



**TPC Benchmark C®
Full Disclosure Report**

**Compaq AlphaServer GS320
Client/Server System
Using
Oracle9i, 9.0.1. Enterprise Edition for
Tru64 UNIX ®
and
Compaq Tru64 UNIX 5.1®**

Company Name	System Name	Database Software	Operating System Software
Compaq Computer Corporation	Compaq AlphaServer GS320 32 CPU Client/Server System	Oracle9i, 9.0.1. Enterprise Edition and Real Applications Cluster with Partitioning for Tru64 UNIX	Compaq Tru64 UNIX V5.1

Availability Date: July 30, 2001

Total System Cost	TPC-C Throughput	Price Performance
- Hardware - Software 3-Years Maintenance \$10,286,029	Sustained maximum throughput of system running TPC Benchmark C expressed in transactions per minute 230,533	Total system cost/ TPC-C® throughput \$44.62

First Printing June 2001

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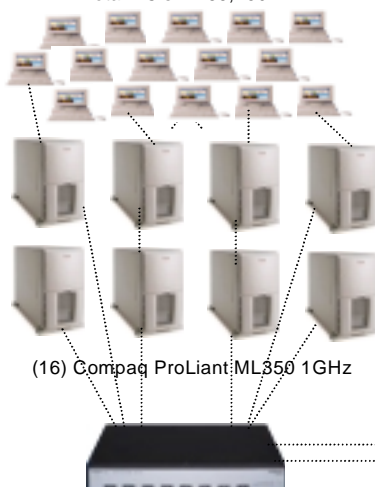
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	Compaq AlphaServer GS320 32 CPU Client/Server System	TPC-C Rev. 5
		Report Date: June 25, 2001

Total System Cost	TPC-C Throughput	Price/Performance	Availability Date
\$10,286,029	230,533	\$44.62	July 30, 2001


Processors	Database	Operating System	Other Software	Number of Users
(32) 1001MHz Alphachip 21264A	Oracle9i, 9.0.1. Enterprise Edition and Real Applications Cluster with Partitioning for Tru64 UNIX	Compaq Tru64 UNIX V5.1	Compaq DB Web Connector V1.1	188,160

192 Ethernet Segments on 10/100 Mbps
980 Users per Segment
Total PC's - 188,160

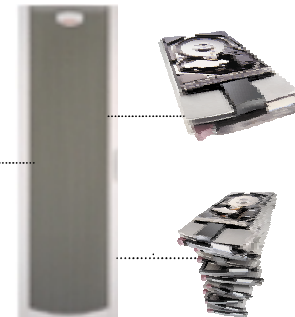


(16) Compaq ProLiant ML350 1GHz

(4) VH-8GB Verizon Horizontal Switch



Compaq AlphaServer GS320
32 CPU
256GB Memory



18	DS-SWXEB-AA
6	DS-RZ1EA-VW 18GB
1172	3R-A0584-AA 9GB
425	3R-A0585-AA 18GB
116	3R-A0527-AA 36GB

	System Components		Client Components (Each of 16)	
	Database Server, Compaq AlphaServer GS320		Compaq ProLiant ML350	
	Qty	Type	Qty	Type
Processors	32	68/1001 MHz Alphachip 21264A	2	1GHz Intel Pentium III
Cache Memory	8	MB Cache	1	512KB Cache
Memory	32	8 GB Memory	1	128MB Memory
Total Memory	256	GB Memory	2	256MB Memory
Disk Controllers	57	Fiber Storage Controllers	640MB	Total Memory
Disks	1172	9 GB Disks	1	18GB Disk
	431	18 GB Disks		
	116	36 GB Disks		
Total Disk Storage	22.4	TB		



**AlphaServer GS320
Model 68/1001
32 CPU C/S System**

TPC-C Rev 5
EXECUTIVE SUMMARY

Report Date: June 25, 2001

Description	Part Number	Third Party Brand	Unit Price	Qty	Extended Price	3 Yr. Maint. Price	
Server Hardware							
Compaq AlphaServer GS320 6/1001 Model 32	DA-320EE-AA	1	466,200	1	466,200	296,168	
GS160/320 ADD-on 1GHz CPU	3X-KN8AB-AE	1	16,100	31	499,100	Inc.	
GS80/160/320 4GB MEM Module	3X-MS8AA-DB	1	23,400	32	748,800	Inc.	
GS80/160/320 4GB MEM DIM UP	3X-MS8AA-DU	1	19,800	32	633,600	Inc.	
RH ULTRASCSI SHELF CAB SPLITB	BA36R-RD	1	1,078	1	1,078	Inc.	
3M VHDCI to 68HD Cable Assy	BN38C-03	1	88	1	88	Inc.	
PCI Fibre Adapter	DS-KGPSA-CA	1	2,800	56	156,800	Inc.	
PCI to Ultra SCSI Adapter	KZPBA-CA	1	322	1	322	Inc.	
1600 Watt Bulk Power Converter	H7506-AA	1	7,000	4	28,000	Inc.	
GS160/320 PCI Expansion Box	3X-DWWPA-SA	1	10,500	11	115,500	Inc.	
System I/O Module	3X-KFWHA-AA	1	2,100	15	31,500	Inc.	
GS80/160/320 Expansion Cab	H9A20-AA	1	3,500	3	10,500	Inc.	
15M Fibre Op Cable 50/125	234457-B23	1	159	56	8,904	Inc.	
PCI to gbE SX Adapter	DEGPA-SA	1	1,364	8	10,912	Inc.	
SC-SC DUAL FO Cbl, MM, PP, 4.5M	BN34B-4E	1	67	8	536	Inc.	
EMA 12000 Storage Array	DS-SWXEB-AA	1	49,976	18	899,568	192,600	
HSG80 FC Controller, w/o ECB Cable Kit 256 Cache w/Op	DS-HSG80-BK	1	11,547	108	1,247,076	Inc.	
16 Port Fibre Switch	DS-DSGGB-AB	1	25,000	18	450,000	Inc.	
Model 2200 ECB	DS-SE2CS-CB	1	207	108	22,356	Inc.	
Short Wave Optical GBIC	380561-B21	1	345	256	88,320	Inc.	
15M Fibre Op Cable 50/125	234457-B23	1	159	216	34,344	0	
18.2GB 7200/rpm UWSCSI Disk**	DS-RZ1EA-VW	1	837	8	6,696	Spared	
9.1GB 10Krpm UWSCSI3 Disk**	3R-A0584-AA	1	403	1290	519,870	Spared	
18.1GB 10Krpm UWSCSI3 Disk**	3R-A0585-AA	1	578	468	270,504	Spared	
36.4GB 10Krpm UWSCSI3 Disk**	3R-A0919-AA	1	972	128	124,416	Spared	
12/24gb 4MM DAT Tape	TLZ10-LB	1	637	1	637	862	
VT510, WHITE, NORTH AMER, NO KEY	VT510-AA	1	427	1	427	0	
US & Canada/English KB	PCXLA-NA	1	18	1	18	0	
Vertical Horizon VH-8G Gigabit Ethernet Switch	VH-8G	2	5,246.25	6	31,478	Spared	
SC Duplex to 1SC DupleX mm Fiber, PVC	9342125-10M	2	39.76	32	1,272	0	
					Subtotal	6,408,822	489,630
Server Software							
3YR TRU64UNIX BRZ 7X24	FM-W16US-36	1	19,055	1	19,055	19,055	
3YR GS160/320 TRU64 UNIX SMP	FM-W16SM-36	1	1,286	31	39,866	39,866	
3YR Tru64Unix O/S & LP	FM-CDDST-36	1	6,765	1	6,765	6,765	
HSG80 ACSsf All Lic/PCRM Pkg	QB-SBUAA-SA	1	4,900	108	529,200		
3YR 7X24 HS*80 SW Dual Controller	FM-DUAL6-36	1	10,209	54	551,286	551,286	
3YR 7X24 HS*80 Platform SW	FM-PLAT2-36	1	844	54	45,576	45,576	
TRU64 UNIX Alpha CDRM	QA-MT4AA-H8	1	277	1	277		
Oracle9i Enterprise Edition Real Application Cluster and Partitioning (3 year term)	Oracle	3	924,000	1	924,000	1,108,000	
					Subtotal	1,453,477	1,770,548
Client Hardware							
Compaq ProLiant ML350 1.0Ghz	160247-001	1	2,093	16	33,488	18,560	
Pentium II P1000-256k Processor	207068-B21	1	1,597	16	25,552	Inc.	
512MB SDRAMM DIMM Memory	128279-B21	1	1,168	16	18,688	Inc.	
ProLiant ML350 Hot Plug Drive Cage	161275-B21	1	441	16	7,056	Inc.	
18.2GB Wide Ultra 3 Drive	142673-B22	1	601	16	9,616	Inc.	
SC-SC Dual FO Cbl, MM, PP, 4.5M	BN34B-4E	1	42	16	672	Inc.	
Compaq NC3134 Fast Ethenet NIC 64 Dual Port 10/100	138603-B21	1	277	64	17,728	Inc.	
Compaq NC3135 Fast Enet Mod Dual 10/100 upgrd for NC3134	138604-B21	1	221	48	10,608	Inc.	
Compaq NC6132 Gigabit Module 1000 SX Upgrade for NC3134	338456-B23	1	551	16	8,816	Inc.	
S510 15" Monitor NH US	168636-001	1	193	16	3,088	Inc.	
					Subtotal	135,312	18,560
Client Software							
Application Optimizer WNT Server Edition	QB-641AA-SA	1	315	16	5,040	4,640	
					Subtotal	5,040	4,640

Notes:** 10% Spares

Subtotal **\$8,002,651** **\$2,283,378**
Three Year Cost of Ownership **\$10,286,029**

1=IC System Solutions, 2=Enterasys Networks, 3= Oracle

tpmC Rating: **230,533.06**

Audited by InfoSizinq (www.infosizinq.com)

\$ / tpmC: **\$44.62**

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

Numeric Quantities Summary
AlphaServer GS320 Client/Server

MQTH

MQTH, computed Maximum Qualified Throughput	230533
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Response Times in seconds

Transaction	90th percentile	Average	Maximum
New-Order	1.337	0.674	11.644
Payment	1.385	0.746	8.362
Order-Status	1.337	0.679	7.432
Delivery (interactive)	0.785	0.362	5.586
Delivery (deferred)	1.844	0.758	11.265
Stock-Level	1.574	0.826	7.956
Menu	0.733	0.339	5.702

Transaction Mix in percent of total transactions

Transaction	Total Occurrences	Percentage
New-Order	27663967	44.981%
Payment	26447136	43.003%
Order-Status	2462929	4.005%
Delivery (interactive)	2462839	4.005%
Stock-Level	2464183	4.007%

Keying/Think Times in seconds

Transaction	Minimum	Average	Maximum
New-Order	18.000/0.000	18.000/12.002	18.155/119.981
Payment	3.000/0.000	3.000/12.002	3.145/120.007
Order-Status	2.000/0.000	2.000/10.003	2.144/ 99.958
Delivery (interactive)	2.000/0.000	2.000/ 5.001	2.144/ 49.975
Stock-Level	2.000/0.000	2.000/ 5.003	2.143/ 49.911

Emulation Delay in seconds

Transaction	Response Time	Menu Response Time
New-Order	0.10	0.10
Payment	0.10	0.10
Order-Status	0.10	0.10
Delivery (interactive)	0.10	0.10
Stock-Level	0.10	0.10

Test Duration

Ramp up time	60 minutes
Measurement interval	120:00.00 minutes
Number of checkpoints	4
Checkpoint interval	30 minutes
Number of transactions (all types) completed in measurement interval	61501054

Abstract

This report documents the compliance of Compaq Computer Corporation's and Oracle Corporation's TPC Benchmark C tests on the Compaq AlphaServer GS320 – 32 CPU Client/Server system with Version 5 of the *TPC Benchmark C Standard Specification*. Sixteen Compaq ProLiant 1600 computers were used as the front-end clients. One of these systems was also used as a development system.

Two standard metrics, transactions-per-minute-C (tpmC) and price per tpmC (\$/tpmC) are reported, in accordance with the TPC Benchmark C Standard. The independent auditor's report by InfoSizing is appended at the end of this report.

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Preface

This report documents the compliance of Compaq Computer Corporation's and Oracle Corporation and TPC Benchmark C (TPC-C) testing on the Compaq AlphaServer GS320 32 CPU client/server system with Version 5 of the TPC Benchmark C Standard Specification. The TPC-C Standard represents an effort by Compaq Computer Corporation and other members of the Transaction Processing Performance Council (TPC) to create industry-wide benchmarks for evaluating the performance and price/performance of transaction processing systems.

These tests were run using Compaq Database Web Connector V1.1 transaction processing monitor, Oracle9i, 9.0.1. Enterprise Edition and Real Applications Cluster with Partitioning for Tru64 UNIX, and Compaq Tru64 UNIX V5.1 operating system. Sixteen Compaq ProLiant 1600 computers were used as the front-end clients. One of these systems was also used as a development system.

About the TPC-C Benchmark

TPC Benchmark C (TPC-C) is an OLTP workload. It is a mixture of read-only and update-intensive transactions that simulate the activities found in complex OLTP application environments. It does so by exercising a breadth of system components associated with such environments, which are 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
- Non-uniform distribution of data access through primary and secondary keys
- Databases consisting of many tables with a wide variety of sizes, attributes, and relationships
- Contention on data access and update

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.

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 benchmarking when critical capacity planning and/or product evaluation decisions are contemplated.

Document Structure

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

- The main body of the document lists each item in Clause 8 of the TPC-C Standard and explains how each requirement is satisfied.
- Appendix A contains the source code of the TPC-C application code used to implement the TPC-C transactions.
- Appendix B contains the database definition and population code used in the tests.
- Appendix C contains the Remote Terminal Emulator (RTE) code used to generate and record transactions.
- Appendix D contains the tunable parameters.
- Appendix E contains the independent auditor's report on the compliance of this disclosure with the benchmark specifications.
- Appendix F contains price quotes.

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TPC Benchmark C Full Disclosure

The *TPC Benchmark C Standard Specification* requires test sponsors to publish, and make available to the public, a full disclosure report for the results to be considered compliant with the Standard. The required contents of the full disclosure report are specified in Clause 8. This report is intended to document the compliance of the benchmark tests with each item listed in Clause 8 of the *TPC Benchmark C Standard Specification*.

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

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

1. General Items

1.1 Order and Titles

The order and titles of sections in the Test Sponsor's Full Disclosure Report must correspond with the order and titles for the TPC-C standard specification. The intent is to make it as easy as possible for readers to compare and contrast material in different Full Disclosure reports.

The order and titles of sections in this report correspond with that of the TPC-C standard specification.

1.2 Summary Statement

The TPC Executive Summary Statement must be included near the beginning of the Full Disclosure report.

The TPC Executive Summary Statement is included at the beginning of this report.

1.3 Numerical Quantities Summary

The numerical quantities listed below must be summarized near the beginning of the Full Disclosure Report.

- *measurement interval in minutes,*
- *number of checkpoints in the measurement interval,*
- *checkpoint interval in minutes,*
- *number of transactions (all types) completed within the measurement interval,*
- *computed maximum Qualified Throughput in tpmC,*
- *ninetieth percentile, average, and maximum response times for the New-Order, Payment, Order-Status, Stock-Level, Delivery (deferred and interactive) and Menu transactions,*
- *time in seconds added to response time to compensate for delays associated with emulated components, and*
- *percentage of transaction mix for each transaction type.*

These numerical quantities are summarized at the beginning of this report.

1.4 Application Program

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 Compaq C application code and the Oracle anonymous block SQL code.

1.5 Sponsor

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

This benchmark test was sponsored by Compaq Computer Corporation and Oracle Corporation, and attested to by InfoSizing.

1.6 Parameters and Options

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

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

The Test Sponsor has elected to provide a listing of all parameters and options. Appendix D contains the tunable parameters used in the TPC-C tests.

1.7 Configuration

Provide diagrams of both the measured and priced configuration, 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 or memory unique to the test.*
- *Number and type of disk drive units (and controllers, if applicable)*
- *Number of channels or bus connections to disk units, including their protocol type*
- *Number of LAN (e.g. Ethernet) connections, including routers, workstations, terminals, etc., that were physically used in the test.*
- *Type and the run-time execution location of software components (e.g., DBMS, client processes, transaction monitors, software drivers, etc.)*

The TPC-C terminal users were emulated by Compaq's Portable Remote Terminal Emulator (PRTE) software, which ran on eight AlphaServer ES40 6/500 computers. Each emulated terminal was connected using HTTP (HyperText Transport Protocol) to a client node.

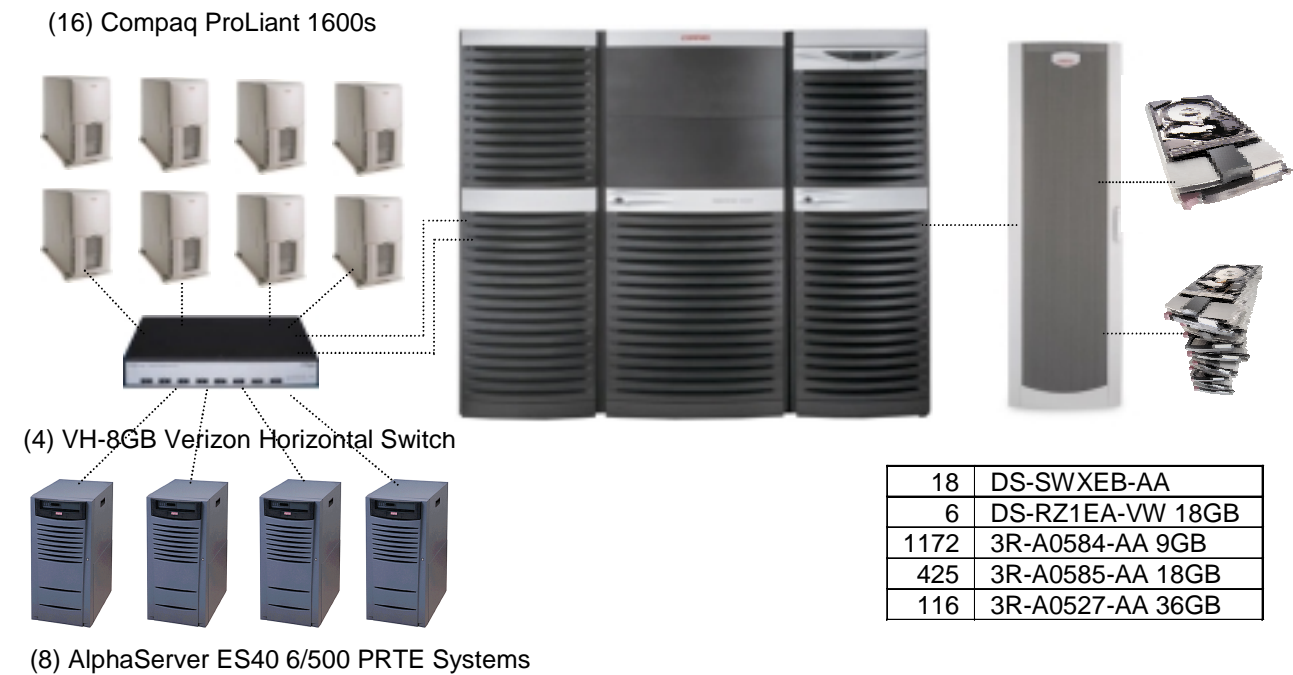
The clients consisted of 16 Compaq ProLiant 1600 computers running the TPC-C web client screen and application software. Each emulated terminal ran the TPC-C client application and made a request to the Oracle9i, 9.0.1. Enterprise Edition and Real Applications Cluster with Partitioning for Tru64 UNIX using OCI calls.

The system consisted of 1 AlphaServer GS320 with 32 CPUs and 256GB of memory. The measured server was configured with (116) 3R-A0527-AA 36GB, (425) 3R-A0585-AA 18GB, (1172) 3R-A0584-AA 9GB and (6) DS-RZ1EA-VW 18GB. The priced configuration consists of (128) 3R-A0527-AA 36GB, (443) A0585-AA 18GB, (1290) 3R-A0584-AA 9GB, and (6) DS-RZ1EA-VW 18GB disks, which includes an additional 10% spareable disks.

Measured Configuration

The following figure represents the measured configuration. The benchmark system used a remote terminal emulator (RTE) to initiate transactions and measure response times of transactions, as well as record various data for each transaction.

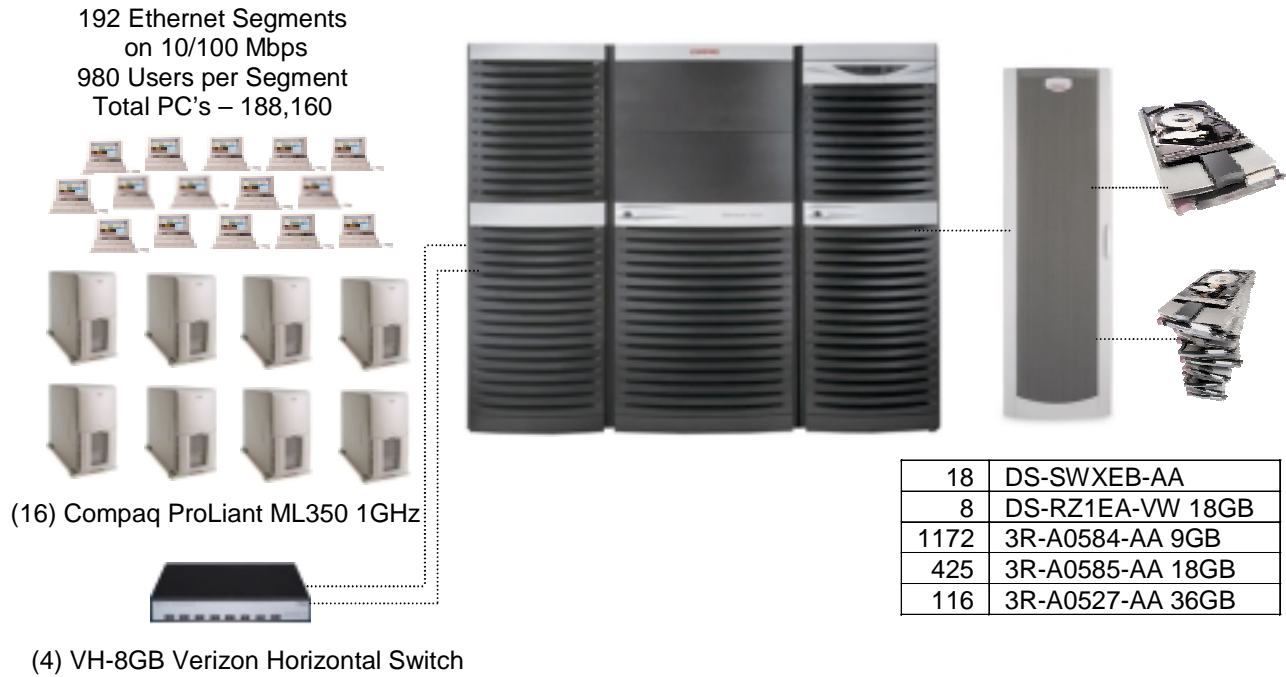
**Compaq AlphaServer GS320
32 CPU
256GB Memory**



Priced Configuration

The following figure depicts the priced system, whose cost determines the normalized price per tpmC reported for this test.

**Compaq AlphaServer GS320
32 CPUs
256GB Memory**



2. Logical Database Design Related Items

2.1 Table Definitions

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

Appendix B contains the database definition files that were used to set up the database.

2.2 Table Organization

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

The scripts used to build and load the database are in Appendix B.

2.3 Insert/Delete Operations

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

There were no restrictions on insert and/or delete operations to any of the tables.

2.4 Disclosure of Partitioning

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

Horizontal partitioning was used on the warehouse, district, new_order, history, order, and order line tables using functionality provided by Oracle9i, 9.0.1. Enterprise Edition and Real Applications Cluster with Partitioning for Tru64 UNIX. For further details, see Appendix B.

2.5 Replication of Tables

Replication of tables, if used, must be disclosed.

No tables were replicated in this benchmark test.

2.6 Additional and/or Duplicated Attributes in any Table

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

No attributes were added or replicated in this benchmark test.

3. Transaction and Terminal Profiles Related Items

3.1 Random Number Generation

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

Random numbers were generated using the drand48() and lrand48() UNIX calls. These functions generate pseudo random numbers using the linear congruential algorithm and 48-bit integer arithmetic. The random number generators are initially seeded using the srand48() call.

3.2 Terminal Input/Output Screen Layouts

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

The screen layouts match the *TPC Benchmark C Standard Specification*.

3.3 Features in Priced Terminals

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

Each of the five transaction types were tested by the auditor from an Intel 486DX2/66 running Windows NT 4.0 SP2 and Netscape Navigator V3.0. The auditor verified that all the features specified in Clause 2.2.2.4 were provided. Any PC configured with any WWW browser will properly display the TPC-C screens.

3.4 Presentation Managers

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

The code to generate the input and menu screens and display the results runs on the front-end clients. The data is passed to the user's PC using the HTML (HyperText Markup Language) format, which can be displayed with any Web browser, such as Netscape Navigator or Internet Explorer. Both of these products come as standard software with many operating systems.

3.5 Home and Remote Order-Lines

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

The table in Section 3.10 shows the percentage of home and remote transactions that occurred during the measurement period for the New-Order transactions.

3.6 New Order Roll Back Transition

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

The table in Section 3.10 shows the percentage of New-Order transactions that were rolled back due to an invalid item number being entered.

3.7 Number of Order-Lines

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

The table in Section 3.10 shows 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 provided.

The table in Section 3.10 shows the percentage of home and remote transactions that occurred during the measurement period for the Payment transactions.

3.9 Non-Primary Key Access in Payment and Order-Status

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

The table in Section 3.10 shows the percentage of non-primary key accesses to the database by the Payment and Order-Status transactions.

3.10 Skipped Deliveries

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

The following table summarizes the data required for disclosure from Sections 3.5 through 3.10. The range of acceptable and the measured results are listed.

Description	Section	Acceptable Requirement	Measured Result
% home order lines in New Order	3.5	(98.05 - 99.05)	98.99%
% remote order lines in New Order	3.5	(0.95 - 1.05)	1.01%
% New Order transactions rolled back	3.6	(0.9 - 1.1)	1.00%
Average number of items per order	3.7	(9.5 - 10.5)	10.00
% home Payment transactions	3.8	(84.0 - 86.0)	85.01%
% remote Payment transactions	3.8	(14.0 - 16.0)	14.99%
% non-primary key access, Payment	3.9	(57.0-63.0)	60.00%
% non-primary key access, Order Status	3.9	(57.0-63.0)	59.96%
% skipped deliveries	3.10	(0.0 - 1.0)	0

3.11 Transaction Mix

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

The following table summarizes the transaction mix.

Transaction Mix in percent of total transactions

Transaction	Total Occurrences	Percentage
New-Order	27663967	44.981%
Payment	26447136	43.003%
Order-Status	2462929	4.005%
Delivery (interactive)	2462839	4.005%
Stock-Level	2464183	4.007%

3.12 Queuing Mechanism

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

The delivery transactions were transmitted to a separate delisrv process using a pipe. The pipe acts as a FIFO queue. The delisrv has multiple threads that can do the delivery transaction in the database. The delivery data is written to a file. The number of threads in the delisrv is configurable.

4. Transaction and System Properties Related Items

4.1 ACID Properties

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

Clause 3 of the TPC Benchmark C Standard Specification lists specific tests to ensure the Atomicity, Consistency, Isolation, and Durability (ACID) properties of the SUT. The following subsections show how the tests required in Clause 3 were performed and the results verified. All mechanisms needed to ensure full ACID properties were enabled during both the measurement and test periods. A fully-sized, 18,816 warehouse database was used for the Consistency and system crash, Atomicity, Isolation, loss of log, and loss of data file Durability tests.

Case A was followed for the execution of Isolation Test 7, as described in the TPC-C Standard Specification, Clause 3.4.2.7.

4.2 Atomicity Tests

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

4.2.1 Atomicity of Completed Transaction

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

The following test was performed, and it verified the atomicity of completed transactions:

1. Select a random warehouse, district, customer, and payment amount.
2. For the selected warehouse, district, and customer, record their contents.
3. Perform a PAYMENT transaction, and COMMIT the transaction.
4. For the selected warehouse, district, and customer, verify the following:
 - A. W_YTD in the warehouse is increased by the payment amount.
 - B. D_YTD in the district is increased by the payment amount.
 - C. C_YTD_PAYMENT in the customer is increased by the payment amount, C_BALANCE is decreased by the payment amount, and C_PAYMENT_CNT is incremented by 1.

4.2.2 Atomicity of Aborted Transaction

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

The following test was performed, and verified the atomicity of aborted transactions:

1. Select a random warehouse, district, customer, and payment amount.
2. For the selected warehouse, district, and customer, record their contents.
3. Perform a PAYMENT transaction and substitute a ROLLBACK for the COMMIT.
4. For the selected warehouse, district, and customer, verify that records have not been changed.

4.3 Consistency Tests

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

The consistency of the database was checked before and after the power fail Durability test. The following consistency conditions were run and verified that all four conditions were met:

4.3.1 Consistency Condition 1

Entries in the WAREHOUSE and DISTRICT tables satisfy:
 $W_YTD = \text{sum}(D_YTD)$ for each warehouse defined by $(W_ID = D_W_ID)$

4.3.2 Consistency Condition 2

Entries in the DISTRICT, ORDER, and NEW-ORDER tables satisfy:
 $D_NEXT_O_ID - 1 = \max(O_ID) = \max(NO_O_ID)$ for each district defined by $(D_W_ID = O_W_ID = NO_W_ID)$ and $(D_ID = O_D_ID = NO_D_ID)$

4.3.3 Consistency Condition 3

Entries in the NEW-ORDER table satisfy:
 $\max(NO_O_ID) - \min(NO_O_ID) = [\# \text{ of rows in NEW-ORDER of this district}]$ for each district defined by NO_W_ID and NO_D_ID

4.3.4 Consistency Condition 4

Entries in the ORDER and ORDER-LINE tables satisfy:
 $\text{sum}(O_OL_CNT) = [\# \text{ of rows in ORDER-LINE of this district}]$ for each district defined by $(O_W_ID = OL_W_ID)$ and $(O_D_ID = OL_D_ID)$.

4.4 Isolation Tests

The TPC Benchmark C Standard Revision 3.3.3 defines seven required tests to be performed to demonstrate that the required levels of transaction isolation are met. All seven required tests were performed successfully. In addition to

those seven tests, two more tests specified by the auditor were performed successfully. These additional tests demonstrated phantom protection within any mix of TPC-C transactions.

4.4.1 Isolation Test 1

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

The following steps were performed to satisfy the test of isolation for Order-Status and New-Order transactions.

1. 1st terminal: Start a New-Order transaction with the necessary inputs. The transaction is delayed for 20 seconds just prior to the Commit.
2. 2nd terminal: Start an Order-Status transaction for the same customer as used in the New-Order transaction.
3. 2nd terminal: The Order-Status transaction attempts to read the file but is locked out by the New-Order transaction waiting to complete.
4. 1st terminal: The New-Order transaction is released, and the Commit is executed releasing the record. With the CUSTOMER record now released, the Order-Status transaction can now complete.
5. 2nd terminal: Verify that the Order-Status transaction delays for approximately 20 seconds and that the results displayed for the Order-Status transaction match the input for the New-Order transaction.

4.4.2 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 rolled back New-Order transactions.

1. 1st terminal: Perform an Order-Status transaction for a random customer. The transaction is completed.
2. 2nd terminal: Perform a New-Order transaction for the same customer in the Order-Status transaction in Step 1; include an invalid item number in the last order. The transaction is delayed for 20 seconds just prior to the roll back.
3. 2nd terminal: Start another Order-Status transaction for the same customer used in the New-Order transaction. The Order-Status transaction attempts to read the CUSTOMER table but is locked by the New-Order transaction.
4. 2nd terminal: Roll back the New-Order transaction. With the CUSTOMER record now released, the Order-Status transaction completes.
5. Verify the results returned from the 1st and 2nd Order-Status transactions match.

4.4.3 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. 1st terminal: Start a New-Order transaction using the necessary inputs. The transaction is delayed for 20 seconds just prior to the Commit.
2. 2nd terminal: Start a second New-Order transaction for the same customer used by the 1st terminal. This transaction is forced to wait while the 1st terminal holds a lock on the CUSTOMER record requested by the 2nd terminal.
3. 1st terminal: The New-Order transaction is allowed to complete and Commit the transaction. With the CUSTOMER record released, the 2nd terminal New-Order transaction will complete.
4. Verify that the order number from the 2nd terminal New-Order transaction is 1 greater than the order number from the 1st terminal. Verify that D_NEXT_O_ID is 1 greater than the order number of the New-Order transaction from the 2nd terminal.

4.4.4 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. 1st terminal: Start a New-Order transaction using the necessary inputs to cause a roll back (invalid item number). The transaction is delayed for 20 seconds just prior to the roll back.
2. 2nd terminal: Start a second New-Order transaction for the same customer used by the 1st terminal. This transaction is forced to wait while the 1st terminal holds a lock on the CUSTOMER record requested by the 2nd terminal.
3. 1st terminal: The New-Order transaction is allowed to complete, and the transaction is rolled back due to the invalid item number.
4. 2nd terminal: With the CUSTOMER record released, the 2nd terminal New-Order transaction will complete normally.
5. Verify that the order number from the 2nd terminal New-Order transaction is equal to the next order number before either New-Order transaction was started. Verify that D_NEXT_O_ID is 1 greater than D_NEXT_O_ID before either transaction was started and is 1 greater than the order number for the 2nd New-Order transaction.

4.4.5 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. 1st terminal: A Delivery transaction is started. The Delivery transaction batch job is started with code added to the transaction to delay the transaction just prior to the Commit. (Note: This delay is only used during the Isolation tests.)
2. 2nd terminal: Start a Payment transaction for a customer that will have an order delivered in the transaction started in Step 1. The Payment transaction is forced to wait while the Delivery transaction holds a lock on the CUSTOMER record.
3. 1st terminal: After the delay time period is expired for the Delivery transaction, the transaction is Committed.
4. 2nd terminal: With the CUSTOMER record released, the Payment transaction is now able to complete.
5. The record is viewed from the CUSTOMER table for the customer and C_BALANCE is verified to reflect the changes from the Delivery and Payment transactions.

4.4.6 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. 1st terminal: Start a Delivery transaction using the Delivery batch job with the delay coded in to halt the transaction just prior to the roll back.
2. 2nd terminal: Start a Payment transaction for a customer that will have an order delivered in the transaction started in Step 1. The Payment transaction is forced to wait while the Delivery transaction holds a lock on the CUSTOMER record.
3. 1st terminal: The Delivery transaction is rolled back after the time period expires.
4. 2nd terminal: With the CUSTOMER record released, the Payment transaction is now able to complete.
5. The record is viewed from the CUSTOMER table for the customer, and C_BALANCE is verified to reflect the change only from the Payment transaction.

4.4.7 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 test demonstrates that this test was conducted successfully.

1. 1st terminal: Using interactive SQL, view and record prices for two items (x, y) selected at random.
2. 2nd terminal: A New-Order transaction is started that contains item x twice and y once. This transaction is stopped after reading the price of item x from the item file the first time.
3. 1st terminal: Using interactive SQL, an update transaction is started for items x and y, increasing their price by 10%. Case A, transaction 3 stalls.
4. 2nd terminal: The New-Order transaction is allowed to complete. It is verified that the prices for items x and y are the same throughout the entire transaction and that they match the results of Step 1.
5. 1st terminal: After the New-Order transaction completes, the update transaction completes and is committed.

4.4.8 Isolation Test 8

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

The execution of the above test proceeded as follows.

1. For a randomly selected warehouse and district, the NO_D_ID column in NEW_ORDER is changed to 11.
2. 1st terminal: A Delivery transaction is started for the selected warehouse. The earliest New-Order for the selected warehouse and district is printed out and should be NULL. The delivery is paused for 30 seconds after reading the New-Order table.
3. 2nd terminal: A New-Order transaction is started for the selected warehouse and district. It is blocked by the other transaction.
4. 1st terminal: After the 30 seconds pause, the Delivery transaction re-reads the NEW_ORDER entries for the selected warehouse and district and verifies that no new orders exist. The Delivery transaction commits, showing nothing delivered for the selected district.
5. 2nd terminal: The blocked New-Order completes only after the Delivery commits.
6. The NO_D_IDs that were set to 11 are restored to their original values.

4.4.9 Isolation Test 9

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

The execution of the above test proceeded as follows.

1. 1st terminal: An Order-Status transaction is started for a randomly selected customer. It is paused for 30 seconds after reading the ORDERS table for that customer. The most recent order is recorded.
2. 2nd terminal: A New-Order transaction is started for the same customer. It is blocked by the paused Order-Status transaction.
3. 1st terminal: After the 30 seconds pause, the Order-Status transaction re-reads the ORDERS entry for the selected customer and verifies that the most recent order is the same in Step 1. The Order-Status commits.
4. 2nd terminal: The blocked New-Order transaction completes only after the Order-Status transaction finishes.

4.5 Durability Tests

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

- *Permanent irrecoverable failure of any single durable medium containing database, ABTH files /tables, or recovery log data.*

- *Instantaneous interruption (system crash/system hang) in processing which requires system reboot to recover.*
- *Failure of all or part of memory (loss of contents).*

Tests were conducted for each of the preceding types of failures and successfully demonstrated that the durability properties were met.

4.5.1 Failure of Durable Medium containing TPC-C Database Tables and Failure of Durable Medium containing Recovery Log Data

This test was conducted on an 18,816 warehouse database. The following steps were performed successfully.

1. The database file was copied to an extra disk using 'dd'.
2. The current number of orders in the database was counted, giving ORDER_COUNT_BEFORE.
3. A test was started and allowed to run at steady state for 3 minutes.
4. One of the log disks from a mirrored pair was removed. The test continued to run, using the remaining disk. An error was logged in the RAID manager software.
5. The test was allowed to run for 3 more minutes.
6. One of the data disks was removed. Errors were reported by the operating system.
7. The emulated users received errors.
8. Oracle9i, 9.0.1. Enterprise Edition and Real Applications Cluster with Partitioning for Tru64 UNIX was stopped.
9. The backup of the database file was restored to a replacement disk.
10. Oracle9i, 9.0.1. Enterprise Edition and Real Applications Cluster with Partitioning for Tru64 UNIX was restarted indicating that media recovery was necessary.
11. The saved transaction log was replayed.
12. The current number of orders in the database was counted giving ORDER_COUNT_AFTER. It was verified that ORDER_COUNT_AFTER - ORDER_COUNT_BEFORE was greater than or equal to the number of committed orders recorded by the RTE.
13. Several orders recorded by the RTE were checked in the database to make sure they existed.

4.5.2 Failure of Memory and Instantaneous Interruption

This test was conducted on the fully scaled 18,816 warehouses database using 188,160 emulated terminals.

1. The current number of orders in the database was counted, giving ORDER_COUNT_BEFORE.
 - 1a. Consistency was verified.
2. A test was started and allowed to run at steady state for at least 5 minutes. Then the system was powered off.
3. The test was aborted on the RTE.
4. The system was powered back on and rebooted.
5. Oracle9i, 9.0.1. Enterprise Edition for Tru64 UNIX was restarted and recovered the database from the transaction log.
6. The current number of orders in the database was counted giving ORDER_COUNT_AFTER. It was verified that ORDER_COUNT_AFTER - ORDER_COUNT_BEFORE was greater than or equal to the number of committed orders recorded by the RTE.
7. Several orders recorded by the RTE were checked in the database to make sure they existed.
8. Consistency was verified again.

5. Scaling and Database Population Related Items

5.1 Cardinalities of the Database Tables

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

The initial cardinalities of the database tables are shown in the following table.

Table Name	Cardinality
Warehouse	18,816
District	188,160
Customer	564,480,000
History	564,480,000
New-Order	564,480,000
Order	169,344,000
Order-Line	5,644,907,824
Stock	1,881,600,000
Item	100,000

5.2 Distribution of Tables and Log

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

The following benchmark configuration tables over all the disks of the priced system is an extension of the distribution in the tested system. System was configured with enough mirrored log disk capacity to support 8 hours of run time.

Distribution of Data on the AlphaServer GS320

/dev/rdisk/dsk107b	cust_0_0	0.59%	/dev/rdisk/dsk464b	ordl_0_36	0.79%
/dev/rdisk/dsk108b	cust_0_1	0.59%	/dev/rdisk/dsk465b	ordl_0_37	0.79%
/dev/rdisk/dsk109b	cust_0_2	0.59%	/dev/rdisk/dsk466b	ordl_0_38	0.79%
/dev/rdisk/dsk110b	cust_0_3	0.59%	/dev/rdisk/dsk467b	ordl_0_39	0.79%
/dev/rdisk/dsk111b	cust_0_4	0.59%	/dev/rdisk/dsk525b	ordl_0_40	0.79%
/dev/rdisk/dsk172b	cust_0_5	0.59%	/dev/rdisk/dsk526b	ordl_0_41	0.79%
/dev/rdisk/dsk173b	cust_0_6	0.59%	/dev/rdisk/dsk527b	ordl_0_42	0.79%
/dev/rdisk/dsk174b	cust_0_7	0.59%	/dev/rdisk/dsk528b	ordl_0_43	0.79%
/dev/rdisk/dsk175b	cust_0_8	0.59%	/dev/rdisk/dsk529b	ordl_0_44	0.79%
/dev/rdisk/dsk176b	cust_0_9	0.59%	/dev/rdisk/dsk530b	ordl_0_45	0.79%
/dev/rdisk/dsk178b	cust_0_10	0.59%	/dev/rdisk/dsk531b	ordl_0_46	0.79%
/dev/rdisk/dsk244b	cust_0_11	0.59%	/dev/rdisk/dsk532b	ordl_0_47	0.79%
/dev/rdisk/dsk245b	cust_0_12	0.59%	/dev/rdisk/dsk476b	ordl_0_48	0.79%
/dev/rdisk/dsk247b	cust_0_13	0.59%	/dev/rdisk/dsk477b	ordl_0_49	0.79%
/dev/rdisk/dsk248b	cust_0_14	0.59%	/dev/rdisk/dsk478b	ordl_0_50	0.79%
/dev/rdisk/dsk249b	cust_0_15	0.59%	/dev/rdisk/dsk479b	ordl_0_51	0.79%
/dev/rdisk/dsk250b	cust_0_16	0.59%	/dev/rdisk/dsk482b	ordl_0_52	0.79%
/dev/rdisk/dsk317b	cust_0_17	0.59%	/dev/rdisk/dsk483b	ordl_0_53	0.79%
/dev/rdisk/dsk318b	cust_0_18	0.59%	/dev/rdisk/dsk484b	ordl_0_54	0.79%
/dev/rdisk/dsk319b	cust_0_19	0.59%	/dev/rdisk/dsk485b	ordl_0_55	0.79%
/dev/rdisk/dsk320b	cust_0_20	0.59%	/dev/rdisk/dsk540b	ordl_0_56	0.79%
/dev/rdisk/dsk113b	cust_0_21	0.59%	/dev/rdisk/dsk541b	ordl_0_57	0.79%
/dev/rdisk/dsk117b	cust_0_22	0.59%	/dev/rdisk/dsk542b	ordl_0_58	0.79%
/dev/rdisk/dsk118b	cust_0_23	0.59%	/dev/rdisk/dsk543b	ordl_0_59	0.79%
/dev/rdisk/dsk119b	cust_0_24	0.59%	/dev/rdisk/dsk547b	ordl_0_60	0.79%
/dev/rdisk/dsk120b	cust_0_25	0.59%	/dev/rdisk/dsk548b	ordl_0_61	0.79%
/dev/rdisk/dsk179b	cust_0_26	0.59%	/dev/rdisk/dsk549b	ordl_0_62	0.79%
/dev/rdisk/dsk180b	cust_0_27	0.59%	/dev/rdisk/dsk550b	ordl_0_63	0.79%
/dev/rdisk/dsk184b	cust_0_28	0.59%	/dev/rdisk/dsk424b	ordl_0_64	0.79%
/dev/rdisk/dsk185b	cust_0_29	0.59%	/dev/rdisk/dsk425b	ordl_0_65	0.79%
/dev/rdisk/dsk186b	cust_0_30	0.59%	/dev/rdisk/dsk426b	ordl_0_66	0.79%
/dev/rdisk/dsk601b	cust_0_31	0.59%	/dev/rdisk/dsk427b	ordl_0_67	0.79%
/dev/rdisk/dsk251b	cust_0_32	0.59%	/dev/rdisk/dsk432b	ordl_0_68	0.79%
/dev/rdisk/dsk252b	cust_0_33	0.59%	/dev/rdisk/dsk433b	ordl_0_69	0.79%
/dev/rdisk/dsk254b	cust_0_34	0.59%	/dev/rdisk/dsk434b	ordl_0_70	0.79%
/dev/rdisk/dsk255b	cust_0_35	0.59%	/dev/rdisk/dsk435b	ordl_0_71	0.79%
/dev/rdisk/dsk256b	cust_0_36	0.59%	/dev/rdisk/dsk489b	ordl_0_72	0.79%
/dev/rdisk/dsk261b	cust_0_37	0.59%	/dev/rdisk/dsk490b	ordl_0_73	0.79%
/dev/rdisk/dsk332b	cust_0_38	0.59%	/dev/rdisk/dsk491b	ordl_0_74	0.79%
/dev/rdisk/dsk333b	cust_0_39	0.59%	/dev/rdisk/dsk493b	ordl_0_75	0.79%
/dev/rdisk/dsk334b	cust_0_40	0.59%	/dev/rdisk/dsk494b	ordl_0_76	0.79%

