    usleep(shmglobal->emulex_response[data->type]*1000000.0+0.9);
#endif

    // Look for errors and set our think time (THINK)
    transaction_mark(WHERE_NOW);
    if (expect_after_match ("ERROR: ")) {
                data->invalid = 1;
                iprint (IPRINT_ERROR, "Slave %d: %s found '%s'\n",
                        shmentry->num, data->menu, "ERROR:");
                // Very dangerous, keep going rather than exiting...
                return RTE_ERROR;
                // Check for consecutive errors and if there are more than
                // 4 of them exit - allow for transient errors to make
                // tuning and testing easier   -oz
                // In either case the transaction is marked as invalid and
                // will be reported as an error by the analyze program.
                // if (consecutive_errs++ > 4)
                //    return RTE_ERROR;
    } else {
                consecutive_errs = 0;
    }
    echo_trace ("Thinking");
    transaction_sleep_set(neg_exp_4(shmglobal->think[data->type])*1000.0);
    iprint(IPRINT_TRACE, "< generic_transaction finish\n");
    return (RTE_OK);
}

/*****************************************************************************/
/***                  Delivery Transaction                             ***/
/*****************************************************************************/
int
Delivery()
{
    static struct delivery_struct delivery, delivery_new;
    int             rc;
    char            *ptr;
    char                buffer[256];
    gen_tran_t      tran;

    tran.invalid = 0;
    tran.data    = &delivery;
    tran.len     = sizeof(delivery);
    tran.keywait = 2;
    tran.type    = DELIVERY;
    tran.menu    = "4";
    tran.request = buffer;

    // Set up all data for new transactions
    delivery_new.carrier = uniform(1, 10);      // carrier # 1 to 10

    // Now create the actual request
    ptr = buffer;
    ptr += sprintf(ptr, "%d\n", delivery_new.carrier);

    // Go do the transaction
    rc = generic_transaction(&tran);
    delivery        = delivery_new;
    delivery.invalid = tran.invalid;

    return (rc);
}

/*****************************************************************************/
/***                  New Order Transaction                            ***/
/*****************************************************************************/
int NewOrder() {
    static struct neword_struct neword, neword_new;
    int             i, rc, whses, low_whse=1;
    char            buffer[2048];
    char            *ptr;
    const char      *ptr2;
    gen_tran_t      tran;

    tran.invalid = 0;
    tran.data    = &neword;
    tran.len     = sizeof(neword);
    tran.keywait = 18;
    tran.type    = NEWORDER;
    tran.menu    = "1";
    tran.request = buffer;

    neword_new.rollback=0;

    /*** SECTION TO DETERMINE ROLLBACK TRANSACTION FOR 1% OF NEW ORDERS ***/
    neword_new.did = uniform(1, 10);                    // district number
    neword_new.cid = NURand(1023, 1, 3000, CUSTC);    // customer # 1 to 3000
    neword_new.nloop = uniform(5, 15);        // number of items to order (5-15)
    neword_new.olremote=0;  // find total number of remote order-lines

    whses = shmglobal->max_warehouses;

    for (i = 0; i < neword_new.nloop; i++) {
                // Warehouse Number
                neword_new.item[i].olswid = WHSEID;
                if (whses > 1 && (uniform(0.0, 100.0) < 1.0)) {
                   /* for 1% of items (if * uniform()==0) */
                   /* Generate a uniform whse number that's different from WHSEID */
                   neword_new.item[i].olswid =
                                (long) uniform((long) low_whse, (long)whses-1);
                   if (neword_new.item[i].olswid >= WHSEID)
                                neword_new.item[i].olswid++;
                   neword_new.olremote++;  // find total number of remote order-lines
                }
                // Item number 1-100000
                neword_new.item[i].oliid = NURand(8191, 1, 100000, ITEMC);
                // Quantity 1-10
                neword_new.item[i].olquantity = uniform(1, 10);
    }                                                   /* end of for n_loop */
    // We occasionally force a transaction to have invalid data to force a
    // rollback
    if (uniform(1, 5000) <= 50)
                neword_new.item[neword_new.nloop-1].oliid = 999999;

    neword_new.oremote = (neword_new.olremote > 0);

    // Now create the actual request
    ptr = buffer;
    ptr += sprintf(ptr, "%d\t%d", neword_new.did, neword_new.cid);
    for (i = 0; i < neword_new.nloop; i++) {
                ptr += sprintf(ptr, "\t%d\t%d\t%d",
                                        neword_new.item[i].olswid,
                                        neword_new.item[i].oliid,
                                        neword_new.item[i].olquantity);
    }
    ptr += sprintf(ptr, "\n");

    // Go do the transaction
    rc = generic_transaction(&tran);
    neword          = neword_new;
    neword.invalid = tran.invalid;

    // Check for a rollback
    if (expect_after_match (ROLLBACK_MESSAGE)) {
                neword.rollback=1;
                echo_trace ("Found rollback!\n");
    }

    // Grab the orderID from the
    if (!(ptr2 = expect_after_match("\033[6;15H"))) {
                echo_trace ("Didn't find order-id for neworder");
                iprint (IPRINT_ERROR, "Neworder didn't have Order-ID");
                neword.oid = -1;
    } else {
                neword.oid = atoi(ptr2+8);
    }

    // This is really not useful since we aren't going to be sending individual
    // keystrokes anymore
    if (shmentry->flags & TES_FLAG_KEYSTROKE_TIME) {
```

```
                log_data(RTE_ITEM_KEYSTROKE_TIMES,
keystroke_length*sizeof(int),keystroke_times);
    }

    return (rc);
}


/*****************************************************************************/
/***                Order Status Transaction                               ***/
/*****************************************************************************/
int OrderStatus() {
    static struct ordstat_struct ordstat, ordstat_new;
    char            buffer[2048];
    int             rc;
    char            *ptr;
    gen_tran_t      tran;

    tran.invalid = 0;
    tran.data    = &ordstat;
    tran.len     = sizeof(ordstat);
    tran.keywait = 2;
    tran.type    = ORDSTAT;
    tran.menu    = "3";
    tran.request = buffer;

    // Set up all data for new transactions
    ordstat_new.did = uniform(1, 10);           /* district number 1 to 10 */
    if (uniform(1, 100) <= 60) {/* for 60% of transactions */
                char *tmp = getname();
                strcpy(ordstat_new.clast, tmp);                 /* by customer last name */
                if (ordstat_new.clast[0] < 'A' || ordstat_new.clast[0] > 'Z') {
                    iprint (IPRINT_ERROR,
                        "ASSERTION: OrderStatus getname() returns invalid name! '%s'\n",
                                ordstat_new.clast);
                    return RTE_ERROR;
                }
                ordstat_new.byname = 1;
                ordstat_new.cid = 0;
    } else {
                ordstat_new.cid = NURand(1023, 1, 3000, CUSTC);         /* cust. # 1 to 3000 */
                ordstat_new.byname = 0;
                ordstat_new.clast[0] = (char) NULL;
    }

    // Now create the actual request
    ptr = buffer;
    ptr += sprintf(ptr, "%d\t", ordstat_new.did);
    if (ordstat_new.byname) {
                ptr += sprintf(ptr, "\t%s\n", ordstat_new.clast);
    } else {
                ptr += sprintf(ptr, "%d\n", ordstat_new.cid);
    }

    // Go do the transaction
    rc = generic_transaction(&tran);
    ordstat         = ordstat_new;
    ordstat.invalid = tran.invalid;

    return (rc);
}

/*****************************************************************************/
/***                Payment Transaction                                    ***/
/*****************************************************************************/
int
Payment()
{
    static struct payment_struct payment, payment_new;
    int             dollars, cents, rc, whses, low_whse = 1;
    char            buffer[2048];
    char            *ptr;
    gen_tran_t      tran;

    tran.invalid = 0;
    tran.data    = &payment;
    tran.len     = sizeof(payment);
    tran.keywait = 3;
    tran.type    = PAYMENT;
    tran.menu    = "2";
    tran.request = buffer;

    payment_new.did = uniform(1, 10);           /* district number 1 to 10 */
    if (uniform(1, 100) <= 60) {/* for 60% of transactions */
                strncpy(payment_new.clast, getname(), 17);    // by customer last name
                if (payment_new.clast[0] < 'A' || payment_new.clast[0] > 'Z') {
                    iprint (IPRINT_ERROR,
                        "ASSERTION: payment_new getname() returns invalid name! '%s'\n",
                                payment_new.clast);
                    return RTE_ERROR;
                }
                payment_new.byname = 1;
                payment_new.cid = 0;
    } else {
                payment_new.cid = NURand(1023, 1, 3000, CUSTC);         /* cust. # 1 to 3000 */
                payment_new.byname = 0;
                payment_new.clast[0] = (char) NULL;
    }