/dev/rdisk/dsk335b	cust_0_41	0.59%	/dev/rdisk/dsk495b	ordl_0_77	0.79%
/dev/rdisk/dsk122b	cust_0_42	0.59%	/dev/rdisk/dsk496b	ordl_0_78	0.79%
/dev/rdisk/dsk123b	cust_0_43	0.59%	/dev/rdisk/dsk497b	ordl_0_79	0.79%
/dev/rdisk/dsk124b	cust_0_44	0.59%	/dev/rdisk/dsk443b	ordl_0_80	0.79%
/dev/rdisk/dsk128b	cust_0_45	0.59%	/dev/rdisk/dsk599b	ordl_0_81	0.79%
/dev/rdisk/dsk129b	cust_0_46	0.59%	/dev/rdisk/dsk445b	ordl_0_82	0.79%
/dev/rdisk/dsk189b	cust_0_47	0.59%	/dev/rdisk/dsk446b	ordl_0_83	0.79%
/dev/rdisk/dsk190b	cust_0_48	0.59%	/dev/rdisk/dsk447b	ordl_0_84	0.79%
/dev/rdisk/dsk191b	cust_0_49	0.59%	/dev/rdisk/dsk448b	ordl_0_85	0.79%
/dev/rdisk/dsk192b	cust_0_50	0.59%	/dev/rdisk/dsk449b	ordl_0_86	0.79%
/dev/rdisk/dsk196b	cust_0_51	0.59%	/dev/rdisk/dsk450b	ordl_0_87	0.79%
/dev/rdisk/dsk197b	cust_0_52	0.59%	/dev/rdisk/dsk506b	ordl_0_88	0.79%
/dev/rdisk/dsk262b	cust_0_53	0.59%	/dev/rdisk/dsk507b	ordl_0_89	0.79%
/dev/rdisk/dsk263b	cust_0_54	0.59%	/dev/rdisk/dsk508b	ordl_0_90	0.79%
/dev/rdisk/dsk264b	cust_0_55	0.59%	/dev/rdisk/dsk509b	ordl_0_91	0.79%
/dev/rdisk/dsk265b	cust_0_56	0.59%	/dev/rdisk/dsk513b	ordl_0_92	0.79%
/dev/rdisk/dsk266b	cust_0_57	0.59%	/dev/rdisk/dsk514b	ordl_0_93	0.79%
/dev/rdisk/dsk267b	cust_0_58	0.59%	/dev/rdisk/dsk515b	ordl_0_94	0.79%
/dev/rdisk/dsk454b	cust_0_59	0.59%	/dev/rdisk/dsk517b	ordl_0_95	0.79%
/dev/rdisk/dsk455b	cust_0_60	0.59%	/dev/rdisk/dsk354b	ordl_0_96	0.79%
/dev/rdisk/dsk456b	cust_0_61	0.59%	/dev/rdisk/dsk355b	ordl_0_97	0.79%
/dev/rdisk/dsk457b	cust_0_62	0.59%	/dev/rdisk/dsk356b	ordl_0_98	0.79%
/dev/rdisk/dsk131b	cust_0_63	0.59%	/dev/rdisk/dsk357b	ordl_0_99	0.79%
/dev/rdisk/dsk132b	cust_0_64	0.59%	/dev/rdisk/dsk361b	ordl_0_100	0.79%
/dev/rdisk/dsk133b	cust_0_65	0.59%	/dev/rdisk/dsk362b	ordl_0_101	0.79%
/dev/rdisk/dsk134b	cust_0_66	0.59%	/dev/rdisk/dsk364d	ordl_0_102	0.79%
/dev/rdisk/dsk135b	cust_0_67	0.59%	/dev/rdisk/dsk364b	ordl_0_103	0.79%
/dev/rdisk/dsk198b	cust_0_68	0.59%	/dev/rdisk/dsk558b	ordl_0_104	0.79%
/dev/rdisk/dsk200b	cust_0_69	0.59%	/dev/rdisk/dsk559b	ordl_0_105	0.79%
/dev/rdisk/dsk201b	cust_0_70	0.59%	/dev/rdisk/dsk560b	ordl_0_106	0.79%
/dev/rdisk/dsk202b	cust_0_71	0.59%	/dev/rdisk/dsk561b	ordl_0_107	0.79%
/dev/rdisk/dsk203b	cust_0_72	0.59%	/dev/rdisk/dsk562b	ordl_0_108	0.79%
/dev/rdisk/dsk204b	cust_0_73	0.59%	/dev/rdisk/dsk563b	ordl_0_109	0.79%
/dev/rdisk/dsk271b	cust_0_74	0.59%	/dev/rdisk/dsk564b	ordl_0_110	0.79%
/dev/rdisk/dsk273b	cust_0_75	0.59%	/dev/rdisk/dsk565b	ordl_0_111	0.79%
/dev/rdisk/dsk274b	cust_0_76	0.59%	/dev/rdisk/dsk372b	ordl_0_112	0.79%
/dev/rdisk/dsk275b	cust_0_77	0.59%	/dev/rdisk/dsk373b	ordl_0_113	0.79%
/dev/rdisk/dsk276b	cust_0_78	0.59%	/dev/rdisk/dsk374b	ordl_0_114	0.79%
/dev/rdisk/dsk277b	cust_0_79	0.59%	/dev/rdisk/dsk375b	ordl_0_115	0.79%
/dev/rdisk/dsk471b	cust_0_80	0.59%	/dev/rdisk/dsk376b	ordl_0_116	0.79%
/dev/rdisk/dsk472b	cust_0_81	0.59%	/dev/rdisk/dsk377b	ordl_0_117	0.79%
/dev/rdisk/dsk473b	cust_0_82	0.59%	/dev/rdisk/dsk378b	ordl_0_118	0.79%
/dev/rdisk/dsk474b	cust_0_83	0.59%	/dev/rdisk/dsk379b	ordl_0_119	0.79%
/dev/rdisk/dsk140b	cust_0_84	0.59%	/dev/rdisk/dsk573b	ordl_0_120	0.79%
/dev/rdisk/dsk141b	cust_0_85	0.59%	/dev/rdisk/dsk574b	ordl_0_121	0.79%
/dev/rdisk/dsk142b	cust_0_86	0.59%	/dev/rdisk/dsk575b	ordl_0_122	0.79%
/dev/rdisk/dsk143b	cust_0_87	0.59%	/dev/rdisk/dsk576b	ordl_0_123	0.79%
/dev/rdisk/dsk144b	cust_0_88	0.59%	/dev/rdisk/dsk580b	ordl_0_124	0.79%
/dev/rdisk/dsk208b	cust_0_89	0.59%	/dev/rdisk/dsk581b	ordl_0_125	0.79%
/dev/rdisk/dsk209b	cust_0_90	0.59%	/dev/rdisk/dsk582b	ordl_0_126	0.79%
/dev/rdisk/dsk210b	cust_0_91	0.59%	/dev/rdisk/dsk583b	ordl_0_127	0.79%
/dev/rdisk/dsk212b	cust_0_92	0.59%	/dev/rdisk/dsk110d	ordr_0_0	12.50%
/dev/rdisk/dsk213b	cust_0_93	0.59%	/dev/rdisk/dsk179d	ordr_0_1	12.50%
/dev/rdisk/dsk214b	cust_0_94	0.59%	/dev/rdisk/dsk129d	ordr_0_2	12.50%
/dev/rdisk/dsk281b	cust_0_95	0.59%	/dev/rdisk/dsk135d	ordr_0_3	12.50%
/dev/rdisk/dsk282b	cust_0_96	0.59%	/dev/rdisk/dsk144d	ordr_0_4	12.50%
/dev/rdisk/dsk284b	cust_0_97	0.59%	/dev/rdisk/dsk152d	ordr_0_5	12.50%
/dev/rdisk/dsk285b	cust_0_98	0.59%	/dev/rdisk/dsk161d	ordr_0_6	12.50%
/dev/rdisk/dsk286b	cust_0_99	0.59%	/dev/rdisk/dsk166d	ordr_0_7	12.50%
/dev/rdisk/dsk287b	cust_0_100	0.59%	/dev/rdisk/dsk397b	roll_0_0	6.25%
/dev/rdisk/dsk419b	cust_0_101	0.59%	/dev/rdisk/dsk399b	roll_0_1	6.25%
/dev/rdisk/dsk421b	cust_0_102	0.59%	/dev/rdisk/dsk414b	roll_1_0	6.25%
/dev/rdisk/dsk422b	cust_0_103	0.59%	/dev/rdisk/dsk415b	roll_1_1	6.25%
/dev/rdisk/dsk423b	cust_0_104	0.59%	/dev/rdisk/dsk538b	roll_2_0	6.25%
/dev/rdisk/dsk146b	cust_0_105	0.59%	/dev/rdisk/dsk539b	roll_2_1	6.25%
/dev/rdisk/dsk150b	cust_0_106	0.59%	/dev/rdisk/dsk553b	roll_3_0	6.25%
/dev/rdisk/dsk151b	cust_0_107	0.59%	/dev/rdisk/dsk554b	roll_3_1	6.25%
/dev/rdisk/dsk152b	cust_0_108	0.59%	/dev/rdisk/dsk503b	roll_4_0	6.25%
/dev/rdisk/dsk153b	cust_0_109	0.59%	/dev/rdisk/dsk505b	roll_4_1	6.25%
/dev/rdisk/dsk215b	cust_0_110	0.59%	/dev/rdisk/dsk520b	roll_5_0	6.25%

/dev/rdisk/dsk216b	cust_0_111	0.59%	/dev/rdisk/dsk521b	roll_5_1	6.25%
/dev/rdisk/dsk220b	cust_0_112	0.59%	/dev/rdisk/dsk571b	roll_6_0	6.25%
/dev/rdisk/dsk221b	cust_0_113	0.59%	/dev/rdisk/dsk572b	roll_6_1	6.25%
/dev/rdisk/dsk222b	cust_0_114	0.59%	/dev/rdisk/dsk586b	roll_7_0	6.25%
/dev/rdisk/dsk224b	cust_0_115	0.59%	/dev/rdisk/dsk587b	roll_7_1	6.25%
/dev/rdisk/dsk288b	cust_0_116	0.59%	/dev/rdisk/dsk36b	stok_0_0	0.50%
/dev/rdisk/dsk289b	cust_0_117	0.59%	/dev/rdisk/dsk37b	stok_0_1	0.50%
/dev/rdisk/dsk293b	cust_0_118	0.59%	/dev/rdisk/dsk38b	stok_0_2	0.50%
/dev/rdisk/dsk294b	cust_0_119	0.59%	/dev/rdisk/dsk47b	stok_0_3	0.50%
/dev/rdisk/dsk295b	cust_0_120	0.59%	/dev/rdisk/dsk104b	stok_0_4	0.50%
/dev/rdisk/dsk297b	cust_0_121	0.59%	/dev/rdisk/dsk105b	stok_0_5	0.50%
/dev/rdisk/dsk436b	cust_0_122	0.59%	/dev/rdisk/dsk170b	stok_0_6	0.50%
/dev/rdisk/dsk437b	cust_0_123	0.59%	/dev/rdisk/dsk171b	stok_0_7	0.50%
/dev/rdisk/dsk438b	cust_0_124	0.59%	/dev/rdisk/dsk242b	stok_0_8	0.50%
/dev/rdisk/dsk439b	cust_0_125	0.59%	/dev/rdisk/dsk243b	stok_0_9	0.50%
/dev/rdisk/dsk155b	cust_0_126	0.59%	/dev/rdisk/dsk315b	stok_0_10	0.50%
/dev/rdisk/dsk156b	cust_0_127	0.59%	/dev/rdisk/dsk316b	stok_0_11	0.50%
/dev/rdisk/dsk157b	cust_0_128	0.59%	/dev/rdisk/dsk325b	stok_0_12	0.50%
/dev/rdisk/dsk161b	cust_0_129	0.59%	/dev/rdisk/dsk326b	stok_0_13	0.50%
/dev/rdisk/dsk162b	cust_0_130	0.59%	/dev/rdisk/dsk381b	stok_0_14	0.50%
/dev/rdisk/dsk225b	cust_0_131	0.59%	/dev/rdisk/dsk382b	stok_0_15	0.50%
/dev/rdisk/dsk226b	cust_0_132	0.59%	/dev/rdisk/dsk392b	stok_0_16	0.50%
/dev/rdisk/dsk227b	cust_0_133	0.59%	/dev/rdisk/dsk393b	stok_0_17	0.50%
/dev/rdisk/dsk228b	cust_0_134	0.59%	/dev/rdisk/dsk39b	stok_0_18	0.50%
/dev/rdisk/dsk232b	cust_0_135	0.59%	/dev/rdisk/dsk40b	stok_0_19	0.50%
/dev/rdisk/dsk233b	cust_0_136	0.59%	/dev/rdisk/dsk41b	stok_0_20	0.50%
/dev/rdisk/dsk298b	cust_0_137	0.59%	/dev/rdisk/dsk42b	stok_0_21	0.50%
/dev/rdisk/dsk299b	cust_0_138	0.59%	/dev/rdisk/dsk43b	stok_0_22	0.50%
/dev/rdisk/dsk300b	cust_0_139	0.59%	/dev/rdisk/dsk44b	stok_0_23	0.50%
/dev/rdisk/dsk301b	cust_0_140	0.59%	/dev/rdisk/dsk106b	stok_0_24	0.50%
/dev/rdisk/dsk305b	cust_0_141	0.59%	/dev/rdisk/dsk103b	stok_0_25	0.50%
/dev/rdisk/dsk306b	cust_0_142	0.59%	/dev/rdisk/dsk48b	stok_0_26	0.50%
/dev/rdisk/dsk350b	cust_0_143	0.59%	/dev/rdisk/dsk49b	stok_0_27	0.50%
/dev/rdisk/dsk351b	cust_0_144	0.59%	/dev/rdisk/dsk114b	stok_0_28	0.50%
/dev/rdisk/dsk352b	cust_0_145	0.59%	/dev/rdisk/dsk115b	stok_0_29	0.50%
/dev/rdisk/dsk353b	cust_0_146	0.59%	/dev/rdisk/dsk116b	stok_0_30	0.50%
/dev/rdisk/dsk164b	cust_0_147	0.59%	/dev/rdisk/dsk181b	stok_0_31	0.50%
/dev/rdisk/dsk165b	cust_0_148	0.59%	/dev/rdisk/dsk182b	stok_0_32	0.50%
/dev/rdisk/dsk166b	cust_0_149	0.59%	/dev/rdisk/dsk253b	stok_0_33	0.50%
/dev/rdisk/dsk167b	cust_0_150	0.59%	/dev/rdisk/dsk257b	stok_0_34	0.50%
/dev/rdisk/dsk168b	cust_0_151	0.59%	/dev/rdisk/dsk327b	stok_0_35	0.50%
/dev/rdisk/dsk234b	cust_0_152	0.59%	/dev/rdisk/dsk336b	stok_0_36	0.50%
/dev/rdisk/dsk236b	cust_0_153	0.59%	/dev/rdisk/dsk337b	stok_0_37	0.50%
/dev/rdisk/dsk237b	cust_0_154	0.59%	/dev/rdisk/dsk338b	stok_0_38	0.50%
/dev/rdisk/dsk238b	cust_0_155	0.59%	/dev/rdisk/dsk394b	stok_0_39	0.50%
/dev/rdisk/dsk239b	cust_0_156	0.59%	/dev/rdisk/dsk404b	stok_0_40	0.50%
/dev/rdisk/dsk240b	cust_0_157	0.59%	/dev/rdisk/dsk405b	stok_0_41	0.50%
/dev/rdisk/dsk307b	cust_0_158	0.59%	/dev/rdisk/dsk406b	stok_0_42	0.50%
/dev/rdisk/dsk309b	cust_0_159	0.59%	/dev/rdisk/dsk45b	stok_0_43	0.50%
/dev/rdisk/dsk310b	cust_0_160	0.59%	/dev/rdisk/dsk46b	stok_0_44	0.50%
/dev/rdisk/dsk311b	cust_0_161	0.59%	/dev/rdisk/dsk50b	stok_0_45	0.50%
/dev/rdisk/dsk312b	cust_0_162	0.59%	/dev/rdisk/dsk51b	stok_0_46	0.50%
/dev/rdisk/dsk313b	cust_0_163	0.59%	/dev/rdisk/dsk52b	stok_0_47	0.50%
/dev/rdisk/dsk365b	cust_0_164	0.59%	/dev/rdisk/dsk53b	stok_0_48	0.50%
/dev/rdisk/dsk366b	cust_0_165	0.59%	/dev/rdisk/dsk112b	stok_0_49	0.50%
/dev/rdisk/dsk367b	cust_0_166	0.59%	/dev/rdisk/dsk169b	stok_0_50	0.50%
/dev/rdisk/dsk368b	cust_0_167	0.59%	/dev/rdisk/dsk58b	stok_0_51	0.50%
/dev/rdisk/dsk368d	cust_0_168	0.59%	/dev/rdisk/dsk59b	stok_0_52	0.50%
/dev/rdisk/dsk108d	dist_1_0	12.50%	/dev/rdisk/dsk125b	stok_0_53	0.50%
/dev/rdisk/dsk120d	dist_1_1	12.50%	/dev/rdisk/dsk126b	stok_0_54	0.50%
/dev/rdisk/dsk128d	dist_1_2	12.50%	/dev/rdisk/dsk183b	stok_0_55	0.50%
/dev/rdisk/dsk134d	dist_1_3	12.50%	/dev/rdisk/dsk193b	stok_0_56	0.50%
/dev/rdisk/dsk143d	dist_1_4	12.50%	/dev/rdisk/dsk194b	stok_0_57	0.50%
/dev/rdisk/dsk150d	dist_1_5	12.50%	/dev/rdisk/dsk258b	stok_0_58	0.50%
/dev/rdisk/dsk156d	dist_1_6	12.50%	/dev/rdisk/dsk259b	stok_0_59	0.50%
/dev/rdisk/dsk164d	dist_1_7	12.50%	/dev/rdisk/dsk452b	stok_0_60	0.50%
/dev/rdisk/dsk395b	hist_0_0	12.50%	/dev/rdisk/dsk453b	stok_0_61	0.50%
/dev/rdisk/dsk412b	hist_0_1	12.50%	/dev/rdisk/dsk463b	stok_0_62	0.50%
/dev/rdisk/dsk536b	hist_0_2	12.50%	/dev/rdisk/dsk468b	stok_0_63	0.50%
/dev/rdisk/dsk551b	hist_0_3	12.50%	/dev/rdisk/dsk523b	stok_0_64	0.50%

/dev/rdisk/dsk501b	hist_0_4	12.50%	/dev/rdisk/dsk524b	stok_0_65	0.50%
/dev/rdisk/dsk518b	hist_0_5	12.50%	/dev/rdisk/dsk533b	stok_0_66	0.50%
/dev/rdisk/dsk569b	hist_0_6	12.50%	/dev/rdisk/dsk534b	stok_0_67	0.50%
/dev/rdisk/dsk584b	hist_0_7	12.50%	/dev/rdisk/dsk54b	stok_0_68	0.50%
/dev/rdisk/dsk245d	icust1_0_0	12.50%	/dev/rdisk/dsk55b	stok_0_69	0.50%
/dev/rdisk/dsk255d	icust1_0_1	12.50%	/dev/rdisk/dsk56b	stok_0_70	0.50%
/dev/rdisk/dsk264d	icust1_0_2	12.50%	/dev/rdisk/dsk57b	stok_0_71	0.50%
/dev/rdisk/dsk274d	icust1_0_3	12.50%	/dev/rdisk/dsk61b	stok_0_72	0.50%
/dev/rdisk/dsk284d	icust1_0_4	12.50%	/dev/rdisk/dsk62b	stok_0_73	0.50%
/dev/rdisk/dsk289d	icust1_0_5	12.50%	/dev/rdisk/dsk121b	stok_0_74	0.50%
/dev/rdisk/dsk299d	icust1_0_6	12.50%	/dev/rdisk/dsk241b	stok_0_75	0.50%
/dev/rdisk/dsk307d	icust1_0_7	12.50%	/dev/rdisk/dsk60b	stok_0_76	0.50%
/dev/rdisk/dsk247d	icust2_0_0	12.50%	/dev/rdisk/dsk69b	stok_0_77	0.50%
/dev/rdisk/dsk261d	icust2_0_1	12.50%	/dev/rdisk/dsk127b	stok_0_78	0.50%
/dev/rdisk/dsk266d	icust2_0_2	12.50%	/dev/rdisk/dsk136b	stok_0_79	0.50%
/dev/rdisk/dsk276d	icust2_0_3	12.50%	/dev/rdisk/dsk195b	stok_0_80	0.50%
/dev/rdisk/dsk286d	icust2_0_4	12.50%	/dev/rdisk/dsk205b	stok_0_81	0.50%
/dev/rdisk/dsk293d	icust2_0_5	12.50%	/dev/rdisk/dsk268b	stok_0_82	0.50%
/dev/rdisk/dsk300d	icust2_0_6	12.50%	/dev/rdisk/dsk269b	stok_0_83	0.50%
/dev/rdisk/dsk309d	icust2_0_7	12.50%	/dev/rdisk/dsk270b	stok_0_84	0.50%
/dev/rdisk/dsk176d	idist_0_0	12.50%	/dev/rdisk/dsk469b	stok_0_85	0.50%
/dev/rdisk/dsk251d	idist_0_1	12.50%	/dev/rdisk/dsk475b	stok_0_86	0.50%
/dev/rdisk/dsk197d	idist_0_2	12.50%	/dev/rdisk/dsk480b	stok_0_87	0.50%
/dev/rdisk/dsk204d	idist_0_3	12.50%	/dev/rdisk/dsk481b	stok_0_88	0.50%
/dev/rdisk/dsk214d	idist_0_4	12.50%	/dev/rdisk/dsk535b	stok_0_89	0.50%
/dev/rdisk/dsk222d	idist_0_5	12.50%	/dev/rdisk/dsk544b	stok_0_90	0.50%
/dev/rdisk/dsk232d	idist_0_6	12.50%	/dev/rdisk/dsk545b	stok_0_91	0.50%
/dev/rdisk/dsk238d	idist_0_7	12.50%	/dev/rdisk/dsk546b	stok_0_92	0.50%
/dev/rdisk/dsk140d	iitem_0_0	100%	/dev/rdisk/dsk63b	stok_0_93	0.50%
/dev/rdisk/dsk395d	iordl_0_0	6.25%	/dev/rdisk/dsk64b	stok_0_94	0.50%
/dev/rdisk/dsk396d	iordl_0_1	6.25%	/dev/rdisk/dsk65b	stok_0_95	0.50%
/dev/rdisk/dsk397d	iordl_0_2	6.25%	/dev/rdisk/dsk66b	stok_0_96	0.50%
/dev/rdisk/dsk399d	iordl_0_3	6.25%	/dev/rdisk/dsk67b	stok_0_97	0.50%
/dev/rdisk/dsk412d	iordl_1_0	6.25%	/dev/rdisk/dsk68b	stok_0_98	0.50%
/dev/rdisk/dsk413d	iordl_1_1	6.25%	/dev/rdisk/dsk130b	stok_0_99	0.50%
/dev/rdisk/dsk414d	iordl_1_2	6.25%	/dev/rdisk/dsk380b	stok_0_100	0.50%
/dev/rdisk/dsk415d	iordl_1_3	6.25%	/dev/rdisk/dsk70b	stok_0_101	0.50%
/dev/rdisk/dsk536d	iordl_2_0	6.25%	/dev/rdisk/dsk72d	stok_0_102	0.50%
/dev/rdisk/dsk537d	iordl_2_1	6.25%	/dev/rdisk/dsk600b	stok_0_103	0.50%
/dev/rdisk/dsk538d	iordl_2_2	6.25%	/dev/rdisk/dsk137b	stok_0_104	0.50%
/dev/rdisk/dsk539d	iordl_2_3	6.25%	/dev/rdisk/dsk138b	stok_0_105	0.50%
/dev/rdisk/dsk551d	iordl_3_0	6.25%	/dev/rdisk/dsk206b	stok_0_106	0.50%
/dev/rdisk/dsk552d	iordl_3_1	6.25%	/dev/rdisk/dsk207b	stok_0_107	0.50%
/dev/rdisk/dsk553d	iordl_3_2	6.25%	/dev/rdisk/dsk278b	stok_0_108	0.50%
/dev/rdisk/dsk554d	iordl_3_3	6.25%	/dev/rdisk/dsk279b	stok_0_109	0.50%
/dev/rdisk/dsk501d	iordl_4_0	6.25%	/dev/rdisk/dsk486b	stok_0_110	0.50%
/dev/rdisk/dsk502d	iordl_4_1	6.25%	/dev/rdisk/dsk487b	stok_0_111	0.50%
/dev/rdisk/dsk503d	iordl_4_2	6.25%	/dev/rdisk/dsk488b	stok_0_112	0.50%
/dev/rdisk/dsk505d	iordl_4_3	6.25%	/dev/rdisk/dsk498b	stok_0_113	0.50%
/dev/rdisk/dsk518d	iordl_5_0	6.25%	/dev/rdisk/dsk416b	stok_0_114	0.50%
/dev/rdisk/dsk519d	iordl_5_1	6.25%	/dev/rdisk/dsk417b	stok_0_115	0.50%
/dev/rdisk/dsk520d	iordl_5_2	6.25%	/dev/rdisk/dsk418b	stok_0_116	0.50%
/dev/rdisk/dsk521d	iordl_5_3	6.25%	/dev/rdisk/dsk429b	stok_0_117	0.50%
/dev/rdisk/dsk569d	iordl_6_0	6.25%	/dev/rdisk/dsk73b	stok_0_118	0.50%
/dev/rdisk/dsk570d	iordl_6_1	6.25%	/dev/rdisk/dsk74b	stok_0_119	0.50%
/dev/rdisk/dsk571d	iordl_6_2	6.25%	/dev/rdisk/dsk75b	stok_0_120	0.50%
/dev/rdisk/dsk572d	iordl_6_3	6.25%	/dev/rdisk/dsk76b	stok_0_121	0.50%
/dev/rdisk/dsk584d	iordl_7_0	6.25%	/dev/rdisk/dsk77b	stok_0_122	0.50%
/dev/rdisk/dsk585d	iordl_7_1	6.25%	/dev/rdisk/dsk78b	stok_0_123	0.50%
/dev/rdisk/dsk586d	iordl_7_2	6.25%	/dev/rdisk/dsk139b	stok_0_124	0.50%
/dev/rdisk/dsk587d	iordl_7_3	6.25%	/dev/rdisk/dsk451b	stok_0_125	0.50%
/dev/rdisk/dsk173d	iordr1_0_0	12.50%	/dev/rdisk/dsk81b	stok_0_126	0.50%
/dev/rdisk/dsk185d	iordr1_0_1	12.50%	/dev/rdisk/dsk82b	stok_0_127	0.50%
/dev/rdisk/dsk191d	iordr1_0_2	12.50%	/dev/rdisk/dsk147b	stok_0_128	0.50%
/dev/rdisk/dsk201d	iordr1_0_3	12.50%	/dev/rdisk/dsk148b	stok_0_129	0.50%
/dev/rdisk/dsk210d	iordr1_0_4	12.50%	/dev/rdisk/dsk217b	stok_0_130	0.50%
/dev/rdisk/dsk216d	iordr1_0_5	12.50%	/dev/rdisk/dsk218b	stok_0_131	0.50%
/dev/rdisk/dsk226d	iordr1_0_6	12.50%	/dev/rdisk/dsk280b	stok_0_132	0.50%
/dev/rdisk/dsk234d	iordr1_0_7	12.50%	/dev/rdisk/dsk290b	stok_0_133	0.50%
/dev/rdisk/dsk174d	iordr2_0_0	12.50%	/dev/rdisk/dsk499b	stok_0_134	0.50%

/dev/rdisk/dsk601d	iordr2_0_1	12.50%	/dev/rdisk/dsk510b	stok_0_135	0.50%
/dev/rdisk/dsk196d	iordr2_0_2	12.50%	/dev/rdisk/dsk511b	stok_0_136	0.50%
/dev/rdisk/dsk203d	iordr2_0_3	12.50%	/dev/rdisk/dsk512b	stok_0_137	0.50%
/dev/rdisk/dsk213d	iordr2_0_4	12.50%	/dev/rdisk/dsk430b	stok_0_138	0.50%
/dev/rdisk/dsk220d	iordr2_0_5	12.50%	/dev/rdisk/dsk431b	stok_0_139	0.50%
/dev/rdisk/dsk227d	iordr2_0_6	12.50%	/dev/rdisk/dsk440b	stok_0_140	0.50%
/dev/rdisk/dsk236d	iordr2_0_7	12.50%	/dev/rdisk/dsk441b	stok_0_141	0.50%
/dev/rdisk/dsk331d	istok_0_0	12.50%	/dev/rdisk/dsk442b	stok_0_142	0.50%
/dev/rdisk/dsk345d	istok_0_1	12.50%	/dev/rdisk/dsk79b	stok_0_143	0.50%
/dev/rdisk/dsk465d	istok_0_2	12.50%	/dev/rdisk/dsk80b	stok_0_144	0.50%
/dev/rdisk/dsk485d	istok_0_3	12.50%	/dev/rdisk/dsk84b	stok_0_145	0.50%
/dev/rdisk/dsk435d	istok_0_4	12.50%	/dev/rdisk/dsk85b	stok_0_146	0.50%
/dev/rdisk/dsk450d	istok_0_5	12.50%	/dev/rdisk/dsk86b	stok_0_147	0.50%
/dev/rdisk/dsk558d	istok_0_6	12.50%	/dev/rdisk/dsk87b	stok_0_148	0.50%
/dev/rdisk/dsk379d	istok_0_7	12.50%	/dev/rdisk/dsk145b	stok_0_149	0.50%
/dev/rdisk/dsk117d	item_0_0	33%	/dev/rdisk/dsk314b	stok_0_150	0.50%
/dev/rdisk/dsk122d	item_0_1	33%	/dev/rdisk/dsk83b	stok_0_151	0.50%
/dev/rdisk/dsk131d	item_0_2	33%	/dev/rdisk/dsk92b	stok_0_152	0.50%
/dev/rdisk/dsk178d	iware_0_0	12.50%	/dev/rdisk/dsk158b	stok_0_153	0.50%
/dev/rdisk/dsk253d	iware_0_1	12.50%	/dev/rdisk/dsk149b	stok_0_154	0.50%
/dev/rdisk/dsk263d	iware_0_2	12.50%	/dev/rdisk/dsk219b	stok_0_155	0.50%
/dev/rdisk/dsk273d	iware_0_3	12.50%	/dev/rdisk/dsk229b	stok_0_156	0.50%
/dev/rdisk/dsk282d	iware_0_4	12.50%	/dev/rdisk/dsk291b	stok_0_157	0.50%
/dev/rdisk/dsk224d	iware_0_5	12.50%	/dev/rdisk/dsk292b	stok_0_158	0.50%
/dev/rdisk/dsk233d	iware_0_6	12.50%	/dev/rdisk/dsk347b	stok_0_159	0.50%
/dev/rdisk/dsk239d	iware_0_7	12.50%	/dev/rdisk/dsk348b	stok_0_160	0.50%
/dev/rdisk/dsk7g	log0_1	6.25%	/dev/rdisk/dsk349b	stok_0_161	0.50%
/dev/rdisk/dsk7h	log0_2	6.25%	/dev/rdisk/dsk358b	stok_0_162	0.50%
/dev/rdisk/dsk8g	log1_1	6.25%	/dev/rdisk/dsk555b	stok_0_163	0.50%
/dev/rdisk/dsk8h	log1_2	6.25%	/dev/rdisk/dsk556b	stok_0_164	0.50%
/dev/rdisk/dsk18g	log2_1	6.25%	/dev/rdisk/dsk557b	stok_0_165	0.50%
/dev/rdisk/dsk18h	log2_2	6.25%	/dev/rdisk/dsk566b	stok_0_166	0.50%
/dev/rdisk/dsk19g	log3_1	6.25%	/dev/rdisk/dsk567b	stok_0_167	0.50%
/dev/rdisk/dsk19h	log3_2	6.25%	/dev/rdisk/dsk88b	stok_0_168	0.50%
/dev/rdisk/dsk24g	log4_1	6.25%	/dev/rdisk/dsk89b	stok_0_169	0.50%
/dev/rdisk/dsk24h	log4_2	6.25%	/dev/rdisk/dsk90b	stok_0_170	0.50%
/dev/rdisk/dsk25g	log5_1	6.25%	/dev/rdisk/dsk91b	stok_0_171	0.50%
/dev/rdisk/dsk25h	log5_2	6.25%	/dev/rdisk/dsk95b	stok_0_172	0.50%
/dev/rdisk/dsk30g	log6_1	6.25%	/dev/rdisk/dsk96b	stok_0_173	0.50%
/dev/rdisk/dsk30h	log6_2	6.25%	/dev/rdisk/dsk154b	stok_0_174	0.50%
/dev/rdisk/dsk31g	log7_1	6.25%	/dev/rdisk/dsk522b	stok_0_175	0.50%
/dev/rdisk/dsk31h	log7_2	6.25%	/dev/rdisk/dsk93b	stok_0_176	0.50%
/dev/rdisk/dsk381d	nord_0_0	12.50%	/dev/rdisk/dsk94b	stok_0_177	0.50%
/dev/rdisk/dsk184d	nord_0_1	12.50%	/dev/rdisk/dsk159b	stok_0_178	0.50%
/dev/rdisk/dsk190d	nord_0_2	12.50%	/dev/rdisk/dsk160b	stok_0_179	0.50%
/dev/rdisk/dsk200d	nord_0_3	12.50%	/dev/rdisk/dsk230b	stok_0_180	0.50%
/dev/rdisk/dsk209d	nord_0_4	12.50%	/dev/rdisk/dsk231b	stok_0_181	0.50%
/dev/rdisk/dsk153d	nord_0_5	12.50%	/dev/rdisk/dsk302b	stok_0_182	0.50%
/dev/rdisk/dsk162d	nord_0_6	12.50%	/dev/rdisk/dsk303b	stok_0_183	0.50%
/dev/rdisk/dsk167d	nord_0_7	12.50%	/dev/rdisk/dsk304b	stok_0_184	0.50%
/dev/rdisk/dsk321b	ordl_0_0	0.79%	/dev/rdisk/dsk359b	stok_0_185	0.50%
/dev/rdisk/dsk322b	ordl_0_1	0.79%	/dev/rdisk/dsk360b	stok_0_186	0.50%
/dev/rdisk/dsk323b	ordl_0_2	0.79%	/dev/rdisk/dsk369b	stok_0_187	0.50%
/dev/rdisk/dsk324b	ordl_0_3	0.79%	/dev/rdisk/dsk370b	stok_0_188	0.50%
/dev/rdisk/dsk328b	ordl_0_4	0.79%	/dev/rdisk/dsk371b	stok_0_189	0.50%
/dev/rdisk/dsk329b	ordl_0_5	0.79%	/dev/rdisk/dsk568b	stok_0_190	0.50%
/dev/rdisk/dsk330b	ordl_0_6	0.79%	/dev/rdisk/dsk577b	stok_0_191	0.50%
/dev/rdisk/dsk331b	ordl_0_7	0.79%	/dev/rdisk/dsk579b	stok_0_192	0.50%
/dev/rdisk/dsk383b	ordl_0_8	0.79%	/dev/rdisk/dsk97b	stok_0_193	0.50%
/dev/rdisk/dsk384b	ordl_0_9	0.79%	/dev/rdisk/dsk98b	stok_0_194	0.50%
/dev/rdisk/dsk385b	ordl_0_10	0.79%	/dev/rdisk/dsk99b	stok_0_195	0.50%
/dev/rdisk/dsk386b	ordl_0_11	0.79%	/dev/rdisk/dsk597b	stok_0_196	0.50%
/dev/rdisk/dsk387b	ordl_0_12	0.79%	/dev/rdisk/dsk101b	stok_0_197	0.50%
/dev/rdisk/dsk388b	ordl_0_13	0.79%	/dev/rdisk/dsk102b	stok_0_198	0.50%
/dev/rdisk/dsk389b	ordl_0_14	0.79%	/dev/rdisk/dsk163b	stok_0_199	0.50%
/dev/rdisk/dsk391b	ordl_0_15	0.79%	/dev/rdisk/dsk578b	stok_0_200	0.50%
/dev/rdisk/dsk339b	ordl_0_16	0.79%	/dev/rdisk/dsk36d	system_001	100%
/dev/rdisk/dsk340b	ordl_0_17	0.79%	/dev/rdisk/dsk395e	temp_0_0	20%
/dev/rdisk/dsk341b	ordl_0_18	0.79%	/dev/rdisk/dsk412e	temp_0_1	20%
/dev/rdisk/dsk342b	ordl_0_19	0.79%	/dev/rdisk/dsk536e	temp_0_2	20%

/dev/rdisk/dsk343b	ordl_0_20	0.79%	/dev/rdisk/dsk551e	temp_0_3	20%
/dev/rdisk/dsk344b	ordl_0_21	0.79%	/dev/rdisk/dsk501e	temp_0_4	20%
/dev/rdisk/dsk345b	ordl_0_22	0.79%	/dev/rdisk/dsk396b	temp_perm_0	12.50%
/dev/rdisk/dsk598b	ordl_0_23	0.79%	/dev/rdisk/dsk413b	temp_perm_1	12.50%
/dev/rdisk/dsk400b	ordl_0_24	0.79%	/dev/rdisk/dsk537b	temp_perm_2	12.50%
/dev/rdisk/dsk401b	ordl_0_25	0.79%	/dev/rdisk/dsk552b	temp_perm_3	12.50%
/dev/rdisk/dsk402b	ordl_0_26	0.79%	/dev/rdisk/dsk502b	temp_perm_4	12.50%
/dev/rdisk/dsk403b	ordl_0_27	0.79%	/dev/rdisk/dsk519b	temp_perm_5	12.50%
/dev/rdisk/dsk407b	ordl_0_28	0.79%	/dev/rdisk/dsk570b	temp_perm_6	12.50%
/dev/rdisk/dsk408b	ordl_0_29	0.79%	/dev/rdisk/dsk585b	temp_perm_7	12.50%
/dev/rdisk/dsk409b	ordl_0_30	0.79%	/dev/rdisk/dsk588b	ware_1_0	12.50%
/dev/rdisk/dsk411b	ordl_0_31	0.79%	/dev/rdisk/dsk589b	ware_1_1	12.50%
/dev/rdisk/dsk458b	ordl_0_32	0.79%	/dev/rdisk/dsk590b	ware_1_2	12.50%
/dev/rdisk/dsk459b	ordl_0_33	0.79%	/dev/rdisk/dsk591b	ware_1_3	12.50%
/dev/rdisk/dsk460b	ordl_0_34	0.79%	/dev/rdisk/dsk594b	ware_1_4	12.50%
/dev/rdisk/dsk461b	ordl_0_35	0.79%	/dev/rdisk/dsk593b	ware_1_5	12.50%
			/dev/rdisk/dsk592b	ware_1_6	12.50%
			/dev/rdisk/dsk595b	ware_1_7	12.50%

5.3 Type of Database

A statement must be provided that describes:

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

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

The database used for this testing was Oracle9i, 9.0.1. Enterprise Edition and Real Applications Cluster with Partitioning for Tru64 UNIX from Oracle Corporation. Oracle9i, 9.0.1. Enterprise Edition and Real Applications Cluster with Partitioning for Tru64 UNIX is a relational DBMS. SQL stored procedures were used and were invoked from the clients using OCI calls.

5.4 Database Partitions/Replications

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

Horizontal partitioning was used on the warehouse, district, new_order, history, order, and orderline tables. The functionality for this was provided by Oracle9i, 9.0.1. Enterprise Edition and Real Applications Cluster with Partitioning for Tru64 UNIX. For further details of the partitioning of the database, see Appendix B.

5.5 60-Days Space Requirement

Details of the 60-day space calculations along with proof that the database is configured to sustain 8 hours of growth for the dynamic tables (Order, Order-line, and History) must be disclosed.

SEGMENT	TYPE	TSPACE	BLOCKS	FIVE_PCT	DAILY_GROW	TOTAL
CUSTCLUSTER	CLUSTER		141120504	7056025	0	148176529
HIST	TABLE PARTITION		8279040	0	1622952	9901992
ICUST1	INDEX		3225600	161280	0	3386880
ICUST2	INDEX		7147520	357376	0	7504896
IDIST	INDEX PARTITION		1024	51	0	1075
IITEM	INDEX		512	26	0	538
INORD	INDEX PARTITION		716800	35840	0	752640

IORDL	INDEX PARTITION	36403200	0	7136173	43539373
IORDR1	INDEX PARTITION	3225600	161280	0	3386880
IORDR2	INDEX PARTITION	5166080	258304	0	5424384
ISTOK	INDEX	9753600	487680	0	10241280
ITEMCLUSTER	CLUSTER	4422	221	0	4643
IWARE	INDEX PARTITION	256	13	0	269
ORDL	TABLE PARTITION	103059200	5152960	0	108212160
ORDR	TABLE PARTITION	5811200	0	1139178	6950378
ROLL_SEG	SYS	262144	0	0	262144
STOKCLUSTER	CLUSTER	171055200	8552760	0	179607960
SYSTEM	SYS	262144	0	0	262144
WARE	TABLE PARTITION	28296	1415		29711
TOTAL		495522342	22225231	9898303	527645876

Dynamic space 147,741,440
Static space 370,006,133
Free space 9,898,303

Daily growth 9,898,303
Daily spread 0 Oracle may be configured such that daily spread is 0
60-day space (blk.) 963,904,313
Block size (bytes) 4,096
60-day (GB) 3,677.00

Log block size 1,024
Log blocks/N_O txn. 13.50 Log blocks used per New-Order transactions
8-hour log (GB) 1,424.65

Total Space (GB) Required on System (except for logs)

180 day (GB) 3,677.00
OS + Oracle 50.01
Swap 46.39
Total 3,773.40

Space Allocated for Data

Space Allocated for Data (Excluding logs)				Total	Space	Disks
Drive Type	Number	Cap. (GB)	Capacity (GB)	Capacity (GB)	Needed	Needed
3R-A0585-AA	30	33.91	1,017.30			0 Data Disks
3R-A0527-AA	425	16.95	7,205.71			0
3R-A0584-AA	1172	8.47	9930.36			0 Data Disks
Total			<u>18,153.37</u>		-14,476.37	0

Space Allocated for OS and Swap

RZ1EA-VW	6	16.96	<u>101.75</u>			0 Swap Disks
Total			101.75		0.00	0 OS + Swap Disks

Space Allocated for Logs

Drive Type	Number	Cap. (GB)	Capacity (GB)		
3R-A0585-AA	43	33.92	1458.45	0.00	0 Mirrored Log

3R-A0585-AA	86	33.92	2916.91		Disks 0 UnMirrored Log Disks
Total Priced devices	3R-A0585-AA	3R-A0527-AA	3R-A0584-AA	RZ1EA-VW	
For Configuration	116	425	1,172		6 mirrored logs + space allocated+OS and Swap
Spares	12	43	118		1 10% extra
	<u>128</u>	<u>468</u>	<u>1,290</u>	<u>7</u>	

6. Performance Metrics and Response Time Related Items

6.1 Reporting All Data

Measured tpmC must be reported

All the data required by Clause 5 is reported below in Section 5.2 through 5.10. The measured tpmC for the Compaq AlphaServer GS320 C/S configuration was 230,533 tpmC.