    whses = shmglobal->max_warehouses;

    if (whses < 2 || uniform(1, 100) <= 85) {/* for 85 % of transactions */
                payment_new.cwid = WHSEID;
                payment_new.cdid = payment_new.did;
                payment_new.remote = 0;
    } else {                                    /* for 15 % of transactions */
                payment_new.cwid = (long) uniform((long)low_whse, (long) whses-1);
                if (payment_new.cwid >= WHSEID)
                    payment_new.cwid++;

                payment_new.remote = 1;
                payment_new.cdid = uniform(1, 10);          /* district 1 to 10 */
    }

    dollars = uniform(1, 5000); /* dollar amt = 1 to 5000 */
    if (dollars == 5000)
                cents = 0;
    else
                cents = uniform(0, 99);

    payment_new.amount = ((double) dollars) + ((double) cents) / 100.0;

    // Now create the actual request
    ptr = buffer;
    ptr += sprintf(ptr, "%d\t", payment_new.did);
    if (payment_new.byname) {
                ptr += sprintf(ptr, "\t%s\t", payment_new.clast);
    } else {
                ptr += sprintf(ptr, "%d\t\t", payment_new.cid);
    }
    ptr += sprintf(ptr, "%d\t%d\t", payment_new.cwid, payment_new.cdid);
    ptr += sprintf(ptr, "%d.%02.2d\n", dollars, cents);

    // Go do the transaction
    rc = generic_transaction(&tran);
    payment         = payment_new;
    payment.invalid = tran.invalid;

    return (rc);
}

/*****************************************************************************/
/***                Stock Level Transaction                                ***/
/*****************************************************************************/
int
StockLevel()
{
    static struct stocklev_struct stocklevel, stocklevel_new;
    char            buffer[2048];
    int             rc;
    char            *ptr;
    gen_tran_t      tran;

    tran.invalid = 0;
    tran.data    = &stocklevel;
    tran.len     = sizeof(stocklevel);
    tran.keywait = 2;
    tran.type    = STOCKLEV;
    tran.menu    = "5";
    tran.request = buffer;

    stocklevel_new.invalid = 0;
    stocklevel_new.threshold = uniform(10, 20);                 /* uniform no. between 10 and
                                                                                                * 20 */
    // Now create the actual request
    ptr = buffer;
    ptr += sprintf(ptr, "%d\n", stocklevel_new.threshold);

    // Go do the transaction
    rc = generic_transaction(&tran);
    stocklevel         = stocklevel_new;
    stocklevel.invalid = tran.invalid;

    return (rc);
}


/*****************************************************************************/
/***  MAIN()                                                               ***/
/*****************************************************************************/
int
user_transaction()
{
    char            logout[32];
    double          ntask;
    int             resp;
    static int task = 0;

    if (shmentry->flags & TES_FLAG_KEYSTROKE_TIME) {
                int rc;
                /* Wait for specified period of time */
                sleep (shmglobal->keystroke_sleep);
                /* Quit after one transaction */
                shm->lock(shmentry->pid);
                shmentry->flags |= TES_FLAG_DIE;
                shm->unlock(shmentry->pid);
                rc = NewOrder();
                iprint (IPRINT_INFO, "Slave %d: Keystroke timing setting die flag\n", shmentry->num);
```