6.2 Response Times

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

Response Times in seconds

Transaction	90th percentile	Average	Maximum
New-Order	1.337	0.674	11.644
Payment	1.385	0.746	8.362
Order-Status	1.337	0.679	7.432
Delivery (interactive)	0.785	0.362	5.586
Delivery (deferred)	1.844	0.758	11.265
Stock-Level	1.574	0.826	7.956
Menu	0.733	0.339	5.702

6.3 Think and Keying Times

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

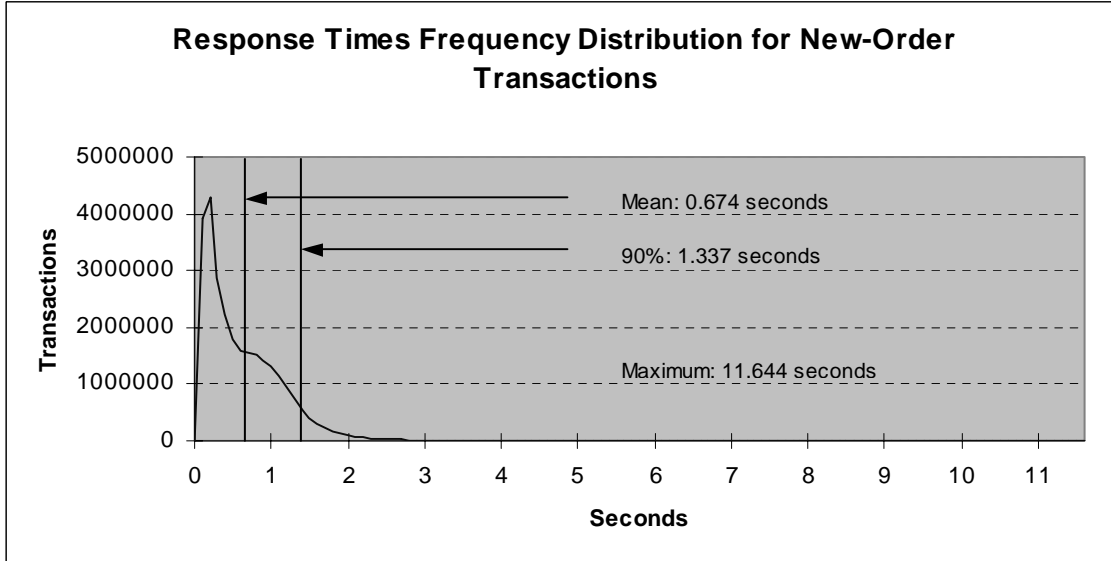
Keying/Think Times in seconds

Transaction	Minimum	Average	Maximum
New-Order	18.000/0.000	18.000/12.002	18.155/119.981
Payment	3.000/0.000	3.000/12.002	3.145/120.007
Order-Status	2.000/0.000	2.000/10.003	2.144/ 99.958
Delivery (interactive)	2.000/0.000	2.000/ 5.001	2.144/ 49.975
Stock-Level	2.000/0.000	2.000/ 5.003	2.143/ 49.911

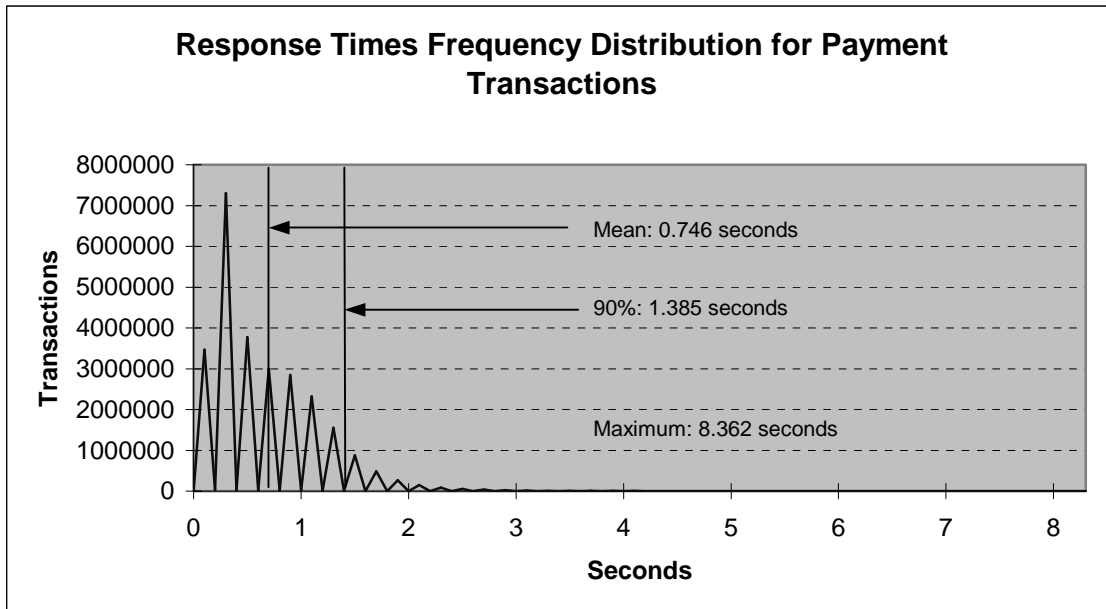
6.4 Response Times Frequency Distribution

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

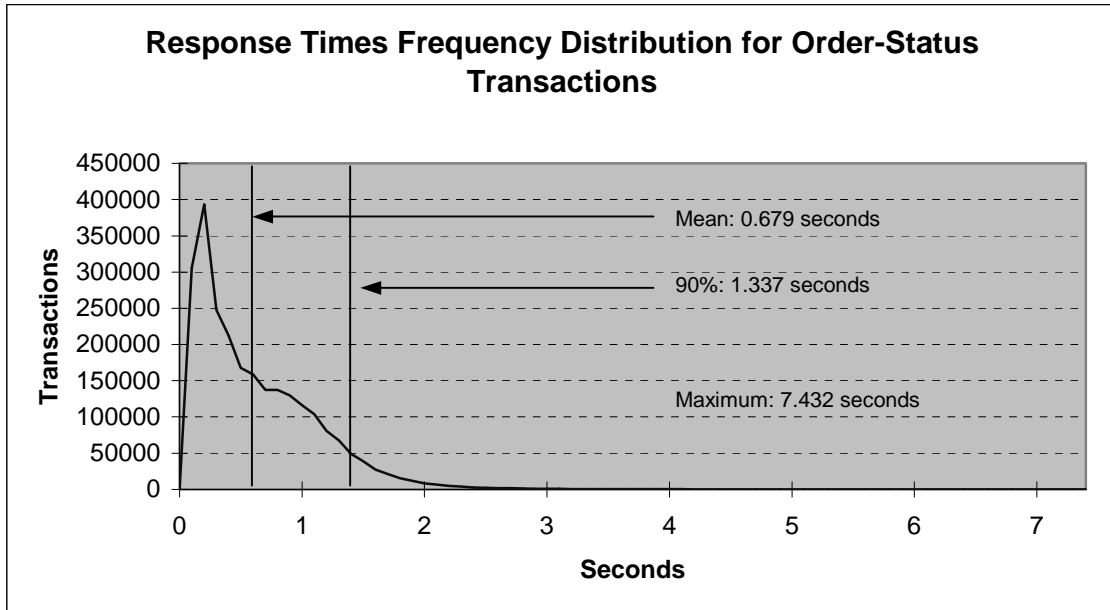
Response Times Frequency Distribution for New-Order Transactions



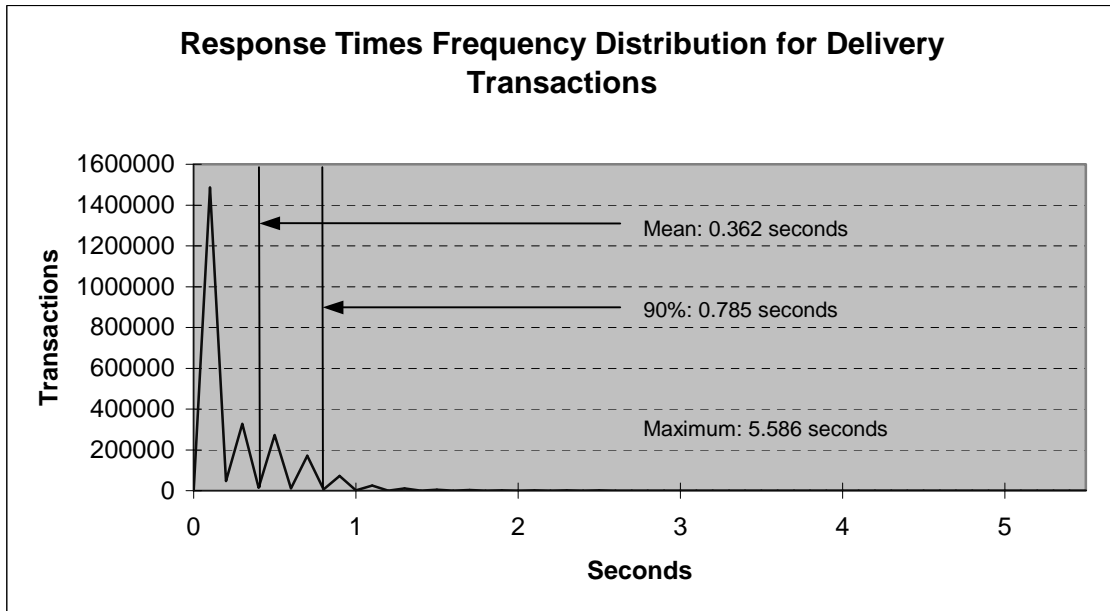
Response Times Frequency Distribution for Payment Transactions



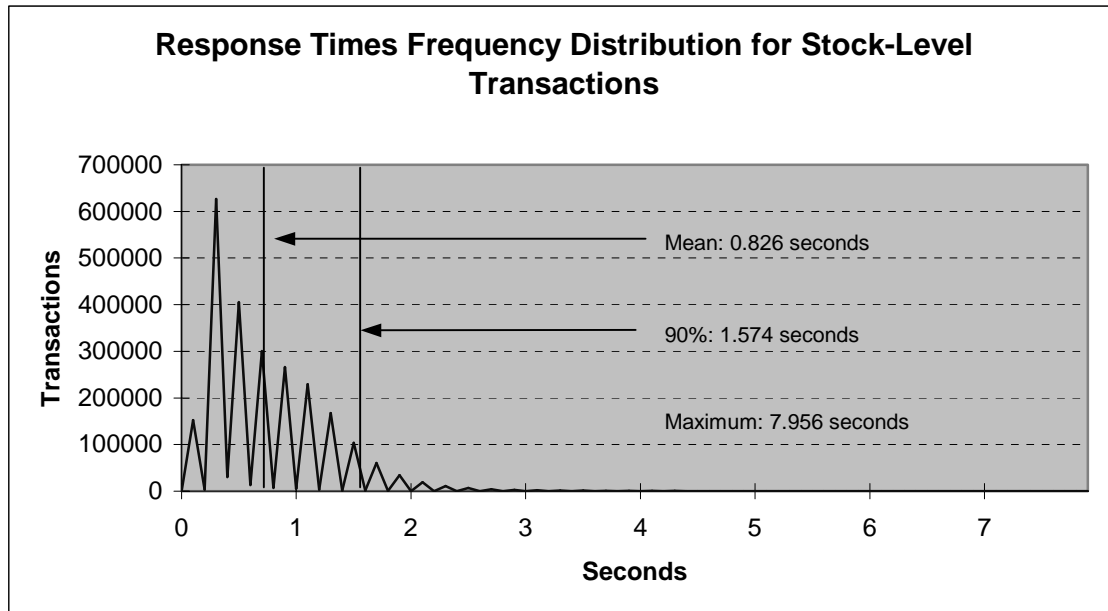
Response Times Frequency Distribution for Order-Status Transactions



Response Times Frequency Distribution for Delivery Transactions



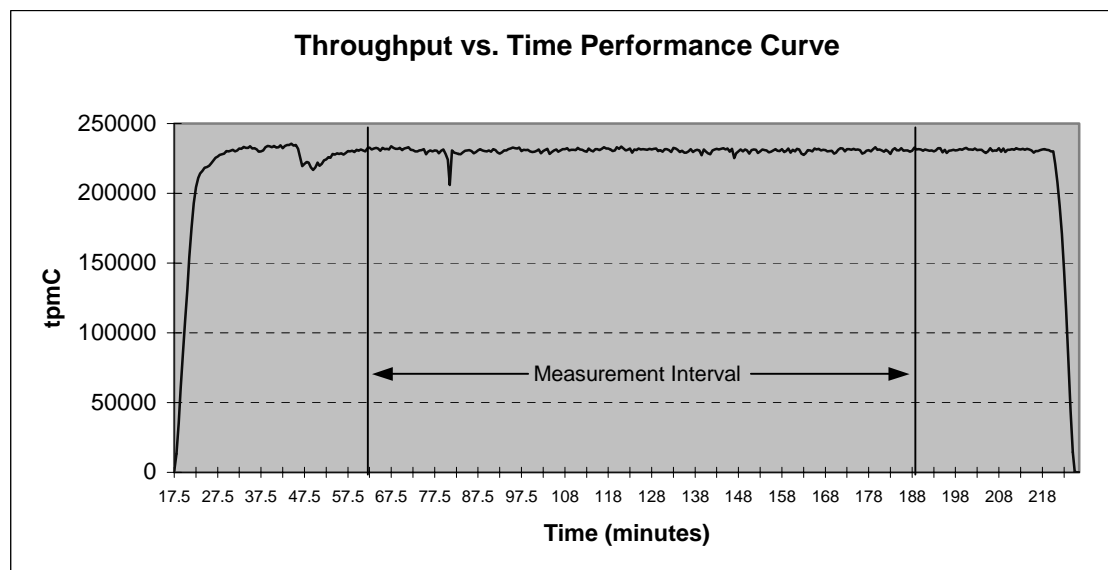
Response Times Frequency Distribution for Stock-Level Transactions



6.5 Response Time versus Throughput Performance Curve

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

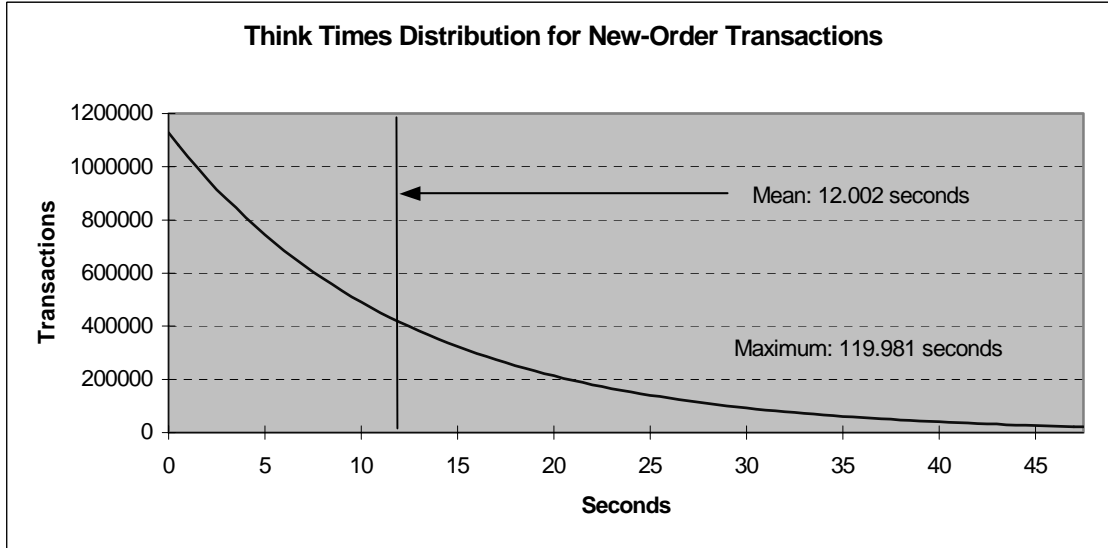
New-Order Response Time versus Throughput



6.6 Think Times Frequency Distribution

Think times frequency distribution curves (see Clause 5.6.3) must be reported for the New Order Transaction.

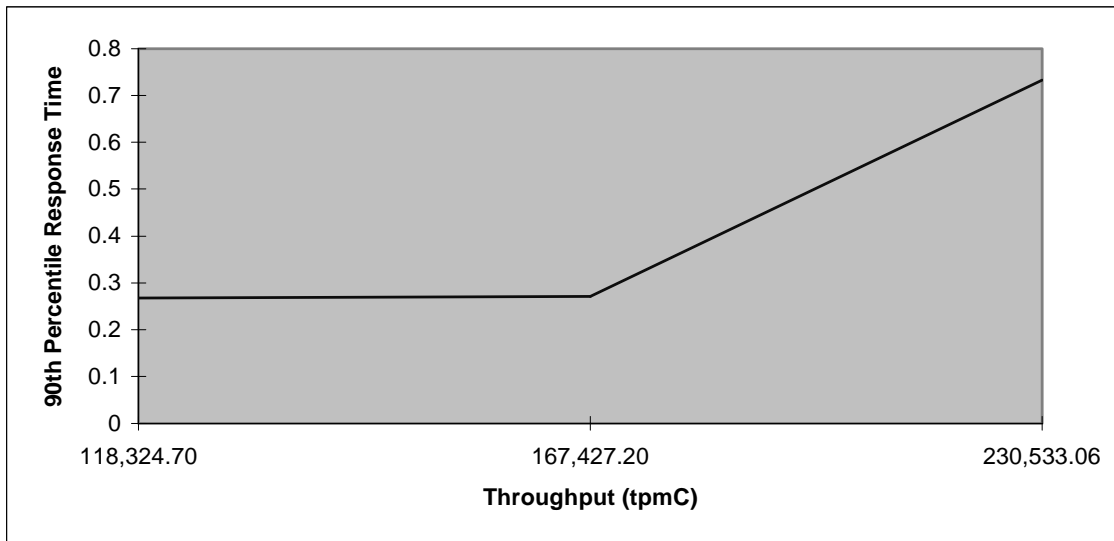
Think Times Distribution for New-Order Transactions



6.7 New-Order Throughput vs. Elapsed Time

A graph of throughput versus elapsed time (see Clause 5.6.5) must be reported for the New-Order transaction.

Throughput vs. Time Performance Curve



6.8 Steady State

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

Confirmation that the SUT has reached steady state prior to the beginning of the data collection measurement interval is based on a visual inspection of the plots of tpmC versus time.

The graph in Section 6.7 plots the average tpmC versus time, averaged over 30 second intervals, and shows that steady state was reached before the data was collected. The ramp-up and steady-state stages are clearly visible.

6.8.1 Transaction Flow

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

Compaq DB Web Connector RT V1.1 for Windows 2000 server was used as the transaction manager (TM). Each transaction was divided into two pieces. The front-end portion handled all screen I/O, while the back-end portion handled all database operations. Both front-end and back-end pieces ran on the client system.

The front-end portion communicates with the back-end portion through shared memory. The back-end portion communicates with the server system over gigaswitch using Oracle9i, 9.0.1. Enterprise Edition and Real Applications Cluster with Partitioning for Tru64 UNIX OCI calls. Compaq DB Web Connector routes the transaction and balances the load according to values in the registry governing the number of processing procedure servers. Following is the transaction flow description.

- Each TPC-C user invokes the TPC-C main front-end portion.
- The front-end portion 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 that transaction.
- The TPC-C front-end accepts all values entered by the user and transmits those values to one of the TPC-C back-end processing procedures. Each of the back-end processing procedures can process any of the transaction types.
- A TPC-C back-end processing procedure receives a workspace and proceeds to execute all database operations related to the transaction type specified. All the information entered on the user terminal is contained in the Compaq DB Web Connector workspace.
- Once the transaction is committed, the TPC-C back-end processing procedure loads the workspace with the transaction output and returns control to the Compaq DB Web Connector transaction manager.
- Compaq DB Web Connector passes the workspace back to the TPC-C main front-end.

6.8.2 Database Transaction

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

- Using Oracle9i, 9.0.1. Enterprise Edition and Real Applications Cluster with Partitioning for Tru64 UNIX OCI calls, the TPC-C back-end program interacts with Oracle9i, 9.0.1. Enterprise Edition for and Real Applications Cluster with Partitioning Tru64 UNIX 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.
- Oracle9i, 9.0.1. Enterprise Edition and Real Applications Cluster with Partitioning for Tru64 UNIX proceeds to update the database as follows:

When Oracle9i, 9.0.1. Enterprise Edition and Real Applications Cluster with Partitioning for Tru64 UNIX 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, Oracle9i, 9.0.1. Enterprise Edition and Real Applications Cluster with Partitioning for Tru64 UNIX 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. For each of the TPC Benchmark C transaction types, the following steps are executed.

Compaq DB Web Connector RT V1.1 for Windows 2000 server was used as the transaction manager (TM). Each transaction was divided into two pieces. The front-end portion handled all screen I/O, while the back-end portion handled all database operations. Both front-end and back-end pieces ran on the client system.

The front-end portion communicates with the back-end portion through shared memory. The back-end portion communicates with the server system over gigaswitch using Oracle9i, 9.0.1. Enterprise Edition and Real Applications Cluster with Partitioning for Tru64 UNIX OCI calls. Compaq DB Web Connector routes the transaction and balances the load according to values in the registry governing the number of processing procedure servers. The transaction flow is described below.

- Each TPC-C user invokes the TPC-C main front-end portion.
- The front-end portion 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 that transaction.
- The TPC-C front-end accepts all values entered by the user and transmits those values to one of the TPC-C back-end processing procedures. Each of the back-end processing procedures can process any of the transaction types.
- A TPC-C back-end processing procedure receives a workspace and proceeds to execute all database operations related to the transaction type specified. All the information entered on the user terminal is contained in the Compaq DB Web Connector workspace.
- Once the transaction is committed, the TPC-C back-end processing procedure loads the workspace with the transaction output and returns control to the Compaq DB Web Connector transaction manager.
- Compaq DB Web Connector passes the workspace back to the TPC-C main front-end.

6.9 Work Performed During Steady State

A description of how the work normally performed during a sustained test actually occurred during the measurement interval must be reported.

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

Each emulated user starts an Internet browser and asks to attach to the application on the desired client. The application formats the menus, input forms and data output using HTML (HyperText Markup Language). The HTML strings are transmitted over TCP/IP back to the client, where they can be displayed by any Web Browser software. The application on the client is run under the control of the Internet Information Server.

Transactions are submitted by the RTE in accordance with the rules of the TPC-C benchmark. The emulated user chooses a transaction from the menu. The RTE records the time it takes from selecting the menu item to receiving the requested form. Data is generated for input to the form, then the user waits the specified keying time. The submit is sent and the RTE records the time it takes for the transaction to be processed and all the output data to be returned. The user then waits for the randomly generated think time before starting the process over again. All timings taken by the RTE generate a start and end timestamp. Keying and think times are calculated as the difference between end-time of a timing to the start of the next.

The database records transactions in the database tables and also the transaction log. Writes to the database may stay in Oracle's in-memory data cache for a while before being written to disk. Checkpoints are initiated once the log files were filled and allowed to roll over.

6.10 Determining Reproducibility

Duration Of the Checkpoint Interval

The start time and duration in seconds of at least four (4) longest checkpoints during the Measurement Interval must be disclosed.

Appendix D contains the report for the checkpoints.

6.11 Duration of Measurement Period

Each experiment was run for a minimum of 195 minutes. The Measurement Interval was 120 minutes and started approximately 60 minutes after all simulated users had begun executing transactions with a 15 minute ramp down.

6.12 Method of Regulation of the Transaction Mix

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

The weighted distribution method was used. The RTE adjusted the transaction mix dynamically in accordance with clause 5.4.2.1.

6.13 Percentage of the Total Mix

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

See Section 3.10.

6.14 Percentage of New-Order Transactions Rolled Back

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

See Section 3.10.

6.15 Average Number of Order-Lines

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

See Section 3.10.

6.16 Percentage of Remote Order-Lines

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

See Section 3.10.

6.17 Percentage of Remote Payment Transactions

The percentage of remote Payment transactions must be disclosed.

See Section 3.10.

6.18 Percentage of Customer Selections

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

See Section 3.10.

6.19 Percentage of Delivery Transactions

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

See Section 3.10.

6.20 Number of Checkpoints

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

A checkpoint is the process of writing all modified data pages to disk. The TPC-C benchmark on the Compaq AlphaServer GS320 C/S system was set up to checkpoint within every 30 minutes. One checkpoint occurs during the warm-up period, and 4 checkpoints occurred during the measurement period.

7. SUT, Driver, and Communication Definition Related Items

7.1 Description of RTE

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

In order to simulate terminal users and record response times, a proprietary emulation package, PRTE, was used to simulate terminal users, generate random data, and record response times. This package runs on a processor that is distinct from the system under test.

7.2 Lost Terminal Connections

The number of terminal connections lost during the Measurement Interval must be disclosed

There were no lost connections during the warm-up or Measurement Interval.

7.3 Driver Functionality and Performance

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

Due to the large number of PCs and associated hardware that would be required to run these tests, Remote Terminal Emulator was used to emulate the connected PCs and LAN.

As configured for this test, the driver software emulates the traffic that would be observed from the users' PCs connected by Ethernet to the front-end clients using HTTP (HyperText Transfer Protocol) over TCP/IP.

7.4 Functional Diagrams and Details of Driver System

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

The diagrams in Section 1.7 show the tested and priced benchmark configurations.

7.5 Network Configurations and Driver System

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

Section 1.7 in this report has a picture of the network configurations of both the tested service and the proposed (target) services.

In the measured configuration, both the client machines (Compaq ProLiant 1600 and AlphaServer GS320) are connected into 4 Vertical Horizon VH-8G Gigabit Ethernet Switch. The emulated PC's are connected on 10/100 Ethernet LANs. The total number of PCs are 188,160.

7.6 Network Bandwidth

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

The Ethernet used in the local area network (LAN) between the emulated terminals and the front-end systems complies with the IEEE 802.3 standard and has a bandwidth of 10 megabits per second (Mbps).

The network between the front-end clients and the server has a bandwidth of 2GB/S. The network connecting the PCs into the gigaswitch is 1000 Mbps.

7.7 Operator Intervention

If the configuration requires operator intervention (see Clause 6.6.6), the mechanism and the frequency of this intervention must be disclosed.

No operator intervention was required.

8. Pricing Related Items

8.1 Hardware and Software Components

A detailed list of hardware and software used in the priced system. 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.

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

The detailed list of all hardware and software for the priced configuration is listed in the system pricing summary.

8.1.1 Hardware Pricing

Compaq Computer Corporation's TPC Benchmark C tests used packaged hardware systems whenever possible to simplify configurations to the fewest number of line items.

All hardware and software products have been priced to satisfy the 3 year warranty and 7 X 24 with 4 hour response requirements.

The hardware prices for the Compaq AlphaServer GS320 32 CPUs 256GB memory and their associated components (e.g., memory, storage subsystem, etc.) are based on IC System Solutions, Data Comm Warehouse and Compaq Computer Corporation price quotations.

8.1.2 Software Pricing

The priced system uses the following software products:

- Compaq Tru64 UNIX operating system
- Compaq TruCluster
- Compaq DB Web Connector
- Compaq C compiler
- Oracle9i, 9.0.1. Enterprise Edition and Real Applications Cluster with Partitioning for Tru64 UNIX
- Microsoft 2000 Server Operating System

The level of post-warranty software service is Layered Product Support (LPS).

8.1.3 Warranty Pricing

In addition to the base warranty, additional warranty has been priced to satisfy the 3-year TPC-C warranty requirements of all products.

The license purchase includes 1 year of warranty service. Two years of additional software warranty is provided for a total of 3 years extended warranty. The software warranty and service levels are the same as the service level for the hardware system on which the software operates.

8.1.4 Price Discounts

See Appendix F.

8.2 Availability Status

The committed delivery date for general 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.

The Compaq AlphaServer GS320 and all associated hardware used in the measurement as well as Compaq's Tru64 UNIX 5.1 will be available on July 30, 2001. Oracle9i, 9.0.1. Enterprise Edition and Real Applications Cluster with Partitioning for Tru64 UNIX will be available June 19, 2001.

8.3 Performance and Price/Performance

A statement of the measured tpmC, as well as the respective calculations for 3-year pricing and price/performance (price/tpmC) and the availability date must be included.

The following table shows the measured tpmC and price/tpmC results for the tested systems:

CPU Model	Configuration	Software	tpmC	Price per tpmC \$/tpmC
Compaq AlphaServer GS320	32 CPU	Compaq Tru64 UNIX v5.1 Oracle9i, 9.0.1. Enterprise Edition and Real Applications Cluster with Partitioning for Tru64 UNIX	230,533	\$44.62/tpmC

8.4 Country Specific Pricing

Additional Clause 7 related items may be included in the Full Disclosure Report for each country specific priced configuration. Country specific pricing is subject to Clause 7.1.7.

None.

8.5 Usage Pricing

For any usage pricing, the sponsor must disclose:

- *Usage level at which the component was priced.*
- *A statement of the company policy allowing such pricing.*

None.

9. Audit Related Items

9.1 Audit

If the benchmark has been independently audited, 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.

Appendix E contains the complete independent auditor's letter by Francois Raab of InfoSizing for the test described in this report.

Appendix A

crestdl.c

```
/*_+*****
*****
*
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RELIABILITY OF ITS *
* SOFTWARE ON EQUIPMENT WHICH IS NOT SUPPLIED BY DIGITAL.
*
*
*****_*/
#ifdef _WIN32
#include <windows.h>
#endif /* _WIN32 */

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

#include <tpcstruct.h>
#include <tpcc_acmsxp.h>

#define MAX(a,b) ((a)>(b)?(a):(b))

void usage( char *prog );

int
main(int argc, char *argv[])
{
    FILE *fptr;
    char *dir;
    int iMaxSize;

    dir = getenv( "USR_OBJ" );

    if( 2 != argc ) {
        usage( argv[0] );
    }

    if( NULL == ( fptr = fopen( argv[1],"w" )))
    {
        fprintf( stderr, "\nCould not open file %s\n", argv[1] );
    }
}
```

```
exit( 1 );
}

iMaxSize = 0;
iMaxSize = MAX(iMaxSize,sizeof(DeliveryData));
iMaxSize = MAX(iMaxSize,sizeof(NewOrderData));
iMaxSize = MAX(iMaxSize,sizeof(OrderStatusData));
iMaxSize = MAX(iMaxSize,sizeof(PaymentData));
iMaxSize = MAX(iMaxSize,sizeof(StockLevelData));

fprintf(fptr, "RECORD io_login_wksp\n");
fprintf(fptr, "\tlogin_data TEXT SIZE %d;\n",sizeof( LoginData ));
fprintf(fptr, "END RECORD;\n\n");
fprintf(fptr, "RECORD io_dy_wksp\n");
fprintf(fptr, "\tdy_data TEXT SIZE %d;\n",sizeof( DeliveryData ));
fprintf(fptr, "END RECORD;\n\n");
fprintf(fptr, "RECORD io_no_wksp\n");
fprintf(fptr, "\tno_data TEXT SIZE %d;\n",sizeof( NewOrderData ));
fprintf(fptr, "END RECORD;\n\n");
fprintf(fptr, "RECORD io_pt_wksp\n");
fprintf(fptr, "\tpt_data TEXT SIZE %d;\n",sizeof( PaymentData ));
fprintf(fptr, "END RECORD;\n\n");
fprintf(fptr, "RECORD io_os_wksp\n");
fprintf(fptr, "\tos_data TEXT SIZE %d;\n",sizeof( OrderStatusData ));
fprintf(fptr, "END RECORD;\n\n");
fprintf(fptr, "RECORD io_sl_wksp\n");
fprintf(fptr, "\tsl_data TEXT SIZE %d;\n",sizeof( StockLevelData ));
fprintf(fptr, "END RECORD;\n\n");
fprintf(fptr, "RECORD io_gc_wksp\n");
fprintf(fptr, "\tgc_data TEXT SIZE %d;\n", iMaxSize );
fprintf(fptr, "END RECORD;\n\n");
fprintf(fptr, "RECORD int_gc_wksp\n");
fprintf(fptr, "\ttrans INTEGER;\n");
fprintf(fptr, "END RECORD;\n\n");

fclose(fptr);
printf( "\n File %s generated.\n", argv[1] );

return 0;
}

void
usage( char *prog )
{
    fprintf( stderr, "usage: %s <output file name>\n", prog );

    exit( 1 );
}
```

deli_cli.c

```
/*_+*****
*****
*
* COPYRIGHT (c) 1997, 2000 BY
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* ALL RIGHTS RESERVED.
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*
*
*****_*/
```

```

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RELIABILITY OF ITS *
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*
*
*

```

```

*****
*****/

```

```

/*+
* Abstract: This file contains functions for the delivery server client code.
*
* Author: W Carr
* Creation Date: July 1997
*
* Modified history:
*
*
*/

```

```

#define DELI_CLI_C

#ifdef _WIN32
#include <windows.h>
#else
#include <unistd.h>
#include <errno.h>
#include <sys/time.h>
#endif

#include <time.h>

#include <tpcstruct.h>
#include <tpccapi.h>
#include <tpccerr.h>

#ifdef _WIN32
#include <buf.h>
#endif
#include <deli_srv.h>
#include <transpool.h>

#ifdef _WIN32
static BOOL gbUsePipe = FALSE;
#else
static BOOL gbUsePipe = TRUE;
#endif

```

```

static BOOL gbDisplayCompletions = TRUE;

/* FUNCTION: int DELIClientStartup( void )
*
* PURPOSE: This function prepares the delivery client for processing.
*
* ARGUMENTS: None
*
* RETURNS: int Error code if unsuccessful
ERR_SUCCESS if no error
*
* COMMENTS: This code presumes that the server portion of the code
has been started first, otherwise, a call to the delivery
function will fail.
*
*/

```

```

int
DELIClientStartup( pDeliveryTransportData pDeliveryTransport,
pLoginData pLogin, int loginDelay, char *Path )
{
int status;

#ifdef _WIN32
/* Let the caller decide on use of pipe. */
gbUsePipe = pDeliveryTransport->use_pipe;
if( gbUsePipe )
{
gbDisplayCompletions = FALSE;
}
}

```

```

else
{
gbDisplayCompletions = pDeliveryTransport->display_completions;
}
#endif

status = DELIServerStartup( pDeliveryTransport, pLogin, loginDelay, Path );
if( ERR_SUCCESS != status )
return( status );

return( ERR_SUCCESS );
}

```

```

/* FUNCTION: int DELIClientShutdown( void )
*
* PURPOSE: This function cleans up allocated objects to allow for
termination of the delivery subsystem.
*
* ARGUMENTS: None
*
* RETURNS: int Error code if unsuccessful
ERR_SUCCESS if no error
*
* COMMENTS: None
*/

```

```

int
DELIClientShutdown( void )
{
return( DELIServerShutdown( ) );
}

```

```

/* FUNCTION: int TPCCDelivery( pDeliveryData *pppDelivery,
pDeliveryData
pCompletedDeliveries[DELIVERY_RESPONSE_COUNT] )
*
* PURPOSE: Writes the input portion the the delivery structure to the
server.
*
* ARGUMENTS: DeliveryData *pDelivery Delivery data i/o struct
ptr
*
* RETURNS: int ERR_DB_SUCCESS success
ERR_DB_NOT_COMMITED other
error
*
* COMMENTS:
*
*/

```

```

int
TPCCDelivery( pDeliveryData *ppDelivery,
pDeliveryData
pCompletedDeliveries[DELIVERY_RESPONSE_COUNT] )
{
pDeliveryData pDeliveryCopy;
size_t bw;
size_t br;
int ii;
int status;

/* Pull any completions off the output queue. We do this first to help */
/* prevent the deadlock situation where both sides of the delivery system */
/* write before reading. */
ii = 0;
if( gbDisplayCompletions ) {
while( ii < DELIVERY_RESPONSE_COUNT ) {
#ifdef _WIN32
status = bfreed( &pCompletedDeliveries[ii], sizeof( pDeliveryData ),
&br, 0, outputbuf );
if( BUF_READTIMEOUT == status ) {
/* there was not a completed transaction waiting */
break;
}
else if( BUF_SUCCESS != status )
return ERR_DELIVERY_OUTPUT_PIPE_READ;
#endif
pCompletedDeliveries[ii] = ReserveTransactionStruct( DELIVERY_TRANS );
}
}
}

```

```

br = sizeof( DeliveryData );
status = DELIQueueRead( outputbuf,
                      (void *)pCompletedDeliveries[ii], &br,
FALSE );
if( ERR_SUCCESS != status )
{
    return( status );
}
if( 0 == br )
{
    UnreserveTransactionStruct( DELIVERY_TRANS,
&pCompletedDeliveries[ii] );
    break;
}
#endif
ii++;
}
}

/* Zero out this and all remaining delivery records. */
while( ii < DELIVERY_RESPONSE_COUNT )
{
    pCompletedDeliveries[ii++] = NULL;
}

/* get local queue time if nothing supplied */
if( 0 == (*ppDelivery)->queue_time )
    time( &(*ppDelivery)->queue_time );

/* Overload the delta time to be the local queue time in milliseconds. */
/* On the server side, we will get the tick count and subtract to */
/* calculate the delta.
*/
StartTime( (*ppDelivery)->delta_time );

if( gbUsePipe ) {
#ifdef _WIN32
    if( 0 == WriteFile( ghPipeInputWrite, (*ppDelivery),
                      sizeof(DeliveryDataInput), &bw, NULL ) ) {
        status = GetLastError();
        return ERR_DB_DELIVERY_NOT_QUEUED;
    }
#else
#pragma message ("FIXME: When the delivery queue fills on Unix, you can reach a
deadlock. There are two ways around this. First, don't block and send an error
message to the caller that they should set the msg-tql parameter in the ipc section of
the sysconfigtab. Second, use mmap() to create a shared memory section and port the
NT buf code so that the buffer size can be managed by application code.")
    status = DELIQueueWrite( inputbuf, (void *)ppDelivery,
                          sizeof( DeliveryDataInput ), TRUE );

    if( ERR_SUCCESS != status )
    {
        if( ERR_DB_DELIVERY_NOT_QUEUED == status )
        {
            TPCCErr( "Check the setting of msg-tql in the ipc: section of the
sysconfigtab.\r\n" );
        }
        return( status );
    }
#endif
}
#endif
#ifdef _WIN32
else {
    /* We need to post a copy of the delivery data to be processed so that */
    /* the original data structure can be returned as having been posted. */
    pDeliveryCopy = ReserveTransactionStruct( DELIVERY_TRANS );
    memcpy( (char *)pDeliveryCopy, (char *)ppDelivery,
          sizeof( DeliveryDataInput ));

    /* Since a copy of the delivery transaction data structure has been */
    /* reserved, we only wish to pass its address to the delivery server. */
    /* Since the buffer code assumes that you wish to copy what is at the */
    /* pointer value (it will dereference the pointer) what we want to pass */
    /* is a pointer to the pointer. */
    if( BUF_SUCCESS != bufwrite( &pDeliveryCopy, sizeof( pDeliveryData ),
                              &bw, INFINITE, inputbuf ))
        return ERR_DB_DELIVERY_NOT_QUEUED;
    }
}
#endif

```

```

/* Fake out the transaction pool code that the inbound transaction did all */
/* the steps of the process. */
TRANSACTION_DEBUG_STAGE( *ppDelivery,
IN_LH|IN_RH|IN_DB|LEAVING_DB|LEAVING_RH|LEAVING_LH );

return ERR_DB_SUCCESS;
}

```

deli_cli.h

```

#ifndef DELI_CLI_H
#define DELI_CLI_H
/*+*****
*****
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*
*
*
*****
******/
/*+
* Abstract: This file contains definitions and declarations for the
* delivery server client code.
*
* Author: W Carr
* Creation Date: July 1997
*
* Modified history:
*
*
*/

int DELIClientStartup( pDeliveryTransportData pDeliveryTransport,
                    pLoginData pLogin, int loginDelay, char *Path );
int DELIClientShutdown( void );

```

deli_srv.c

```

/*+*****
*****
*
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*
*
*

```

```

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*
*
*

```

```

*****
*****_*/

```

```

/*+
* Abstract: This file contains functions for the delivery server queue.
*
* Author: W Carr
* Creation Date: July 1997
*
* Modified history:
*
*
*/

```

```

#define DELI_SRV_C

#ifdef _WIN32
#include <windows.h>
#include <winsock.h>
#include <process.h>
#else
#include <unistd.h>
#include <errno.h>
#include <signal.h>
#include <fcntl.h>
#include <sys/file.h>
#include <sys/time.h>
#include <sys/wait.h>
#include <sys/msg.h>
#define __stdcall
#define GetCurrentThreadId getpid
#endif
#include <time.h>
#include <stdio.h>
#include <stdlib.h>
#ifdef _WIN32
#include <crtdbg.h>
#include <buf.h>
#endif

#include <tpcstruct.h>
#include <tpccapi.h>
#include <tpccerr.h>

#include <transpool.h>
#include <deli_srv.h>

```

```

static int giDeliInitStatus = ERR_SUCCESS;
static long gDeliThreadStartCtr;
#ifdef USE_PROCESSES
static BOOLgbUsePipe = TRUE; /* Use OS pipe delivery code */

```

```

#else /* USE_PROCESSES */
static BOOLgbUsePipe = FALSE; /* Use OS pipe delivery code */
static HANDLE gDeliThreadStartEvent;
/* Used for OS pipe deliveries */
static HANDLE hPipeInputRead = INVALID_HANDLE_VALUE;
static BOOLbDone; /* termination request
flag */
#endif /* USE_PROCESSES */
static BOOLgbDisplayCompletions = TRUE; /* Send comp. back to UI? */

static FILE *fpLog = NULL; /* pointer to log file */

static BOOLgbWriteDeliLog = FALSE; /* log transactions to
file? */
static BOOLgbFlushDeliLog = FALSE; /* Flush log info when
written */
static BOOLgbDirectConnect = FALSE; /* Use transport or connect */

```

```

/* function prototypes */
void DELIErrorMessage(int iError);
void DELILog( pDeliveryData pDelivery );
unsigned __stdcall DELIThread( void *ptr );
#ifdef USE_PROCESSES
#define DELIVERY_MESSAGE 1
#define DELIVERY_SHUTDOWN -1
#define DELIVERY_STARTUP_SUCCESS -2
#define DELIVERY_STARTUP_FAILURE -3
#define INPUT_QUEUE_ID 71759
#define OUTPUT_QUEUE_ID 10492
#define DELI_PARAMS_NAME "/tmp/deli_server.params"
#define DELI_LOCK_NAME "/tmp/deli_server.lock"
typedef struct _DELIMsgStruct
{
long int iType;
DeliveryData Delivery;
} DELIMsgStruct, *pDELIMsgStruct;
typedef struct _DELIServerStruct
{
int RunId;
int CurrentServerCount;
int CurrentClientCount;
} DELIServerStruct, *pDELIServerStruct;
int DELIServerShutdownInternal( pDELIServerStruct pds );
void DELISigchldHandler( int );
#if 1
#define CRASH *segv = 0
int *segv = NULL;
#else
int num = 1;
int denom = 0;
#define CRASH num/denom;
#endif
#endif

```

```

/* FUNCTION: void DELIErrorMessage(int iError)
*
* PURPOSE: This function writes an error message to the error log file.
*
* ARGUMENTS: int iError error id to be logged
*
* RETURNS: None
*
* COMMENTS: None
*
*/

```

```

void DELIErrorMessage(int iError)
{
TPCCErr( "Error(%d): %s\r\n", iError, TPCCErrString( iError ));
return;
}

```

```

/* FUNCTION: void DELILog( pDeliveryData pDelivery )
*
* PURPOSE: Writes the delivery results to the delivery log file.
*
* ARGUMENTS: LPSYSTEMTIME lpBegin Local
delivery start time.

```

```

*          pDeliveryData      pDelivery  Delivery data to be
written.
*
* RETURNS:      None
*
* COMMENTS:    None
*
*/

void
DELILog( pDeliveryData pDelivery )
{
    struct tm          start;
    struct tm          *end;
    time_t             endt;
    unsigned           delta_time_seconds;
    unsigned           delta_time_milliseconds;

    delta_time_seconds = pDelivery->delta_time / 1000;
    delta_time_milliseconds = pDelivery->delta_time - (delta_time_seconds * 1000);

    memcpy( &start, localtime( &pDelivery->queue_time ), sizeof( start ));
    endt = pDelivery->queue_time + delta_time_seconds;
    end = localtime( &endt );

    fprintf( fpLog,
            "% 2.2d/% 2.2d/% 2.2d,"
            "% 2.2d:% 2.2d:% 2.2d:% 3.3d,"
            "% 2.2d:% 2.2d:% 2.2d:% 3.3d,"
            "% 8.8d,"
            "% 5.5d,% 2.2d,"
            "% 4.4d,% 4.4d,% 4.4d,% 4.4d,% 4.4d,"
            "% 4.4d,% 4.4d,% 4.4d,% 4.4d,% 4.4d,% 4.4d\r\n",
            start.tm_year, start.tm_mon, start.tm_mday,
            start.tm_hour, start.tm_min, start.tm_sec, 0,
            end->tm_hour, end->tm_min, end->tm_sec, delta_time_milliseconds,
            pDelivery->delta_time,
            pDelivery->w_id, pDelivery->o_carrier_id,
            pDelivery->o_id[0], pDelivery->o_id[1],
            pDelivery->o_id[2], pDelivery->o_id[3],
            pDelivery->o_id[4], pDelivery->o_id[5],
            pDelivery->o_id[6], pDelivery->o_id[7],
            pDelivery->o_id[8], pDelivery->o_id[9] );

    if ( gbFlushDeliLog )
        fflush(fpLog);

    return;
}

#ifdef USE_PROCESSES
int
DELIServerShutdown( void )
{
    int          status;
    int          err;
    DELIMsgStruct  Delimsg;
    int          retlen;
    int          flags;

    flags = ( block ) ? 0 : IPC_NOWAIT;
    retlen = msgrcv( pipe, &Delimsg, *plen, DELIVERY_MESSAGE, flags );
    if( -1 == retlen && ENOMSG == errno )
    {
        *plen = 0;
        status = ERR_SUCCESS;
    }
    else if( -1 == retlen || *plen != retlen )
    {
        err = errno;
        status = ERR_DELIVERY_PIPE_READ;
    }
    else
    {
        memcpy( data, &Delimsg.Delivery, retlen );
        status = ERR_SUCCESS;
    }

    return( status );
}

```

```

}
#endif /* USE_PROCESSES */

#ifdef USE_PROCESSES
int
DELIServerShutdown( void )
{
    int          status;
    int          err;
    DELIMsgStruct  Delimsg;
    int          retlen;
    int          flags;

    Delimsg.iType = DELIVERY_MESSAGE;
    memcpy( &Delimsg.Delivery, data, len );

    flags = ( block ) ? 0 : IPC_NOWAIT;
    retlen = msgsnd( pipe, &Delimsg, len, flags );
    if( -1 == retlen && EAGAIN == errno )
    {
        status = ERR_DB_DELIVERY_NOT_QUEUED;
    }
    else if( -1 == retlen )
    {
        err = errno;
        CRASH;
        status = ERR_DB_DELIVERY_NOT_QUEUED;
    }
    else
    {
        status = ERR_SUCCESS;
    }

    return( status );
}
#endif /* USE_PROCESSES */

/* FUNCTION: int DELIServerShutdown( void )
*
* PURPOSE:      This function cleans up allocated objects to allow for
*                termination of the delivery subsystem.
*
* ARGUMENTS:    None
*
* RETURNS:      None
*
* COMMENTS:    None
*
*/

int
DELIServerShutdown( void )
{
    int          status;
#ifdef USE_PROCESSES
    int          err;
    int          lock;
    int          paramsFD;
    DELIServerStruct  dss;
    int          size;
#endif /* USE_PROCESSES */

    status = ERR_SUCCESS;

#ifdef USE_PROCESSES
    if( -1 == ( lock = open( DELI_LOCK_NAME, O_WRONLY | O_CREAT, 0666 )))
    {
        err = errno;
        status = ERR_DELIVERY_PARAMS_FILE;
    }
    else
    {
        flock( lock, LOCK_EX );          /* Exclusive lock */

        if( -1 == ( paramsFD = open( DELI_PARAMS_NAME, O_RDWR, 0666 )))
        {
            status = ERR_DELIVERY_SHUTDOWN;
        }
    }
#endif /* USE_PROCESSES */
}

```

```

else
{
/* A params file exists. Use its content to shutdown the servers.*/
size = sizeof( DELIServerStruct );
if( size != read( paramsFD, &dss, size ))
{
err = errno;
status = ERR_DELIVERY_PARAMS_FILE;
}
else if( 0 == --dss.CurrentClientCount )
{
status = DELIServerShutdownInternal( &dss );
unlink( DELI_PARAMS_NAME );
unlink( DELI_LOCK_NAME );
}
else
{
if( (off_t) -1 == lseek( paramsFD, 0, SEEK_SET ) ||
size != write( paramsFD, &dss, size ))
{
err = errno;
status = ERR_DELIVERY_PARAMS_FILE;
}
}
close( paramsFD );
}

close( lock );
}
#else /* USE_PROCESSES */
if( gbUsePipe ) {
CloseHandle( hPipeInputRead );
CloseHandle( ghPipeInputWrite );
}
else {
bufclose( inputbuf );
bufclose( outputbuf );
}
#endif /* USE_PROCESSES */

if ( fpLog )
fclose(fpLog);

fpLog = NULL;

return( status );
}

#ifdef USE_PROCESSES
int
DELIServerShutdownInternal( pDELIServerStruct pdss )
{
int status;
int inerr;
int outerr;
int ii;
int Count;
DeliveryDataInput DeliveryClose;

if( -1 != inputbuf )
{
DeliveryClose.o_carrier_id = DELIVERY_SHUTDOWN;
Count = pdss->CurrentServerCount;
for( ii = 0; ii < Count; ii++ ) {
status = DELIQueueWrite( inputbuf, (void *)&DeliveryClose,
sizeof( DeliveryClose ), FALSE );

if( ERR_SUCCESS != status && ERR_DB_DELIVERY_NOT_QUEUED !=
status )
{
return( status );
}
}
}
if( -1 == msgctl( inputbuf, IPC_RMID, NULL ))
{
inerr = errno;
CRASH;
return( ERR_DELIVERY_PIPE_DESTROY );
}
}

/* #if
MSG_QUEUES_SEEM_TO_DELETE_THEMSELVES_ON_EXIT_OF_LAST_REA
DER */
#if 1
if( -1 != outputbuf )
{
if( -1 == msgctl( outputbuf, IPC_RMID, NULL ))
{
outerr = errno;
CRASH;
return( ERR_DELIVERY_PIPE_DESTROY );
}
}
#endif

return( ERR_SUCCESS );
}
#endif

/* FUNCTION: int DELIServerStartup( pDeliveryTransportData pDeliveryTransport,
pLoginData pLogin, int
loginDelay,
char *Path )
*
* PURPOSE: This function prepares the delivery subsystem for execution.
*
* ARGUMENTS: None
*
* RETURNS: int iError Error code if
unsuccessful
ERR_SUCCESS No error successful
code
*
* COMMENTS: None
*/

int
DELIServerStartup( pDeliveryTransportData pDeliveryTransport,
pLoginData pLogin, int loginDelay, char *Path )
{
char LogName[PATH_MAX];
#ifdef USE_PROCESSES
int ii;
int err;
int inerr;
int outerr;
int childPid;
int status;
int lock;
int paramsFD;
DELIServerStruct dss;
int ParamsSize = sizeof( DELIServerStruct );
int size;
#else /* USE_PROCESSES */
int ii;
int iError;
size_t inputbufsize;
size_t outputbufsize;
unsigned long tid;
unsigned long ulhThread;
HANDLE hThread;
#endif /* USE_PROCESSES */

gDeliThreadStartCtr = pDeliveryTransport->num_threads;
gbWriteDeliLog = pDeliveryTransport->write_log;
gbFlushDeliLog = pDeliveryTransport->flush_log;
gbDirectConnect = !pDeliveryTransport->use_transport;
strcpy( LogName, Path ), "delilog." );

#ifdef USE_PROCESSES
status = ERR_SUCCESS;
if( -1 == ( lock = open( DELI_LOCK_NAME, O_WRONLY | O_CREAT, 0666 )))
{
err = errno;
CRASH;
status = ERR_DELIVERY_PARAMS_FILE;
}
else

```

```

{
    flock( lock, LOCK_EX );          /* Exclusive lock */

    if( -1 == ( paramsFD = open( DELL_PARAMS_NAME, O_RDWR | O_CREAT,
0666 )))
    {
        err = errno;
        status = ERR_DELIVERY_PARAMS_FILE;
    }
    else
    {
        /* A params file exists. Check if its for the current or an old run. */
        size = read( paramsFD, &dss, ParamsSize );
        if(( 0 != size ) && ( ParamsSize != size ))
        {
            /* File exists, but content is invalid. */
            status = ERR_DELIVERY_PARAMS_FILE;
        }
        else if(( 0 != size ) && ( pLogin->databaseLogin.iRunId == dss.RunId ))
        {
            /* servers have been started for this run, update client count */
            dss.CurrentClientCount++;
        }
        else
        {
            status = ERR_SUCCESS;
            if(( 0 != size ) && ( pLogin->databaseLogin.iRunId != dss.RunId ))
            {
                /* we have to cleanup a previous run */
                if( -1 == ( inputbuf = msgget( INPUT_QUEUE_ID, IPC_R )))
                {
                    inerr = errno;
                }
                if( -1 == ( outputbuf = msgget( OUTPUT_QUEUE_ID, IPC_R )))
                {
                    outerr = errno;
                }
                if( (-1 == inputbuf && ENOENT != inerr) ||
                    (-1 == outputbuf && ENOENT != outerr) )
                {
                    CRASH;
                    status = ERR_DELIVERY_PIPE_OPEN;
                }
                else if( -1 != inputbuf || -1 != outputbuf )
                {
                    status = DELIServerShutdownInternal( &dss );
                }
                else
                {
                    status = ERR_SUCCESS;
                }
            }
            if( ERR_SUCCESS == status )
            {
                /* Start the servers. */
                if( -1 == msgget( INPUT_QUEUE_ID,
IPC_CREAT|IPC_EXCL|IPC_R|IPC_W )) ||
                    -1 == msgget( OUTPUT_QUEUE_ID,
IPC_CREAT|IPC_EXCL|IPC_R|IPC_W ))
                {
                    err = errno;
                    CRASH;
                    status = ERR_DELIVERY_PIPE_CREATE;
                }
                else
                {
                    signal( SIGCHLD, DELISigchildHandler );
                    for( ii = 0; ii < pDeliveryTransport->num_threads; ii++ )
                    {
                        if( -1 == ( childPid = fork( )))
                        {
                            err = errno;
                            status = ERR_CANT_START_DELIVERY_THREAD;
                        }
                        else if( 0 < childPid )
                        {
                            /* we are the parent */
                            Sleep( loginDelay );
                        }
                        else
                    }
                }
            }
        }
    }
}

{
    /* we are the child */
    close( paramsFD );
    close( lock );
    if( -1 == ( inputbuf = msgget( INPUT_QUEUE_ID, IPC_R
)) ||
        -1 == ( outputbuf = msgget( OUTPUT_QUEUE_ID,
IPC_W )))
    {
        CRASH;
        status = ERR_DELIVERY_PIPE_OPEN;
    }
    /* Open a log file if requested. */
    else if( gbWriteDeliLog && NULL ==
(fpLog=fopen(LogName, "wb")))
    {
        status = ERR_CANNOT_CREATE_RESULTS_FILE;
    }
    else
    {
        status = DELIThread( pLogin );
    }
    exit( status );
}
}
dss.RunId = pLogin->databaseLogin.iRunId;
dss.CurrentServerCount = pDeliveryTransport->num_threads;
dss.CurrentClientCount = 1;
}
}

if( (off_t) -1 == lseek( paramsFD, 0, SEEK_SET ) ||
    ParamsSize != write( paramsFD, &dss, ParamsSize ))
{
    err = errno;
    status = ERR_DELIVERY_PARAMS_FILE;
}
close( paramsFD );
}
close( lock );
}

if( -1 == ( inputbuf = msgget( INPUT_QUEUE_ID, IPC_W )) ||
    -1 == ( outputbuf = msgget( OUTPUT_QUEUE_ID, IPC_R )))
{
    CRASH;
    status = ERR_DELIVERY_PIPE_OPEN;
}

return( status );
#else /* USE_PROCESSES */
/* Let the caller decide on use of pipe. */
gbUsePipe = pDeliveryTransport->use_pipe;
if( gbUsePipe )
{
    gbDisplayCompletions = FALSE;
}
else
{
    gbDisplayCompletions = pDeliveryTransport->display_completions;
}

/* Open a log file if requested. */
if( gbWriteDeliLog ) {
    fpLog = fopen( LogName, "wb" );
    if ( NULL == fpLog )
        return ERR_CANNOT_CREATE_RESULTS_FILE;
}

if( gbUsePipe ) {
    /* start delivery pipe */
    inputbufsize = pDeliveryTransport->num_threads *
pDeliveryTransport->num_queued_deliveries * sizeof( DeliveryData );
    if( 0 == CreatePipe( &hPipeInputRead, &hPipeInputWrite, NULL, inputbufsize )) {
        iError = GetLastError( );
        return( ERR_DELIVERY_PIPE_CREATE );
    }
}
else {

```

```

/* create delivery buffer */
inputbufsize =
pDeliveryTransport->num_queued_deliveries * sizeof( pDeliveryData );
if( BUF_SUCCESS != bufopen( inputbufsize, &inputbuf ) )
return ERR_DELIVERY_PIPE_OPEN;

if( gbDisplayCompletions ) {
/* create response buffer */
outputbufsize =
pDeliveryTransport->num_queued_responses * sizeof( pDeliveryData );
if( BUF_SUCCESS != bufopen( outputbufsize, &outputbuf ) )
return ERR_DELIVERY_PIPE_OPEN;
}
}

/* prepare to start and verify starting of delivery threads */
gDeliThreadStartEvent = CreateEvent( NULL, TRUE, FALSE, NULL );
if ( gDeliThreadStartEvent == NULL )
return ERR_CANT_CREATE_FORCE_THRED_STRT_EVENT;

bDone = FALSE;

if ( !bDone ){
for( ii = 0; ii < pDeliveryTransport->num_threads; ii++ ) {
ulhThread = _beginthreadex( NULL, 0, DELIThread, pLogin, 0, &tid );
if( 0 == ulhThread )
return ERR_CANT_START_DELIVERY_THREAD;
hThread = ( HANDLE )ulhThread;
CloseHandle( hThread );
if( !pDeliveryTransport->use_transport )
Sleep( loginDelay );
}
}

WaitForSingleObject( gDeliThreadStartEvent, INFINITE );

return giDeliInitStatus;
#endif
}

#ifdef USE_PROCESSES
void
DELISigchldHandler( int sig )
{
int wait_status;

/* Make sure we get all of the children who may have status change info */
while( wait3(&wait_status, WNOHANG, 0) > 0 ) {
gDeliThreadStartCtr--;
}
}
#endif

/* FUNCTION: void DELIThread( void *ptr )
*
* PURPOSE: This function is executed by each delivery thread.
* A thread will block on a read of the buffer from the client.
* Return from the read will indicate either data is to be
* processed, an error has occurred, or the buffer has been
* closed.
*
* ARGUMENTS: void *ptr unused, passed by thread creation
* routine.
*
* RETURNS: None
*
* COMMENTS: The registry key value NumberOfDeliveryThreads controls
* how
* many of these functions are running.
*
*/

unsigned __stdcall
DELIThread( void *ptr )
{
size_t br;
pDeliveryData pDelivery;
int retcode;
CallersContext CC;
pLoginData pCallersLogin;

```

```

LoginData login;
char tmp[16];
int status;
DBContext DBC;
#ifdef USE_PROCESSES
BOOL bDone = FALSE;
#endif /* USE_PROCESSES */

/* Initialize calling parameters */
pCallersLogin = ptr;
CC = 0;
DBC = INVALID_DB_CONTEXT;

/* Should we connect directly ourselves, or should we use the transport to */
/* perform the deliveries in the same manner as the other 4 transactions? */
if( gbDirectConnect ) {
gethostname( tmp, sizeof( tmp ) );
login.w_id = 0;
login.ld_id = 0;
login.CC = CC;
strcpy( login.databaseLogin.szServer,
pCallersLogin->databaseLogin.szServer );
strcpy( login.databaseLogin.szDatabase,
pCallersLogin->databaseLogin.szDatabase );
strcpy( login.databaseLogin.szUser, pCallersLogin->databaseLogin.szUser );
strcpy( login.databaseLogin.szPassword,
pCallersLogin->databaseLogin.szPassword );
sprintf( login.databaseLogin.szApplication, "%s:delisrv - %d",
tmp, GetCurrentThreadId() );
status = TPCCConnectDB( &DBC, &login );
if( ERR_DB_SUCCESS != status && ERR_SUCCESS != giDeliInitStatus )
{
giDeliInitStatus = status;
}
}

#ifdef USE_PROCESSES
#else /* USE_PROCESSES */
/* wait until all threads are started */
if ( InterlockedDecrement( &gDeliThreadStartCtr ) == 0 )
SetEvent( gDeliThreadStartEvent );

WaitForSingleObject( gDeliThreadStartEvent, INFINITE );
#endif /* USE_PROCESSES */

if( ERR_SUCCESS != giDeliInitStatus )
{
return( giDeliInitStatus );
}

/* while delisrv running i.e. user has not requested termination */
while( !bDone ){
if( gbUsePipe ) {
pDelivery = ReserveTransactionStruct( DELIVERY_TRANS );
#ifdef USE_PROCESSES
br = sizeof( DeliveryDataInput );
status = DELIQueueRead( inputbuf, ( void *)pDelivery, &br, TRUE );
if( ERR_SUCCESS != status )
{
return( status );
}
}
else if( DELIVERY_SHUTDOWN == pDelivery->o_carrier_id )
{
bDone = TRUE;
continue;
}
#else /* USE_PROCESSES */
if( 0 == ReadFile( hPipeInputRead, pDelivery, sizeof( DeliveryDataInput ),
&br, NULL ) ) {
status = GetLastError( );
DELIErrorMessage( ERR_DELIVERY_PIPE_READ );
continue;
}
}
#endif /* USE_PROCESSES */
}
#ifdef USE_PROCESSES
#else /* USE_PROCESSES */
else {
if( BUF_SUCCESS != bufread( &pDelivery, sizeof( pDeliveryData ), &br,

```



```

                INFINITE, inputbuf )) {
    DELIErrorMessage( ERR_DELIVERY_PIPE_READ );
    continue;
}
}
#endif /* USE_PROCESSES */
if( gbDirectConnect )
    retcode = TPCCDeliveryDB( DBC, pDelivery );
else
    retcode = TPCCDeliveryDeferred( &pDelivery );

retcode = TPCCDeliveryDeferredResponse( retcode, pDelivery );
}

return( status );
}

```

```

/* FUNCTION: int TPCCDeliveryDeferredResponse( DeliveryData *deliveryData )
 *
 * PURPOSE:      This function writes the completed delivery transaction
 *               record to the log file and to the queue for reporting
 *               to the browser.
 *
 * ARGUMENTS:   EXTENSION_CONTROL_BLOCK *pECB
 *               DeliveryData *deliveryData pointer
 *               to the delivery
 *               data
 *               structure.
 *
 * RETURNS:     none
 *
 * COMMENTS:    none
 */

```

```

int
TPCCDeliveryDeferredResponse( int retcode, pDeliveryData pDelivery )
{
    size_t      bw;
    int         status;

    if ( ERR_DB_PENDING == retcode )
    {
        return( retcode );
    }
    else
    {
        if( ERR_DB_SUCCESS != retcode )
        {
            /* send a flag to the reducer to mark an error on the delivery */
            pDelivery->queue_time = 1;
            DELIErrorMessage(retcode);
        }
        /* The delta time was overloaded by the client to be the local queue time */
        /* in milliseconds. Here we get the tick count and subtract to */
        /* calculate the delta.
           */
        DeltaTime( pDelivery->delta_time );

        /* update log */
        if( gbWriteDeliLog )
            DELILog( pDelivery );

        if( gbDisplayCompletions ) {
            /* send a delivery completion record */
        }
#ifdef USE_PROCESSES
        status = DELIQueueWrite( outputbuf, (void *)pDelivery,
                                sizeof( *pDelivery ), TRUE );

        if( ERR_SUCCESS != status )
        {
            DELIErrorMessage( ERR_DELIVERY_OUTPUT_PIPE_WRITE );
            return( retcode );
        }
        /* The delivery transaction is at the end of its life */
        UnreserveTransactionStruct( DELIVERY_TRANS, &pDelivery );
#endif /* USE_PROCESSES */
        status = bufwrite( &pDelivery, sizeof(pDeliveryData),
                            &bw, INFINITE, outputbuf );

        if( BUF_SUCCESS != status )
        {
            DELIErrorMessage( ERR_DELIVERY_OUTPUT_PIPE_WRITE );

```

```

        return( retcode );
    }
}
#endif /* USE_PROCESSES */
}
else {
    /* The delivery transaction is at the end of its life */
    UnreserveTransactionStruct( DELIVERY_TRANS, &pDelivery );
}
}

return( retcode );
}

```

deli_srv.h

```

#ifndef DELI_SRV_H
#define DELI_SRV_H
/*+*****
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 *
 *
 *
 */

```

```

*****
****_*/

```

```

/*+
 * Abstract: This file contains definitions of the delivery server queue.
 *
 * Author: W Carr
 * Creation Date: July 1997
 *
 * Modified history:
 * 21-Oct-1997 WCarr Replaced NamedPipe with buffer code.
 *
 */

```

```

#ifdef _WIN32
#define StartTime(num) ((num) = GetTickCount( ))
#define DeltaTime(num) ((num) = GetTickCount( ) - num)
#else
#include <sys/timeb.h>
typedef int BUFPTR;
#define StartTime(num) \
{
    struct timeb tb;\
    ftime( &tb );\
    /* get the time since midnight today UTC in milliseconds */\
    (num) = ((tb.time % (24*60*60)) * 1000) + tb.millitm;\
}

```

```

# define DeltaTime(num) \
{
    struct timeb tb;\
    int now;\
    ftime( &tb );\
    /* get the time since midnight today UTC in milliseconds */\
    now = ((tb.time % (24*60*60)) * 1000) + tb.millitm;\
    if( now < (num) )\
    {\
        /* we wrapped past midnight UTC, add a day in milliseconds */\
        now += (24*60*60*1000);\
    }\
    (num) = now - (num);\
}
#endif

#ifdef DELI_SRV_C
# define DELI_GLOBAL(thing,init) thing = init
#else
# define DELI_GLOBAL(thing,init) extern thing
#endif

#ifdef DELI_CLI_C || defined DELI_SRV_C
# ifdef _WIN32
/* Used for OS pipe deliveries */
DELI_GLOBAL(HANDLE ghPipeInputWrite,INVALID_HANDLE_VALUE);
DELI_GLOBAL(BUFPTR inputbuf,NULL); /* submitted deliveries
*/
DELI_GLOBAL(BUFPTR outputbuf,NULL); /* completed
deliveries */
# else
DELI_GLOBAL(BUFPTR inputbuf,-1); /* submitted deliveries
*/
DELI_GLOBAL(BUFPTR outputbuf,-1); /* completed
deliveries */
# endif
#endif

int DELIServerStartup( pDeliveryTransportData pDeliveryTransport,
    pLoginData pLogin, int loginDelay, char *Path );
int DELIServerShutdown( void );
int DELIQueueRead( int pipe, void *data, unsigned long *plen, BOOL block );
int DELIQueueWrite( int pipe, void *data, unsigned long len, BOOL block );

#endif /* DELI_SRV_H */

```

oracle_db8.c

```

/*+ file: oracle_db8.c based on Oracle file tpcplc
/*+=====
====+
| Copyright (c) 1994 Oracle Corp, Redwood Shores, CA |
| OPEN SYSTEMS PERFORMANCE GROUP |
| All Rights Reserved |
+=====
| DESCRIPTION
| TPC-C transactions in PL/SQL.
+=====
====*/
/*+*****
*****
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* * * * *

```

```

*****
*****/

```

```

#ifdef _WIN32
# include <windows.h>
# include <process.h>
#endif

#include <stdio.h>
#include <stdlib.h>
#include <sys/types.h>
#include <sys/timeb.h>

#include <oci.h>
#include <ocidfn.h>
#include <ociapr.h>

#define ORACLE_DB_C

#include <tpccerr.h>
#include <tpccstruct.h>
#include <tpccapi.h>
#include <tpcc.h>
#include <oracle_db8.h>

#include <config.h>

#ifdef _WIN32
# include <crtdbg.h>
#endif

```

```

#define DEADLOCKRETRIES 6

```

```

char szErrorLogName[256];
char szOraLogName[256];
char szOraErrorLogName[256];

/* anonymous block statement buffers */
text stmbuf_payz[SQL_BUF_SIZE] = { '\0' };
text stmbuf_paynz[SQL_BUF_SIZE] = { '\0' };
text stmbuf_tkvcpnw[SQL_BUF_SIZE] = { '\0' };

```

```

/* prototypes */
void vgetdate (unsigned char *oradt);
void cvtdmy (unsigned char *oradt, char *outdate);
void cvtdmyhms (unsigned char *oradt, char *outdate);

```

```

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

#ifdef DEBUG
    TPCCErr("tkvuopen() fnam: %s, mode: %s\n", fnam, mode);
#endif

```

```

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

```

```

    return(fd);
}

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

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

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

    fclose( fd );

    return(nulpt);
}

int getfile(char *filename, text *filebuf)
{
    char parsbuf[SQL_BUF_SIZE];
    int pathlen = sizeof( parsbuf ) - 1;

    if( ERR_SUCCESS != GetConfigStr( PATH, &pathlen, parsbuf ) )
    {
        return( ERR_DB_ERROR );
    }
    strcat(parsbuf, filename);
    return(sqlfile(parsbuf, filebuf));
}

int TPCCStartupDB( pConfigData pConfig )
{
#ifdef DEBUG_TPCCSTARTUPDB
    _ASSERT(FALSE);
#endif

    /* Tell Oracle this is multi-threaded code */
    OCIInitialize(OCI_THREADED | OCI_OBJECT ,(dvoid *)0,0,0,0);

    if(ERR_DB_ERROR == getfile("paynz.sql",stmbuf_paynz))
    {
        TPCCErr("Error opening the file paynz.sql");
        return ERR_DB_ERROR;
    }

    if(ERR_DB_ERROR == getfile("payz.sql",stmbuf_payz))
    {
        TPCCErr("Error opening the file payz.sql");
        return ERR_DB_ERROR;
    }

    if(ERR_DB_ERROR == getfile("tkvcpnew.sql",stmbuf_tkvcpnew))
    {
        TPCCErr("Error opening the file tkvcpnew.sql");
        return ERR_DB_ERROR;
    }

    return ERR_DB_SUCCESS;
}

int TPCCShutdownDB(void)
{
    /* Add Oracle specific code */

    return ERR_DB_SUCCESS;
}

```

```

int ocierror(char *fname, int lineno, OraContext *p, sword status)
{
    char errbuf[512];
    text tempbuf[512];
    sb4 errcode;
    OCIError *errhp;

    errhp = p->errhp;

    switch (status) {
    case OCI_SUCCESS:
        return RECOVERR;
        break;
    case OCI_SUCCESS_WITH_INFO:
        sprintf(errbuf, "Module %s Line %d\r\n", fname, lineno);
        strcat(errbuf, "Error - OCI_SUCCESS_WITH_INFO\r\n");
        break;
    case OCI_NEED_DATA:
        sprintf(errbuf, "Module %s Line %d\r\n", fname, lineno);
        strcat(errbuf, "Error - OCI_NEED_DATA\r\n");
        break;
    case OCI_NO_DATA:
        sprintf(errbuf, "Module %s Line %d\r\n", fname, lineno);
        sprintf(errbuf, "Error - OCI_NO_DATA\r\n");
        return IRRECERR;
        break;
    case OCI_ERROR:
        (void) OCIErrorGet (errhp, (ub4) 1,
                           (text *) NULL, &errcode, tempbuf,
                           (ub4) sizeof(errbuf), OCI_HTYPE_ERROR);

        switch(errcode){
        case NOT_SERIALIZABLE:
            /* if error is NOT_SERIALIZABLE return without writing anything */
            return errcode;

        case DEADLOCK:
            TPCCErr("Warning Deadlock, being retried");
            return RECOVERR;

        case SNAPSHOT_TOO_OLD:
            /* SNAPSHOT_TOO_OLD is considered recoverable */
            TPCCErr("Error snapshot too old: %s", tempbuf);
            return RECOVERR;

        default:
            /* else write a message */
            /* All else are irrecoverable */
            TPCCErr("Module %s Line %d\r\nError - %s\r\n",
                   fname, lineno, tempbuf);
            return errcode;
        }

        /* vmm313 TPCCDisconnectDB(p); */
        /* vmm313 exit(1); */
        break;
    case OCI_INVALID_HANDLE:
        sprintf(errbuf, "Module %s Line %d\r\n", fname, lineno);
        strcat(errbuf, "Error - OCI_INVALID_HANDLE\r\n");
        TPCCErr("%s", errbuf);
        TPCCDisconnectDB(p, NULL);
        return IRRECERR;
        /* terminate(-1); */
        /* exit(-1); */
        break;
    case OCI_STILL_EXECUTING:
        sprintf(errbuf, "Module %s Line %d\r\n", fname, lineno);
        strcat(errbuf, "Error - OCI_STILL_EXECUTE\r\n");
        break;
    case OCI_CONTINUE:
        sprintf(errbuf, "Module %s Line %d\r\n", fname, lineno);
        strcat(errbuf, "Error - OCI_CONTINUE\r\n");
        break;
    default:
        break;
    }
    TPCCErr("%s", errbuf);
    return RECOVERR;
}

```

```

p->errhp);

/* FUNCTION: int TPCCConnectDB()
 *
 * PURPOSE:          This function opens the sql connection for use.
 *
 * ARGUMENTS:
 * RETURNS:          int          0          if successful
 *                  int          1          if an error occurs
 *
 * COMMENTS:        None
 *
 */

```

```

int
TPCCConnectDB( DBContext *pDBC, pLoginData pLogin )
{
#define SERIAL_TXT "alter session set isolation_level = serializable"
#ifdef SQL_TRACE
#define SQLTXT1 "alter session set sql_trace = true"
#endif

/* Add Oracle specific code */

text stmbuff[100];
OraContext *p;

p = (OraContext *) malloc(sizeof(OraContext));

*pDBC = (DBContext) p;

/* initialize flags to not initialized */
p->new_init = 0;
p->pay_init = 0;
p->ord_init = 0;
p->sto_init = 0;
p->del_init = 0;

OCIEnvInit(&(p->tpcenv), OCI_DEFAULT, 0, (dvoid **)0);
OCIHandleAlloc((dvoid *)p->tpcenv, (dvoid **)&(p->tpcsrv),
OCI_HTYPE_SERVER,
0, (dvoid **)0);
OCIHandleAlloc((dvoid *)p->tpcenv, (dvoid **)&(p->errhp),
OCI_HTYPE_ERROR,
0, (dvoid **)0);
OCIHandleAlloc((dvoid *)p->tpcenv, (dvoid **)&(p->datecvterrhp),
OCI_HTYPE_ERROR,
0, (dvoid **)0);
OCIHandleAlloc((dvoid *)p->tpcenv, (dvoid **)&(p->tpcsvc),
OCI_HTYPE_SVCCTX,
0, (dvoid **)0);
if (RECOVERR != (OCIERROR(p, OCIServerAttach(p->tpcsrv, p->errhp,
(text *)pLogin->databaseLogin.szServer,
strlen pLogin->databaseLogin.szServer ),
OCI_DEFAULT))))
return ERR_DB_ERROR;

OCIAttrSet((dvoid *)p->tpcsvc, OCI_HTYPE_SVCCTX, (dvoid *)p->tpcsrv,
(ub4)0, OCI_ATTR_SERVER, p->errhp);
OCIHandleAlloc((dvoid *)p->tpcenv, (dvoid **)&(p->tpcusr),
OCI_HTYPE_SESSION,
0, (dvoid **)0);
OCIAttrSet((dvoid *)p->tpcusr, OCI_HTYPE_SESSION,
(dvoid *)pLogin->databaseLogin.szUser,
(ub4)strlen(pLogin->databaseLogin.szUser),
OCI_ATTR_USERNAME, p->errhp);
OCIAttrSet((dvoid *)p->tpcusr, OCI_HTYPE_SESSION,
(dvoid *)pLogin->databaseLogin.szPassword,
(ub4)strlen(pLogin->databaseLogin.szPassword),
OCI_ATTR_PASSWORD, p->errhp);
if (RECOVERR != (OCIERROR(p, OCISESSIONBegin(p->tpcsvc, p->errhp, p-
>tpcusr,
OCI_CRED_RDBMS,
OCI_DEFAULT))))
return (ERR_DB_ERROR);

OCIAttrSet(p->tpcsvc, OCI_HTYPE_SVCCTX, p->tpcusr, 0,
OCI_ATTR_SESSION,

```

```

/* run all transaction in serializable mode */

OCIHandleAlloc(p->tpcenv, (dvoid **)&(p->curi), OCI_HTYPE_STMT, 0,
(dvoid **)0);
sprintf ((char *) stmbuff, SERIAL_TXT);
OCISmtPrepare(p->curi, p->errhp, stmbuff, strlen((char *)stmbuff),
OCI_NTV_SYNTAX, OCI_DEFAULT);
if (RECOVERR != (OCIERROR(p, OCISmtExecute(p->tpcsvc, p->curi, p->errhp,
1, 0, 0, 0,
OCI_DEFAULT))))
return (ERR_DB_ERROR);
OCIHandleFree(p->curi, OCI_HTYPE_STMT);

#ifdef SQL_TRACE
/* Turn on the SQL_TRACE */
OCIHandleAlloc(p->tpcenv, (dvoid **)&(p->curi), OCI_HTYPE_STMT, 0,
&xmem);
sprintf ((char *) stmbuff, TRACE_TXT);
OCISmtPrepare(p->curi, p->errhp, stmbuff, strlen((char *)stmbuff),
OCI_NTV_SYNTAX, OCI_DEFAULT);
if (RECOVERR != (OCIERROR(p, OCISmtExecute(p->tpcsvc, p->curi, p->errhp,
1, 0, 0, 0,
OCI_DEFAULT))))
return(ERR_DB_ERROR);
OCIHandleFree((dvoid *)p->curi, OCI_HTYPE_STMT);
#endif /* End SQL_TRACE */

/**** logon = 1;****/

if (tkvcninit (&(p->bindvars.info.newOrder), p)) {
TPCCDisconnectDB (p, NULL);
return ERR_DB_ERROR;
}
else
p->new_init = 1;

if (tkvcpinit (&(p->bindvars.info.payment), p)) {
TPCCDisconnectDB (p, NULL);
return ERR_DB_ERROR;
}
else
p->pay_init = 1;

if (tkvcoint (&(p->bindvars.info.orderStatus), p)) {
TPCCDisconnectDB (p, NULL);
return ERR_DB_ERROR;
}
else
p->ord_init = 1;

if (tkvcsinit (&(p->bindvars.info.stockLevel), p)) {
TPCCDisconnectDB (p, NULL);
return ERR_DB_ERROR;
}
else
p->sto_init = 1;

if (tkvcdinit (&(p->bindvars.info.delivery[0]), p)) {
TPCCDisconnectDB (p, NULL);
return ERR_DB_ERROR;
}
else
p->del_init = 1;

return ERR_DB_SUCCESS;
}

/* FUNCTION: int TPCCDisconnectDB(OraContext *dbproc)
 *
 * PURPOSE:          This function closes the sql connection.
 *
 * ARGUMENTS:
 *                  OraContext *dbproc   pointer to OraContext
 *
 * RETURNS:          int          ERR_DB_SUCCESS   if successful

```

```

*
* error value if an error occurs
*
* COMMENTS:      None
*
*/

int
TPCCDisconnectDB( DBContext DBC, pConnData pConn )
{
    OraContext *dbproc = (OraContext *)DBC;

    if (1 == dbproc->new_init) {
        tkvcndone(&(dbproc->nctx));
        dbproc->new_init = 0;
    }

    if (1 == dbproc->pay_init) {
        tkvcpdone(&(dbproc->pctx));
        dbproc->pay_init = 0;
    }

    if (1 == dbproc->ord_init) {
        tkvcodone(&(dbproc->octx));
        dbproc->ord_init = 0;
    }

    if (1 == dbproc->sto_init) {
        tkvcsdone(&(dbproc->sctx));
        dbproc->sto_init = 0;
    }

    if (1 == dbproc->del_init) {
        tkvcddone(&(dbproc->dctx));
        dbproc->del_init = 0;
    }

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

#ifdef BATCH_DEL
    if (lfp) {
        fclose (lfp);
        lfp = NULL;
    }
#endif /* BATCH_DEL */

    return ERR_DB_SUCCESS;
}

/* FUNCTION: TPCCStockLevelDB(CallersContext *pCC, int iTermId, int
iSyncId, OraContext *dbproc, int deadlock_retry, StockLevelData *pStockLevel)
*
* PURPOSE:      This function handles the stock level transaction.
*
* ARGUMENTS:    CallersContext      *pCC
                passed in structure pointer from inetsrv.
                int                  iTermId
                terminal id of browser
                int                  iSyncId
                sync id of browser
                OraContext *dbproc
                connection db process id
                StockLevelData      *pStockLevel
                stock level input / output data structure
                int                  deadlock_retry
                retry count if deadlocked
*
* RETURNS:      int      ERR_DB_SUCCESS if successfull
                error value if deadlocked
*
* COMMENTS:     None
*
*/

int
TPCCStockLevelDB( DBContext DBC, pStockLevelData pStockLevel )
{

```

```

OraContext *dbproc = (OraContext *)DBC;
int tries,status;
StockLevelData *pbindvars;

pbindvars = &dbproc->bindvars.info.stockLevel;

memcpy(pbindvars, pStockLevel, sizeof(StockLevelData));

for ( tries = 0,status = RECOVERR;
      tries < DEADLOCKRETRIES && status == RECOVERR; tries++) {

    status = tkvcs(dbproc);
}

pStockLevel->low_stock = dbproc->bindvars.info.stockLevel.low_stock;
if (status == RECOVERR) return ERR_DB_DEADLOCK_LIMIT;
else return (status);
}

/* FUNCTION: int TPCCNewOrderDB(CallersContext *pCC, int iTermId, int
iSyncId, int iTermId, int iSyncId, OraContext *dbproc, int deadlock_retry,
NewOrderData *pNewOrder)
*
* PURPOSE:      This function handles the new order transaction.
*
* ARGUMENTS:    CallersContext      *pCC
                passed in structure pointer from inetsrv.
                int                  iTermId
                terminal id of browser
                int                  iSyncId
                sync id of browser
                OraContext *dbproc
                connection db process id
                NewOrderData      *pNewOrder
                pointer to new order structure for input/output data
                int                  deadlock_retry
                retry count if deadlocked
*
* RETURNS:      int      ERR_DB_SUCCESS
                transaction committed
                ERR_DB_NOT_COMMITTED item number
                is not valid
                ERR_DB_DEADLOCK_LIMIT deadlock
                max retry reached
                ERR_DB_ERROR
*
* COMMENTS:     None
*
*/

#pragma message ("FIXME: return code is overloaded. How to report invalid item
number?")
int
TPCCNewOrderDB( DBContext DBC, pNewOrderData pNewOrder )
{
    OraContext *dbproc = (OraContext *)DBC;
    int tries,status;
    int ii;
    int jj;
    int datebufsize;
    OCIError *datecvtrrh = dbproc->datecvtrrh;
    unsigned char localcr_date[7];
    int temp;
    int ol_i_id[MAX_OL];
    int orig_pos[MAX_OL];

    NewOrderData *pbindvars = &(dbproc->bindvars.info.newOrder);
    newctx *nctx = &(dbproc->nctx);
    newtemp *ntemp = &(dbproc->tempvars.new);

    /* vgetdate(&ntemp->cr_date); */
    vgetdate(localcr_date);
    cvtdmyhms(localcr_date,ntemp->entry_date);
    OCIDateFromText(datecvtrrh,
                    (const unsigned char *)ntemp->entry_date,
                    strlen(ntemp->entry_date),
                    (const unsigned char *)"DD-MM-YYYY HH24:MI:SS",

```

```

                21,(text *) 0,0,&ntemp->cr_date);
ntemp->n_retry = 0;

memcpy(pbindvars, pNewOrder, sizeof(NewOrderData));

/* Oracle needs the items in ascending order. The item IDs are used */
/* as a hierarchical locking scheme. Collect this order's list of item */
/* IDs and record their original position. */
for( jj = 0; jj < MAX_OL; jj++ )
{
    ol_i_id[jj] = pNewOrder->o_ol[jj].ol_i_id;
    orig_pos[jj] = jj;
}

/* Swap-sort the arrays so that item IDs are in ascending order. */
for( ii = 0; ii < pNewOrder->o_ol_cnt-1; ii++ )
{
    for( jj = ii+1; jj < pNewOrder->o_ol_cnt; jj++ )
    {
        if( ol_i_id[ii] > ol_i_id[jj] )
        {
            /* If an item ID is to be swapped during the sort, perform a */
            /* corresponding swap in the original locations array. */
            temp = ol_i_id[ii];
            ol_i_id[ii] = ol_i_id[jj];
            ol_i_id[jj] = temp;
            temp = orig_pos[ii];
            orig_pos[ii] = orig_pos[jj];
            orig_pos[jj] = temp;
        }
    }
}

for( jj= 0; jj<MAX_OL; jj++ )
{
    /* Move the data from the input data structure into the bound */
    /* variables data structure using the ascending order of item IDs */
    /* generated above. */
    ntemp->nol_i_id[jj] = pbindvars->o_ol[orig_pos[jj]].ol_i_id;
    ntemp->nol_supply_w_id[jj] = pbindvars->o_ol[orig_pos[jj]].ol_supply_w_id;
    ntemp->nol_quantity[jj] = pbindvars->o_ol[orig_pos[jj]].ol_quantity;
}

for ( tries = 0,status = RECOVERR;
      tries < DEADLOCKRETRIES && status == RECOVERR; tries++ )
{
    status = tkvcn(&dbproc->bindvars.info.newOrder, dbproc);
}

memcpy(pNewOrder, pbindvars, sizeof(NewOrderData));

/* convert and/or copy data to our structure format */
pNewOrder->c_discount = ntemp->c_discount*100.0;
pNewOrder->w_tax = (float)ntemp->w_tax*100.0;
pNewOrder->d_tax = (float)ntemp->d_tax*100.0;

for ( ii = 0; ii < pNewOrder->o_ol_cnt; ii++ )
{
    /* return data from the bound and updated variables into the output */
    /* data structure using the original positions array generated above. */
    pNewOrder->o_ol[orig_pos[ii]].ol_i_id = ntemp->nol_i_id[ii];
    pNewOrder->o_ol[orig_pos[ii]].ol_supply_w_id = ntemp->nol_supply_w_id[ii];
    pNewOrder->o_ol[orig_pos[ii]].ol_quantity = ntemp->nol_quantity[ii];
    strncpy(pNewOrder->o_ol[orig_pos[ii]].i_name, ntemp->i_name[ii], 24);
    pNewOrder->o_ol[orig_pos[ii]].s_quantity = ntemp->s_quantity[ii];
    pNewOrder->o_ol[orig_pos[ii]].i_price = ntemp->i_price[ii]/100.0;
    pNewOrder->o_ol[orig_pos[ii]].ol_amount = ntemp->nol_amount[ii]/100.0;
    pNewOrder->o_ol[orig_pos[ii]].b_g[0]=ntemp->brand_generic[ii];
}

/* datebufsize = the size of entry_date in newtemp struct */
datebufsize=21;
/* datebufsize=sizeof(ntemp->entry_date); */
/* OCIDateToText(datecvterrhp, &ntemp->cr_date,(text *) "DD-MM-YYYY
HH:MM:SS", 19, (text *) 0, 0, &datebufsize, &ntemp->entry_date); */
/* cvtdmymhms(ntemp->cr_date, ntemp->entry_date); */
pNewOrder->o_entry_d.day = atoi(&(ntemp->entry_date[0]));
pNewOrder->o_entry_d.month = atoi(&(ntemp->entry_date[3]));

```

```

pNewOrder->o_entry_d.year = atoi(&(ntemp->entry_date[6]));
pNewOrder->o_entry_d.hour = atoi(&(ntemp->entry_date[11]));
pNewOrder->o_entry_d.minute = atoi(&(ntemp->entry_date[14]));
pNewOrder->o_entry_d.second = atoi(&(ntemp->entry_date[17]));

if (status == RECOVERR) return ERR_DB_DEADLOCK_LIMIT;
else return (status);
}

/* FUNCTION: int TPCCPaymentDB(CallersContext *pCC, int iTermId, int iSyncId,
OraContext *dbproc, int deadlock_retry, PaymentData *pPayment)
*
* PURPOSE: This function handles the payment transaction.
*
* ARGUMENTS: CallersContext *pCC
              passed in structure pointer from inetsrv.
              int iTermId
              terminal id of browser
              int iSyncId
              sync id of browser
              OraContext *dbproc
              connection db process id
              PaymentData *pPayment pointer to
              payment input/output data structure
              int deadlock_retry
              deadlock retry count
*
* RETURNS: int ERR_DB_SUCCESS success
           int ERR_DB_DEADLOCK_LIMIT max
           int ERR_DB_NOT_COMMITTED invalid
*
* COMMENTS: None
*
*/

int
TPCCPaymentDB( DBContext DBC, pPaymentData pPayment )
{
    OraContext *dbproc = (OraContext *)DBC;
    int tries;
    int status;
    unsigned int datebufsize;
    OCIError *datecvterrhp = dbproc->datecvterrhp;

    PaymentData *pbindvars = &(dbproc->bindvars.info.payment);
    payctx *pctx = &(dbproc->pctx);
    paytemp *ptemp = &(dbproc->tempvars.pay);

    ptemp->p_retry = 0;

    memcpy(pbindvars, pPayment, sizeof(PaymentData));

    /* the db is stored in pennies - convert input to cents. */
    ptemp->h_amount = (int)(pbindvars->h_amount*100);

    for ( tries = 0,status = RECOVERR;
          tries < DEADLOCKRETRIES && status == RECOVERR; tries++ ) {

        if ((pbindvars->c_id) == 0) {
            (pbindvars->byname) = TRUE;
        }
        else {
            (pbindvars->byname) = FALSE;
        }

        status = tkvcp(&dbproc->bindvars.info.payment, dbproc);
    }

    memcpy(pPayment, pbindvars, sizeof(PaymentData));
    /* datebufsize = the size of c_since_str in paytemp struct */
    datebufsize=sizeof(ptemp->c_since_str);
    /* convert date format */
    /* OCIDateToText(datecvterr, &ptemp->customer_sdate,(text *) 0, 10, (text *) 0, 0,
    &datebufsize, &ptemp->c_since_str); */
    OCIDateToText(datecvterrhp, &ptemp->customer_sdate,(text *)
    DATE_FORMAT_STR, 10, (text *) 0, 0, &datebufsize, (text *)&ptemp->c_since_str);

```

```

/* cvtdmy(ptemp->customer_sdate, ptemp->c_since_str); */
/* datebufsize = the size of h_date string in paytemp struct */
/* datebufsize=DATE_TIME_SIZ; */
/* OCIDateToText(datecvtrrhp, &ptemp->cr_date, (text *) "DD-MM-
YYYY.HH24:MI:SS", 21, (text *) 0, 0, &datebufsize, &ptemp->h_date); */
pPayment->c_credit_lim = ptemp->c_credit_lim/100.0;
pPayment->c_discount = ptemp->c_discount*100.0;
pPayment->c_balance = pPayment->c_balance/100.0;
pPayment->h_amount = ptemp->h_amount/100.0;

pPayment->c_since.day = atoi(&(ptemp->c_since_str[0]));
pPayment->c_since.month = atoi(&(ptemp->c_since_str[3]));
pPayment->c_since.year = atoi(&(ptemp->c_since_str[6]));
pPayment->h_date.day = atoi(&(ptemp->h_date[0]));
pPayment->h_date.month = atoi(&(ptemp->h_date[3]));
pPayment->h_date.year = atoi(&(ptemp->h_date[6]));
pPayment->h_date.hour = atoi(&(ptemp->h_date[11]));
pPayment->h_date.minute = atoi(&(ptemp->h_date[14]));
pPayment->h_date.second = atoi(&(ptemp->h_date[17]));

if (status == RECOVERR) return ERR_DB_DEADLOCK_LIMIT;
else return (status);
}

/* FUNCTION: int TPCCOrderStatusDB(CallersContext *pCC, int iTermId, int
iSyncId, OraContext *dbproc, int deadlock_retry, OrderStatusData *pOrderStatus)
*
* PURPOSE: This function processes the Order Status transaction.
*
* ARGUMENTS: CallersContext *pCC
passed in structure pointer from inetsrv.
int iTermId
terminal id of browser
int iSyncId
sync id of browser
OraContext *dbproc
connection db process id
OrderStatusData *pOrderStatus
pointer to Order Status data input/output structure
int deadlock_retry
deadlock retry count
*
* RETURNS: int ERR_DB_DEADLOCK_LIMIT
max deadlock reached
ERR_DB_NOT_COMMITED
No orders found for customer
ERR_DB_SUCCESS
Transaction successfull
*
* COMMENTS: None
*/

int
TPCCOrderStatusDB( DBContext DBC, pOrderStatusData pOrderStatus )
{
OraContext *dbproc = (OraContext *)DBC;
int tries,status;
int ii;
OrderStatusData *pbindvars = &(dbproc->bindvars.info.orderStatus);
ordtemp *otemp = &(dbproc->tempvars.ord);
OCIError *datecvtrrhp = dbproc->datecvtrrhp;

memcpy(pbindvars, pOrderStatus, sizeof(OrderStatusData));

for ( tries = 0,status = RECOVERR;
tries < DEADLOCKRETRIES && status == RECOVERR; tries++) {

if ((pbindvars->c_id) == 0) {
(pbindvars->byname) = TRUE;
}
else {
(pbindvars->byname) = FALSE;
}

status = tkvco(&dbproc->bindvars.info.orderStatus, dbproc);
}

```

```

if (status == ERR_DB_ERROR) return status;
memcpy(pOrderStatus,pbindvars, sizeof(OrderStatusData));

for (ii=0; ii < pOrderStatus->o_ol_cnt; ii++)
{
pOrderStatus->s_ol[ii].ol_supply_w_id = otemp->loc_ol_supply_w_id[ii];
pOrderStatus->s_ol[ii].ol_i_id = otemp->loc_ol_i_id[ii];
pOrderStatus->s_ol[ii].ol_quantity = otemp->loc_ol_quantity[ii];
pOrderStatus->s_ol[ii].ol_amount = otemp->loc_ol_amount[ii]/100.0;
pOrderStatus->s_ol[ii].ol_delivery_d.day =
atoi(&(otemp->ol_delivery_date_str[ii][0]));
pOrderStatus->s_ol[ii].ol_delivery_d.month =
atoi(&(otemp->ol_delivery_date_str[ii][3]));
pOrderStatus->s_ol[ii].ol_delivery_d.year =
atoi(&(otemp->ol_delivery_date_str[ii][6]));
};

pOrderStatus->c_balance = pOrderStatus->c_balance/100.0;
pOrderStatus->o_entry_d.day = atoi(&(otemp->entry_date_str[0]));
pOrderStatus->o_entry_d.month = atoi(&(otemp->entry_date_str[3]));
pOrderStatus->o_entry_d.year = atoi(&(otemp->entry_date_str[6]));
pOrderStatus->o_entry_d.hour = atoi(&(otemp->entry_date_str[11]));
pOrderStatus->o_entry_d.minute = atoi(&(otemp->entry_date_str[14]));
pOrderStatus->o_entry_d.second = atoi(&(otemp->entry_date_str[17]));

if (status == RECOVERR) return ERR_DB_DEADLOCK_LIMIT;
else return (status);
}

/* FUNCTION: int TPCCDeliveryDB( CallersContext *pCC, int iConnectionID,
* int iSyncID, DBContext *pdbContext,
* int deadlock_retry, pDeliveryData pDelivery )
*
* PURPOSE: This function writes the delivery information to the
delivery pipe. The information is sent as a long.
*
* ARGUMENTS: CallersContext *pCC passed
in structure pointer from inetsrv.
int iTermId
terminal id of browser
int iSyncId sync id
of browser
OraContext *dbproc connection db
process id
int deadlock_retry
deadlock retry count
DeliveryData *pDelivery pointer to Delivery
data input/output structure
*
* RETURNS: int ERR_DB_SUCCESS success
ERR_DB_DEADLOCK_LIMIT max
ERR_DB_NOT_COMMITED other
*
* COMMENTS: The pipe is initially created with 16K buffer size this
should allow for up to 4096 deliveries
to be queued before an overflow condition would occur.
The only reason that an overflow would occur is if the
delivery application stopped listening while deliveries were being
posted.
*/

int
TPCCDeliveryDB( DBContext DBC, pDeliveryData pDeliveryData )
{
OraContext *dbproc = (OraContext *)DBC;
int retries = 0;
int status;
DeliveryData *pbindvars;

pbindvars = &dbproc->bindvars.info.delivery[0];

```

```

memcpy(pbindvars, pDeliveryData, sizeof(DeliveryData));

for (retries = 0, status = RECOVERR;
    retries < DEADLOCKRETRIES && status == RECOVERR; retries++){

    status = tkvcd(pDeliveryData, dbproc);
}

if(status == RECOVERR) return ERR_DB_DEADLOCK_LIMIT;
else return (status);

}

/* FUNCTION: int TPCCCheckpointDB()
*
* PURPOSE:      This function does a checkpoint transaction.
*
* ARGUMENTS:
* RETURNS:      int          ERR_DB_DEADLOCK_LIMIT      max
deadlock reached
*              ERR_DB_NOT_COMMITED      No orders
found for customer
*              ERR_DB_SUCCESS
Transaction successful
*
* COMMENTS:     None
*
*/

#define CHECKPOINT_TXT "alter system checkpoint local"

int
TPCCCheckpointDB( DBContext DBC, pCheckpointData pCheckpoint )
{
    OraContext *dbproc = (OraContext *)DBC;
    text stmbuf[100];

    OCIHandleAlloc(dbproc->tpcenv, (dvoid **)&(dbproc->curi), OCI_HTYPE_STMT,
        0, (dvoid**)0);
    sprintf ((char *) stmbuf, CHECKPOINT_TXT);
    OCIERROR(dbproc, OCIStmtPrepare(dbproc->curi, dbproc->errhp, stmbuf,
        strlen((char *)stmbuf),
        OCI_NTV_SYNTAX,
        OCI_DEFAULT));
    if (RECOVERR != OCIERROR(dbproc,
        OCIStmtExecute(dbproc->tpcsvc, dbproc->curi,
        dbproc->errhp, 1, 0,
        0, 0,
        OCI_DEFAULT)))
        return (ERR_DB_ERROR);
    OCIHandleFree(dbproc->curi, OCI_HTYPE_STMT);

    return ERR_DB_SUCCESS;
}

```

oracle_db8.h

/*+ file: oracle_db8.h based on Oracle file tpcep1.h

```

/*+
=====
|   Copyright (c) 1994 Oracle Corp, Redwood Shores, CA   |
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=====
| DESCRIPTION
| header file for the TPC-C transactions.
=====
-*/
/*_*****
*****_*/

```

```

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-*/
-*/
*****_*/
#endif ORACLE_DB_H
#define ORACLE_DB_H

#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 */

#define RECOVERR -10
#define IRRECERR -20
#define NO_COMMIT -30
#define NOERR 111

#define DEADLOCKWAIT 10

#if (defined(__osf__) && defined(__alpha))
#define HDA_SIZ 512
#else
#define HDA_SIZ 256
#endif

#define DATE_FORMAT_STR "DD-MM-YYYY" /* includes null
terminator */
#define DATE_SIZ sizeof(DATE_FORMAT_STR)
#define DATE_TIME_FORMAT_STR "DD-MM-YYYY HH24:MI:SS" /*
includes null */
#define DATE_TIME_SIZ sizeof("DD-MM-YYYY HH:MI:SS")
#define MSG_SIZ 512
#define NITEMS 15
#define NDISTS 10
#define ROWIDLEN 20
#define OCIROWLEN 20