```
                return rc;
  }

#if 1
  switch (shmglobal->test_state) {
  case 0: // Normal
                break;
  case 1: // pause
                sleep (1);
                return RTE_OK;
  case 2: // warmup
                switch(task++) {
                case 0: return Delivery();
                case 1: return OrderStatus();
                case 2: return Payment();
                case 3: return StockLevel();
                case 4: task = 0; return NewOrder();
                }
  }
  /*************************************************************************/
  /***  CHOOSE ONE OF THE TRANSACTIONS                                   ***/
  /*************************************************************************/
  ntask = (double) uniform(0.0, 100.0);
  if (ntask <= shmglobal->chances[DELIVERY]) {
                return Delivery();
  }
  ntask -= shmglobal->chances[DELIVERY];
  if (ntask <= shmglobal->chances[ORDSTAT]) {
                return OrderStatus();
  }
  ntask -= shmglobal->chances[ORDSTAT];
  if (ntask <= shmglobal->chances[PAYMENT]) {
                return Payment();
  }
  ntask -= shmglobal->chances[PAYMENT];
  if (ntask <= shmglobal->chances[STOCKLEV]) {
                return StockLevel();
  }
  return NewOrder();
#else
  // this code should be shared between all of the users on a slave
  // int the best case it should be shared between all of the slaves,
  // but that would be too costly.
  // for now it is done on a per user basis.  If this thing is ever
  // modified to be threaded then it will probably go to the per-process
  // basis.  Although with shared memory, it would be possible to go to
  // per-slave.  Actually, before this code is put into use it must be
  // fixed up to share across processes.  Right now it will take, on average,
  // 22 minutes for one user to just key in the 100 entries.

  // use a card deck with no replacement to fulfill the requirements
  {
                int deck[100], count=-1, i, size=1, tmp;
                // lock deck
                if (count < 0) {
                   // deck is empty fill it up
                   count = 0;
                   for (i = 0; i < 43 * size; i++) {
                                deck[count++] = Payment;
                   }
                   for (i = 0; i < 4 * size; i++) {
                                deck[count++] = StockLevel;
                   }
                   for (i = 0; i < 4 * size; i++) {
                                deck[count++] = OrderStatus;
                   }
                   for (i = 0; i < 4 * size; i++) {
                                deck[count++] = Delivery;
                   }
                   for (; count < 100 * size; i++) {
                                deck[count++] = NewOrder;
                   }
                   // randomize the deck
                   for (i = 0; i < 100 * size; i++) {
                                int tmp;
                                int pick = uniform(i+1, 100);
                                tmp = deck[i];
                                deck[i] = deck[pick];
                                deck[pick] = tmp;
                   }
                }
                tmp = deck[count--];
                // unlock deck
                switch(tmp) {
                case Delivery:    return Delivery();
                case OrderStatus: return OrderStatus();
                case Payment:     return Payment();
                case StockLevel:  return StockLevel();
                case NewOrder:    return NewOrder();
                }
  }
#endif

#if 0
  if (resp != RTE_OK) {                 /* logoff if response is not correct */
                strcpy(logout, "9\n");          /* menu option 9 */
                transmit(logout);
                resp = expect("tpcc_cstux_inf:");
                return (ERROR);
   } else
                return (RTE_OK);
#endif
}                                                       /* end of main */

int user_parameter_change(void) {
   #if 0
   int i;
   iprint(IPRINT_TRACE, "Slave %d: total_users = %d\n", shmentry->num);
   iprint(IPRINT_TRACE, "Slave %d: chances     = ", shmentry->num);
   for (i = 0; i < MAX_TRAN_TYPE; i++)
                iprint(IPRINT_TRACE, "%6.2f ", shmglobal->chances[i]);
   iprint(IPRINT_TRACE, "\nSlave %d: think       = ", shmentry->num);
   for (i = 0; i < MAX_TRAN_TYPE; i++)
                iprint(IPRINT_TRACE, "%6.2f ", shmglobal->think[i]);
   iprint(IPRINT_TRACE, "\n");
   #endif
   return RTE_OK;
}

int user_login(char *user, char *password, void *data) {
   UserLocal *localdata = (UserLocal *)data;
   int rc;
   int timeout_value = shmglobal->login_timeout;
   char buffer[32];
   set_typing_delay(0);

   rc = expect   (TRIGGER, timeout_value);
   if (rc == RTE_ERROR) {
                iprint (IPRINT_ERROR, "Slave %d: didn't find Warehouse prompt\n", shmentry->num);
   }
   sprintf(buffer, "%d\t%d\n", localdata->Warehouse, localdata->District);
   transmit(buffer);
   iprint (IPRINT_TRACE, "Slave %d: Warehouse=%d, District=%d, pid=%d\n", shmentry->num,
localdata->Warehouse, localdata->District, getpid());

   rc = expect (TRIGGER, timeout_value);
   if (rc != RTE_OK) {
      iprint (IPRINT_ERROR, "Slave %d: Failed logging in\n", shmentry->num);
                return RTE_ERROR;
   }
   return RTE_OK;
}