```



```

#define DEL_DATE_LEN 7
#define SQL_BUF_SIZE 16384

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

/* global variables */
#ifdef ORACLE_DB_C
#else
#endif /* ORACLE_DB_C */

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

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

/* anonymous block statement buffers */
extern text stmbuf_payz[SQL_BUF_SIZE];
extern text stmbuf_paynz[SQL_BUF_SIZE];
extern text stmbuf_tkvcnew[SQL_BUF_SIZE];

struct _delctx {
    sb2 cons_ind[NDISTS];
    sb2 w_id_ind[NDISTS];
    sb2 d_id_ind[NDISTS];
    sb2 c_id_ind[NDISTS];
    sb2 del_o_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];
#ifdef ISO || ISO5 || ISO6 || ISO8
    sb2 inum_ind;
#endif
    OCIBind *olamt_bp;

    ub2 cons_len[NDISTS];
    ub2 w_id_len[NDISTS];
    ub2 d_id_len[NDISTS];
    ub4 c_id_len[NDISTS];
    ub4 del_o_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];
#ifdef ISO || ISO5 || ISO6 || ISO8
    ub2 inum_len;
#endif

    ub2 cons_rcode[NDISTS];
    ub2 w_id_rcode[NDISTS];
    ub2 d_id_rcode[NDISTS];
    ub2 c_id_rcode[NDISTS];
    ub2 del_o_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];
#ifdef ISO || ISO5 || ISO6 || ISO8
    ub2 inum_rcode;
#endif
    int cons[NDISTS];
    int w_id[NDISTS];
    int d_id[NDISTS];
    int c_id[NDISTS];
    int del_o_id[NDISTS];
    int carrier_id[NDISTS];
    /* float amt[NDISTS]; Changed to int */
    int amt[NDISTS];

    ub4 del_o_id_rcnt;
    OCIRowid *no_rowid_ptr[NDISTS];
    OCIRowid *o_rowid_ptr[NDISTS];
    OCIDate del_date[NDISTS];
#ifdef ISO || ISO5 || ISO6 || ISO8
    char inum[10];
#endif
    OCISmt *curd0;
    OCISmt *curd1;
    OCISmt *curd2;
    OCISmt *curd3;
    OCISmt *curd4;
    OCISmt *curd5;
    OCISmt *curd6;
    OCISmt *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];
    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;

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;

struct _newctx {
    sb2 nol_i_id_ind[NITEMS];
    sb2 nol_supply_w_id_ind[NITEMS];
    sb2 nol_quantity_ind[NITEMS];
    sb2 nol_amount_ind[NITEMS];
    sb2 i_name_ind[NITEMS];
    sb2 s_quantity_ind[NITEMS];
    sb2 i_price_ind[NITEMS];
    sb2 ol_w_id_ind[NITEMS];
    sb2 ol_d_id_ind[NITEMS];
    sb2 ol_o_id_ind[NITEMS];
    sb2 ol_number_ind[NITEMS];
    sb2 cons_ind[NITEMS];
    sb2 s_rowid_ind[NITEMS];
    sb2 s_remote_ind[NITEMS];
    sb2 s_quant_ind[NITEMS];
    sb2 i_data_ind[NITEMS];
    sb2 s_data_ind[NITEMS];
};

```

```

sb2 s_dist_info_ind[NITEMS];
sb2 ol_dist_info_ind[NITEMS];
sb2 null_date_ind[NITEMS];
sb2 s_bg_ind[NITEMS];

ub2 nol_i_id_len[NITEMS];
ub2 nol_supply_w_id_len[NITEMS];
ub2 nol_quantity_len[NITEMS];
ub2 nol_amount_len[NITEMS];
ub2 i_name_len[NITEMS];
ub2 s_quantity_len[NITEMS];
ub2 i_price_len[NITEMS];
ub2 ol_w_id_len[NITEMS];
ub2 ol_d_id_len[NITEMS];
ub2 ol_o_id_len[NITEMS];
ub2 ol_number_len[NITEMS];
ub2 cons_len[NITEMS];
ub2 s_rowid_len[NITEMS];
ub2 s_remote_len[NITEMS];
ub2 s_quant_len[NITEMS];
ub2 i_data_len[NITEMS];
ub2 s_data_len[NITEMS];
ub2 s_dist_info_len[NITEMS];
ub2 ol_dist_info_len[NITEMS];
ub2 null_date_len[NITEMS];
sb2 s_bg_len[NITEMS];

ub2 nol_i_id_rcode[NITEMS];
ub2 nol_supply_w_id_rcode[NITEMS];
ub2 nol_quantity_rcode[NITEMS];
ub2 nol_amount_rcode[NITEMS];
ub2 i_name_rcode[NITEMS];
ub2 s_quantity_rcode[NITEMS];
ub2 i_price_rcode[NITEMS];
ub2 ol_w_id_rcode[NITEMS];
ub2 ol_d_id_rcode[NITEMS];
ub2 ol_o_id_rcode[NITEMS];
ub2 ol_number_rcode[NITEMS];
ub2 cons_rcode[NITEMS];
ub2 s_rowid_rcode[NITEMS];
ub2 s_remote_rcode[NITEMS];
ub2 s_quant_rcode[NITEMS];
ub2 i_data_rcode[NITEMS];
ub2 s_data_rcode[NITEMS];
ub2 s_dist_info_rcode[NITEMS];
ub2 ol_dist_info_rcode[NITEMS];
ub2 null_date_rcode[NITEMS];
sb2 s_bg_rcode[NITEMS];

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

OCIRowid *s_rowid_ptr[NITEMS];

int s_remote[NITEMS];
char i_data[NITEMS][51];
char s_data[NITEMS][51];
char s_dist_info[NITEMS][25];

/* changed to OCIDate unsigned char null_date[NITEMS][7]; */
OCIDate null_date[NITEMS]; /* base date for null date entry */
/* not needed for Oracle 8.1.5 OCIStmt *curn; */
OCIStmt *curn1;
OCIStmt *curn2;
OCIStmt *curn3[10];
OCIStmt *curn4;
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;
OCIBind *ol_i_id_bp4;
OCIBind *ol_supply_w_id_bp4;
OCIBind *ol_quantity_bp4;
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 *ol_i_id_bp;
OCIBind *ol_supply_w_id_bp;
OCIBind *s_quantity_bp;
OCIBind *s_rowid_bp;
OCIBind *ol_quantity_bp;
OCIBind *s_remote_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;

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 ol_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;

```

```

OCISmt *curo0;
OCISmt *curo1;
OCISmt *curo2;
OCISmt *curo3;
OCISmt *curo4;
OCIBind *w_id_bp0;
OCIBind *w_id_bp2;
OCIBind *w_id_bp3;
OCIBind *w_id_bp4;
OCIBind *d_id_bp0;
OCIBind *d_id_bp2;
OCIBind *d_id_bp3;
OCIBind *d_id_bp4;
OCIBind *c_id_bp;
OCIBind *byln_bp;
OCIBind *c_last_bp;
OCIBind *c_last_bp4;
OCIBind *c_first_bp;
OCIBind *c_middle_bp;
OCIBind *c_balance_bp;
OCIBind *o_id_bp;
OCIBind *o_entry_d_bp;
OCIBind *o_cr_id_bp;
OCIBind *o_ol_cnt_bp;
OCIBind *ol_s_w_id_bp;
OCIBind *ol_i_id_bp;
OCIBind *ol_quantity_bp;
OCIBind *ol_amount_bp;
OCIBind *ol_d_d_bp;
OCIBind *c_rowid_bp;
OCIDefine *c_rowid_dp;
OCIDefine *c_last_dp;
OCIDefine *c_last_dp1;
OCIDefine *c_id_dp;
OCIDefine *c_id_dp1;
OCIDefine *c_first_dp1;
OCIDefine *c_first_dp2;
OCIDefine *c_middle_dp1;
OCIDefine *c_middle_dp2;
OCIDefine *c_balance_dp1;
OCIDefine *c_balance_dp2;
OCIDefine *o_id_dp1;
OCIDefine *o_id_dp2;
OCIDefine *o_entry_d_dp1;
OCIDefine *o_entry_d_dp2;
OCIDefine *o_cr_id_dp1;
OCIDefine *o_cr_id_dp2;
OCIDefine *o_ol_cnt_dp1;
OCIDefine *o_ol_cnt_dp2;
OCIDefine *ol_d_d_dp;
OCIDefine *ol_i_id_dp;
OCIDefine *ol_supply_w_id_dp;
OCIDefine *ol_quantity_dp;
OCIDefine *ol_amount_dp;
OCIDefine *ol_d_base_dp;
OCIDefine *c_count_dp;

OCIRowid *c_rowid_ptr[100];
OCIRowid *middle_cust;
int cs;
int cust_idx;
int norow;
int rcount;
int somerows;
};
typedef struct _ordctx ordctx;

struct _defctx {
boolean reexec;
ub4 count;
};
typedef struct _defctx defctx;

struct _payctx {
OCISmt *curp1;
OCISmt *curp0;
OCISmt *curp1;
OCIBind *w_id_bp;
OCIBind *w_id_bp1;

```

sb2 w_id_ind;
 ub2 w_id_len;
 ub2 w_id_rc;

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

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

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

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

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

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

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

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

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

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

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

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

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

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;

struct _stoctx {
    OCISmt *curs;
    OCIBind *w_id_bp;
    OCIBind *d_id_bp;
    OCIBind *threshold_bp;
    OCIDefine *low_stock_bp;
    int norow;
};
typedef struct _stoctx stoctx;

/* temporary structures needed since oracle binds to some vars differently
   than we store in our tpc structures from tpcstruct.h */

typedef struct _deltemp {
    char cvtcr_date[DATE_TIME_SIZ];
    OCIDate cr_date;
} deltemp;

typedef struct _newtemp {
    char entry_date[DATE_TIME_SIZ + 1];
    OCIDate cr_date;
    int nol_i_id[MAX_OL];
    int nol_supply_w_id[MAX_OL];
    int nol_quantity[MAX_OL];
    char i_name[MAX_OL][25];
    int s_quantity[MAX_OL];
    int i_price[MAX_OL];
    int nol_amount[MAX_OL];
    char brand_generic[MAX_OL];
    float c_discount;
    float w_tax;

    float d_tax;
    int n_retry;
} newtemp;

typedef struct _ordtemp {
    OCIDate entry_date;
    char entry_date_str[DATE_TIME_SIZ];
    int loc_ol_i_id[MAX_OL];
    int loc_ol_supply_w_id[MAX_OL];
    int loc_ol_quantity[MAX_OL];
    int loc_ol_amount[MAX_OL];
    OCIDate loc_ol_delivery_date[MAX_OL];
    char ol_delivery_date_str[MAX_OL][DATE_SIZ];
} ordtemp;

typedef struct _paytemp {
    char h_date[DATE_TIME_SIZ];
    OCIDate customer_sdate;
    char c_since_str[DATE_SIZ];
    OCIDate cr_date;
    float c_discount;
    int h_amount;
    int c_credit_lim;
    int p_retry;
} paytemp;

typedef struct _oracontext {
    /* V8 handles for talking to Oracle */
    OCIEnv *tpcenv;
    OCIServer *tpcsrv;
    OCIError *errhp;
    OCIError *datecvtrrhp;
    OCISvcCtx *tpcsvc;
    OCISession *tpcusr;
    OCISmt *curi;
    /* other V8 additions */
    dvoid *xmemp;
    /* are these really needed since we do not malloc and therefore do not
       need to free in *txn*done ???*/
    int del_init;
    int new_init;
    int pay_init;
    int ord_init;
    int sto_init;
    /* data areas where cursors will find data */
    GenericData bindvars;
    /* oracle structures for bind data information during a transaction */
    ordctx octx;
    delctx dctx;
    delctx dctx2;
    newctx netx;
    payctx pctx;
    stoctx sctx;
    defctx cbctx;
    amtctx actx;
    /* temporary data areas for cursor data - oracle stores/binds
       differently than tpc */
    union {
        deltemp del;
        newtemp new;
        ordtemp ord;
        paytemp pay;
    } tempvars;
} OraContext;

#define OCIERROR(p,function)\
    ocierror(__FILE__, __LINE__, (p), (function))

#define OCIBND(stmp, bndp, p, sqlvar, progvl, ftype)\
    ocierror(__FILE__, __LINE__, (p), \
        OCIBindByName((stmp), &(bndp), (p->errhp), \
            (text *) (sqlvar), strlen((sqlvar)), \
            (progvl), (progvl), (ftype), 0, 0, 0, 0, OCI_DEFAULT))

#define OCIBNDRA(stmp, bndp, p, sqlvar, progvl, ftype, indp, alen, arcode) \
    ocierror(__FILE__, __LINE__, (p), \
        OCIBindByName((stmp), &(bndp), (p->errhp), (text *) (sqlvar), strlen((sqlvar)), \

```

```

(progvl),(ftype),(indp),(alen),(arcode),0,0,OCI_DEFAULT)

#define
OCIBNDRAD(stmp,bndp,p,sqlvar,progvl,ftype,indp,ctxp,cbf_nodata,cbf_data) \
ocierror(_FILE_,_LINE_(p), \
OCIBindByName((stmp),&(bndp),(p->errhp),(text*)(sqlvar), \
strlen((sqlvar)),0,(progvl),(ftype), \
indp,0,0,0,OCI_DATA_AT_EXEC)); \
ocierror(_FILE_,_LINE_(p), \
OCIBindDynamic((bndp),(p->errhp),(ctxp),(cbf_nodata),(ctxp),(cbf_data)))

#define OCIBNDR(stmp,bndp,p,sqlvar,progvl,ftype,indp,alen,arcode) \
ocierror(_FILE_,_LINE_(p), \
OCIBindByName((stmp),&(bndp),(p->errhp),(text*)(sqlvar),strlen((sqlvar)), \
(progvl),(progvl),(ftype),(indp),(alen),(arcode),0,0,OCI_DEFAULT)

#define OCIBNDRAA(stmp,bndp,p,sqlvar,progvl,ftype,indp,alen,arcode,ms,cu) \
ocierror(_FILE_,_LINE_(p), \
OCIBindByName((stmp), &(bndp), (p->errhp), \
(text*)(sqlvar), strlen((sqlvar)), \
(progvl), (progvl), (ftype),(indp),(alen),(arcode), \
(ms),(cu),OCI_DEFAULT))

#define OCIDEFINE(stmp,dfnp,errp,pos,progvl,ftype) \
OCIDefineByPos((stmp),&(dfnp),(errp),(pos),(progvl),(ftype), \
0,0,0,OCI_DEFAULT)

#define OCIDEF(stmp,dfnp,errp,pos,progvl,ftype) \
OCIDefineByPos((stmp),&(dfnp),(errp),(pos),(progvl),(progvl), \
(ftype),NULL,NULL,NULL,OCI_DEFAULT)

#define OCIDFNRA(stmp,dfnp,errp,pos,progvl,ftype,indp,alen,arcode) \
OCIDefineByPos((stmp),&(dfnp),(errp),(pos),(progvl), \
(progvl),(ftype),(indp),(alen), \
(arcode),OCI_DEFAULT)

#define OCIDFNDRY(stmp,dfnp,errp,pos,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),(progvl), (progvl),(ftype), \
(indp),NULL,NULL, OCI_DYNAMIC_FETCH)); \
ocierror(_FILE_,_LINE_(errp), \
OCIDefineDynamic((dfnp),(errp),(ctxp),(cbf_data)));

/* old defines for v7 */
/*****

#define OBNDRV(lda,cursor,sqlvar,progvl,ftype) \
if (obndrv((cursor),(text*)(sqlvar),NA,(ub1*)(progvl),(progvl),(ftype),NA, \
(sb2)*0,(text)*0,NA,NA)) \
{ErrRpt(lda,cursor->rc);return(ERR_DB_ERROR);} \
else \
DISCARD 0

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

#define OBNDRAA(lda,cursor,sqlvar,progvl,ftype,indp,alen,arcode,ms,cs) \
if (obndraa((cursor),(text*)(sqlvar),NA,(ub1*)(progvl),(progvl),(ftype),NA, \
(indp),(alen),(arcode),(ub4)(ms),(ub4*)(cs),(text)*0,NA,NA)) \
{ErrRpt(lda,cursor->rc);return(ERR_DB_ERROR);} \
else \
DISCARD 0

#define ODEFIN(lda,cursor,pos,buf,buf1,(ftype),(scale),(indp), \
(text*)(fmt),(fntl),(fmnt),(rlen),(rcode)) \
{ErrRpt(lda,cursor->rc);return(ERR_DB_ERROR);} \
else \
DISCARD 0

#define OEXFET(lda,cursor,nrows,exact) \
if (oexfet((cursor),(nrows),(cancel),(exact)) \
{if ((cursor->rc == 1403) DISCARD 0; \
else if (ErrRpt(lda,cursor->rc)==RECOVER) \
{orol(lda);return(RECOVER);} \
else {orol(lda);return(ERR_DB_ERROR);} \
else \
DISCARD 0

#define OOPEN(lda,cursor) \
if (oopen((cursor),(lda),(text*)0,NA,NA,(text*)0,NA)) \
{ErrRpt(lda,cursor->rc);return(ERR_DB_ERROR);} \
else \
DISCARD 0

#define OPARSE(lda,cursor,sqlstm,sql,deflg,lngflg) \
if (oparse((cursor),(sqlstm),(sb4)(sql),(deflg),(ub4)(lngflg)) \
{ErrRpt(lda,cursor->rc);return(ERR_DB_ERROR);} \
else \
DISCARD 0

#define OFEN(lda,cursor,nrows) \
if (ofen((cursor),(nrows)) \
{if (ErrRpt(lda,cursor->rc)==RECOVER) \
{orol(lda);return(RECOVER);} \
else {orol(lda);return(ERR_DB_ERROR);} \
else \
DISCARD 0

#define OEXEC(lda,cursor) \
if (oexec((cursor)) \
{if (ErrRpt(lda,cursor->rc)==RECOVER) \
{orol(lda);return(RECOVER);} \
else {orol(lda);return(ERR_DB_ERROR);} \
else \
DISCARD 0

#define OCOM(lda,cursor) \
if (ocom((lda)) \
{ErrRpt(lda,cursor->rc);orol(lda);return(-1);} \
else \
DISCARD 0

#define OEXN(lda,cursor,itors,rowoff) \
if (oexn((cursor),(itors),(rowoff)) \
{if (ErrRpt(lda,cursor->rc)==RECOVER) \
{orol(lda);return(RECOVER);} \
else {orol(lda);return(-1);} \
else \
DISCARD 0

*****

/* prototypes */
extern int tkvcninit (NewOrderData *pNew,
OraContext *p);

extern int tkvcn (NewOrderData *pNew, OraContext *p);

extern void tkvcndone (newctx *pnctx);

extern int tkvcpin (PaymentData *pPay,
OraContext *p);

extern int tkvcp (PaymentData *pPay, OraContext *p);

extern void tkvcpdone (payctx *ppctx);

```

```

extern int tkvcoint(OrderStatusData *pOrd,
                  OraContext *p);

extern int tkvco (OrderStatusData *pOrd, OraContext *p);

extern void tkvcodone (ordctx *pctx);

extern int tkvcsinit(StockLevelData *pOrd,
                   OraContext *p);

extern int tkvcs (OraContext *p);

extern void tkvcsdone (stoctx *pctx);

extern int tkvcdinit (DeliveryData *pDel,
                    OraContext *p);

extern int tkvcd (DeliveryData *pDel, OraContext *p);

extern void tkvcdone (delctx *pctx);

int ocierror(char *fname, int lineno, OraContext *p, sword status);
extern int ErrRpt(Lda_Def *pLda, int rc);
void TPCCErr( char *fmt, ...);
void TPCCLog( char *fmt, ...);

```

```
#endif /* ORACLE_DB_H */
```

oracle_txns8.c

```

/*+ file: oracle_txns8.c based on Oracle files - plpay.c plnew.c plord.c
      pldel.c plsto.c      -*/
/*+=====+
|      Copyright (c) 1995 Oracle Corp, Redwood Shores, CA      |
|      OPEN SYSTEMS PERFORMANCE GROUP                          |
|      All Rights Reserved                                      |
+=====+
| DESCRIPTION
| OCI version (using PL/SQL stored procedure) of
| PAYMENT transaction in TPC-C benchmark.
| OCI version (using PL/SQL stored procedure) of
| NEW ORDER transaction in TPC-C benchmark.
| OCI version (using PL/SQL anonymous block) of
| ORDER STATUS transaction in TPC-C benchmark.
| OCI version of DELIVERY transaction in TPC-C benchmark.
| OCI version of STOCK LEVEL transaction in TPC-C benchmark.
+=====+
/*+-----*/
/*+*****
*****
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*
*

```

```

*****
****_*/

```

```

/*+
* Abstract: This file contains the transaction routines for connection
* to the oracle v8 database - for the tpc benchmark.
*
* Modified history:
*
*
*/

```

```

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

#include <oci.h>
#include <ocidfn.h>
#include <ociapr.h>

```

```

#ifdef _WIN32
# include <windows.h>
#endif

```

```

#include <tpccerr.h>
#include <tpcstruct.h>
#include <oracle_db8.h>

```

```

#ifdef OL_CHECK
# include <htpext.h>
extern int iMaxWareHouses;
#endif

```

```
/* prototypes */
```

```

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 > 99) Date.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); */
    sprintf(outdate,"%02d-%02d-%4d",day,month,year);

    return;
}

void cvtdmyhms (unsigned char *oradt, char *outdate)
{
    struct ORADATE {
        unsigned char century;
        unsigned char year;
        unsigned char month;
        unsigned char day;
        unsigned char hour;
        unsigned char minute;
        unsigned char second;
    } Date;

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

    memcpy(&Date,oradt,7);

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

    /*sprintf(outdate,"%02d-%02d-%4d %02d:%02d:%02d\0", */
    sprintf(outdate,"%02d-%02d-%4d %02d:%02d:%02d",
        day,month,year,hour,min,sec);

    return;
}

```

```

swapitemstock (int i, int j, int *i_price, char i_name[][25],
                int *s_quantity, newctx *nctx)
{
    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;

tempub2 = nctx->s_dist_info_ind[i];
nctx->s_dist_info_ind[i] = nctx->s_dist_info_ind[j];
nctx->s_dist_info_ind[j] = tempub2;
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);

tempub2 = nctx->s_data_ind[i];
nctx->s_data_ind[i] = nctx->s_data_ind[j];
nctx->s_data_ind[j] = tempub2;
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);
return 0;
}

/* the arrays are initialized based on a successful select from */
/* stock/item. We need to shift the values in the orderline array */
/* one position up to compensate when we have an invalid item */

shiftitemstock (int i, int j, newctx *nctx, OraContext *p)
{
    newtemp *ntemp = &(p->tempvars.new);

    /* 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];
    ntemp->nol_i_id[i] = ntemp->nol_i_id[j];

    nctx->nol_quantity_ind[i] = nctx->nol_quantity_ind[j];
    ntemp->nol_quantity[i] = ntemp->nol_quantity[j];

    nctx->nol_supply_w_id_ind [i] = nctx->nol_supply_w_id_ind[j];
    ntemp->nol_supply_w_id[i] = ntemp->nol_supply_w_id[j];
    return 0;
}

int SellItemStk (NewOrderData *pNew,
                int *pstatus,
                int retries, int proc_no, newctx *nctx, OraContext *p)
{
    int i, j, rpc3,rcount;
    int errcode;
    int execstatus;

#ifdef OL_CHECK
    newtemp *ntemp = &(p->tempvars.new);
    for (i = 0; i < MAX_OL; i++) {
        if((TRUE == nctx->nol_supply_w_id_ind[i]) &&
            ( ntemp->nol_supply_w_id[i] > iMaxWareHouses )) {
            TPCCerr( "Bad supply warehouse ol: %d, s_w_id: %d, query: %s",
                    i+1, ntemp->nol_supply_w_id[i],
                    ((EXTENSION_CONTROL_BLOCK *)pNew->pCC)-
>lpszQueryString );

```

```

    }
    }
#endif

/* array select from item and stock tables */
execstatus=OCISmtExecute(p->tpcsvc,(nctx->cur3)[pNew->d_id-1],p->errhp,
                        pNew->o_ol_cnt,0,0,OCI_DEFAULT);
if((execstatus != OCI_SUCCESS) && (execstatus != OCI_NO_DATA)) {
    errcode = OCIERROR(p,execstatus);
    if((errcode == NOT_SERIALIZABLE) || (errcode == RECOVER))
    {
        /* In case of NO_DATA this should NOT return, but simply fall through */
        OCITransRollback(p->tpcsvc,p->errhp,OCI_DEFAULT);
        return (RECOVER);
    }
    else
    {
        OCITransRollback(p->tpcsvc,p->errhp,OCI_DEFAULT);
        return (IRRECERR);
    }
}
/* mark invalid items */
OCIAttrGet((nctx->cur3)[pNew->d_id-1], OCI_HTYPE_STMT,&rcount,NULL,
            OCI_ATTR_ROW_COUNT, p->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 ((*pstatus = pNew->o_ol_cnt - rcount) >1)
{
    TPCCerr ("TPC-C server %d: more than 1 invalid item?\n", proc_no);
    return (rpc3);
}
if (*pstatus == 0) return (rpc3);

/* find the invalid item, transfer the rowid information */

for (i = 0; i < pNew->o_ol_cnt; i++) {
    if (nctx->cons[i] != i) break; /* this item is invalid */
}
/**
TPCCerr("TPC-C server %d: reordering items and stocks\n",
        proc_no); /**/

/* not the last item - shift up */

for (j = i; j < pNew->o_ol_cnt-1; j++)
{
    shiftitemstock (j, j+1, nctx, p);
}
/* zero the last item */
i = pNew->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);
}

UpdStk (OraContext *p, NewOrderData *pNew, int proc_no)
{
int rcount;
int execstatus;
int errcode;
newctx *nctx = &(p->nctx);

#ifdef OL_CHECK
int i;
newtemp *ntemp = &(p->tempvars.new);
for (i = 0; i < MAX_OL; i++) {
if((TRUE == nctx->no_l_supply_w_id_ind[i]) &&
(nctx->no_l_supply_w_id[i] > iMaxWareHouses )) {
TPCCerr( "Bad supply warehouse ol in updstk: %d, s_w_id: %d, query: %s",
i+1, nctx->no_l_supply_w_id[i],
((EXTENSION_CONTROL_BLOCK *)pNew->pCC)-
>lpszQueryString );
}
}
#endif
/* array update of stock table */

execstatus = OCIStmtExecute(p->tpcsvc,nctx->cur2,p->errhp,pNew->o_ol_cnt,
0,0,0,OCI_DEFAULT);
if(execstatus != OCI_SUCCESS) {
OCITransRollback(p->tpcsvc,p->errhp,OCI_DEFAULT);
errcode = OCIERROR(p, execstatus);
if((errcode == NOT_SERIALIZABLE) || (errcode == RECOVER)) {
return (RECOVER);
} else {
return (IRRECERR);
}
}
OCIAttrGet(nctx->cur2,OCI_HTYPE_STMT,&rcount,NULL,
OCI_ATTR_ROW_COUNT, p->errhp);
if (rcount != (pNew->o_ol_cnt) ) {
TPCCerr ("Error in TPC-C server %d: array update failed in UpdStk()\n",
proc_no);
OCITransRollback(p->tpcsvc,p->errhp,OCI_DEFAULT);
return (IRRECERR);
}
return (rcount);
}

UpdStk2 (OraContext *p, NewOrderData *pNew, int status, int proc_no)
{
int rcount;
int execstatus;
int errcode;
newctx *nctx = &(p->nctx);

#ifdef OL_CHECK
int i;
newtemp *ntemp = &(p->tempvars.new);
for (i = 0; i < MAX_OL; i++) {
if((TRUE == nctx->no_l_supply_w_id_ind[i]) &&
(nctx->no_l_supply_w_id[i] > iMaxWareHouses )) {
TPCCerr( "Bad supply warehouse ol in updstk2: %d, s_w_id: %d, query: %s",
i+1, nctx->no_l_supply_w_id[i],
((EXTENSION_CONTROL_BLOCK *)pNew->pCC)-
>lpszQueryString );
}
}
#endif
/* array update of stock table */

execstatus = OCIStmtExecute(p->tpcsvc,nctx->cur2,p->errhp,
pNew->o_ol_cnt-
status,0,0,0,OCI_DEFAULT);
if(execstatus != OCI_SUCCESS) {
OCITransRollback(p->tpcsvc,p->errhp,OCI_DEFAULT);
errcode = OCIERROR(p,execstatus);
}

```

```

if(errcode == NOT_SERIALIZABLE) {
return (RECOVER);
} else if (errcode == RECOVER) {
return (RECOVER);
} else {
return (IRRECERR);
}
}
OCIAttrGet(nctx->cur2,OCI_HTYPE_STMT,&rcount,NULL,
OCI_ATTR_ROW_COUNT,
p->errhp);

if (rcount != (pNew->o_ol_cnt - status)) {
TPCCerr("Error in TPC-C server %d: array update failed in UpdStk()\n",
proc_no);
OCITransRollback(p->tpcsvc,p->errhp,OCI_DEFAULT);
return (NO_COMMIT);
}

return (rcount);
}

/* stock level transaction */

#define SLSQLTXT "SELECT count (DISTINCT s_i_id) \
FROM ordl, stok, dist \
WHERE d_id = :d_id AND d_w_id = :w_id AND \
d_id = ol_d_id AND d_w_id = ol_w_id AND \
ol_i_id = s_i_id AND ol_w_id = s_w_id AND \
s_quantity < :threshold AND \
ol_o_id BETWEEN (d_next_o_id - 20) AND (d_next_o_id - 1)"

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

tkvcsinit (StockLevelData *pSL,
OraContext *p)
{
stctx *sctx = &(p->sctx);
text stmbuf[SQL_BUF_SIZE];

sctx-> curs = NULL;

memset(sctx,(char)0,sizeof(stctx));
sctx-> norow=0;

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

/* bind variables */

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

return (ERR_DB_SUCCESS);
}

tkvcs (OraContext *p)
{
stctx *sctx = &(p->sctx);

int execstatus = 0;

```

```

int errcode = 0;

execstatus = OCIStmtExecute(p->tpcsvc,sctx->curs,p->errhp,1,0,0,0,
                           OCI_COMMIT_ON_SUCCESS |
OCI_DEFAULT);
if(execstatus != OCI_SUCCESS) {
    OCITransCommit(p->tpcsvc,p->errhp,OCI_DEFAULT);
    errcode = OCIERROR(p,execstatus);
    if(errcode == NOT_SERIALIZABLE) {
        return (RECOVER);
    } else if (errcode == RECOVER) {
        return (RECOVER);
    } else if (errcode == SNAPSHOT_TOO_OLD) {
        return (RECOVER);
    } else {
        return (ERR_DB_ERROR);
    }
}

return (ERR_DB_SUCCESS);
}

void tkvcsdone (stoctx *psctx)
{
    stoctx sctx = *psctx;

    if(NULL != sctx.curs)
        OCIHandleFree((dvoid *)sctx.curs,OCI_HTYPE_STMT);
}

#define SQLTXT_PAY_ZERO "BEGIN apayment.adopayment(:w_id,:d_id,:c_w_id,
:c_d_id, \
:c_id,0, \
: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, \
:h_date, :retry, :cr_date); END;"

#define SQLTXT_PAY_NONZERO "BEGIN apayment.adopayment(:w_id,:d_id,
:c_w_id, :c_d_id, \
:c_id,1, \
: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, \
:h_date, :retry, :cr_date); END;"

#define SQLTXT_PAY_INIT "BEGIN initpay.pay_init; END;"

tkvpinit (PaymentData *pPay,
          OraContext *p)
{
    payctx *pctx = &(p->pctx);
    paytemp *ptemp = &(p->tempvars.pay);

    text stmbuff[SQL_BUF_SIZE];

    pctx->curpi = NULL;
    pctx->curp0 = NULL;
    pctx->curp1 = NULL;

    memset(pctx,(char)0,sizeof(payctx));

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

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

/* build the init statement and execute it */

```

```

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

/* customer id != 0, go by customer id */
OCIERROR(p,OCIStmtPrepare(pctx->curp0, p->errhp, stmbuff_paynz,
                          strlen((char *)stmbuff_paynz), OCI_NTV_SYNTAX, OCI_DEFAULT));

/* customer id == 0, go by last name */
OCIERROR(p,OCIStmtPrepare(pctx->curp1, p->errhp, stmbuff_payz,
                          strlen((char *)stmbuff_payz), OCI_NTV_SYNTAX, OCI_DEFAULT));

pctx->w_id_ind = TRUE;
pctx->w_id_len = SIZ(pPay->w_id);
pctx->d_id_ind = TRUE;
pctx->d_id_len = SIZ(pPay->d_id);
pctx->c_w_id_ind = TRUE;
pctx->c_w_id_len = SIZ(pPay->c_w_id);
pctx->c_d_id_ind = TRUE;
pctx->c_d_id_len = SIZ(pPay->c_d_id);
pctx->c_id_ind = TRUE;
pctx->c_id_len = 0;
pctx->h_amount_len = SIZ(ptemp->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;

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pctx->retries_len = 0;
pctx->cr_date_ind = TRUE;
/* pctx->cr_date_len = 7; */
pctx->cr_date_len = sizeof(ptemp->cr_date);

/* bind variables */

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

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

OCIBNDR(pctx->curp1, pctx->w_id_bp1, p,":w_id",
        ADR(pPay->w_id),SIZ(pPay->w_id),
        SQT_INT, &pctx->w_id_ind, &pctx->w_id_len, &pctx->w_id_rc);
OCIBNDR(pctx->curp1, pctx->d_id_bp1, p,":d_id",ADR(pPay->d_id),
        SIZ(pPay->d_id),
        SQT_INT, &pctx->d_id_ind, &pctx->d_id_len, &pctx->d_id_rc);
OCIBNDR(pctx->curp1, pctx->c_w_id_bp1, p,":c_w_id",ADR(pPay->c_w_id),
        SIZ(pPay->c_w_id),
        SQT_INT);
OCIBNDR(pctx->curp1, pctx->c_d_id_bp1, p,":c_d_id",ADR(pPay->c_d_id),
        SIZ(pPay->c_d_id),
        SQT_INT);
OCIBNDR(pctx->curp1, pctx->c_id_bp1, p,":c_id",ADR(pPay->c_id),
        SIZ(int),
        SQT_INT, &pctx->c_id_ind, &pctx->c_id_len, &pctx->c_id_rc);
OCIBNDR(pctx->curp1, pctx->h_amount_bp1, p,":h_amount",
        ADR(ptemp->h_amount),
        SIZ(int),SQT_INT, &pctx->h_amount_ind, &pctx->h_amount_len,
        &pctx->h_amount_rc);
OCIBNDR(pctx->curp1, pctx->c_last_bp1, p,":c_last",pPay->c_last,
        SIZ(pPay->c_last),
        SQT_STR);
OCIBNDR(pctx->curp1, pctx->w_street_1_bp1, p,":w_street_1",
        pPay->w_street_1,
        SIZ(pPay->w_street_1),SQT_STR, &pctx->w_street_1_ind,
        &pctx->w_street_1_len, &pctx->w_street_1_rc);
OCIBNDR(pctx->curp1, pctx->w_street_2_bp1, p,":w_street_2",
        pPay->w_street_2,
        SIZ(pPay->w_street_2),SQT_STR, &pctx->w_street_2_ind,
        &pctx->w_street_2_len, &pctx->w_street_2_rc);
OCIBNDR(pctx->curp1, pctx->w_city_bp1, p,":w_city",pPay->w_city,
        SIZ(pPay->w_city),
        SQT_STR, &pctx->w_city_ind, &pctx->w_city_len, &pctx->w_city_rc);
OCIBNDR(pctx->curp1, pctx->w_state_bp1, p,":w_state",pPay->w_state,
        SIZ(pPay->w_state), SQT_STR,

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        &pctx->w_state_ind, &pctx->w_state_len, &pctx->w_state_rc);
OCIBNDR(pctx->curp1, pctx->w_zip_bp1, p, "w_zip", pPay->w_zip,
        SIZ(pPay->w_zip),
        SQLT_STR, &pctx->w_zip_ind, &pctx->w_zip_len, &pctx->w_zip_rc);
OCIBNDR(pctx->curp1, pctx->d_street_1_bp1, p, "d_street_1",
        pPay->d_street_1,
        SIZ(pPay->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, p, "d_street_2",
        pPay->d_street_2,
        SIZ(pPay->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, p, "d_city",
        pPay->d_city, SIZ(pPay->d_city),
        SQLT_STR, &pctx->d_city_ind, &pctx->d_city_len, &pctx->d_city_rc);
OCIBNDR(pctx->curp1, pctx->d_state_bp1, p, "d_state",
        pPay->d_state, SIZ(pPay->d_state), SQLT_STR,
        &pctx->d_state_ind, &pctx->d_state_len,
        &pctx->d_state_rc);
OCIBNDR(pctx->curp1, pctx->d_zip_bp1, p, "d_zip", pPay->d_zip,
        SIZ(pPay->d_zip),
        SQLT_STR, &pctx->d_zip_ind, &pctx->d_zip_len, &pctx->d_zip_rc);
OCIBNDR(pctx->curp1, pctx->c_first_bp1, p, "c_first", pPay->c_first,
        SIZ(pPay->c_first), SQLT_STR,
        &pctx->c_first_ind, &pctx->c_first_len,
        &pctx->c_first_rc);
OCIBNDR(pctx->curp1, pctx->c_middle_bp1, p, "c_middle",
        pPay->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, p, "c_street_1",
        pPay->c_street_1,
        SIZ(pPay->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, p, "c_street_2",
        pPay->c_street_2,
        SIZ(pPay->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, p, "c_city", pPay->c_city,
        SIZ(pPay->c_city), SQLT_STR,
        &pctx->c_city_ind, &pctx->c_city_len, &pctx->c_city_rc);
OCIBNDR(pctx->curp1, pctx->c_state_bp1, p, "c_state", pPay->c_state,
        SIZ(pPay->c_state), SQLT_STR, &pctx->c_state_ind, &pctx->
>c_state_len,
        &pctx->c_state_rc);
OCIBNDR(pctx->curp1, pctx->c_zip_bp1, p, "c_zip", pPay->c_zip,
        SIZ(pPay->c_zip),
        SQLT_STR, &pctx->c_zip_ind, &pctx->c_zip_len, &pctx->c_zip_rc);
OCIBNDR(pctx->curp1, pctx->c_phone_bp1, p, "c_phone", pPay->c_phone,
        SIZ(pPay->c_phone), SQLT_STR,
        &pctx->c_phone_ind, &pctx->c_phone_len,
        &pctx->c_phone_rc);
OCIBNDR(pctx->curp1, pctx->c_since_bp1, p, "c_since",
        ADR(pctx->customer_sdate), SIZ(pctx->customer_sdate),
SQLT_ODT,
        &pctx->c_since_ind, &pctx->c_since_len, &pctx->c_since_rc);
OCIBNDR(pctx->curp1, pctx->c_credit_bp1, p, "c_credit",
        pPay->c_credit,
        SIZ(pPay->c_credit), SQLT_CHR,
        &pctx->c_credit_ind, &pctx->c_credit_len,
        &pctx->c_credit_rc);
OCIBNDR(pctx->curp1, pctx->c_credit_lim_bp1, p, "c_credit_lim",
        ADR(pctx->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, p, "c_discount",
        ADR(pctx->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, p, "c_balance",
        ADR(pPay->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, p, "c_data", pPay->c_data,
        SIZ(pPay->c_data),
        SQLT_STR, &pctx->c_data_ind, &pctx->c_data_len, &pctx->c_data_rc);
/* OCIBNDR(pctx->curp1, pctx->h_date_bp1, p, "h_date",
        pctx->h_date, SIZ(pctx->h_date),
        SQLT_STR, &pctx->h_date_ind, &pctx->h_date_len, &pctx->h_date_rc); */
OCIBNDR(pctx->curp1, pctx->retries_bp1, p, "retries",
        ADR(pctx->p_retry), SIZ(int), SQLT_INT,

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```

        &pctx->retries_ind, &pctx->retries_len, &pctx->retries_rc);
OCIBNDR(pctx->curp1, pctx->cr_date_bp1, p, "cr_date",
        ADR(pctx->cr_date), SIZ(pctx->cr_date), SQLT_ODT,
        &pctx->cr_date_ind, &pctx->cr_date_len,
        &pctx->cr_date_rc);
return (ERR_DB_SUCCESS);
}

tkvcp (PaymentData *pPay, OraContext *p)
{
    int execstatus;
    int errcode;
    payctx *pctx = &(p->pctx);
    paytemp *ptemp = &(p->tempvars.pay);
    unsigned char localcr_date[7];
    OCIError *datecvtrrh = p->datecvtrrh;

    /* vgetdate(ptemp->cr_date); */
    vgetdate(localcr_date);
    cvtdmyhms(localcr_date, ptemp->h_date);
    OCIDateFromText(datecvtrrh, (unsigned char *)ptemp->h_date, strlen(ptemp-
>h_date), (const unsigned char *)"DD-MM-YYYY HH24:MI:SS".21, (text *) 0,
    0, &ptemp->cr_date);

    pctx->w_id_ind = TRUE;
    pctx->w_id_len = SIZ(pPay->w_id);
    pctx->d_id_ind = TRUE;
    pctx->d_id_len = SIZ(pPay->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(ptemp->h_amount);
    pctx->h_amount_ind = TRUE;
    pctx->c_last_ind = TRUE;
    pctx->c_last_len = SIZ(pPay->c_last);
    pctx->w_street_1_ind = NA;
    pctx->w_street_1_len = 0;
    pctx->w_street_2_ind = NA;
    pctx->w_street_2_len = 0;
    pctx->w_city_ind = NA;
    pctx->w_city_len = 0;
    pctx->w_state_ind = NA;
    pctx->w_state_len = 0;
    pctx->w_zip_ind = NA;
    pctx->w_zip_len = 0;
    pctx->d_street_1_ind = NA;
    pctx->d_street_1_len = 0;
    pctx->d_street_2_ind = NA;
    pctx->d_street_2_len = 0;
    pctx->d_city_ind = NA;
    pctx->d_city_len = 0;
    pctx->d_state_ind = NA;
    pctx->d_state_len = 0;
    pctx->d_zip_ind = NA;
    pctx->d_zip_len = 0;
    pctx->c_first_ind = NA;
    pctx->c_first_len = 0;
    pctx->c_middle_ind = NA;
    pctx->c_middle_len = 0;
    pctx->c_street_1_ind = NA;
    pctx->c_street_1_len = 0;
    pctx->c_street_2_ind = NA;
    pctx->c_street_2_len = 0;
    pctx->c_city_ind = NA;
    pctx->c_city_len = 0;
    pctx->c_state_ind = NA;
    pctx->c_state_len = 0;
    pctx->c_zip_ind = NA;
    pctx->c_zip_len = 0;
    pctx->c_phone_ind = NA;
    pctx->c_phone_len = 0;
    pctx->c_since_ind = NA;

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```

pctx->c_since_len = 0;
pctx->c_credit_ind = NA;
pctx->c_credit_len = 0;
pctx->c_credit_lim_ind = NA;
pctx->c_credit_lim_len = 0;
pctx->c_discount_ind = NA;
pctx->c_discount_len = 0;
pctx->c_balance_ind = NA;
pctx->c_balance_len = sizeof(double);
pctx->c_data_ind = NA;
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; */
pctx->cr_date_len = sizeof(pctx->cr_date);

if(pPay->byname)
{
    pctx->c_id_ind = NA;
    execstatus=OCIStmtExecute(p->tpcsvc,pctx->curp1,p->errhp,
1,0,0,OCI_DEFAULT|OCI_COMMIT_ON_SUCCESS);
}
else
{
    pctx->c_last_ind = NA;
    execstatus=OCIStmtExecute(p->tpcsvc,pctx->curp0,p->errhp,
1,0,0,OCI_DEFAULT|OCI_COMMIT_ON_SUCCESS);
}

if(execstatus != OCI_SUCCESS) {
    OCITransRollback(p->tpcsvc,p->errhp,OCI_DEFAULT);
    errcode = OCIERROR(p,execstatus);
    if(errcode == NOT_SERIALIZABLE) {
        return(RECOVER);
    } else if (errcode == RECOVER) {
        return(RECOVER);
    } else if (errcode == SNAPSHOT_TOO_OLD) {
        return(RECOVER);
    } else {
        return ERR_DB_ERROR;
    }
}

return (ERR_DB_SUCCESS);
}

void tkvcpdone (payctx *ppctx)
{
    payctx pctx = *ppctx;

    if(NULL != pctx.curpi)
        OCIHandleFree((dvoid *)pctx.curpi,OCI_HTYPE_STMT);
    if(NULL != pctx.curp0)
        OCIHandleFree((dvoid *)pctx.curp0,OCI_HTYPE_STMT);
    if(NULL != pctx.curp1)
        OCIHandleFree((dvoid *)pctx.curp1,OCI_HTYPE_STMT);
}

/*
-----
Orderstatus transaction
*/

#define SQL_ORD_CUR0 "SELECT rowid FROM cust \
    WHERE c_d_id = :d_id AND c_w_id = :w_id AND c_last = :c_last \
    ORDER BY c_w_id, c_d_id, c_last, c_first"

#define SQL_ORD_CUR1 "SELECT c_id, c_balance, c_first, c_middle, c_last, \
    o_id, o_entry_d, o_carrier_id, o_ol_cnt \
    FROM cust, ord \
    WHERE cust.rowid = :cust_rowid \
    AND o_d_id = c_d_id AND o_w_id = c_w_id AND o_c_id = c_id \
    ORDER BY o_w_id, o_d_id, o_c_id, o_id DESC"

#define SQL_ORD_CUR2 "SELECT c_balance, c_first, c_middle, c_last, \
    o_id, o_entry_d, o_carrier_id, o_ol_cnt, c_id \
    FROM cust, ord \
    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 SQL_ORD_CUR3 "SELECT ol_i_id,ol_supply_w_id,ol_quantity,ol_amount, \
    ol_delivery_d \
    FROM ord \
    WHERE ol_d_id = :d_id AND ol_w_id = :w_id AND ol_o_id = :o_id"

#define SQL_ORD_CUR4 "SELECT count (c_last) FROM cust \
    WHERE c_d_id = :d_id AND c_w_id = :w_id AND c_last = :c_last "

sb4 rid_data(dvoid *ctxp, OCIDefine *dp, ub4 iter, dvoid **bufpp, ub4 **alenp,
    ub1 *piecep, dvoid **indpp, ub2 **rcodepp)
{
    ub4 i;

    ordctx *octx = &((OraContext *)ctxp)->octx;
    defctx *cbctx = &((OraContext *)ctxp)->cbctx);

    if (cbctx->reexec) /* if this is the second execute - use entry 0 */
    {
        i=0;
        cbctx->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);
}

tkvcoint (OrderStatusData *pOrd,
    OraContext *p)
{
    int i;
    text stmbuf[8192];
    ordtemp *otemp = &(p->tempvars.ord);
    ordctx *octx = &(p->octx);

    memset(octx,(char)0,sizeof(ordctx));
    octx->cs = 1;
    octx->norow = 0;
    octx->somerows = 10;
    octx->curo0 = NULL;
    octx->curo1 = NULL;
    octx->curo2 = NULL;
    octx->curo3 = NULL;
    octx->curo4 = NULL;

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

```

```

OCIERROR(p,OCIHandleAlloc(p->tpcenv,(dvoid**)&octx-
>куро0,OCI_HTYPE_STMT,
    0,(dvoid**0));
OCIERROR(p,OCIHandleAlloc(p->tpcenv,(dvoid**)&octx-
>куро1,OCI_HTYPE_STMT,
    0,(dvoid**0));
OCIERROR(p,OCIHandleAlloc(p->tpcenv,(dvoid**)&octx-
>куро2,OCI_HTYPE_STMT,
    0,(dvoid**0));
OCIERROR(p,OCIHandleAlloc(p->tpcenv,(dvoid**)&octx-
>куро3,OCI_HTYPE_STMT,
    0,(dvoid**0));
OCIERROR(p,OCIHandleAlloc(p->tpcenv,(dvoid**)&octx-
>куро4,OCI_HTYPE_STMT,
    0,(dvoid**0));

/* c_id = 0, use find customer by lastname. Get an array or rowid's back*/
sprintf((char *) smbuf, SQL_ORD_CUR0);
OCIERROR(p,OCIStmtPrepare(octx->куро0,p->errhp,smbuf,
    strlen((char *)smbuf),
    OCI_NTV_SYNTAX,OCI_DEFAULT));
OCIERROR(p,OCIAttrSet(octx->куро0,OCI_HTYPE_STMT,(dvoid*)&octx-
>norow,0,
    OCI_ATTR_PREFETCH_ROWS,p->errhp));

/* get order/customer info back based on rowid */
sprintf((char *) smbuf, SQL_ORD_CUR1);
OCIERROR(p,OCIStmtPrepare(octx->куро1,p->errhp,smbuf,
    strlen((char *)smbuf),
    OCI_NTV_SYNTAX,OCI_DEFAULT));
OCIERROR(p,OCIAttrSet(octx->куро1,OCI_HTYPE_STMT,(dvoid*)&octx-
>norow,0,
    OCI_ATTR_PREFETCH_ROWS,p->errhp));

/* c_id != 0, use id to find customer */
sprintf((char *) smbuf, SQL_ORD_CUR2);
OCIERROR(p,OCIStmtPrepare(octx->куро2,p->errhp,smbuf,
    strlen((char *)smbuf),
    OCI_NTV_SYNTAX,OCI_DEFAULT));
OCIERROR(p,OCIAttrSet(octx->куро2,OCI_HTYPE_STMT,(dvoid*)&octx-
>norow,0,
    OCI_ATTR_PREFETCH_ROWS,p->errhp));

sprintf((char *) smbuf, SQL_ORD_CUR3);
OCIERROR(p,OCIStmtPrepare(octx->куро3,p->errhp,smbuf,
    strlen((char *)smbuf),
    OCI_NTV_SYNTAX,OCI_DEFAULT));
OCIERROR(p,OCIAttrSet(octx->куро3,OCI_HTYPE_STMT,(dvoid*)&octx-
>norow,0,
    OCI_ATTR_PREFETCH_ROWS,p->errhp));

sprintf((char *) smbuf, SQL_ORD_CUR4);
OCIERROR(p,OCIStmtPrepare(octx->куро4,p->errhp,smbuf,
    strlen((char *)smbuf),
    OCI_NTV_SYNTAX,OCI_DEFAULT));
OCIERROR(p,OCIAttrSet(octx->куро4,OCI_HTYPE_STMT,(dvoid*)&octx-
>norow,0,
    OCI_ATTR_PREFETCH_ROWS,p->errhp));

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_delivery_d_len[i] = sizeof(pOrd->s_ol->ol_delivery_d); */
}
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 */

/* c_id (customer id) is not known */
/* cursor 0 */
OCIBND(octx->куро0,octx->w_id_bp0,p,":w_id",ADR(pOrd->w_id),SIZ(int),
    SQLT_INT);
OCIBND(octx->куро0,octx->d_id_bp0,p,":d_id",ADR(pOrd->d_id),SIZ(int),
    SQLT_INT);
OCIBND(octx->куро0,octx->c_last_bp,p,":c_last",pOrd->c_last,
    SIZ(pOrd->c_last),SQLT_STR);

ocierror(__FILE__, __LINE__, p, \
    OCIDefineByPos(octx->куро0,&octx->c_rowid_dp,p->errhp,1, \
    octx->c_rowid_ptr, sizeof(OCIRowid*),SQLT_RDD,octx->c_rowid_ind, \
    NULL,NULL, OCI_DYNAMIC_FETCH));
ocierror(__FILE__, __LINE__, p, OCIDefineDynamic(octx->c_rowid_dp, \
    p->errhp, \
    p,rid_data));

/** sth OCIDFNDDYN( octx->куро0,
    octx->c_rowid_dp,
    p,
    1,
    octx->c_rowid_ptr,
    sizeof(OCIRowid*),
    SQLT_RDD,
    octx->c_rowid_ind,
    p,
    rid_data);
**/

OCIBND(octx->куро1,octx->c_rowid_bp,p,":cust_rowid",
    &octx->middle_cust,sizeof(octx->middle_cust),SQLT_RDD);

OCIDEF(octx->куро1,octx->c_id_dp,p->errhp,1,ADR(pOrd->c_id),SIZ(int),
    SQLT_INT);
OCIDEF(octx->куро1,octx->c_balance_dp1,p->errhp,2,ADR(pOrd->c_balance),
    SIZ(double),SQLT_FLT);
OCIDEF(octx->куро1,octx->c_first_dp1,p->errhp,3,pOrd->c_first,
    SIZ(pOrd->c_first)-1,
    SQLT_CHR);
OCIDEF(octx->куро1,octx->c_middle_dp1,p->errhp,4,pOrd->c_middle,
    SIZ(pOrd->c_middle)-1,SQLT_AFC);

OCIDEF(octx->куро1,octx->c_last_dp1,p->errhp,5,pOrd->c_last,
    SIZ(pOrd->c_last)-1, SQLT_CHR);
OCIDEF(octx->куро1,octx->o_id_dp1,p->errhp,6,ADR(pOrd->o_id),SIZ(int),
    SQLT_INT);
OCIDEF(octx->куро1,octx->o_entry_d_dp1,p->errhp,7,
    &otemp->entry_date,SIZ(otemp->entry_date),SQLT_ODT);
OCIDEF(octx->куро1,octx->o_cr_id_dp1,p->errhp,8,ADR(pOrd->o_carrier_id),
    SIZ(int),SQLT_INT);
OCIDEF(octx->куро1,octx->o_ol_cnt_dp1,p->errhp,9,ADR(pOrd->o_ol_cnt),
    SIZ(int),SQLT_INT);

/* Bind for cursor 2 , no-zero customer id */
OCIBND(octx->куро2,octx->w_id_bp2,p,":w_id",ADR(pOrd->w_id),SIZ(int),
    SQLT_INT);
OCIBND(octx->куро2,octx->d_id_bp2,p,":d_id",ADR(pOrd->d_id),SIZ(int),
    SQLT_INT);
OCIBND(octx->куро2,octx->c_id_bp,p,":c_id",ADR(pOrd->c_id),SIZ(int),
    SQLT_INT);
OCIDEF(octx->куро2,octx->c_balance_dp2,p->errhp,1,ADR(pOrd->c_balance),
    SIZ(double),SQLT_FLT);
OCIDEF(octx->куро2,octx->c_first_dp2,p->errhp,2,pOrd->c_first,
    SIZ(pOrd->c_first)-1,
    SQLT_CHR);
OCIDEF(octx->куро2,octx->c_middle_dp2,p->errhp,3,pOrd->c_middle,
    SIZ(pOrd->c_middle)-1,SQLT_AFC);

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OCIDEF(octx->curo2,octx->c_last_dp,p->errhp,4,pOrd->c_last,
      SIZ(pOrd->c_last)-1,
      SFLT_CHR);
OCIDEF(octx->curo2,octx->o_id_dp2,p->errhp,5,ADR(pOrd->o_id),SIZ(int),
      SFLT_INT);
OCIDEF(octx->curo2,octx->o_entry_d_dp2,p->errhp,6,
      &otemp->entry_date,SIZ(otemp->entry_date),SFLT_ODT);
OCIDEF(octx->curo2, octx->o_cr_id_dp2,p->errhp,7,ADR(pOrd->o_carrier_id),
      SIZ(int), SFLT_INT);
OCIDEF(octx->curo2,octx->o_ol_cnt_dp2,p->errhp,8,ADR(pOrd->o_ol_cnt),
      SIZ(int),SFLT_INT);
OCIDEF(octx->curo2,octx->c_id_dp1,p->errhp,9,ADR(pOrd->c_id),SIZ(int),
      SFLT_INT);

/* Bind for last cursor - 3 */

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

OCIDFNRA(octx->curo3, octx->ol_i_id_dp, p->errhp, 1, otemp->loc_ol_i_id,
      SIZ(int), SFLT_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,p->errhp,2,
      otemp->loc_ol_supply_w_id,
      SIZ(int),SFLT_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,p->errhp,3,
      otemp->loc_ol_quantity, SIZ(int),
      SFLT_INT, octx->ol_quantity_ind,octx->ol_quantity_len,
      octx->ol_quantity_rcode);
OCIDFNRA(octx->curo3,octx->ol_amount_dp,p->errhp,4,otemp->loc_ol_amount,
      SIZ(int),
      SFLT_INT,octx->ol_amount_ind, octx->ol_amount_len,
      octx->ol_amount_rcode);
OCIDFNRA(octx->curo3,octx->ol_d_base_dp,p->errhp,5,
      otemp->loc_ol_delivery_date,SIZ(OCIDate), SFLT_ODT,
      octx->ol_delivery_d_ind,octx->ol_delivery_d_len,
      octx->ol_delivery_d_rcode);

OCIBND(octx->curo4, octx->w_id_bp4, p, ":w_id", ADR(pOrd->w_id), SIZ(int),
      SFLT_INT);
OCIBND(octx->curo4,octx->d_id_bp4,p,":d_id",ADR(pOrd->d_id),SIZ(int),
      SFLT_INT);
OCIBND(octx->curo4,octx->c_last_bp4,p,":c_last",ADR(pOrd->c_last),
      SIZ(pOrd->c_last), SFLT_STR);
OCIDEF(octx->curo4,
      octx->c_count_dp,
      p->errhp,
      1,
      ADR(octx->rcount),
      SIZ(int),
      SFLT_INT);

return (ERR_DB_SUCCESS);

}

tkvco (OrderStatusData *pOrd, OraContext *p)
{
ordctx *octx = &(p->octx);
defctx *cbctx = &(p->cbctx);
ordtemp *otemp = &(p->tempvars.ord);
int i;
int execstatus;
int errcode;
int entry_date_str_len = sizeof(otemp->entry_date_str);

int rcount;

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(otemp->loc_ol_delivery_date[i]);
}
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;

/* initialize bound output variables to null for oracle v8 */
/* octx->o_ol_cnt_ind = NA; */
/* pOrd->o_ol_cnt = 0; */
if(pOrd->byname)
{
cbctx->reexec = FALSE;
execstatus=OCISmtExecute(p->tpcsvc,octx->curo0,p->errhp,
      100,0,0,0,OCI_DEFAULT);
if ((execstatus != OCI_NO_DATA) && (execstatus != OCI_SUCCESS))
/* will get OCI_NO_DATA if <100 found */
{
errcode = OCIERROR(p,execstatus);
if ((errcode == NOT_SERIALIZABLE) || (errcode == RECOVER) ||
    (errcode == SNAPSHOT_TOO_OLD))
{
OCITransCommit(p->tpcsvc,p->errhp,OCI_DEFAULT);
return RECOVER;
} else {
return ERR_DB_ERROR;
}
}
if (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,
p->errhp);

if (rcount < 1)
{
TPCCErr("No Data Found");
return ERR_DB_ERROR;
}
octx->cust_idx=(rcount-1)/2;
}
else
{
/* count the number of rows */
execstatus = OCISmtExecute(p->tpcsvc,octx->curo4,p->errhp,
      1,0,0,0,OCI_DEFAULT);
if ((execstatus != OCI_NO_DATA) && (execstatus != OCI_SUCCESS))
{
errcode = OCIERROR(p,execstatus);
if ((errcode == NOT_SERIALIZABLE) || (errcode == RECOVER)
    || (errcode == SNAPSHOT_TOO_OLD))
{
OCITransCommit(p->tpcsvc,p->errhp,OCI_DEFAULT);
return RECOVER;
} else {
return ERR_DB_ERROR;
}
}
if (octx->rcount+1 < 200)
octx->cust_idx=(octx->rcount-1)/2;
else
{
cbctx->reexec = TRUE;
cbctx->count = (octx->rcount+1)/2;
execstatus = OCISmtExecute(p->tpcsvc,octx->curo0,p->errhp,
      cbctx-
>count,0,0,0,OCI_DEFAULT);
/* will get OCI_NO_DATA if <100 found */
if (cbctx->count>0)
{
TPCCErr("Did not get all rows.");
return ERR_DB_ERROR;
}
}
if ((execstatus != OCI_NO_DATA) && (execstatus != OCI_SUCCESS))

```



```

{
errcode=OCIERROR(p,execstatus);
if ((errcode == NOT_SERIALIZABLE) || (errcode == RECOVER)
|| (errcode == SNAPSHOT_TOO_OLD))
{
OCITransCommit(p->tpcsvc,p->errhp,OCI_DEFAULT);
return RECOVER;
} else {
return ERR_DB_ERROR;
}
}
octx->cust_idx=0;
}

octx->middle_cust=octx->c_rowid_ptr[octx->cust_idx];
execstatus = OCISmtExecute(p->tpcsvc,octx->uro1,p->errhp,
1,0,0,OCI_DEFAULT);

if (execstatus != OCI_SUCCESS)
{
errcode = OCIERROR(p,execstatus);
OCITransCommit(p->tpcsvc,p->errhp,OCI_DEFAULT);
if ((errcode == NOT_SERIALIZABLE) || (errcode == RECOVER) ||
(errcode == SNAPSHOT_TOO_OLD))
{
return RECOVER;
} else {
return ERR_DB_ERROR;
}
}
else
{
/* execstatus = OCISmtExecute(p->tpcsvc,octx->uro2,p->errhp,
1,0,0,OCI_DEFAULT); */
execstatus = OCISmtExecute(p->tpcsvc,octx->uro2,p->errhp,
1,0,0,OCI_DEFAULT);

if (execstatus != OCI_SUCCESS)
{
errcode = OCIERROR(p,execstatus);
OCITransCommit(p->tpcsvc,p->errhp,OCI_DEFAULT);
if ((errcode == NOT_SERIALIZABLE) || (errcode == RECOVER)
|| (errcode == SNAPSHOT_TOO_OLD))
{
return RECOVER;
} else {
return ERR_DB_ERROR;
}
}
}

octx->ol_w_id_ind = TRUE;
octx->ol_d_id_ind = TRUE;
octx->ol_o_id_ind = TRUE;
octx->ol_w_id_len = sizeof(int);
octx->ol_d_id_len = sizeof(int);
octx->ol_o_id_len = sizeof(int);

execstatus = OCISmtExecute(p->tpcsvc,octx->uro3,p->errhp,pOrd->o_ol_cnt,
0,0,0,OCI_DEFAULT |

OCI_COMMIT_ON_SUCCESS);
if (execstatus != OCI_SUCCESS)
{
errcode = OCIERROR(p,execstatus);
OCITransCommit(p->tpcsvc,p->errhp,OCI_DEFAULT);
if ((errcode == NOT_SERIALIZABLE) || (errcode == RECOVER)
|| (errcode == SNAPSHOT_TOO_OLD))
{
return RECOVER;
} else {
return ERR_DB_ERROR;
}
}
}

/*
#ifdef NOTMORE
OCIERROR(errhp,
OCITransCommit(tpcsvc,errhp,OCI_DEFAULT));
#endif
*/
}

/* clean up and convert the delivery dates */
for (i = 0; i < pOrd->o_ol_cnt; i++) {
if (octx->ol_delivery_d_ind[i] == -1) /* null date in field */
strcpy(otemp->ol_delivery_date_str[i],"01-01-1811",10);
else
/* cvtdmy(otemp->loc_ol_delivery_date[i], otemp->ol_delivery_date_str[i]); */
{
octx->ol_delivery_d_len[i]=sizeof(otemp->ol_delivery_date_str[i]);
OCIERROR(p, OCIDateToText(p->errhp,&otemp->loc_ol_delivery_date[i],
(text*)"dd-mm-yyyy",strlen("dd-mm-yyyy"),(text*)0,0,
&octx->ol_delivery_d_len[i],(text*)&otemp->ol_delivery_date_str[i]));
}
}

/* convert the order entry date */
/* cvtdmyhms(otemp->entry_date, otemp->entry_date_str); */
OCIERROR(p, OCIDateToText(p->errhp,&otemp->entry_date,
(text*)"dd-mm-yyyy HH24:MI:SS",strlen("dd-mm-yyyy
HH:MI:SS"),(text*)0,0,
&entry_date_str_len,(text*)&otemp->entry_date_str);

return (ERR_DB_SUCCESS);
}

void tkvcodone (ordctx *pordctx)
{
ordctx octx = *pordctx;

if(NULL != octx.curo0)
OCIHandleFree((dvoid *)octx.curo0,OCI_HTYPE_STMT);
if(NULL != octx.curo1)
OCIHandleFree((dvoid *)octx.curo1,OCI_HTYPE_STMT);
if(NULL != octx.curo2)
OCIHandleFree((dvoid *)octx.curo2,OCI_HTYPE_STMT);
if(NULL != octx.curo3)
OCIHandleFree((dvoid *)octx.curo3,OCI_HTYPE_STMT);
if(NULL != octx.curo4)
OCIHandleFree((dvoid *)octx.curo4,OCI_HTYPE_STMT);
}

**** delivery transaction */

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

#define SQLTXT1 "DELETE FROM nord WHERE no_d_id = :d_id \
AND no_w_id=:w_id and rownum <=1 \
RETURNING no_o_id into :o_id "

#define SQLTXT3 "UPDATE ord 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"

#define SQLTXT4 "UPDATE /*+ buffer */ ord 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 "

#define SQLTXT6 "UPDATE cust 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"

sb4 no_data(dvoid *ctxp, OCIBind *bp, ub4 iter, ub4 index,
dvoid **bufpp, ub4 *alenp, ub1 *piecep,
dvoid **indpp)
{
*bufpp = (dvoid*)0;
*alenp = 0;
*indpp = (dvoid*)0;
}

```

```

*piecep =OCI_ONE_PIECE;
return (OCI_CONTINUE);
}

```

```

sb4 TPC_oid_data(dvoid *ctxp, OCIBind *bp, ub4 iter, ub4 index,
dvoid **bufpp, ub4 **alenp, ub1 *piecep,
dvoid **indpp, ub2 **rcodepp)

```

```

{
delctx *dctx;
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;
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);
}

```

```

void shiftdata(from,dctx)

```

```

int from;
delctx *dctx;
{
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];
}
} /* end shiftdata */

```

```

tkvodinit (DeliveryData *pDel,
OraContext *p)

```

```

{

```

```

delctx *dctx = &(p->dctx);
amtctx *actx = &(p->actx);
text stmbuf[8192];
memset(dctx,(char)0,sizeof(delctx));
memset(actx,(char)0,sizeof(amtctx));

```

```

dctx->norow = 0;
dctx->curd1 = NULL;
dctx->curd2 = NULL;
dctx->curd3 = NULL;
dctx->curd4 = NULL;
dctx->curd5 = NULL;
dctx->curd6 = NULL;

```

```

#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, p->errhp, stmbuf, strlen((char
*)stmbuf),OCI_NTV_SYNTAX, OCI_DEFAULT);

```

```

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

```

```

/* open first cursor */

```

```

OCIHandleAlloc(p->tpcenv, (dvoid **)&dctx->curd1, OCI_HTYPE_STMT,
0, (dvoid**0));
sprintf ((char *) stmbuf, SQLTXT1);
OCIStmtPrepare(dctx->curd1, p->errhp, stmbuf, strlen((char *)stmbuf),
OCI_NTV_SYNTAX, OCI_DEFAULT);

```

```

/* bind variables */

```

```

OCIBND(dctx->curd1, dctx->w_id_bp,p,"w_id",dctx->w_id,SIZ(int),
SQLT_INT);
OCIBNDRA(dctx->curd1, dctx->d_id_bp,p,"d_id",dctx->d_id,SIZ(int),
SQLT_INT,NULL,NULL,NULL);
OCIBNDRAD(dctx->curd1, dctx->del_o_id_bp,p,"o_id",SIZ(int),
SQLT_INT,NULL,dctx,no_data,TPC_oid_data);

```

```

/* open third cursor */

```

```

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

```

```

/* bind variables */

```

```

OCIBNDRA(dctx->curd3, dctx->carrier_id_bp,p,"carrier_id",dctx->carrier_id,
SIZ(int),SQLT_INT,dctx->carrier_id_ind,
dctx->carrier_id_len,dctx->carrier_id_rcode);
OCIBNDRA(dctx->curd3, dctx->w_id_bp3,p,"w_id",dctx->w_id,
SIZ(int),SQLT_INT,NULL,NULL,NULL);
OCIBNDRA(dctx->curd3, dctx->d_id_bp3,p,"d_id",dctx->d_id,
SIZ(int),SQLT_INT,NULL,NULL,NULL);
OCIBNDRA(dctx->curd3, dctx->del_o_id_bp3,p,"o_id",dctx->del_o_id,
SIZ(int),SQLT_INT,NULL,NULL,NULL);
OCIBNDRAD(dctx->curd3, dctx->c_id_bp3,p,"o_c_id",SIZ(int),
SQLT_INT,NULL,dctx,no_data,cid_data);

```

```

/* open fourth cursor */

```

```

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

```

```

/* bind variables */
OCIBND(dctx->curd4, dctx->w_id_bp4,p,":w_id",dctx->w_id,SIZ(dctx->w_id[0]),
      SFLT_INT);
OCIBND(dctx->curd4, dctx->d_id_bp4,p,":d_id",dctx->d_id,SIZ(dctx->d_id[0]),
      SFLT_INT);
OCIBND(dctx->curd4, dctx->o_id_bp,p,":o_id",dctx->del_o_id,SIZ(int),
      SFLT_INT);
OCIBND(dctx->curd4, dctx->cr_date_bp,p,":cr_date",dctx->del_date,
      SIZ(OCIDate), SFLT_ODT);

OCIBNDRAD(dctx->curd4, dctx->olamt_bp,p,":ol_amount",SIZ(int),
      SFLT_INT,NULL,actx,no_data,amt_data);

/* open sixth cursor */
OCIHandleAlloc(p->tpcenv, (dvoid **)&dctx->curd6, OCI_HTYPE_STMT, 0,
      (dvoid**)0);
sprintf((char *) stmbuf, SFLT_INT);
OCIStmtPrepare(dctx->curd6, p->errhp, stmbuf, strlen((char *)stmbuf),
      OCI_NTV_SYNTAX, OCI_DEFAULT);

/* bind variables */
OCIBND(dctx->curd6, dctx->amt_bp,p,":amt",dctx->amt,SIZ(int),
      SFLT_INT);
OCIBND(dctx->curd6, dctx->w_id_bp6,p,":w_id",dctx->w_id,SIZ(int),
      SFLT_INT);
OCIBND(dctx->curd6, dctx->d_id_bp6,p,":d_id",dctx->d_id,SIZ(int),
      SFLT_INT);
OCIBND(dctx->curd6, dctx->c_id_bp,p,":c_id",dctx->c_id,SIZ(int),
      SFLT_INT);

return (ERR_DB_SUCCESS);
}

tkvcd (DeliveryData *pDel, OraContext *p)
{
  delctx *dctx = &(p->dctx);
  amtctx *actx = &(p->actx);
  deltemp *dtemp = &(p->tempvars.del);
  int i, j;
  int rpc,rcount,count;
  int invalid;
  unsigned char localcr_date[7];
  OCIError *datecvterrhp = p->datecvterrhp;
  int execstatus;
  int errcode;
  int proc_no = 0;

  invalid = 0;

  vgetdate(localcr_date);
  cvtdmyhms(localcr_date,dtemp->cvtr_date);
  OCIDateFromText(datecvterrhp,(text *)dtemp->cvtr_date,strlen(dtemp-
  >cvtr_date),(text *)"DD-MM-YYYY HH24:MI:SS",21,(text *) 0, 0,&dtemp-
  >cr_date);

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

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

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

  #if defined(ISO) || defined(ISO5) || defined(ISO6) || defined(ISO8)

```

```

iso:
#endif

/* 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] = pDel->w_id;
  dctx->d_id[i] = i+1;
  dctx->carrier_id[i] = pDel->o_carrier_id;
  memcpy(&dctx->del_date[i],&dtemp->cr_date,sizeof(OCIDate));

  actx->ol_cnt[i]=0;
}

/* array select from new_order and orders tables */
execstatus=OCIStmtExecute(p->tpcsvc,dctx->curd1,p->errhp,NDISTS,0,0,0,
      OCI_DEFAULT);
if((execstatus != OCI_SUCCESS) && (execstatus != OCI_NO_DATA))
{
  OCITransRollback(p->tpcsvc,p->errhp,OCI_DEFAULT);
  errcode = OCIERROR(p,execstatus);
  if(errcode == NOT_SERIALIZABLE)
  {
    return(RECOVER);
  }
  else if (errcode == RECOVER)
  {
    return(RECOVER);
  }
  else if (errcode == SNAPSHOT_TOO_OLD)
  {
    return(RECOVER);
  }
  else
  {
    return (ERR_DB_ERROR);
  }
}

/* mark districts with no new order */
OCIAttrGet(dctx-
>curd1,OCI_HTYPE_STMT,&rcount,0,OCI_ATTR_ROW_COUNT,p->errhp);
rpc = rcount;

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(j,dctx);
  }
}

```

```

    }
}

#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;
}
} /* end if (invalid) */
#endif

execstatus=OCISmtExecute(p->tpcsvc,dctx->curd3,p->errhp,rc,0,0,0,
OCI_DEFAULT);

if(execstatus != OCI_SUCCESS)
{
OCITransRollback(p->tpcsvc,p->errhp,OCI_DEFAULT);
errcode = OCIERROR(p,execstatus);
if(errcode == NOT_SERIALIZABLE)
{
return(RECOVERR);
}
else if (errcode == RECOVERR)
{
return (RECOVERR);
}
else if (errcode == SNAPSHOT_TOO_OLD)
{
return (RECOVERR);
}
else
{
return (ERR_DB_ERROR);
}
}

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

if (rcount != rpc)
{
TPCCErr( "Error in TPC-C server %d: %d rows selected, %d ords updated\n",
proc_no, rc, rcount);
OCITransRollback(p->tpcsvc,p->errhp,OCI_DEFAULT);
return (ERR_DB_ERROR);
}

/* array update of order_line table */
execstatus=OCISmtExecute(p->tpcsvc,dctx->curd4,p->errhp,rc,0,0,0,
OCI_DEFAULT);

if(execstatus != OCI_SUCCESS)
{
OCITransRollback(p->tpcsvc,p->errhp,OCI_DEFAULT);
errcode = OCIERROR(p,execstatus);
if(errcode == NOT_SERIALIZABLE)
{
return(RECOVERR);
}
}

```

```

}
else if (errcode == RECOVERR)
{
return(RECOVERR);
}
else if (errcode == SNAPSHOT_TOO_OLD)
{
return(RECOVERR);
}
else
{
return (ERR_DB_ERROR);
}
}

OCIAttrGet(dctx-
>curd4,OCI_HTYPE_STMT,&rcount,NULL,OCI_ATTR_ROW_COUNT,p->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)
{
TPCCErr( "Error in TPC-C server %d: %d ordns updated, %d ordl updated\n",
proc_no, rc, rcount);
}

#if defined(ISO5) || defined(ISO6)
printf 9"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=OCISmtExecute(p->tpcsvc,dctx->curd6,p->errhp,rc,0,0,0,
OCI_DEFAULT);
#else
execstatus=OCISmtExecute(p->tpcsvc,dctx->curd6,p->errhp,rc,0,0,0,
OCI_COMMIT_ON_SUCCESS | OCI_DEFAULT);
#endif

if(execstatus != OCI_SUCCESS)
{
OCITransRollback(p->tpcsvc,p->errhp,OCI_DEFAULT);
errcode = OCIERROR(p,execstatus);
if(errcode == NOT_SERIALIZABLE)
{
return (RECOVERR);
}
}
else if (errcode == RECOVERR)
{
return (RECOVERR);
}
else if (errcode == SNAPSHOT_TOO_OLD)
{
return (RECOVERR);
}
else
{
return (ERR_DB_ERROR);
}
}

OCIAttrGet(dctx-
>curd6,OCI_HTYPE_STMT,&rcount,0,OCI_ATTR_ROW_COUNT,p->errhp);

```

```

if (rcount != rpc) {
    TPCCERR ("Error in TPC-C server %d: %d rows selected, %d cust updated\n",
        proc_no, rpc, rcount);
    OCITransRollback(p->tpcsvc, p->errhp, OCI_DEFAULT);
    return (ERR_DB_ERROR);
}

#ifdef ISO5 || defined(ISO6)
    sysdate;
#endif

#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 is rolling back.\n");
    OCITransRollback(p->tpcsvc, p->errhp, OCI_DEFAULT);
#endif

#ifdef ISO5
    OCITransCommit(p->tpcsvc, p->errhp, OCI_DEFAULT);
#endif

#ifdef 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++)
    pDel->o_id[i] = 0;
for (i = 0; i < rpc; i++)
    pDel->o_id[dctx->d_id[i] - 1] = dctx->de_o_id[i];

return (ERR_DB_SUCCESS);
}

void tkvcdone (delctx *pdctx)
{
    delctx dctx = *pdctx;

#ifdef ISO || defined(ISO5) || defined(ISO6) || defined(ISO8)
    OCIHandleFree((dvoid *)dctx->curd0, OCI_HTYPE_STMT);
#endif

if(NULL != dctx.curd1)
    OCIHandleFree((dvoid *)dctx.curd1, OCI_HTYPE_STMT);
if(NULL != dctx.curd2)
    OCIHandleFree((dvoid *)dctx.curd2, OCI_HTYPE_STMT);
if(NULL != dctx.curd3)
    OCIHandleFree((dvoid *)dctx.curd3, OCI_HTYPE_STMT);
if(NULL != dctx.curd4)
    OCIHandleFree((dvoid *)dctx.curd4, OCI_HTYPE_STMT);
if(NULL != dctx.curd5)
    OCIHandleFree((dvoid *)dctx.curd5, OCI_HTYPE_STMT);
if(NULL != dctx.curd6)
    OCIHandleFree((dvoid *)dctx.curd6, OCI_HTYPE_STMT);
}

/*
-----
NEW ORDER TRANSACTION
-----
*/

#define NOSQLTXT2 "BEGIN initnew.new_init(:idx1arr); END;"

```

```

int tkvcninit (NewOrderData *pNew,
    OraContext *p)
{
    newctx *nctx = &(p->nctx);
    newtemp *ntemp = &(p->tempvars.new);
    int i;
    int execstatus;
    int errcode;
    text stmbuf[16384];

    memset(nctx, (char)0, sizeof(newctx));
    nctx->cs = 1;
    nctx->norow = 0;
    nctx->cur1 = NULL;
    nctx->cur2 = NULL;
    for (i = 0; i < 100; i++)
        (nctx->cur3)[i] = NULL;
    nctx->cur4 = NULL;

    for(i=0; i<NITEMS; i++) {
        OCIERROR(p, OCIDescriptorAlloc(p->tpcnv,
            (dvoid**)&nctx->s_rowid_ptr[i],
            OCI_DTYPE_ROWID, 0, (dvoid**)0));
    }
    nctx->w_id_ind = TRUE;
    nctx->w_id_len = sizeof(pNew->w_id);
    nctx->d_id_ind = TRUE;
    nctx->d_id_len = sizeof(pNew->d_id);
    nctx->c_id_ind = TRUE;
    nctx->c_id_len = sizeof(pNew->c_id);
    nctx->o_all_local_ind = TRUE;
    nctx->o_all_local_len = sizeof(pNew->o_all_local);
    nctx->o_o_cnt_ind = TRUE;
    nctx->o_o_cnt_len = sizeof(pNew->o_o_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(pNew->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(ntemp->n_retry);
    nctx->cr_date_ind = TRUE;
    nctx->cr_date_len = sizeof(ntemp->cr_date);

    /* open first cursor */
    OCIERROR(p, OCIHandleAlloc(p->tpcnv, (dvoid **)&nctx->cur1,
        OCI_HTYPE_STMT, 0,
        (dvoid**)0));
    OCIERROR(p, OCIStmtPrepare(nctx->cur1, p->errhp, stmbuf_tkvcpnew,
        strlen((char *)stmbuf_tkvcpnew),
        OCI_DEFAULT));

    /* bind variables */

    OCIBNDR(nctx->cur1, nctx->w_id_bp, p, ":w_id", ADR(pNew->w_id),
        SIZ(pNew->w_id),
        SQLT_INT, &nctx->w_id_ind, &nctx->w_id_len, &nctx->w_id_rc);
    OCIBNDR(nctx->cur1, nctx->d_id_bp, p, ":d_id", ADR(pNew->d_id),
        SIZ(pNew->d_id),
        SQLT_INT, &nctx->d_id_ind, &nctx->d_id_len, &nctx->d_id_rc);
    OCIBNDR(nctx->cur1, nctx->c_id_bp, p, ":c_id", ADR(pNew->c_id),
        SIZ(pNew->c_id),
        SQLT_INT, &nctx->c_id_ind, &nctx->c_id_len, &nctx->c_id_rc);
    OCIBNDR(nctx->cur1, nctx->o_all_local_bp, p, ":o_all_local",
        ADR(pNew->o_all_local), SIZ(pNew->o_all_local), SQLT_INT,
        &nctx->o_all_local_ind,
        &nctx->o_all_local_len, &nctx->o_all_local_rc);
    OCIBNDR(nctx->cur1, nctx->o_o_cnt_bp, p, ":o_o_cnt",

```

```

ADR(pNew->o_ol_cnt), SIZ(pNew->o_ol_cnt), SOLT_INT,
&nctx->o_ol_cnt_ind, &nctx->o_ol_cnt_len, &nctx->o_ol_cnt_rc);

OCIBNDR(nctx->curr1, nctx->w_tax_bp, p, "w_tax", ADR(ntemp->w_tax),
SIZ(ntemp->w_tax),
SQLT_FLT, &nctx->w_tax_ind, &nctx->w_tax_len, &nctx->w_tax_rc);
OCIBNDR(nctx->curr1, nctx->d_tax_bp, p, "d_tax", ADR(ntemp->d_tax),
SIZ(ntemp->d_tax),
SQLT_FLT, &nctx->d_tax_ind, &nctx->d_tax_len, &nctx->d_tax_rc);
OCIBNDR(nctx->curr1, nctx->o_id_bp, p, "o_id", ADR(pNew->o_id),
SIZ(pNew->o_id),
SQLT_INT, &nctx->o_id_ind, &nctx->o_id_len, &nctx->o_id_rc);
OCIBNDR(nctx->curr1, nctx->c_discount_bp, p, "c_discount",
ADR(ntemp->c_discount), SIZ(ntemp->c_discount), SOLT_FLT,
&nctx->c_discount_ind, &nctx->c_discount_len, &nctx-
>c_discount_rc);
OCIBNDR(nctx->curr1, nctx->c_credit_bp, p, "c_credit", pNew->c_credit,
SIZ(pNew->c_credit), SOLT_CHR,
&nctx->c_credit_ind, &nctx->c_credit_len, &nctx->c_credit_rc);
OCIBNDR(nctx->curr1, nctx->c_last_bp, p, "c_last", pNew->c_last,
SIZ(pNew->c_last),
SQLT_STR, &nctx->c_last_ind, &nctx->c_last_len, &nctx->c_last_rc);
OCIBNDR(nctx->curr1, nctx->retries_bp, p, "retry", ADR(ntemp->n_retry),
SIZ(ntemp->n_retry), SOLT_INT,
&nctx->retries_ind, &nctx->retries_len, &nctx->retries_rc);
OCIBNDR(nctx->curr1, nctx->cr_date_bp, p, "cr_date", ADR(ntemp->cr_date),
SIZ(ntemp->cr_date), SOLT_ODT,
&nctx->cr_date_ind, &nctx->cr_date_len, &nctx->cr_date_rc);

OCIBNDRAA(nctx->curr1, nctx->ol_i_id_bp, p, "ol_i_id", ntemp->no_l_i_id,
SIZ(int), SOLT_INT, nctx->no_l_i_id_ind, nctx->no_l_i_id_len,
nctx->no_l_i_id_rcode, NITEMS, &nctx->no_l_i_count);

OCIBNDRAA(nctx->curr1, nctx->ol_supply_w_id_bp, p, "ol_supply_w_id",
ntemp->no_l_supply_w_id, SIZ(int), SOLT_INT,
nctx->no_l_supply_w_id_ind, nctx->no_l_supply_w_id_len,
nctx->no_l_supply_w_id_rcode, NITEMS, &nctx->no_l_s_count);

OCIBNDRAA(nctx->curr1, nctx->ol_quantity_bp, p, "ol_quantity",
ntemp->no_l_quantity, SIZ(int), SOLT_INT, nctx->no_l_quantity_ind,
nctx->no_l_quantity_len, nctx->no_l_quantity_rcode, NITEMS,
&nctx->no_l_q_count);

OCIBNDRAA(nctx->curr1, nctx->i_price_bp, p, "i_price",
ntemp->i_price, SIZ(int), SOLT_INT, nctx->i_price_ind,
nctx->i_price_len, nctx->i_price_rcode, NITEMS,
&nctx->no_l_item_count);

OCIBNDRAA(nctx->curr1, nctx->i_name_bp, p, "i_name",
ntemp->i_name, SIZ(pNew->o_ol[0].i_name), SOLT_STR,
nctx->i_name_ind,
nctx->i_name_len, nctx->i_name_rcode, NITEMS,
&nctx->no_l_name_count);

OCIBNDRAA(nctx->curr1, nctx->s_quantity_bp, p, "s_quantity",
ntemp->s_quantity, SIZ(int), SOLT_INT, nctx->s_quant_ind,
nctx->s_quant_len, nctx->s_quant_rcode, NITEMS,
&nctx->no_l_qty_count);

OCIBNDRAA(nctx->curr1, nctx->s_bg_bp, p, "brand_generic",
ntemp->brand_generic, SIZ(char), SOLT_CHR, nctx->s_bg_ind,
nctx->s_bg_len, nctx->s_bg_rcode, NITEMS,
&nctx->no_l_bg_count);

OCIBNDRAA(nctx->curr1, nctx->ol_amount_bp, p, "ol_amount",
ntemp->no_l_amount, SIZ(int), SOLT_INT, nctx->no_l_amount_ind,
nctx->no_l_amount_len, nctx->no_l_amount_rcode, NITEMS,
&nctx->no_l_am_count);

OCIBNDRAA(nctx->curr1, nctx->s_remote_bp, p, "s_remote",
nctx->s_remote, SIZ(int), SOLT_INT, nctx->s_remote_ind,
nctx->s_remote_len, nctx->s_remote_rcode, NITEMS,
&nctx->s_remote_count);

/* open second cursor */
OCIERROR(p, OCIHandleAlloc(p->tpcenv, (dvoid **)&nctx->curr2),

```

```

OCI_HTYPE_STMT, 0,
(dvoid**0));
sprintf((char *) stmbuf, NOSQLTXT2);
OCIERROR(p, OCIStmtPrepare(nctx->curr2, p->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;
pNew->o_ol_cnt=NITEMS;

/* Bind array */
OCIBNDRAA(nctx->curr2, idx1arr_bp, p, "idx1arr", idx1arr, SIZ(int), SOLT_INT,
idx1arr_ind, idx1arr_len, idx1arr_rcode, NITEMS, &idx1arr_count);

execstatus = OCISmtExecute(p->tpcsvc, nctx->curr2, p->errhp, 1, 0, 0, 0,
OCI_DEFAULT);

if (execstatus != OCI_SUCCESS)
{
OCITransRollback(p->tpcsvc, p->errhp, OCI_DEFAULT);
errcode = OCIERROR(p, execstatus);
return ERR_DB_ERROR;
}

return (ERR_DB_SUCCESS);
}

int tkvcn (NewOrderData *pNew, OraContext *p)
{
int statusCnt;
int execstatus;
int errcode;
newctx *nctx = &(p->nctx);
newtemp *ntemp = &(p->tempvars.new);

int proc_no = 0;
int retries = 0;
int i;
int rcount;

statusCnt = 0; /* number of invalid items */

/* get number of order lines, and check if all are local */
/* this section of code is needed for cprime, but we have
already calculated the number of order lines back in web_ui
no need to recalculate. */
/* pNew->o_ol_cnt = NITEMS;
pNew->o_all_local = 1;
for (i = 0; i < NITEMS; i++) {
if (ntemp->no_l_i_id[i] == 0) {
pNew->o_ol_cnt = i;
break;
}
}
*/

for (i = 0; i < pNew->o_ol_cnt; i++) {
if (ntemp->no_l_supply_w_id[i] != pNew->w_id) {
nctx->s_remote[i] = 1;
pNew->o_all_local = 0;

```

```

}
else
  nctx->s_remote[i] = 0;
}

nctx->w_id_ind = TRUE;
nctx->w_id_len = sizeof(pNew->w_id);
nctx->d_id_ind = TRUE;
nctx->d_id_len = sizeof(pNew->d_id);
nctx->c_id_ind = TRUE;
nctx->c_id_len = sizeof(pNew->c_id);
nctx->o_all_local_ind = TRUE;
nctx->o_all_local_len = sizeof(pNew->o_all_local);
nctx->o_ol_cnt_ind = TRUE;
nctx->o_ol_cnt_len = sizeof(pNew->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(pNew->o_id);
nctx->c_discount_ind = TRUE;
nctx->c_discount_len = 0;
nctx->c_credit_ind = TRUE;
nctx->c_credit_len = 0;
nctx->c_last_ind = TRUE;
nctx->c_last_len = 0;
nctx->retries_ind = TRUE;
nctx->retries_len = sizeof(retries);
nctx->cr_date_ind = TRUE;
nctx->cr_date_len = sizeof(ntemp->cr_date);

```

```

/* this is the row count */
rcount = pNew->o_ol_cnt;
nctx->nol_i_count = pNew->o_ol_cnt;
nctx->nol_q_count = pNew->o_ol_cnt;
nctx->nol_s_count = pNew->o_ol_cnt;
nctx->s_remote_count = pNew->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 = pNew->o_ol_cnt;
nctx->i_data_count = pNew->o_ol_cnt;

```

```

/* initialization for array operations */
for (i = 0; i < pNew->o_ol_cnt; i++) {
  nctx->ol_w_id[i] = pNew->w_id;
  nctx->ol_d_id[i] = pNew->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 = pNew->o_ol_cnt; i < NITEMS; i++) {
  nctx->nol_i_id_ind[i] = NA;
  nctx->nol_supply_w_id_ind[i] = NA;
  nctx->nol_quantity_ind[i] = NA;
  nctx->nol_amount_ind[i] = NA;
  nctx->ol_w_id_ind[i] = NA;
  nctx->ol_d_id_ind[i] = NA;
  nctx->ol_o_id_ind[i] = NA;
  nctx->ol_number_ind[i] = NA;
  nctx->ol_dist_info_ind[i] = NA;
  nctx->>null_date_ind[i] = NA;
  nctx->s_remote_ind[i] = NA;
  nctx->s_data_ind[i] = NA;
  nctx->i_data_ind[i] = NA;
  nctx->s_quant_ind[i] = NA;
  nctx->s_bg_ind[i] = NA;
  nctx->cons_ind[i] = NA;
  nctx->s_rowid_ind[i] = NA;

```

```

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

```

```

execstatus = OCIStmtExecute(p->tpscvc,nctx->cum1,p->errhp,1,0,0,0,
  OCI_DEFAULT |
  OCI_COMMIT_ON_SUCCESS);

```

```

if(execstatus != OCI_SUCCESS) {
  OCITransRollback(p->tpscvc,p->errhp,OCI_DEFAULT);
  errcode = OCIERROR(p,execstatus);
  if(errcode == NOT_SERIALIZABLE)
  {
    retries++;
    return (RECOVERR);
  }
  else if (errcode == RECOVERR)
  {
    retries++;
    return (RECOVERR);
  }
  else if (errcode == SNAPSHOT_TOO_OLD)
  {
    retries++;
    return (RECOVERR);
  }
  else
  {
    return (ERR_DB_ERROR);
  }
}

```

```

/* did the txn succeed? */

```

```

if (rcount != pNew->o_ol_cnt)
{
statusCnt = rcount - pNew->o_ol_cnt;
pNew->o_ol_cnt = rcount;
return (ERR_DB_NOT_COMMITED);
}

#ifdef ISO1
else {
OCITransCommit(p->tpcsvc, p->errhp, OCI_DEFAULT);
}
#endif

#ifdef defined(ISO1) || defined(ISO7)
sysdate (sdate);
printf ("New Order completed at: %s\n", sdate);
#endif

/* calculate total amount */
pNew->total_amount = 0.0;
for (i=0;i<pNew->o_ol_cnt;i++)
{
if (nctx->no_l_amount_ind[i] != NA)
{
pNew->total_amount += ntemp->no_l_amount[i];
}
}
pNew->total_amount *= ((float)(1-ntemp->c_discount)) * (float)(1.0 +
((float)(ntemp->d_tax))+((float)(ntemp->w_tax)));
pNew->total_amount = pNew->total_amount/100;

return (ERR_DB_SUCCESS);
}

```

```
void tkvdone (newctx *pnctx)
```

```

{
int i;
newctx nctx = *pnctx;

if(NULL != nctx.curn1)
OCIHandleFree((dvoid *)nctx.curn1,OCI_HTYPE_STMT);
if(NULL != nctx.curn2)
OCIHandleFree((dvoid *)nctx.curn2,OCI_HTYPE_STMT);
for (i = 0; i < 10; i++)
if(NULL != ((nctx.curn3)[i]))
OCIHandleFree((dvoid *)nctx.curn3[i],OCI_HTYPE_STMT);
if(NULL != nctx.curn4)
OCIHandleFree((dvoid *)nctx.curn4,OCI_HTYPE_STMT);
}

```

tpcc.c

```

/*+
FILE: TPCC.C
Microsoft TPC-C Kit Ver. 3.00.000
Audited 08/23/96 By Francois Raab

Copyright Microsoft, 1996
Copyright Digital Equipment Corp., 1997

PURPOSE: Main module for TPCC.DLL which is an ISAPI service dll.
Author: Philip Durr
philipdu@Microsoft.com

MODIFICATIONS:

Routines substantially modified by:

```

```

* Anne Bradley Digital Equipment
Corp.
* Bill Carr Digital Equipment Corp.
*/
/*_*****
*****
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*
*
*****_*/

```

```

#include <windows.h>
#include <stdio.h>
#include <stdarg.h>
#include <malloc.h>
#include <stdlib.h>
#include <string.h>
#include <time.h>
#include <sys/timeb.h>
#include <io.h>

#define TPCC_C

#include <tpccerr.h>
#include <tpccstruct.h>
#include <tpccapi.h>
#include <httpext.h>

#include <tpcc.h>
#include <web_ui.h>

```

```

/* FUNCTION: void FormatString(char *szDest, char *szPic, char *szSrc)
*
* PURPOSE: This function formats a character string for inclusion in the
HTML formatted page being constructed.
*
* ARGUMENTS: char *szDest
Destination buffer where
formatted
string is to be
*
char *szPic
placed
picture
string which describes
*
character value is to be
*
formatted.
*
char *szSrc
character
string value.

```



```

*
* RETURNS:      None
*
* COMMENTS:    This functions is used to format TPC-C phone and zip value
*              strings.
*
*/

```

```
void FormatString(char *szDest, char *szPic, char *szSrc)
```

```

{
  while( *szPic )
  {
    if ( *szPic == 'X' )
    {
      if ( *szSrc )
        *szDest++ = *szSrc++;
      else
        *szDest++ = ' ';
    }
    else
      *szDest++ = *szPic;
    szPic++;
  }
  *szDest = 0;

  return;
}

```

```

/* FUNCTION: int ParseNewOrderQuery( char *pProcessedQuery[],
*                                   NewOrderData
*                                   *pNewOrderData )
*
* PURPOSE:      This function extracts and validates the new order query
*               from an http command string.
*
* ARGUMENTS:   char      *pProcessedQuery[]  array of char* that
*               points to                               the value
*               of each name-value                               pair.
*               NewOrderData *pNewOrderData  pointer to new order
*               data                               structure
*
* RETURNS:     int      ERR_SUCCESS          input data
*               successfully parsed
*               error_code                  reason for failure
*
* COMMENTS:    None
*
*/

```

```
int ParseNewOrderQuery(char *pQueryString, NewOrderData *pNewOrderData)
```

```

{
  char *ptr;
  int i;
  short items;
  char *pProcessedQuery[MAXNEWORDERVALS];

```

```

  PARSE_QUERY_STRING(pQueryString, MAXNEWORDERVALS,
                    newOrderStrs, pProcessedQuery);

```

```

  if ( !GetValuePtr(pProcessedQuery, DID, &ptr) )
    return ERR_NEWORDER_FORM_MISSING_DID;

```

```

  GetNumeric(ptr, &pNewOrderData->d_id);
  if(0 == pNewOrderData->d_id)
    return ERR_NEWORDER_DISTRICT_INVALID;

```