int user_init () {
   extern int expect_save_active;
   WHSEID = shmlocal->Warehouse;

   status->max_transmit =  shmglobal->keystroke_packet_size;
   expect_save_active = 1;
   return RTE_OK;
}

int user_logout () {
   transmit("9");
   iprint (IPRINT_TRACE, "Slave %d: Warehouse=%d, District=%d\n", shmentry->num,
shmlocal->Warehouse, shmlocal->District);
   return RTE_OK;
}

int user_cleanup () {
   transaction_sleep_do();
   transaction_start(0, 0, NULL); // Just something to clear out the buffer...
   return RTE_OK;
}

int user_spawn_ok() {
   int rc, hb;
   hb = ((UserGlobal *)(shm->global_data))->host_busy;
   rc = hb?RTE_ERROR:RTE_OK;
   return rc;
}
```

D.4 user_tpcc.h

```
/*************************************************************************/
/* user_tpcc.h                                   Audit: 05/30/96 */
/*************************************************************************/

/* $Id: user_tpcc.h,v 1.1 1999/02/22 06:31:06 channui Exp $ */

#ifndef USER_TPCC_H
#define USER_TPCC_H
/*************************************************************************/
/***   run-time constant for customer last name from 0 to 255,         ***/
/***   run-time constant for customer id from 0 to 1023,               ***/
/***   run-time constant for item id from 0 to 8191.                   ***/
/*************************************************************************/
/* #define       LASTC         117 */
/* Change for 3.1 */
#define         LASTC         193
#define         CUSTC         319
#define         ITEMC         3849

/*************************************************************************/
```

```
/***    response type
***/
/*****************************************************************************/
/* #define OK  1  */
/* #define ERROR               -1 */

/*****************************************************************************/
/***    transaction type
***/
/*****************************************************************************/
#define         NEWORDER 1
#define         PAYMENT                 2
#define         ORDSTAT                 3
#define         DELIVERY   4
#define         STOCKLEV   5

/*****************************************************************************/
/***    transaction structures
***/
/*****************************************************************************/
struct neword_struct {
    char        invalid;        /* transaction completed sucessfully */
    long        did;
    long        cid;
    long        oid;    /* Order-ID returned from client */
    long        nloop;          /* number of order line, avg = 15 */
    char        oremote;        /* 1 for remote order, 10% */
    long        olremote;       /* number of remote order line, 1% */
    char        rollback;       /* actually saw rollback text on screen */
    struct items_struct {
                long            olswid;
                long            oliid;
                long            olquantity;
    } item[15];
};

struct payment_struct {
    char        invalid;        /* transaction completed sucessfully */
    long did;
    long cid;
    long cwid;
    long cdid;
    char clast[17];
    double amount;
    char byname;                                        /* 1 for by last name, 0 for by id */
    char remote;                                        /* 1 for remote wardhouse, 0 otherwise */
};

struct ordstat_struct {
    char        invalid;        /* transaction completed sucessfully */
    long did;
    long cid;
    char clast[17];
    char byname;                                        /* 1 for by last name, 0 for by id */
};

struct delivery_struct {
    char        invalid;        /* transaction completed sucessfully */
    char carrier;
};

struct stocklev_struct {
    char        invalid;        /* transaction completed sucessfully */
    long threshold;
};

struct generic_struct {
    char        invalid;        /* transaction completed sucessfully */
};

union transaction_info {
    char   invalid;
    struct generic_struct  generic;
    struct neword_struct   neword;
    struct payment_struct  payment;
    struct ordstat_struct  ordstat;
    struct delivery_struct delivery;
    struct stocklev_struct stocklev;
};

struct UserGlobal {
    int total_users;
    int max_warehouses;
    int keystroke_sleep;
    int login_timeout;
    int keystroke_packet_size;
    int lastc;
    int test_state;
    int host_busy;
    double chances[MAX_TRAN_TYPE];
    double think[MAX_TRAN_TYPE];
    double emulex_response[MAX_TRAN_TYPE];
    double emulex_menu    [MAX_TRAN_TYPE];
};

struct UserLocal {
    int Warehouse;
    int District;
};

struct user_data_header {
};

extern UserGlobal *shmglobal;
extern UserLocal  *shmlocal;

#endif
```

Appendix E: Third Party Quotes