```

  if ( !GetValuePtr(pProcessedQuery, CID, &ptr) )
    return ERR_NEWORDER_CUSTOMER_KEY;

```

```

  if( !GetNumeric(ptr, &pNewOrderData->c_id) )
    return ERR_NEWORDER_CUSTOMER_INVALID;

```

```
pNewOrderData->o_all_local = 1;
```

```
for(i=0, items=0; i<MAX_OL; i++)
```

```

{
  if( !GetValuePtr(pProcessedQuery, i*3+IID00, &ptr) )
    return ERR_NEWORDER_MISSING_IID_KEY;
  if(*ptr != '&' && *ptr)
  {
    if(!GetNumeric(ptr, &pNewOrderData->o_ol[items].ol_i_id) )
      return ERR_NEWORDER_ITEMID_INVALID;

    if(!GetValuePtr(pProcessedQuery, i*3+SP00, &ptr) )
      return ERR_NEWORDER_MISSING_SUPPW_KEY;
    if(!GetNumeric(ptr, &pNewOrderData->o_ol[items].ol_supply_w_id) )
      return ERR_NEWORDER_SUPPW_INVALID;
    if ( pNewOrderData->o_all_local &&
        pNewOrderData->o_ol[items].ol_supply_w_id !=
        pNewOrderData->w_id )
      pNewOrderData->o_all_local = 0;
    if(!GetValuePtr(pProcessedQuery, i*3+QTY00, &ptr) )
      return ERR_NEWORDER_MISSING_QTY_KEY;
    if(!GetNumeric(ptr, &pNewOrderData->o_ol[items].ol_quantity) )
      return ERR_NEWORDER_QTY_INVALID;
    if ( pNewOrderData->o_ol[items].ol_i_id >= 1000000 ||
        pNewOrderData->o_ol[items].ol_i_id < 1 )
      return ERR_NEWORDER_ITEMID_RANGE;
    if ( pNewOrderData->o_ol[items].ol_quantity >= 100 ||
        pNewOrderData->o_ol[items].ol_quantity < 1 )
      return ERR_NEWORDER_QTY_RANGE;

    items++;
  }
  else
  {
    if(!GetValuePtr(pProcessedQuery, i*3+SP00, &ptr) )
      return ERR_NEWORDER_MISSING_SUPPW_KEY;
    if(*ptr != '&' && *ptr)
      return ERR_NEWORDER_SUPPW_WITHOUT_ITEMID;

    if(!GetValuePtr(pProcessedQuery, i*3+QTY00, &ptr) )
      return ERR_NEWORDER_MISSING_QTY_KEY;
    if(*ptr != '&' && *ptr)
      return ERR_NEWORDER_QTY_WITHOUT_ITEMID;
  }
}
if ( items == 0 )
  return ERR_NEWORDER_NOITEMS_ENTERED;

pNewOrderData->o_ol_cnt = items;

return ERR_SUCCESS;
}

```

```

/* FUNCTION: int ParseOrderStatusQuery( char *pProcessedQuery[],
*                                       OrderStatusData
*                                       *pOrderStatusData )
*
* PURPOSE:      This function extracts and validates the order status query
*               from an http command string.
*
* ARGUMENTS:   char      *pProcessedQuery[]  array of char* that
*               points to                               the value
*               of each name-value                               pair.
*               OrderStatusData *pOrderStatusData pointer to new order
*               data                               structure
*
* RETURNS:     int      ERR_SUCCESS          input data
*               successfully parsed
*               error_code                  reason for failure
*
* COMMENTS:    None
*
*/

```

```

int ParseOrderStatusQuery(char *pQueryString,
                          OrderStatusData *pOrderStatusData)
{
  char szTmp[26];
  char *ptr;
  char *pSzTmp;
  char *pProcessedQuery[MAXORDERSTATUSVALS];

```

```

PARSE_QUERY_STRING(pQueryString, MAXORDERSTATUSVALS,
                    orderStatusStrs, pProcessedQuery);

if ( !GetValuePtr(pProcessedQuery, DID, &ptr) )
    return ERR_ORDERSTATUS_MISSING_DID_KEY;
if ( !GetNumeric(ptr, &pOrderStatusData->d_id) )
    return ERR_ORDERSTATUS_DID_INVALID;

if ( !GetValuePtr(pProcessedQuery, CID, &ptr) )
    return ERR_ORDERSTATUS_MISSING_CID_KEY;

if ( *ptr == '&' || !(*ptr) )
{
    pSzTmp = szTmp;
    pOrderStatusData->c_id = INVALID_C_ID;
    if ( !GetValuePtr(pProcessedQuery, CLT_O, &ptr) )
        return ERR_ORDERSTATUS_MISSING_CLT_KEY;
    while(*ptr != '&' && *ptr)
    {
        *pSzTmp = *ptr;
        pSzTmp++;
        ptr++;
    }
    *pSzTmp = '\0';
    _strupr( szTmp );
    strcpy(pOrderStatusData->c_last, szTmp);
    if ( strlen(pOrderStatusData->c_last) > 16 )
        return ERR_ORDERSTATUS_CLT_RANGE;
}
else
{
    if ( !GetNumeric(ptr, &pOrderStatusData->c_id) )
        return ERR_ORDERSTATUS_CID_INVALID;
    if ( !GetValuePtr(pProcessedQuery, CLT_O, &ptr) )
        return ERR_ORDERSTATUS_MISSING_CLT_KEY;
    if ( *ptr != '&' && *ptr )
        return ERR_ORDERSTATUS_CID_AND_CLT;
}

return ERR_SUCCESS;
}

/* FUNCTION: int ParsePaymentQuery( char *pProcessedQuery[],
*                                     PaymentData *pPaymentData )
*
* PURPOSE:          This function extracts and validates the payment query
*                   from an http command string.
*
* ARGUMENTS:       char      *pProcessedQuery[]    array of char* that
*                   points to                                     the value
*                   of each name-value                               pair.
*                   PaymentData *pPaymentData     pointer to payment
*                   data                                           structure
*
* RETURNS:         int      ERR_SUCCESS           input data
*                   successfully parsed
*                   error_code                   reason for failure
*
* COMMENTS:       None
*
*/

int ParsePaymentQuery(char *pQueryString, PaymentData *pPaymentData)
{
    char    szTmp[26];
    char    *ptr;
    char    *pPtr;
    char    *pSzTmp;
    char    *pProcessedQuery[MAXPAYMENTVALS];

    PARSE_QUERY_STRING(pQueryString, MAXPAYMENTVALS,
                       paymentStrs, pProcessedQuery);

    if ( !GetValuePtr(pProcessedQuery, DID, &ptr) )

```

```

        return ERR_PAYMENT_MISSING_DID_KEY;
    if ( !GetNumeric(ptr, &pPaymentData->d_id) )
        return ERR_PAYMENT_DISTRICT_INVALID;

    if ( !GetValuePtr(pProcessedQuery, CID, &ptr) )
        return ERR_PAYMENT_MISSING_CID_KEY;

    if(*ptr == '&' || !(*ptr))
    {
        pPaymentData->c_id = INVALID_C_ID;
        pSzTmp = szTmp;
        if ( !GetValuePtr(pProcessedQuery, CLT_P, &ptr) )
            return ERR_PAYMENT_MISSING_CLT;
        if (*ptr == '&' || !(*ptr))
            return ERR_PAYMENT_MISSING_CID_CLT;
        while(*ptr != '&' && *ptr)
        {
            *pSzTmp = *ptr;
            pSzTmp++;
            ptr++;
        }
        *pSzTmp = '\0';
        _strupr( szTmp );

        strcpy(pPaymentData->c_last, szTmp);
        if ( strlen(pPaymentData->c_last) > 16 )
            return ERR_PAYMENT_LAST_NAME_TO_LONG;
    }
    else
    {
        if ( !GetNumeric(ptr, &pPaymentData->c_id) )
            return ERR_PAYMENT_CUSTOMER_INVALID;
        if ( !GetValuePtr(pProcessedQuery, CLT_P, &ptr) )
            return ERR_PAYMENT_MISSING_CLT_KEY;
        if(*ptr != '&' && *ptr)
            return ERR_PAYMENT_CID_AND_CLT;
    }

    if ( !GetValuePtr(pProcessedQuery, CDI, &ptr) )
        return ERR_PAYMENT_MISSING_CDI_KEY;
    if ( !GetNumeric(ptr, &pPaymentData->c_d_id) )
        return ERR_PAYMENT_CDI_INVALID;

    if ( !GetValuePtr(pProcessedQuery, CWI, &ptr) )
        return ERR_PAYMENT_MISSING_CWI_KEY;

    if ( !GetNumeric(ptr, &pPaymentData->c_w_id) )
        return ERR_PAYMENT_CWI_INVALID;

    if ( !GetValuePtr(pProcessedQuery, HAM, &ptr) )
        return ERR_PAYMENT_MISSING_HAM_KEY;

    pPtr = ptr;
    while( *pPtr != '&' && *pPtr )
    {
        if ( *pPtr == '.' )
        {
            pPtr++;
            if ( !*pPtr )
                break;
            if ( *pPtr < '0' || *pPtr > '9' )
                return ERR_PAYMENT_HAM_INVALID;
            pPtr++;
            if ( !*pPtr )
                break;
            if ( *pPtr < '0' || *pPtr > '9' )
                return ERR_PAYMENT_HAM_INVALID;
            if ( !*pPtr )
                return ERR_PAYMENT_HAM_INVALID;
        }
        else if ( *pPtr < '0' || *pPtr > '9' )
            return ERR_PAYMENT_HAM_INVALID;
        pPtr++;
    }

    pPaymentData->h_amount = atof(ptr);
    if ( pPaymentData->h_amount >= 10000.00 || pPaymentData->h_amount < 0 )

```

```

return ERR_PAYMENT_HAM_RANGE;

return ERR_SUCCESS;
}

```

tpcc.h

```

#ifndef TPCC_H
#define TPCC_H

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*****
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*
*
*****_*/

```

```

*****_*/

```

```

/*_+
* Abstract: This is the header file for web_ui.c. it contains the
* function prototypes for the routines that are called outside web_ui.c
*
* Author: A Bradley
* Creation Date: May 1997
*
* Modified history:
*
*
*/

```

```

#ifdef WEB_UI_C || defined TPCC_C

```

```

void FormatString(char *szDest, char *szPic, char *szSrc);

```

```

int ParseNewOrderQuery(char *pQueryString, NewOrderData *pNewOrderData);
int ParsePaymentQuery(char *pQueryString, PaymentData *pPaymentData);
int ParseOrderStatusQuery(char *pQueryString,
                           OrderStatusData *pOrderStatusData);
#endif /* defined WEB_UI_C || defined TPCC_C */

```

```

#endif /* TPCC_H */

```

tpcc_acmsxp.h

```

#ifndef TPCC_ACMSXP_H
#define TPCC_ACMSXP_H
/*_+*****
*****
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*
*
*
*****_*/

```

```

*****_*/

```

```

int ACMSxpStartup( pConfigData pConfig, long totalGovValue );
int ACMSxpShutdown( void );

```

```

#endif /* TPCC_ACMSXP_H */

```

tpcc_acmsxp_pp.stdl

```

#include "tm_xp_workspaces"
!
! STL DL DY Processing group definition for TPC-C
!
PROCESSING GROUP tpcc_dy
  UUID "11111111-8322-11cf-1111-08002be44c83";
  VERSION 1.0;
  SOURCE LANGUAGE IS C;

PROCEDURE dy_transaction_init
  ARGUMENT IS
    io_login_wksp PASSED AS INOUT;

PROCEDURE dy_transaction
  ARGUMENT IS
    io_dy_wksp PASSED AS INOUT;

END PROCESSING GROUP;

!
! STL DL NO Processing group definition for TPC-C
!
PROCESSING GROUP tpcc_no
  UUID "2402d1dc-8322-11cf-ba68-08002be44c83";
  VERSION 1.0;
  SOURCE LANGUAGE IS C;

PROCEDURE no_transaction_init
  ARGUMENT IS
    io_login_wksp PASSED AS INOUT;

PROCEDURE no_transaction

```

```

ARGUMENT IS
    io_no_wksp PASSED AS INOUT;

END PROCESSING GROUP;

!
! STDL OS Processing group definition for TPC-C
!
PROCESSING GROUP tpcc_os
    UUID "4d654a5f-8322-11cf-b420-08002be44c83";
    VERSION 1.0;
    SOURCE LANGUAGE IS C;

PROCEDURE os_transaction_init
    ARGUMENT IS
        io_login_wksp PASSED AS INOUT;

PROCEDURE os_transaction
    ARGUMENT IS
        io_os_wksp PASSED AS INOUT;

END PROCESSING GROUP;

!
! STDL PT Processing group definition for TPC-C
!
PROCESSING GROUP tpcc_pt
    UUID "70e38ff0-8322-11cf-99f7-08002be44c83";
    VERSION 1.0;
    SOURCE LANGUAGE IS C;

PROCEDURE pt_transaction_init
    ARGUMENT IS
        io_login_wksp PASSED AS INOUT;

PROCEDURE pt_transaction
    ARGUMENT IS
        io_pt_wksp PASSED AS INOUT;

END PROCESSING GROUP;

!
! STDL SL Processing group definition for TPC-C
!
PROCESSING GROUP tpcc_sl
    UUID "c02bdfc2-8322-11cf-b76e-08002be44c83";
    VERSION 1.0;
    SOURCE LANGUAGE IS C;

PROCEDURE sl_transaction_init
    ARGUMENT IS
        io_login_wksp PASSED AS INOUT;

PROCEDURE sl_transaction
    ARGUMENT IS
        io_sl_wksp PASSED AS INOUT;

END PROCESSING GROUP;

!
! STDL GC Processing group definition for TPC-C
!
PROCESSING GROUP tpcc_gc
    UUID "00000000-8322-11cf-0000-08002be44c83";
    VERSION 1.0;
    SOURCE LANGUAGE IS C;

PROCEDURE gc_transaction_init
    ARGUMENT IS
        io_login_wksp PASSED AS INOUT;

PROCEDURE gc_transaction
    ARGUMENT IS
        io_gc_wksp PASSED AS INOUT,
        int_gc_wksp PASSED AS INPUT;

END PROCESSING GROUP;

```

tpcc_fct.c

```

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

#ifdef _WIN32
#include <windows.h>
#include <process.h>
#else
#endif

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

#include <tpccstruct.h>
#include <tpccapi.h>
#include <tpccerr.h>

#include <transpool.h>

#include <tpcc_acmsxp.h>
#include <tpcc_acmsxp_pp.h>

#include <deli_cli.h>
#include <deli_srv.h>

#ifdef FFE_DEBUG
#include <crtdbg.h>
#endif

#define TOTAL_ADMIN_CONNECTIONS 1

#ifdef FORCE_CONNECT
static HANDLE gForceAllThreadsEvent;
static int gForceAllThreadsCtr;
#endif /* FORCE_CONNECT */

static int gInitRetStatus;
static BOOL gbGeneric = FALSE;
static BOOL gbSynchronous = FALSE;

```

```

typedef void ( _STD_CALL_ * stdl_callback_t )( void * );
#define STDL_SYNCHRONOUS ((stdl_callback_t)-1)

void _STD_CALL_ dy_callback( void * );
void _STD_CALL_ no_callback( void * );
void _STD_CALL_ os_callback( void * );
void _STD_CALL_ pt_callback( void * );
void _STD_CALL_ sl_callback( void * );

static pTPCCNewOrderResponseFunc pTPCCNewOrderResponse;
static pTPCCOrderStatusResponseFunc pTPCCOrderStatusResponse;
static pTPCCPaymentResponseFunc pTPCCPaymentResponse;
static pTPCCStockLevelResponseFunc pTPCCStockLevelResponse;
static pTPCCResponseCompleteFunc pTPCCResponseComplete;

struct int_gc_wksp dy = { DELIVERY_TRANS };
struct int_gc_wksp no = { NEW_ORDER_TRANS };
struct int_gc_wksp os = { ORDER_STATUS_TRANS };
struct int_gc_wksp pt = { PAYMENT_TRANS };
struct int_gc_wksp sl = { STOCK_LEVEL_TRANS };
struct int_gc_wksp gc = { GENERIC_TRANS };

#ifdef FORCE_CONNECT
void __cdecl force_connect( void *arglist );
#endif /* FORCE_CONNECT */

BOOL setGovernorValue( char *group, long ctr );
#ifdef USE_MUX
stdl_call_dll_init( DWORD why_called );
#endif

#ifdef FFE_DEBUG
pDeliveryData gpDelivery = NULL;
pNewOrderData gpNewOrder = NULL;
pOrderStatusData gpOrderStatus = NULL;
pPaymentData gpPayment = NULL;
pStockLevelData gpStockLevel = NULL;
#endif

void _STD_CALL_
dy_callback( void *data )
{
    pDeliveryData pDelivery = data;

#ifdef FFE_DEBUG
    _ASSERT( VALID_DB_ERR(pDelivery->status) );
#endif

    ( void )TPCCDeliveryDeferredResponse( pDelivery->status, pDelivery );

    /* batch transactions do not return to the UI, so no response complete */
    /* call is necessary. */
}

void _STD_CALL_
no_callback( void *data )
{
    pNewOrderData pNewOrder = data;
    CallersContext CC;

#ifdef FFE_DEBUG
    _ASSERT( VALID_DB_ERR(pNewOrder->status) );
#endif

    CC = pNewOrder->CC;

    ( void )( *pTPCCNewOrderResponse )( pNewOrder->status, pNewOrder );

    ( *pTPCCResponseComplete )( CC );
}

void _STD_CALL_
os_callback( void *data )
{
    pOrderStatusData pOrderStatus = data;
    CallersContext CC;

#ifdef FFE_DEBUG
    _ASSERT( VALID_DB_ERR(pOrderStatus->status) );
#endif
}

```

```

CC = pOrderStatus->CC;

( void )( *pTPCCOrderStatusResponse )( pOrderStatus->status, pOrderStatus );

( *pTPCCResponseComplete )( CC );
}

void _STD_CALL_
pt_callback( void *data )
{
    pPaymentData pPayment = data;
    CallersContext CC;

#ifdef FFE_DEBUG
    _ASSERT( VALID_DB_ERR(pPayment->status) );
#endif

    CC = pPayment->CC;

    ( void )( *pTPCCPaymentResponse )( pPayment->status, pPayment );

    ( *pTPCCResponseComplete )( CC );
}

void _STD_CALL_
sl_callback( void *data )
{
    pStockLevelData pStockLevel = data;
    CallersContext CC;

#ifdef FFE_DEBUG
    _ASSERT( VALID_DB_ERR(pStockLevel->status) );
#endif

    CC = pStockLevel->CC;

    ( void )( *pTPCCStockLevelResponse )( pStockLevel->status, pStockLevel );

    ( *pTPCCResponseComplete )( CC );
}

/*****
int
TPCCDeliveryDeferred( pDeliveryData *ppDelivery )
{
    int retcode;
    stdl_callback_t callback;

    TRANSACTION_DEBUG_STAGE( *ppDelivery, IN_LH );
    TRANSACTION_DEBUG_TM_SYNC_SET( *ppDelivery, gbSynchronous );

    callback = ( gbSynchronous ) ? STDL_SYNCHRONOUS : dy_callback;

    /* Call ACMSxp for New Order */
    if( gbGeneric )
        gc_transaction( callback, (void *)(*ppDelivery),
                        (struct io_gc_wksp *)(*ppDelivery), &dy );
    else
        dy_transaction( callback, (void *)(*ppDelivery),
                        (struct io_dy_wksp *)(*ppDelivery) );

    retcode = ( gbSynchronous ) ? (*ppDelivery)->status : ERR_DB_PENDING;

#ifdef FFE_DEBUG
    _ASSERT( VALID_DB_ERR(retcode) );
#endif
    TRANSACTION_DEBUG_STAGE( *ppDelivery, LEAVING_LH );

    return retcode;
}

/*****
int
TPCCNewOrder( pNewOrderData *ppNewOrder )
{
    int retcode;
    stdl_callback_t callback;

    TRANSACTION_DEBUG_STAGE( *ppNewOrder, IN_LH );
    TRANSACTION_DEBUG_TM_SYNC_SET( *ppNewOrder, gbSynchronous );

    callback = ( gbSynchronous ) ? STDL_SYNCHRONOUS : no_callback;
}

```

```

/** Call ACMSxp for New Order */
if( gbGeneric )
    gc_transaction( callback, (void *)(*ppNewOrder),
                    (struct io_gc_wksp *)(*ppNewOrder), &no );
else
    no_transaction( callback, (void *)(*ppNewOrder),
                    (struct io_no_wksp *)(*ppNewOrder) );

retcode = ( gbSynchronous ) ? (*ppNewOrder)->status : ERR_DB_PENDING;

#ifdef FFE_DEBUG
_ASSERT( VALID_DB_ERR(retcode));
#endif
TRANSACTION_DEBUG_STAGE( *ppNewOrder, LEAVING_LH );

return retcode;
}

/*****/
int
TPCCOrderStatus( pOrderStatusData *ppOrderStatus )
{
    int retcode;
    stdl_callback_t callback;

    TRANSACTION_DEBUG_STAGE( *ppOrderStatus, IN_LH );
    TRANSACTION_DEBUG_TM_SYNC_SET( *ppOrderStatus, gbSynchronous );

    callback = ( gbSynchronous ) ? STDL_SYNCHRONOUS : os_callback;

    /** Call ACMSxp for order status */
    if( gbGeneric )
        gc_transaction( callback, (void *)(*ppOrderStatus),
                        (struct io_gc_wksp *)(*ppOrderStatus), &os );
    else
        os_transaction( callback, (void *)(*ppOrderStatus),
                        (struct io_os_wksp *)(*ppOrderStatus) );

    retcode = ( gbSynchronous ) ? (*ppOrderStatus)->status : ERR_DB_PENDING;

#ifdef FFE_DEBUG
_ASSERT( VALID_DB_ERR(retcode));
#endif
TRANSACTION_DEBUG_STAGE( *ppOrderStatus, LEAVING_LH );

return retcode;
}

/*****/
int
TPCCPayment( pPaymentData *ppPayment )
{
    int retcode;
    stdl_callback_t callback;

    TRANSACTION_DEBUG_STAGE( *ppPayment, IN_LH );
    TRANSACTION_DEBUG_TM_SYNC_SET( *ppPayment, gbSynchronous );

    callback = ( gbSynchronous ) ? STDL_SYNCHRONOUS : pt_callback;

    /** Call ACMSxp for payment */
    if( gbGeneric )
        gc_transaction( callback, (void *)(*ppPayment),
                        (struct io_gc_wksp *)(*ppPayment), &pt );
    else
        pt_transaction( callback, (void *)(*ppPayment),
                        (struct io_pt_wksp *)(*ppPayment) );

    retcode = ( gbSynchronous ) ? (*ppPayment)->status : ERR_DB_PENDING;

#ifdef FFE_DEBUG
_ASSERT( VALID_DB_ERR(retcode));
#endif
TRANSACTION_DEBUG_STAGE( *ppPayment, LEAVING_LH );

return retcode;
}

/*****/

```

```

int
TPCCStockLevel( pStockLevelData *ppStockLevel )
{
    int retcode;
    stdl_callback_t callback;

    TRANSACTION_DEBUG_STAGE( *ppStockLevel, IN_LH );
    TRANSACTION_DEBUG_TM_SYNC_SET( *ppStockLevel, gbSynchronous );

    callback = ( gbSynchronous ) ? STDL_SYNCHRONOUS : sl_callback;

    /** Call ACMSxp for stock level */
    if( gbGeneric )
        gc_transaction( callback, (void *)(*ppStockLevel),
                        (struct io_gc_wksp *)(*ppStockLevel), &sl );
    else
        sl_transaction( callback, (void *)(*ppStockLevel),
                        (struct io_sl_wksp *)(*ppStockLevel) );

    retcode = ( gbSynchronous ) ? (*ppStockLevel)->status : ERR_DB_PENDING;

#ifdef FFE_DEBUG
_ASSERT( VALID_DB_ERR(retcode));
#endif
TRANSACTION_DEBUG_STAGE( *ppStockLevel, LEAVING_LH );

return retcode;
}

/*
**++
** FUNCTION NAME: setGovernorValue
**--
*/
int
setGovernorValue( char *group, long ctr )
{
    char    keyname[256];
    int     status;
#ifdef _WIN32
    HKEY    hKey;
    DWORD   size;
    DWORD   dwDisposition;
    LONG    lRet;

    sprintf( keyname,
            "SOFTWARE\\DigitalEquipmentCorporation\\TPware\\Group
            Settings\\%s",
            group );

    lRet = RegCreateKeyEx( HKEY_LOCAL_MACHINE, keyname, 0, NULL,
                          REG_OPTION_NON_VOLATILE,
                          KEY_ALL_ACCESS,
                          NULL, &hKey, &dwDisposition );
    if( ERROR_SUCCESS != lRet ) {
        TPCCErr( "OS Error %d, group settings not created/failed for %s\r\n",
                lRet, keyname );
        return( ERR_CANT_SET_GOVERNOR_VALUE );
    }

    size = sizeof( ctr );
    lRet = RegSetValueEx( hKey, "MaxThreads", 0, REG_DWORD, (LPBYTE)&ctr,
                          size );
    if( ERROR_SUCCESS == lRet ) {
        status = ERR_SUCCESS;
    }
    else {
        TPCCErr( "OS Error %d, MaxThreads value not set for key %s\r\n",
                lRet, keyname );
        status = ERR_CANT_SET_GOVERNOR_VALUE;
    }

    RegCloseKey( hKey );
#else /* _WIN32 */
    sprintf( keyname,
            "SOFTWARE_DigitalEquipmentCorporation_TPware_Group_Settings_%s=%d",
            group, ctr );
    putenv( keyname );
#endif
}

```

```

    status = ERR_SUCCESS;
#endif /* _WIN32 */
    return status;
}

/*
**++
** FUNCTION NAME: TPCCGetTransportMode
**--
*/
int
TPCCGetTransportMode( int *Mode )
{
    *Mode = TRANS_ASYNC;

    return( ERR_SUCCESS );
}

/*
**++
** FUNCTION NAME: TPCCStartup
**--
*/
int
TPCCStartup( pStartupData pStartup )
{
    int status;
    unsigned long ulhThread;
    int counts[HIGHEST_TRANS] = { 0 };
    int count;
    int index;
    int trans;
    long total;
    int maxDBConnections;
    pLoginData pLoginArray;
    ConfigData Config;

#ifdef USE_MUX
    stdl_call_dll_init( DLL_PROCESS_ATTACH );
#endif

    /* Save response function pointers */
    pTPCCNewOrderResponse = pStartup->pTPCCNewOrderResponse;
    pTPCCOrderStatusResponse = pStartup->pTPCCOrderStatusResponse;
    pTPCCPaymentResponse = pStartup->pTPCCPaymentResponse;
    pTPCCStockLevelResponse = pStartup->pTPCCStockLevelResponse;
    pTPCCResponseComplete = pStartup->pTPCCResponseComplete;

    /* Save general mode of operation stuff */
    gbGeneric = pStartup->Transport.generic;
    gbSynchronous = !pStartup->Transport.asynchronous;

    /**** Set the ACMSxp Governor values in the registry. *****/
    if( gbGeneric ) {
        status = setGovernorValue( "tpcc_gc", pStartup->Transport.num_gc );
        if( ERR_SUCCESS != status ) return( status );
    }
    else {
        status = setGovernorValue( "tpcc_dy", pStartup->Transport.num_dy );
        if( ERR_SUCCESS != status ) return( status );
        status = setGovernorValue( "tpcc_no", pStartup->Transport.num_no );
        if( ERR_SUCCESS != status ) return( status );
        status = setGovernorValue( "tpcc_os", pStartup->Transport.num_os );
        if( ERR_SUCCESS != status ) return( status );
        status = setGovernorValue( "tpcc_pt", pStartup->Transport.num_pt );
        if( ERR_SUCCESS != status ) return( status );
        status = setGovernorValue( "tpcc_sl", pStartup->Transport.num_sl );
        if( ERR_SUCCESS != status ) return( status );
    }

    /**** start up server specific stuff *****/
    total = 0;
    if( gbGeneric ) {
        total = pStartup->Transport.num_gc;
    }
    else {
        /* zero out the array */
        for( trans = 0; trans < HIGHEST_TRANS; trans++ )
        {
            counts[trans] = 0;
        }
        counts[DELIVERY_TRANS] = pStartup->Transport.num_dy;
        total += pStartup->Transport.num_dy;
        counts[NEW_ORDER_TRANS] = pStartup->Transport.num_no;
        total += pStartup->Transport.num_no;
        counts[ORDER_STATUS_TRANS] = pStartup->Transport.num_os;
        total += pStartup->Transport.num_os;
        counts[PAYMENT_TRANS] = pStartup->Transport.num_pt;
        total += pStartup->Transport.num_pt;
        counts[STOCK_LEVEL_TRANS] = pStartup->Transport.num_sl;
        total += pStartup->Transport.num_sl;
    }

    maxDBConnections = total + TOTAL_ADMIN_CONNECTIONS;
    if( !pStartup->DeliveryTransport.use_transport )
        maxDBConnections += pStartup->DeliveryTransport.num_threads;

    Config.maxConnections = maxDBConnections;
    Config.maxDistricts = pStartup->Config.maxDistricts;
    status = ACMSxpStartup( &Config, total );
    if ( status != ERR_DB_SUCCESS )
        return status;

    /* start the delivery subsystem */
    status = DELIClientStartup( &pStartup->DeliveryTransport,
                               &pStartup->Login, pStartup->loginDelay,
                               pStartup->Path );

    if( ERR_SUCCESS != status )
        return status;

    gInitRetStatus = ERR_DB_SUCCESS;    /*** preset to success */

#ifdef FORCE_CONNECT
    gForceAllThreadsCtr = total;
    gForceAllThreadsEvent = CreateEvent( 0, TRUE, FALSE, 0 );
    if ( NULL == gForceAllThreadsEvent ) return
    ERR_CANT_CREATE_ALL_THREADS_EVENT;

    if( !gbGeneric ) {
        index = 0;
        pLoginArray = alloca( total * sizeof( LoginData ) );
        for( trans = 0; trans < HIGHEST_TRANS; trans++ ) {
            for( count = 0; count < counts[trans]; count++ ) {
                /* copy login data and overload unused status value as the */
                /* type of server to start */
                memcpy( &pLoginArray[index], &pStartup->Login, sizeof( LoginData ) );
                pLoginArray[index].status = trans;
                ulhThread = _beginthread( force_connect, 0, &pLoginArray[index] );
                if( -1 == ulhThread ) {
                    return ERR_CANT_START_FRCDINIT_THREAD;
                }
                Sleep( pStartup->loginDelay );
                index++;
            }
        }
    }
    else {
        for( count = 0; count < pStartup->Transport.num_gc; count++ ) {
            /* overload unused status value as the type of server to start */
            pStartup->Login.status = GENERIC_TRANS;
            ulhThread = _beginthread( force_connect, 0, &pStartup->Login );
            if( -1 == ulhThread ) {
                return ERR_CANT_START_FRCDINIT_THREAD;
            }
            Sleep( pStartup->loginDelay );
        }
    }

    WaitForSingleObject( gForceAllThreadsEvent, INFINITE );
#endif /* FORCE_CONNECT */

    pStartup->Login.status = gInitRetStatus;
    return gInitRetStatus;
}

/*
**++
** FUNCTION NAME: TPCCConnect

```

```

**_
*/
int
TPCCConnect( pLoginData *ppLogin )
{
    return ERR_DB_SUCCESS;
}

/*
**++
** FUNCTION NAME: TPCCDisconnect
**_
*/
int
TPCCDisconnect( pConnData *ppConn )
{
    return ERR_DB_SUCCESS;
}

/*
**++
** FUNCTION NAME: TPCCShutdown
**_
*/
int
TPCCShutdown( void )
{
    int                retcode;

    retcode = ACMSxpShutdown( );
    if( ERR_SUCCESS != retcode )
        return retcode;

    retcode = DELIClientShutdown( );
    if( ERR_SUCCESS != retcode )
        return retcode;

    return retcode;
}

#ifdef FORCE_CONNECT
void __cdecl
force_connect( void *arglist )
{
    pLoginData        pLogin;
    LoginData         loginLocal;
    int                txnType;

    pLogin = arglist;
    txnType = pLogin->status;

    memcpy( &loginLocal, pLogin, sizeof( LoginData ));
    loginLocal.w_id = 0;
    loginLocal.ld_id = 0;
    loginLocal.CC = 0;
    loginLocal.databaseLogin.szApplication[0] = '\0';

    switch ( txnType ) {
    case DELIVERY_TRANS:
        dy_transaction_init( STDL_SYNCHRONOUS, &loginLocal,
                            (struct io_login_wksp *)&loginLocal );
        break;

    case NEW_ORDER_TRANS:
        no_transaction_init( STDL_SYNCHRONOUS, &loginLocal,
                            (struct io_login_wksp *)&loginLocal );
        break;

    case ORDER_STATUS_TRANS:
        os_transaction_init( STDL_SYNCHRONOUS, &loginLocal,
                            (struct io_login_wksp *)&loginLocal );
        break;

    case PAYMENT_TRANS:
        pt_transaction_init( STDL_SYNCHRONOUS, &loginLocal,
                            (struct io_login_wksp *)&loginLocal );
        break;
    }
}

```

```

case STOCK_LEVEL_TRANS:
    sl_transaction_init( STDL_SYNCHRONOUS, &loginLocal,
                        (struct io_login_wksp *)&loginLocal );
    break;

case GENERIC_TRANS:
    gc_transaction_init( STDL_SYNCHRONOUS, &loginLocal,
                        (struct io_login_wksp *)&loginLocal );
    break;
}
if ( loginLocal.status != ERR_DB_SUCCESS ) {
    /** Only store the first failure */
    if ( ERR_DB_SUCCESS == gInitRetStatus )
        gInitRetStatus = ERR_FORCE_CONNECT_THREAD_FAILED;

    TPCCerr( "Connect Transaction returned %8d\r\n", loginLocal.status );
}
if ( InterlockedDecrement( &gForceAllThreadsCtr ) == 0 )
    SetEvent( gForceAllThreadsEvent );
return;
}
#endif /* FORCE_CONNECT */

```

tpcc_ps.c

```

/*+*****
*****
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*
*****
*****/
#ifdef _WIN32
#include <windows.h>
#include <process.h>
#include <winsock.h>
#else /* _WIN32 */
#endif /* _WIN32 */

#include <errno.h>
#include <string.h>
#include <stdio.h>
#include <sys/types.h>

#include <tpcstruct.h>
#include <tpccapi.h>
#include <tpccerr.h>

```



```

#include <transpool.h>

#include <tm_xp_workspaces.h>
#include <tpcc_acmsxp.h>

#ifdef FFE_DEBUG
#include <crtdbg.h>
#endif

#ifdef USE_PROCESSES
static int gTLSDBContext = 0;
static DBContext gDBContext = INVALID_DB_CONTEXT;
int TlsAlloc( void ) { return 1; }
DBContext TlsGetValue( int tls ) { return( gDBContext ); }
int TlsSetValue( int tls, DBContext DBC ) { gDBContext = DBC; return 1; }
void TlsFree( int tls ) { return; }
#define GetCurrentThreadId( ) getpid( )
#else /* USE_PROCESSES */
static DWORD gTLSDBContext = 0;
#endif /* USE_PROCESSES */

#ifdef FORCE_CONNECT
static LONG gForceThreadStartCtr;
static HANDLE gForceThreadStartEvent;
#endif /* FORCE_CONNECT */

/*
**++
** FUNCTION NAME: transaction_init
**--
*/
void
transaction_init( char *type, pLoginData pLogin )
{
char tmp[16];
long dwTID;

DBContext DBC = (DBContext) TlsGetValue(gTLSDBContext);

if (DBC == INVALID_DB_CONTEXT) {
/* make up app_name */
gethostname(tmp, sizeof(tmp));
dwTID = GetCurrentThreadId( );
sprintf( pLogin->databaseLogin.szApplication, "%s:%s - %d",
tmp, type, dwTID );

pLogin->status = TPCCConnectDB( &DBC, pLogin );

TPCCLog( "%s, dbprocptr = %16X\r\n",
pLogin->databaseLogin.szApplication, DBC );

if ( pLogin->status == ERR_DB_SUCCESS ) {
if (TlsSetValue(gTLSDBContext, DBC) == 0)
pLogin->status = ERR_CANT_SET_THREAD_LOCAL_STORAGE;
}
}

#ifdef FORCE_CONNECT
if ( InterlockedDecrement( &gForceThreadStartCtr ) == 0 )
SetEvent( gForceThreadStartEvent );

WaitForSingleObject( gForceThreadStartEvent, INFINITE );
#endif /* FORCE_CONNECT */
}
else {
dwTID = GetCurrentThreadId( );
TPCCLog( "Already logged in: %8X\r\n", dwTID );
pLogin->status = ERR_ALREADY_LOGGED_IN;
}
}

/*
**++
** FUNCTION NAME: dy_transaction_init
**--
*/
void
dy_transaction_init( struct io_login_wksp *login_wksp )
{
transaction_init( "DY", (pLoginData)login_wksp );
}

/*
**++
** FUNCTION NAME: no_transaction_init
**--
*/
void
no_transaction_init( struct io_login_wksp *login_wksp )
{
transaction_init( "NO", (pLoginData)login_wksp );
}

/*
**++
** FUNCTION NAME: os_transaction_init
**--
*/
void
os_transaction_init( struct io_login_wksp *login_wksp )
{
transaction_init( "OS", (pLoginData)login_wksp );
}

/*
**++
** FUNCTION NAME: pt_transaction_init
**--
*/
void
pt_transaction_init( struct io_login_wksp *login_wksp )
{
transaction_init( "PT", (pLoginData)login_wksp );
}

/*
**++
** FUNCTION NAME: sl_transaction_init
**--
*/
void
sl_transaction_init( struct io_login_wksp *login_wksp )
{
transaction_init( "SL", (pLoginData)login_wksp );
}

/*
**++
** FUNCTION NAME: gc_transaction_init
**--
*/
void
gc_transaction_init( struct io_login_wksp *login_wksp )
{
transaction_init( "GC", (pLoginData)login_wksp );
}

/*
**++
** FUNCTION NAME: dy_transaction
**--
*/
void
dy_transaction( struct io_dy_wksp *dy_wksp )
{
DBContext DBC = (DBContext) TlsGetValue(gTLSDBContext);
pDeliveryData ptr;

ptr = (pDeliveryData)dy_wksp;

TRANSACTION_DEBUG_STAGE( ptr, IN_RH );
TRANSACTION_DEBUG_TM_THREAD_SET( ptr );

if (DBC == INVALID_DB_CONTEXT) {
ptr->status = ERR_DB_NOT_LOGGED_IN;
}
else {
ptr->status = TPCCDeliveryDB( DBC, ptr );
}
}

```

```

#ifdef FFE_DEBUG
_ASSERT( VALID_DB_ERR(ptr->status) );
#endif
TRANSACTION_DEBUG_STAGE( ptr, LEAVING_RH );
}

/*
**++
** FUNCTION NAME: no_transaction
**--
*/
void
no_transaction( struct io_no_wksp *no_wksp )
{
    DBContext DBC = (DBContext) TlsGetValue(gTLSDBContext);
    pNewOrderData ptr;

    ptr = (pNewOrderData)no_wksp;

    TRANSACTION_DEBUG_STAGE( ptr, IN_RH );
    TRANSACTION_DEBUG_TM_THREAD_SET( ptr );

    if (DBC == INVALID_DB_CONTEXT) {
        ptr->status = ERR_DB_NOT_LOGGED_IN;
    }
    else {
        ptr->status = TPCCNewOrderDB( DBC, ptr );
    }
}

#ifdef FFE_DEBUG
_ASSERT( VALID_DB_ERR(ptr->status) );
#endif
TRANSACTION_DEBUG_STAGE( ptr, LEAVING_RH );
}

/*
**++
** FUNCTION NAME: os_transaction
**--
*/
void
os_transaction( struct io_os_wksp *os_wksp )
{
    DBContext DBC = (DBContext) TlsGetValue(gTLSDBContext);
    pOrderStatusData ptr;

    ptr = (pOrderStatusData)os_wksp;

    TRANSACTION_DEBUG_STAGE( ptr, IN_RH );
    TRANSACTION_DEBUG_TM_THREAD_SET( ptr );

    if (DBC == INVALID_DB_CONTEXT) {
        ptr->status = ERR_DB_NOT_LOGGED_IN;
    }
    else {
        ptr->status = TPCCOrderStatusDB( DBC, ptr );
    }
}

#ifdef FFE_DEBUG
_ASSERT( VALID_DB_ERR(ptr->status) );
#endif
TRANSACTION_DEBUG_STAGE( ptr, LEAVING_RH );
}

/*
**++
** FUNCTION NAME: pt_transaction
**--
*/
void
pt_transaction( struct io_pt_wksp *pt_wksp )
{
    DBContext DBC = (DBContext) TlsGetValue(gTLSDBContext);
    pPaymentData ptr;

    ptr = (pPaymentData)pt_wksp;

    TRANSACTION_DEBUG_STAGE( ptr, IN_RH );
    TRANSACTION_DEBUG_TM_THREAD_SET( ptr );

    if (DBC == INVALID_DB_CONTEXT) {
        ptr->status = ERR_DB_NOT_LOGGED_IN;
    }
    else {
        ptr->status = TPCCPaymentDB( DBC, ptr );
    }
}

#ifdef FFE_DEBUG
_ASSERT( VALID_DB_ERR(ptr->status) );
#endif
TRANSACTION_DEBUG_STAGE( ptr, LEAVING_RH );
}

/*
**++
** FUNCTION NAME: sl_transaction
**--
*/
void
sl_transaction( struct io_sl_wksp *sl_wksp )
{
    DBContext DBC = (DBContext) TlsGetValue(gTLSDBContext);
    pStockLevelData ptr;

    ptr = (pStockLevelData)sl_wksp;

    TRANSACTION_DEBUG_STAGE( ptr, IN_RH );
    TRANSACTION_DEBUG_TM_THREAD_SET( ptr );

    if (DBC == INVALID_DB_CONTEXT) {
        ptr->status = ERR_DB_NOT_LOGGED_IN;
    }
    else {
        ptr->status = TPCCStockLevelDB( DBC, ptr );
    }
}

#ifdef FFE_DEBUG
_ASSERT( VALID_DB_ERR(ptr->status) );
#endif
TRANSACTION_DEBUG_STAGE( ptr, LEAVING_RH );
}

/*
**++
** FUNCTION NAME: gc_transaction
**--
*/
void
gc_transaction( struct io_gc_wksp *gc_wksp, struct int_gc_wksp *ptype )
{
    int transaction_type;

    transaction_type = ptype->trans;
    switch( transaction_type ) {
    case DELIVERY_TRANS:
        dy_transaction( (struct io_dy_wksp *)gc_wksp );
        break;
    case NEW_ORDER_TRANS:
        no_transaction( (struct io_no_wksp *)gc_wksp );
        break;
    case ORDER_STATUS_TRANS:
        os_transaction( (struct io_os_wksp *)gc_wksp );
        break;
    case PAYMENT_TRANS:
        pt_transaction( (struct io_pt_wksp *)gc_wksp );
        break;
    case STOCK_LEVEL_TRANS:
        sl_transaction( (struct io_sl_wksp *)gc_wksp );
        break;
    default:
#ifdef FFE_DEBUG
_ASSERT( FALSE );
#endif
    }
}

/*

```

```

**++
** FUNCTION NAME: ACMSxpStartup
**_
*/
int ACMSxpStartup( pConfigData pConfig, long totalGovValue )
{
    int ret_status;

    /***** Allocate an index into Thread Local Storage *****/
    if ((gTlsDBContext = TlsAlloc()) == 0xFFFFFFFF)
        return ERR_CANT_ALLOCATE_THREAD_LOCAL_STORAGE;

    /*** Initial value of a counter is set to the maximum number of threads which
        can be created by ACMSxp; i.e. the total of the governor values in the
        registry. By blocking each of these threads until they have all
        started, we guarantee that they will all be created. Waiting until
        demand requires them is the worst time to be connecting to a DB.
        They are unblocked by the counter reaching zero which causes the
        event to be set. *****/

#ifdef FORCE_CONNECT
    gForceThreadStartCtr = totalGovValue;

    gForceThreadStartEvent = CreateEvent( NULL, TRUE, FALSE, NULL );
    if ( gForceThreadStartEvent == NULL )
        return ERR_CANT_CREATE_FORCE_THRED_STRT_EVENT;
#endif /* FORCE_CONNECT */

    ret_status = TPCCStartupDB( pConfig );
    return ret_status;
}

/*
**++
** FUNCTION NAME: ACMSxpShutdown
**_
*/
int ACMSxpShutdown( void )
{
#ifdef FORCE_CONNECT
    CloseHandle( gForceThreadStartEvent );
#endif /* FORCE_CONNECT */
    TlsFree( gTlsDBContext );
    return( TPCCShutdownDB() );
}

```

tpccapi.h

```

#ifndef TPCCAPI_H
#define TPCCAPI_H
/*+*****
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*
*
*
*
*****
/*+*****
*****
***** tpccapi.h
*****
*****
*
** tpccapi.h: This header file declares function calls between TPCC
application and server
*
*
* Authors: Tareef Kawaf and Bill Carr
**
**
** 02-05-97 FWM Added bQueueDelivery flag to startup call.
** 18-Feb-98 WCarr Introduced TPCCAPI V2.0
** 08-Apr-99 WCarr Introduced TPCCAPI V3.0
**
*/

#define FILENAMESIZE 256

#define TRANS_ASYNC 1 /* Transport async capable */
#define TRANS_SYNC 2 /* Transport not async capable */
#define TRANS_NONE 3 /* No transport connected */

#ifndef MAX
#define MAX
#endif /* MAX */
#define MAX(a,b) (((a)>(b))?(a):(b))

int TPCCGetTransportModeUI( int *Mode );
typedef int (*TPCCGetTransportModeUIFunc)( int *Mode );
int TPCCGetTransportMode( int *Mode );
typedef int (*TPCCGetTransportModeFunc)( int *Mode );

int TPCCStartupUI( pStartupData pStartup );
typedef int (*TPCCStartupUIFunc)( pStartupData pStartup );
int TPCCStartup( pStartupData pStartup );
typedef int (*TPCCStartupFunc)( pStartupData pStartup );
int TPCCStartupDB( pConfigData pConfig );
typedef int (*TPCCStartupDBFunc)( pConfigData pConfig );

int TPCCConnectUI( pLoginData *ppLogin );
typedef int (*TPCCConnectUIFunc)( pLoginData *ppLogin );
int TPCCConnect( pLoginData *ppLogin );
typedef int (*TPCCConnectFunc)( pLoginData *ppLogin );
int TPCCConnectDB( DBContext *pDBC, pLoginData pLogin );
typedef int (*TPCCConnectDBFunc)( DBContext *pDBC, pLoginData pLogin );

int TPCCDeliveryUI( pDeliveryData *ppDelivery,
pDeliveryData
CompletedDeliveries[DELIVERY_RESPONSE_COUNT]);
typedef int (*TPCCDeliveryUIFunc)( pDeliveryData *ppDelivery,
pDeliveryData
CompletedDeliveries[DELIVERY_RESPONSE_COUNT]);
int TPCCDelivery( pDeliveryData *ppDelivery,
pDeliveryData
CompletedDeliveries[DELIVERY_RESPONSE_COUNT] );
typedef int (*TPCCDeliveryFunc)( pDeliveryData *ppDelivery,
pDeliveryData
CompletedDeliveries[DELIVERY_RESPONSE_COUNT] );
int TPCCDeliveryDeferred( pDeliveryData *ppDelivery );
int TPCCDeliveryDB( DBContext DBC, pDeliveryData pDelivery );
typedef int (*TPCCDeliveryDBFunc)( DBContext DBC, pDeliveryData pDelivery );

int TPCCNewOrderUI( pNewOrderData *ppNewOrder );
typedef int (*TPCCNewOrderUIFunc)( pNewOrderData *ppNewOrder );
int TPCCNewOrder( pNewOrderData *ppNewOrder );

```

```

typedef int (*TPCCNewOrderFunc)( pNewOrderData *ppNewOrder );
int TPCCNewOrderDB( DBContext DBC, pNewOrderData pNewOrder );
typedef int (*TPCCNewOrderDBFunc)( DBContext DBC, pNewOrderData
pNewOrder );

int TPCCOrderStatusUI( pOrderStatusData *ppOrderStatus );
typedef int (*TPCCOrderStatusUIFunc)( pOrderStatusData *ppOrderStatus );
int TPCCOrderStatus( pOrderStatusData *ppOrderStatus );
typedef int (*TPCCOrderStatusFunc)( pOrderStatusData *ppOrderStatus );
int TPCCOrderStatusDB( DBContext DBC, pOrderStatusData pOrderStatus );
typedef int (*TPCCOrderStatusDBFunc)( DBContext DBC, pOrderStatusData
pOrderStatus );

int TPCCPaymentUI( pPaymentData *ppPayment );
typedef int (*TPCCPaymentUIFunc)( pPaymentData *ppPayment );
int TPCCPayment( pPaymentData *ppPayment );
typedef int (*TPCCPaymentFunc)( pPaymentData *ppPayment );
int TPCCPaymentDB( DBContext DBC, pPaymentData pPayment );
typedef int (*TPCCPaymentDBFunc)( DBContext DBC, pPaymentData pPayment );

int TPCCStockLevelUI( pStockLevelData *ppStockLevel );
typedef int (*TPCCStockLevelUIFunc)( pStockLevelData *ppStockLevel );
int TPCCStockLevel( pStockLevelData *ppStockLevel );
typedef int (*TPCCStockLevelFunc)( pStockLevelData *ppStockLevel );
int TPCCStockLevelDB( DBContext DBC, pStockLevelData pStockLevel );
typedef int (*TPCCStockLevelDBFunc)( DBContext DBC, pStockLevelData
pStockLevel );

int TPCCCheckpointConnectUI( pLoginData *ppLogin );
typedef int (*TPCCCheckpointConnectUIFunc)( pLoginData *ppLogin );
int TPCCCheckpointConnect( pLoginData *ppLogin );
typedef int (*TPCCCheckpointConnectFunc)( pLoginData *ppLogin );

int TPCCCheckpointUI( pCheckpointData *ppCheckpoint );
typedef int (*TPCCCheckpointUIFunc)( pCheckpointData *ppCheckpoint );
int TPCCCheckpoint( pCheckpointData *ppCheckpoint );
typedef int (*TPCCCheckpointFunc)( pCheckpointData *ppCheckpoint );
int TPCCCheckpointDB( DBContext DBC, pCheckpointData pCheckpoint );
typedef int (*TPCCCheckpointDBFunc)( DBContext DBC, pCheckpointData
pCheckpoint );

int TPCCCheckpointDisconnectUI( pConnData *ppConn );
typedef int (*TPCCCheckpointDisconnectUIFunc)( pConnData *ppConn );
int TPCCCheckpointDisconnect( pConnData *ppConn );
typedef int (*TPCCCheckpointDisconnectFunc)( pConnData *ppConn );

int TPCCDisconnectUI( pConnData *ppConn );
typedef int (*TPCCDisconnectUIFunc)( pConnData *ppConn );
int TPCCDisconnect( pConnData *ppConn );
typedef int (*TPCCDisconnectFunc)( pConnData *ppConn );
int TPCCDisconnectDB( DBContext DBC, pConnData pConn );
typedef int (*TPCCDisconnectDBFunc)( DBContext DBC, pConnData pConn );

int TPCCShutdownUI( void );
typedef int (*TPCCShutdownUIFunc)( void );
int TPCCShutdown( void );
typedef int (*TPCCShutdownFunc)( void );
int TPCCShutdownDB( void );
typedef int (*TPCCShutdownDBFunc)( void );

int TPCCDeliveryResponse( int retcode, pDeliveryData pDelivery,
pDeliveryData
CompletedDeliveries[DELIVERY_RESPONSE_COUNT] );

int TPCCDeliveryDeferredResponse( int retcode, pDeliveryData pDelivery );

int TPCCNewOrderResponse( int retcode, pNewOrderData pNewOrder );

int TPCCOrderStatusResponse( int retcode, pOrderStatusData pOrderStatus );

int TPCCPaymentResponse( int retcode, pPaymentData pPayment );

int TPCCStockLevelResponse( int retcode, pStockLevelData pStockLevel );

int TPCCCheckpointResponse( int retcode, pCheckpointData pCheckpoint );

void TPCCResponseComplete( CallersContext CC );

void ErrorMessage( CallersContext CC, int iError, int iErrorType,
char *pszMesage );

```

```

int TPCCGetTransportErrorString( int iErrorCode, int iBufSize, char *pBuffer );
int TPCCGetDBErrorString( int iErrorCode, int iBufSize, char *pBuffer );

BOOL TPCCOpenLogUI( char *Path );
typedef BOOL (*TPCCOpenLogUIFunc)( char *Path );
BOOL TPCCOpenLog( char *Path );
typedef BOOL (*TPCCOpenLogFunc)( char *Path );

BOOL TPCCCloseLogUI( void );
typedef BOOL (*TPCCCloseLogUIFunc)( void );
BOOL TPCCCloseLog( void );
typedef BOOL (*TPCCCloseLogFunc)( void );

void TPCCLog( char *fmt, ... );
typedef void (*TPCCLogFunc)( char *fmt, ... );

void TPCCErr( char *fmt, ... );
typedef void (*TPCCErrFunc)( char *fmt, ... );

char *TPCCErrString( int iError );
typedef char *(*TPCCErrStringFunc)( int iError );

void TPCCTransactionErr( pConnData pConn, char *fmt, ... );

int TPCCTMLoadUI( void );
typedef int (*TPCCTMLoadUIFunc)( void );
int TPCCTMLoad( void );

int TPCCTMUnloadUI( void );
typedef int (*TPCCTMUnloadUIFunc)( void );
int TPCCTMUnload( void );

#endif /* TPCCAPI_H */

```

tpccerr.h

```

#ifndef TPCCERR_H
#define TPCCERR_H

/*_*****
*****
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*
*
*****_*/
/* FILE: TPCCERR.H
*/

```

```

*           Copyright Microsoft, 1996
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*
*           PURPOSE: Header file for ISAPI TPCC.DLL, defines structures
*                   and error messages used by tpcc benchmark
code.
*           Author:      Philip Durr
*                       philipdu@Microsoft.com
*
*           Modified by: William D. Carr
*                       carr@perfrom.enet.dec.com
*/

#pragma message ("FIXME: the error types need to be made DB non-specific")

#define ERR_DB_SUCCESS          0
#define ERR_DB_ERROR           1
#define ERR_TRANSPORT_ERROR    2
#define ERR_DB_INTERFACE       3
#define ERR_DB_DEADLOCK_LIMIT  4
#define ERR_DB_NOT_COMMITED    5
#define ERR_DB_DEAD            6
#define ERR_DB_PENDING         7
#define ERR_DB_NOT_LOGGED_IN   8
#define ERR_DB_LOGIN_FAILED    9
#define ERR_DB_USE_FAILED      10
#define ERR_DB_LOGOUT_FAILED   11
#define ERR_DB_INVALID_CONTEXT 12
#define ERR_DB_INVALID_W_ID    13
#define ERR_DB_INVALID_D_ID    14
#define ERR_DB_INVALID_NO_ITEM_ID 15
#define ERR_DB_MAX_CONN_EXCEEDED 16
/* NOTE: Be sure to update MAX_ERR if new error code is added. */
#define ERR_DB_MAX_ERR         16

#define VALID_DB_ERR(err) (((err) >= ERR_DB_SUCCESS)&&((err) <=
ERR_DB_MAX_ERR))

#define ERR_SUCCESS            1000
#define ERR_COMMAND_UNDEFINED  1001
#define ERR_NOT_IMPLEMENTED_YET 1002
#define ERR_CANNOT_INIT_TERMINAL 1003
#define ERR_OUT_OF_MEMORY      1004
#define ERR_NEW_ORDER_NOT_PROCESSED 1005
#define ERR_PAYMENT_NOT_PROCESSED 1006
#define ERR_NO_SERVER_SPECIFIED 1007
#define ERR_ORDER_STATUS_NOT_PROCESSED 1008
#define ERR_W_ID_INVALID       1009
#define ERR_CAN_NOT_SET_MAX_CONNECTIONS 1010
#define ERR_NOSUCH_CUSTOMER    1011
#define ERR_D_ID_INVALID       1012
#define ERR_MAX_CONNECT_PARAM  1013
#define ERR_INVALID_SYNC_CONNECTION 1014
#define ERR_INVALID_TERMID     1015
#define ERR_PAYMENT_INVALID_CUSTOMER 1016
#define ERR_SQL_OPEN_CONNECTION 1017
#define ERR_STOCKLEVEL_MISSING_THRESHOLD_KEY 1018
#define ERR_STOCKLEVEL_THRESHOLD_INVALID 1019
#define ERR_STOCKLEVEL_THRESHOLD_RANGE 1020
#define ERR_STOCKLEVEL_NOT_PROCESSED 1021
#define ERR_NEWORDER_FORM_MISSING_DID 1022
#define ERR_NEWORDER_DISTRICT_INVALID 1023
#define ERR_NEWORDER_DISTRICT_RANGE 1024
#define ERR_NEWORDER_CUSTOMER_KEY 1025
#define ERR_NEWORDER_CUSTOMER_INVALID 1026
#define ERR_NEWORDER_CUSTOMER_RANGE 1027
#define ERR_NEWORDER_MISSING_IID_KEY 1028
#define ERR_NEWORDER_ITEM_BLANK_LINES 1029
#define ERR_NEWORDER_ITEMID_INVALID 1030
#define ERR_NEWORDER_MISSING_SUPPW_KEY 1031
#define ERR_NEWORDER_SUPPW_INVALID 1032
#define ERR_NEWORDER_MISSING_QTY_KEY 1033
#define ERR_NEWORDER_QTY_INVALID 1034
#define ERR_NEWORDER_SUPPW_RANGE 1035
#define ERR_NEWORDER_ITEMID_RANGE 1036
#define ERR_NEWORDER_QTY_RANGE 1037
#define ERR_PAYMENT_DISTRICT_INVALID 1038
#define ERR_NEWORDER_SUPPW_WITHOUT_ITEMID 1039
#define ERR_NEWORDER_QTY_WITHOUT_ITEMID 1040

#define ERR_NEWORDER_NOITEMS_ENTERED 1041
#define ERR_PAYMENT_MISSING_DID_KEY 1042
#define ERR_PAYMENT_DISTRICT_RANGE 1043
#define ERR_PAYMENT_MISSING_CID_KEY 1044
#define ERR_PAYMENT_CUSTOMER_INVALID 1045
#define ERR_PAYMENT_MISSING_CLT 1046
#define ERR_PAYMENT_LAST_NAME_TO_LONG 1047
#define ERR_PAYMENT_CUSTOMER_RANGE 1048
#define ERR_PAYMENT_CID_AND_CLT 1049
#define ERR_PAYMENT_MISSING_CDI_KEY 1050
#define ERR_PAYMENT_CDI_INVALID 1051
#define ERR_PAYMENT_CDI_RANGE 1052
#define ERR_PAYMENT_MISSING_CWI_KEY 1053
#define ERR_PAYMENT_CWI_INVALID 1054
#define ERR_PAYMENT_CWI_RANGE 1055
#define ERR_PAYMENT_MISSING_HAM_KEY 1056
#define ERR_PAYMENT_HAM_INVALID 1057
#define ERR_PAYMENT_HAM_RANGE 1058
#define ERR_ORDERSTATUS_MISSING_DID_KEY 1059
#define ERR_ORDERSTATUS_DID_INVALID 1060
#define ERR_ORDERSTATUS_DID_RANGE 1061
#define ERR_ORDERSTATUS_MISSING_CID_KEY 1062
#define ERR_ORDERSTATUS_MISSING_CLT_KEY 1063
#define ERR_ORDERSTATUS_CLT_RANGE 1064
#define ERR_ORDERSTATUS_CID_INVALID 1065
#define ERR_ORDERSTATUS_CID_RANGE 1066
#define ERR_ORDERSTATUS_CID_AND_CLT 1067
#define ERR_DELIVERY_MISSING_OCD_KEY 1068
#define ERR_DELIVERY_CARRIER_INVALID 1069
#define ERR_DELIVERY_CARRIER_ID_RANGE 1070
#define ERR_PAYMENT_MISSING_CLT_KEY 1071
#define ERR_CANT_FIND_TPCC_KEY 1072
#define ERR_CANT_FIND_INETINFO_KEY 1073
#define ERR_CANT_FIND_POOLTHREADLIMIT 1074
#define ERR_DB_DELIVERY_NOT_QUEUED 1075
#define ERR_DELIVERY_NOT_PROCESSED 1076
#define ERR_TERM_ALLOCATE_FAILED 1077
#define ERR_PENDING            1078
#define ERR_CANT_START_FRCDINIT_THREAD 1079
#define ERR_CANT_START_DELIVERY_THREAD 1080
#define ERR_GOVERNOR_VALUE_NOT_FOUND 1081
#define ERR_SERVER_MISMATCH    1082
#define ERR_DATABASE_MISMATCH  1083
#define ERR_USER_MISMATCH      1084
#define ERR_PASSWORD_MISMATCH  1085
#define ERR_CANT_CREATE_ALL_THREADS_EVENT 1086
#define ERR_CANT_CREATE_FORCE_THRED_STRT_EVENT 1087
#define ERR_CANT_ALLOCATE_THREAD_LOCAL_STORAGE 1088
#define ERR_CANT_SET_THREAD_LOCAL_STORAGE 1089
#define ERR_FORCE_CONNECT_THREAD_FAILED 1090
#define ERR_CANT_FIND_SERVER_VALUE 1091
#define ERR_NO_MESSAGE         1092
#define ERR_CANT_FIND_PATH_VALUE 1093
#define ERR_CANNOT_CREATE_RESULTS_FILE 1094
#define ERR_DELIVERY_PIPE_SECURITY 1095
#define ERR_DELIVERY_PIPE_CREATE 1096
#define ERR_DELIVERY_PIPE_OPEN 1097
#define ERR_DELIVERY_PIPE_READ 1098
#define ERR_DELIVERY_PIPE_DESTROY 1099
#define ERR_CANT_FIND_DATABASE_VALUE 1100
#define ERR_CANT_FIND_USER_VALUE 1101
#define ERR_CANT_FIND_PASSWORD_VALUE 1102
#define ERR_DELIVERY_OUTPUT_PIPE_WRITE 1103
#define ERR_DELIVERY_OUTPUT_PIPE_READ 1104
#define ERR_DELIVERY_MISSING_QUEUEUETIME_KEY 1105
#define ERR_DELIVERY_QUEUEUETIME_INVALID 1106
#define ERR_ALREADY_LOGGED_IN  1107
#define ERR_INVALID_FORM       1109
#define ERR_DELIVERY_MUST_CONNECTDB 1110
#define ERR_INVALID_FORM_AND_CMD_NOT_BEGIN 1111
#define ERR_MAX_CONNECTIONS_EXCEEDED 1112
#define ERR_CANNOT_FIND_CONNECTION 1113
#define ERR_CKPT_NOT_INITIALIZED 1114
#define ERR_CANT_FIND_CLASS    1115
#define ERR_CANT_FIND_VALUE    1116
#define ERR_LOGFILE_SUBSYSTEM_NOT_INITED 1117
#define ERR_CANT_FIND_TOTAL_DISTRICT_COUNT_VALUE 1118
#define ERR_CANT_FIND_MAXIMUM_CONNECTIONS_VALUE 1119
#define ERR_CANT_FIND_NUMBER_OF_DELIVERY_THREADS_VALUE 1120

```

```

#define
ERR_CANT_FIND_NUMBER_OF_QUEUED_DELIVERY_TRANSACTIONS_VA
LUE 1121
#define ERR_CANT_FIND_USE_DELIVERY_PIPE_VALUE
1122
#define ERR_CANT_FIND_DISPLAY_DELIVERY_COMPLETIONS_VALUE
1123
#define
ERR_CANT_FIND_DELIVERY_SERVER_USES_TRANSACTION_SERVER_VA
LUE 1124
#define ERR_CANT_FIND_FLUSH_DELIVERY_LOG_VALUE
1125
#define ERR_CANT_FIND_WRITE_DELIVERY_LOG_VALUE
1126
#define ERR_CANT_FIND_GENERIC_TRANSACTION_SERVERS_VALUE
1127
#define ERR_CANT_FIND_NUMBER_OF_GC_SERVERS_VALUE
1128
#define ERR_CANT_FIND_NUMBER_OF_DY_SERVERS_VALUE
1129
#define ERR_CANT_FIND_NUMBER_OF_NO_SERVERS_VALUE
1130
#define ERR_CANT_FIND_NUMBER_OF_OS_SERVERS_VALUE
1131
#define ERR_CANT_FIND_NUMBER_OF_PT_SERVERS_VALUE
1132
#define ERR_CANT_FIND_NUMBER_OF_SL_SERVERS_VALUE
1133
#define ERR_CANT_SET_GOVERNOR_VALUE
1134
#define ERR_VALUE_TOO_LONG
1135
#define
ERR_CANT_FIND_ASYNCHRONOUS_TRANSACTION_SERVERS_VALUE
1136
#define ERR_CANT_FIND_TM_VALUE
1137
#define ERR_CANT_LOAD_TM_MODULE
1138
#define ERR_CANT_FIND_TM_FUNC
1139
#define ERR_CANT_UNLOAD_TM_MODULE
1140
#define ERR_CANT_FIND_RUN_ID_VALUE
1141
#define ERR_DELIVERY_PARAMS_FILE
1142
#define ERR_DELIVERY_SHUTDOWN
1143
#define ERR_PAYMENT_MISSING_CID_CLT
1144
#define ERR_HOME_ENV_VAL_NOT_SET
1145
#define ERR_CANT_OPEN_CONFIG_DATABASE
1146
#define ERR_CANT_CREATE_CONFIG_DATABASE
1147
#define ERR_CANT_SET_CONFIG_VALUE
1148
#define ERR_TERM_IO_ERROR
1149
#define ERR_OPERATION_CANCELLED
1150
#define ERR_CANT_DISPLAY_FORM
1151

/* error message structure used in ErrorMessage API */
typedef struct _SERRORMSG
{
    int iError; /* error id of message */
    char szMsg[80]; /* message to sent to browser */
} SERRORMSG;

#ifdef TPCERR_C
SERRORMSG errorMsgs[] =
{
    { ERR_DB_SUCCESS, "Database completed operation successfully." },
    { ERR_DB_ERROR, "Database encountered an error in last operation." },
    { ERR_TRANSPORT_ERROR, "Transaction monitor encountered an error in last
operation." },
    { ERR_DB_INTERFACE, "Database interface module encountered an error in last
operation." },
    { ERR_DB_DEADLOCK_LIMIT, "Database deadlocked trying to complete last
operation." },
    { ERR_DB_NOT_COMMITTED, "Database could not commit last transaction." },
    { ERR_DB_DEAD, "Database has failed." },
    { ERR_DB_PENDING, "Transaction is continuing asynchronously." },
    { ERR_DB_NOT_LOGGED_IN, "Operation can not be completed without logging
in." },
    { ERR_DB_LOGIN_FAILED, "An error occurred while logging into the database." },
    { ERR_DB_USE_FAILED, "Connecting to specified database segment failed." },
    { ERR_DB_LOGOUT_FAILED, "An error occurred while logging out of the
database." },
    { ERR_DB_INVALID_CONTEXT, "The Database Context is invalid." },
    { ERR_DB_INVALID_W_ID, "The warehouse id is not valid." },
    { ERR_DB_INVALID_D_ID, "The district id is not valid." },
    { ERR_DB_INVALID_NO_ITEM_ID, "The item id specified in the new order is
invalid." },
    { ERR_DB_MAX_CONN_EXCEEDED, "The maximum number of database
connections has been exceeded." },
    { ERR_SUCCESS, "Success, no error." },
    { ERR_NO_MESSAGE, "No message string available for the specified error code."
},
    { ERR_COMMAND_UNDEFINED, "Command undefined." },
    { ERR_NOT_IMPLEMENTED_YET, "Not Implemented Yet." },
    { ERR_CANNOT_INIT_TERMINAL, "Cannot initialize client connection." },
    { ERR_OUT_OF_MEMORY, "Insufficient memory." },
    { ERR_NEW_ORDER_NOT_PROCESSED, "Cannot process new Order form." },
    { ERR_PAYMENT_NOT_PROCESSED, "Cannot process payment form." },
    { ERR_NO_SERVER_SPECIFIED, "No Server name specified." },
    { ERR_ORDER_STATUS_NOT_PROCESSED, "Cannot process order status form."
},
    { ERR_W_ID_INVALID, "Invalid Warehouse ID." },
    { ERR_CAN_NOT_SET_MAX_CONNECTIONS, "Insufficient memory to allocate
# connections." },
    { ERR_NOSUCH_CUSTOMER, "No such customer." },
    { ERR_D_ID_INVALID, "Invalid District ID Must be 1 to 10." },
    { ERR_MAX_CONNECT_PARAM, "Max client connections exceeded, run install
to increase." },
    { ERR_INVALID_SYNC_CONNECTION, "Invalid Terminal Sync ID." },
    { ERR_INVALID_TERMID, "Invalid Terminal ID." },
    { ERR_PAYMENT_INVALID_CUSTOMER, "Payment Form, No such Customer."
},
    { ERR_SQL_OPEN_CONNECTION, "SQLOpenConnection API Failed." },
    { ERR_STOCKLEVEL_MISSING_THRESHOLD_KEY, "Stock Level missing
Threshold key \"TT*\"." },
    { ERR_STOCKLEVEL_THRESHOLD_INVALID, "Stock Level Threshold invalid
data type range = 1 - 99." },
    { ERR_STOCKLEVEL_THRESHOLD_RANGE, "Stock Level Threshold out of
range, range must be 1 - 99." },
    { ERR_STOCKLEVEL_NOT_PROCESSED, "Stock Level not processed." },
    { ERR_NEWORDER_FORM_MISSING_DID, "New Order missing District key
\"DID*\"." },
    { ERR_NEWORDER_DISTRICT_INVALID, "New Order District ID Invalid range
1 - 10." },
    { ERR_NEWORDER_DISTRICT_RANGE, "New Order District ID out of Range.
Range = 1 - 10." },
    { ERR_NEWORDER_CUSTOMER_KEY, "New Order missing Customer key
\"CID*\"." },
    { ERR_NEWORDER_CUSTOMER_INVALID, "New Order customer id invalid
data type, range = 1 to 3000." },
    { ERR_NEWORDER_CUSTOMER_RANGE, "New Order customer id out of range,
range = 1 to 3000." },
    { ERR_NEWORDER_MISSING_IID_KEY, "New Order missing Item Id key
\"IID*\"." },
    { ERR_NEWORDER_ITEM_BLANK_LINES, "New Order blank order lines all
orders must be continuous." },
    { ERR_NEWORDER_ITEMID_INVALID, "New Order Item Id is wrong data type,
must be numeric." },
    { ERR_NEWORDER_MISSING_SUPPW_KEY, "New Order missing Supp_W key
\"SP##*\"." },
    { ERR_NEWORDER_SUPPW_INVALID, "New Order Supp_W invalid data type
must be numeric." },
    { ERR_NEWORDER_MISSING_QTY_KEY, "New Order Missing Qty key
\"Qty##*\"." },
    { ERR_NEWORDER_QTY_INVALID, "New Order Qty invalid must be numeric
range 1 - 99." },

```

```

{ ERR_NEWORDER_SUPPW_RANGE, "New Order Supp_W value out of range
range = 1 - Max Warehouses." },
{ ERR_NEWORDER_ITEMID_RANGE, "New Order Item Id is out of range. Range
= 1 to 999999." },
{ ERR_NEWORDER_QTY_RANGE, "New Order Qty is out of range. Range = 1 to
99." },
{ ERR_PAYMENT_DISTRICT_INVALID, "Payment District ID is invalid must be
1 - 10." },
{ ERR_NEWORDER_SUPPW_WITHOUT_ITEMID, "New Order Supp_W field
entered without a corresponding Item_Id." },
{ ERR_NEWORDER_QTY_WITHOUT_ITEMID, "New Order Qty entered without
a corresponding Item_Id." },
{ ERR_NEWORDER_NOITEMS_ENTERED, "New Order Blank Items between
items, items must be continuous." },
{ ERR_PAYMENT_MISSING_DID_KEY, "Payment missing District Key
'DID*.'" },
{ ERR_PAYMENT_DISTRICT_RANGE, "Payment District Out of range, range = 1
- 10." },
{ ERR_PAYMENT_MISSING_CID_KEY, "Payment missing Customer Key
'CID*.'" },
{ ERR_PAYMENT_CUSTOMER_INVALID, "Payment Customer data type invalid,
must be numeric." },
{ ERR_PAYMENT_MISSING_CLT, "Payment missing Customer Last Name Key
'CLT*.'" },
{ ERR_PAYMENT_MISSING_CID_CLT, "Payment entered without Customer ID
or last Name." },
{ ERR_PAYMENT_LAST_NAME_TO_LONG, "Payment Customer last name
longer than 16 characters." },
{ ERR_PAYMENT_CUSTOMER_RANGE, "Payment Customer ID out of range,
must be 1 to 3000." },
{ ERR_PAYMENT_CID_AND_CLT, "Payment Customer ID and Last Name
entered must be one or other." },
{ ERR_PAYMENT_MISSING_CDI_KEY, "Payment missing Customer district key
'CDI*.'" },
{ ERR_PAYMENT_CDI_INVALID, "Payment Customer district invalid must be
numeric." },
{ ERR_PAYMENT_CDI_RANGE, "Payment Customer district out of range must be
1 - 10." },
{ ERR_PAYMENT_MISSING_CWI_KEY, "Payment missing Customer Warehouse
key 'CWI*.'" },
{ ERR_PAYMENT_CWI_INVALID, "Payment Customer Warehouse invalid must
be numeric." },
{ ERR_PAYMENT_CWI_RANGE, "Payment Customer Warehouse out of range, 1
to Max Warehouses." },
{ ERR_PAYMENT_MISSING_HAM_KEY, "Payment missing Amount key
'HAM*.'" },
{ ERR_PAYMENT_HAM_INVALID, "Payment Amount invalid data type must be
numeric." },
{ ERR_PAYMENT_HAM_RANGE, "Payment Amount out of range, 0 - 9999.99."
},
{ ERR_ORDERSTATUS_MISSING_DID_KEY, "Order Status missing District key
'DID*.'" },
{ ERR_ORDERSTATUS_DID_INVALID, "Order Status District invalid, value must
be numeric 1 - 10." },
{ ERR_ORDERSTATUS_DID_RANGE, "Order Status District out of range must be
1 - 10." },
{ ERR_ORDERSTATUS_MISSING_CID_KEY, "Order Status missing Customer
key 'CID*.'" },
{ ERR_ORDERSTATUS_MISSING_CLT_KEY, "Order Status missing Customer
Last Name key 'CLT*.'" },
{ ERR_ORDERSTATUS_CLT_RANGE, "Order Status Customer last name longer
than 16 characters." },
{ ERR_ORDERSTATUS_CID_INVALID, "Order Status Customer ID invalid, range
must be numeric 1 - 3000." },
{ ERR_ORDERSTATUS_CID_RANGE, "Order Status Customer ID out of range
must be 1 - 3000." },
{ ERR_ORDERSTATUS_CID_AND_CLT, "Order Status Customer ID and
LastName entered must be only one." },
{ ERR_DELIVERY_MISSING_OCD_KEY, "Delivery missing Carrier ID key
'OCD*.'" },
{ ERR_DELIVERY_CARRIER_INVALID, "Delivery Carrier ID invalid must be
numeric 1 - 10." },
{ ERR_DELIVERY_CARRIER_ID_RANGE, "Delivery Carrier ID out of range
must be 1 - 10." },
{ ERR_PAYMENT_MISSING_CLT_KEY, "Payment missing Customer Last Name
key 'CLT*.'" },
{ ERR_DB_ERROR, "A Database error has occurred." },
{ ERR_DELIVERY_NOT_PROCESSED, "Delivery not processed." },
{ ERR_DB_DELIVERY_NOT_QUEUED, "Delivery not queued." },
{ ERR_CANT_FIND_TPCC_KEY, "TPCC key not found in registry." },

```

```

{ ERR_CANT_FIND_INETINFO_KEY, "inetinfo key not found in registry." },
{ ERR_CANT_FIND_POOLTHREADLIMIT, "PoolThreadLimit value not set in
inetinfo\Parameters key." },
{ ERR_TERM_ALLOCATE_FAILED, "Failed to allocate terminal data structure." },
{ ERR_DELIVERY_PIPE_SECURITY, "Failed to initialize delivery pipe security."
},
{ ERR_DELIVERY_PIPE_CREATE, "Failed to create delivery pipe." },
{ ERR_DELIVERY_PIPE_OPEN, "Failed to open delivery pipe." },
{ ERR_DELIVERY_PIPE_READ, "Failed to read delivery pipe." },
{ ERR_DELIVERY_PIPE_DESTROY, "Failed to destroy delivery pipe." },
{ ERR_PENDING, "Transaction pending." },
{ ERR_CANT_START_FRCDINIT_THREAD, "Can't start Forced Initialization
thread." },
{ ERR_CANT_START_DELIVERY_THREAD, "Can't start delivery thread." },
{ ERR_GOVERNOR_VALUE_NOT_FOUND, "Governor value not found in
Registry." },
{ ERR_SERVER_MISMATCH, "Server does not match registry value." },
{ ERR_DATABASE_MISMATCH, "Database name does not match registry value."
},
{ ERR_USER_MISMATCH, "User name does not match registry value." },
{ ERR_PASSWORD_MISMATCH, "Password does not match registry value." },
{ ERR_CANT_CREATE_ALL_THREADS_EVENT, "Can't create All Threads
Event." },
{ ERR_CANT_CREATE_FORCE_THRED_STRT_EVENT, "Can't create Force
Thread Start Event." },
{ ERR_CANT_ALLOCATE_THREAD_LOCAL_STORAGE, "Can't allocate thread
local storage." },
{ ERR_CANT_SET_THREAD_LOCAL_STORAGE, "Can't set thread local
storage." },
{ ERR_FORCE_CONNECT_THREAD_FAILED, "At least one database connect
call failed, check log files for specific error." },
{ ERR_CANT_FIND_SERVER_VALUE, "Server value not set in TPCC key." },
{ ERR_CANT_FIND_PATH_VALUE, "PATH value not set in TPCC key." },
{ ERR_CANNOT_CREATE_RESULTS_FILE, "Cannot create results file." },
{ ERR_CANT_FIND_DATABASE_VALUE, "Database value not set in TPCC key."
},
{ ERR_CANT_FIND_USER_VALUE, "User value not set in TPCC key." },
{ ERR_CANT_FIND_PASSWORD_VALUE, "Password value not set in TPCC
key." },
{ ERR_DELIVERY_OUTPUT_PIPE_WRITE, "Failed to write output delivery
pipe." },
{ ERR_DELIVERY_OUTPUT_PIPE_READ, "Failed to read output delivery pipe."
},
{ ERR_DELIVERY_MISSING_QUEUEUETIME_KEY, "Delivery queue time missing
from query." },
{ ERR_DELIVERY_QUEUEUETIME_INVALID, "Delivery queue time is invalid." },
{ ERR_ALREADY_LOGGED_IN, "TPCCConnectDB has already been called." },
{ ERR_DB_NOT_LOGGED_IN, "TPCCConnectDB has not yet been called." },
{ ERR_INVALID_FORM, "The FORM field is missing or invalid." },
{ ERR_DELIVERY_MUST_CONNECTDB, "Specified TM does not allow Delivery
Servers to use Transaction Server queues." },
{ ERR_INVALID_FORM_AND_CMD_NOT_BEGIN, "The FORM field is missing
and CMD is not Begin." },
{ ERR_MAX_CONNECTIONS_EXCEEDED, "The maximum number of
connections has been exceeded." },
{ ERR_CANNOT_FIND_CONNECTION, "Transport layer unable to find a
DBContext corresponding to the CallersContext." },
{ ERR_CKPT_NOT_INITIALIZED, "The checkpoint subsystem has not been
started." },
{ ERR_CANT_FIND_CLASS, "Can't find the specified config variable class." },
{ ERR_CANT_FIND_VALUE, "Can't find the specified config variable." },
{ ERR_LOGFILE_SUBSYSTEM_NOT_INITED, "The Logfile Subsystem has not
been initialized." },
{ ERR_CANT_FIND_TOTAL_DISTRICT_COUNT_VALUE, "TOTAL_DISTRICT_COUNT value not set in TPCC key." },
{ ERR_CANT_FIND_MAXIMUM_CONNECTIONS_VALUE, "MaxConnections
value not set in TPCC key." },
{ ERR_CANT_FIND_NUMBER_OF_DELIVERY_THREADS_VALUE, "NumberOfDeliveryThreads
value not set in TPCC key." },
{ ERR_CANT_FIND_NUMBER_OF_QUEUED_DELIVERY_TRANSACTIONS_VA
LUE, "NumberOfQueuedDeliveryTransactions value not set in TPCC key." },
{ ERR_CANT_FIND_USE_DELIVERY_PIPE_VALUE, "UseDeliveryPipe value
not set in TPCC key." },
{ ERR_CANT_FIND_DISPLAY_DELIVERY_COMPLETIONS_VALUE, "DisplayDeliveryCompletions
value not set in TPCC key." },
{ ERR_CANT_FIND_DELIVERY_SERVER_USES_TRANSACTION_SERVER_VA
LUE, "DeliveryServerUsesTransactionServer value not set in TPCC key." },

```

```

{ ERR_CANT_FIND_FLUSH_DELIVERY_LOG_VALUE, "FlushDeliveryLog
value not set in TPCC key." },
{ ERR_CANT_FIND_WRITE_DELIVERY_LOG_VALUE, "WriteDeliveryLog
value not set in TPCC key." },
{ ERR_CANT_FIND_GENERIC_TRANSACTION_SERVERS_VALUE,
"GenericTransactionServers value not set in TPCC key." },
{ ERR_CANT_FIND_NUMBER_OF_GC_SERVERS_VALUE,
"NumberOfGCServers value not set in TPCC key." },
{ ERR_CANT_FIND_NUMBER_OF_DY_SERVERS_VALUE,
"NumberOfDYServers value not set in TPCC key." },
{ ERR_CANT_FIND_NUMBER_OF_NO_SERVERS_VALUE,
"NumberOfNOServers value not set in TPCC key." },
{ ERR_CANT_FIND_NUMBER_OF_OS_SERVERS_VALUE,
"NumberOfOSServers value not set in TPCC key." },
{ ERR_CANT_FIND_NUMBER_OF_PT_SERVERS_VALUE,
"NumberOfPTServers value not set in TPCC key." },
{ ERR_CANT_FIND_NUMBER_OF_SL_SERVERS_VALUE,
"NumberOfSLServers value not set in TPCC key." },
{ ERR_CANT_SET_GOVERNOR_VALUE, "Can't set ACMSxp governor value in
Registry." },

{ ERR_VALUE_TOO_LONG, "Target string too short for value." },
{ ERR_CANT_FIND_ASYNCHRONOUS_TRANSACTION_SERVERS_VALUE,
"AsynchronousTransactionServers value not set in TPCC key." },
{ ERR_CANT_FIND_TM_VALUE, "TM module not set in TPCC key." },
{ ERR_CANT_LOAD_TM_MODULE, "Failed to load the TM module." },
{ ERR_CANT_FIND_TM_FUNC, "Failed to find TM routine in TM module." },
{ ERR_CANT_UNLOAD_TM_MODULE, "Failed to unload the TM module." },
{ ERR_CANT_FIND_RUN_ID_VALUE, "RUN_ID value not set in TPCC key." },
{ ERR_DELIVERY_PARAMS_FILE, "Error manipulating the delivery server
parameters file." },
{ ERR_DELIVERY_SHUTDOWN, "Error shutting down the delivery subsystem." },
{ ERR_HOME_ENV_VAL_NOT_SET, "FFE environment variable is not set." },
{ ERR_CANT_OPEN_CONFIG_DATABASE, "Can't open the configuration
database." },
{ ERR_CANT_CREATE_CONFIG_DATABASE, "Can't create the configuration
database." },
{ ERR_CANT_SET_CONFIG_VALUE, "Can't set the configuration database
value." },
{ ERR_TERM_IO_ERROR, "A terminal IO error has occurred." },
{ ERR_OPERATION_CANCELLED, "The operation was cancelled." },
{ ERR_CANT_DISPLAY_FORM, "Can't display form." },
{ 0, "" }
};
#else /* TPCCERR_C */
extern SERRORMSG errorMsgs[];
#endif /* TPCCERR_C */

#endif /* TPCCERR_H */

```

tpccstruct.h

```

#ifndef TPCCSTRUCT_H
#define TPCCSTRUCT_H

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*****
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/*****
*****
***** tpcstruct.h
*****
*****
******/

/*
** tpcstruct.h: This header file declares data structures for use in
** application and server
**/
/* Copyright 1996 Digital Equipment Corporation */
/*
** Author: Bill Carr
** (Majority of content from previous work by Ruth Morgenstein)
**
**
**/

#include <time.h>

#ifdef _WIN32
#ifndef BOOLEAN
#define BOOLEAN BOOL
#endif
#define PATH_MAX MAX_PATH
#else
#include <sys/types.h>
#include <sys/time.h>
#define BOOL int
#define BOOLEAN BOOL
#define VMS 0
#define LINEMAX 256
#define Sleep(ms) \
{ struct timeval tv; \
tv.tv_sec=(ms)/1000;tv.tv_usec=((ms)%1000)*1000; \
select(0,NULL,NULL,NULL,&tv); }
#endif

#include <confvar.h>

#define MIN_OL 5
#define MAX_OL 15
#define MAX_OL_QUANTITY 10
#define INVALID_C_ID 0
#define DISTRICTS_PER_WAREHOUSE 10
#define MAX_I_ID_POPULATED 100000
#define MAX_I_ID 200000
#define MAX_C_ID 3000
#define MIN_SL_THRESHOLD 10
#define MAX_SL_THRESHOLD 20
#define MAX_CARRIER_ID 10
#define MAX_PT_AMOUNT_CENTS 500000

#define ILLEGAL_ITEM 111111

#define DELIVERY_RESPONSE_COUNT 2

#ifdef TRANSACTION_DEBUG

#define CALLING_LH 0x0001
#define IN_LH 0x0002
#define IN_RH 0x0004
#define IN_DB 0x0008
#define LEAVING_DB 0x0010
#define LEAVING_RH 0x0020

```



```

# define LEAVING_LH 0x0040
# define CALLING_RESP 0x0080
# define UNRESERVING 0x0100

# define TRANSACTION_DEBUG_STAGE(pTxn,Stage) \
    ((pConnData)(pTxn)->iStage != (Stage))

# define TRANSACTION_DEBUG_STAGE_CHECK(pTxn,Stages) \
    (_ASSERT(((pConnData)(pTxn)->iStage == (Stages)))

# ifndef TRANSACTION_DEBUG_ALL_STAGES
# define TRANSACTION_DEBUG_ALL_STAGES 0x01ff
# endif

# define TRANSACTION_DEBUG_INFO\
    int iStage;

# else /* TRANSACTION_DEBUG */

# define TRANSACTION_DEBUG_INFO
# define TRANSACTION_DEBUG_STAGE(pTxn,Stage)
# define TRANSACTION_DEBUG_STAGE_CHECK(pTxn,Stages)

# endif /* TRANSACTION_DEBUG */

-

# ifdef _WIN32
typedef LONGLONG CallersContext;
# else
typedef long CallersContext;
# endif
typedef void *DBContext;

# define INVALID_DB_CONTEXT NULL

/*
** Function pointer prototypes;
**
*/

typedef struct _NewOrderData *pNewOrderData;
typedef struct _OrderStatusData *pOrderStatusData;
typedef struct _PaymentData *pPaymentData;
typedef struct _StockLevelData *pStockLevelData;

typedef int (*pTPCCNewOrderResponseFunc)( int retcode,
                                           pNewOrderData
                                           pNewOrder );
typedef int (*pTPCCOrderStatusResponseFunc)( int retcode,
                                              pOrderStatusData
                                              pOrderStatus );
typedef int (*pTPCCPaymentResponseFunc)( int retcode, pPaymentData pPayment );
typedef int (*pTPCCStockLevelResponseFunc)( int retcode,
                                             pStockLevelData
                                             pStockLevel );
typedef void (*pTPCCResponseCompleteFunc)( CallersContext CC );

/*
** Data structures descriptions for IO data for each transaction type
**
*/

/* Holds constants for emulation/browser delays for each transaction */
typedef struct _emulated_display_delay_t {
    double menu_delay;
    double txn_delay;
} emulated_display_delay_t;

typedef struct _emulated_display_delay_data_t {
    emulated_display_delay_t dy;
    emulated_display_delay_t no;
    emulated_display_delay_t os;
    emulated_display_delay_t pt;
    emulated_display_delay_t sl;
} emulated_display_delay_data_t;

```

```

typedef struct _DBDate {
    int year; /* 1900 - 2100 */
    int month; /* 1 - 12 */
    int day; /* 1 - 31 */
    int hour; /* 0 - 23 */
    int minute; /* 0 - 59 */
    int second; /* 0 - 59 */
} DBDateData, *pDBDateData;

/* Data common to all transactions that represents the connection to the UI */
/* and the database are built as a macro to reduce duplication. */
# define CONN_DATA \
    int iSize;\
    int iType;\
    TRANSACTION_DEBUG_INFO\
    int w_id;\
    int ld_id;\
    CallersContext CC;\
    int status;\
    int dbstatus;

typedef struct _ConnData
{
    CONN_DATA
} ConnData, *pConnData;

/* DELIVERY is built as a macro so that i_delivery struct is consistant with */
/* the io_delivery struct. Note also that the input portion of the delivery */
/* data can be simply memcpied from the input to the input/output struct. */
# define I_DELIVERY \
    CONN_DATA\
    time_t queue_time;\
    int o_carrier_id;\
    unsigned delta_time; /* in milliseconds */

typedef struct _DeliveryDataInput {
    I_DELIVERY
} DeliveryDataInput, *pDeliveryDataInput;

typedef struct _DeliveryData {
    I_DELIVERY /* see comment above */
    int o_id[10];
} DeliveryData, *pDeliveryData;

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

typedef struct _NewOrderData {
    CONN_DATA
    int d_id;
    int c_id;
    int o_ol_cnt;
    int o_all_local;
    struct io_order_line o_ol[MAX_OL];
    DBDateData o_entry_d;
    char c_last[17];
    char c_credit[3];
    double c_discount;
    double w_tax;
    double d_tax;
    int o_id;
    double tax_n_discount;
    double total_amount;
} NewOrderData;

struct status_order_line {
    int ol_supply_w_id;
    int ol_i_id;
    int ol_quantity;
    double ol_amount;
    DBDateData ol_delivery_d;

```

```

};

typedef struct _OrderStatusData {
    CONN_DATA
    BOOLEAN byname;
    int d_id;
    int c_id;
    char c_last[17];
    char c_first[17];
    char c_middle[3];
    double c_balance;
    int o_id;
    DBDateData o_entry_d;
    int o_carrier_id;
    int o_ol_cnt;
    struct status_order_line s_ol[MAX_OL];
} OrderStatusData;

```

```

typedef struct _PaymentData {
    CONN_DATA
    BOOLEAN byname;
    int d_id;
    int c_id;
    char c_last[17];
    int c_w_id;
    int c_d_id;
    double h_amount;
    DBDateData h_date;
    char w_street_1[21];
    char w_street_2[21];
    char w_city[21];
    char w_state[3];
    char w_zip[10];
    char d_street_1[21];
    char d_street_2[21];
    char d_city[21];
    char d_state[3];
    char d_zip[10];
    char c_first[17];
    char c_middle[3];
    char c_street_1[21];
    char c_street_2[21];
    char c_city[21];
    char c_state[3];
    char c_zip[10];
    char c_phone[17];
    DBDateData c_since;
    char c_credit[3];
    double c_credit_lim;
    double c_discount;
    double c_balance;
    char c_data[201];
} PaymentData;

```

```

typedef struct _StockLevelData {
    CONN_DATA
    int threshold;
    int low_stock;
} StockLevelData;

```

```

typedef struct _CheckpointData {
    CONN_DATA
    int how_many;
    int interval;
} CheckpointData, *pCheckpointData;

```

```

/*
** Data structure for input & output data
*/

```

```

typedef struct _LoginData {
    CONN_DATA
    DatabaseLoginData databaseLogin;
} LoginData, *pLoginData;

```

```

typedef struct _GenericData {
    union {
        ConnData conn;
        LoginData login;
        DeliveryData delivery[1+DELIVERY_RESPONSE_COUNT];
    };
};

```

```

NewOrderData newOrder;
OrderStatusData orderStatus;
PaymentData payment;
StockLevelData stockLevel;
CheckpointData checkpoint;
} info;
} GenericData, *pGenericData;

```

```

/* Data structure for passing startup and configuration data */

```

```

typedef struct _StartupData {
    ConfigData Config;
    DeliveryTransportData DeliveryTransport;
    TransportData Transport;
    LoginData Login;
    int loginDelay;
    char *Path;
    pTPCCNewOrderResponseFunc pTPCCNewOrderResponse;
    pTPCCOrderStatusResponseFunc pTPCCOrderStatusResponse;
    pTPCCPaymentResponseFunc pTPCCPaymentResponse;
    pTPCCStockLevelResponseFunc pTPCCStockLevelResponse;
    pTPCCResponseCompleteFunc pTPCCResponseComplete;
} StartupData, *pStartupData;

```

```

#endif /* TPCSTRUCT_H */

```

web_ui.c

```

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*****_*/

```

```

/*+
* Abstract: This file contains the Digital created front end functions
* for the tpc benchmark.
*
* Author: A Bradley & W Carr
* Creation Date: May 1997
*
* Modified history:
*
*
*/
#include <windows.h>
#include <winsock2.h>

```

```

#include <stdio.h>
#include <stdarg.h>
#include <malloc.h>
#include <stdlib.h>
#include <string.h>
#include <time.h>
#include <sys/timeb.h>
#include <io.h>
#include <crtdbg.h>
#include <process.h>

#define WEB_UI_C
#include <tpccerr.h>
#include <tpccstruct.h>
#include <tpccapi.h>
#include <htptext.h>

#include <tpcc.h>
#include <web_ui.h>
#include <config.h>
#include <ckpt.h>
#include <transpool.h>
#include <tm_util.h>
#include <reg.h>

#ifdef FFE_DEBUG
#include <crtdbg.h>
static int tmpDbgFlag;
static _HFILE hMemFile;
#endif

#define PUT_STRING(szString, iLen, pStart, pStruct) \
pStruct.szStr=szString; pStruct.iIndex=pStart; pStruct.iFieldSize=iLen;

#define CONVERT_SPECIAL(pout, pin, iwid)
{
char *out = pout;
char *in = pin;
int wid = iwid;
while( wid && '\0' != *in )
{
if( '>' == *in )
{ *out++='&'; *out++='g'; *out++='\t'; *out++=';'; }
else if( '<' == *in )
{ *out++='&'; *out++='l'; *out++='\t'; *out++=';'; }
else if( '&' == *in )
{ *out++='&'; *out++='a'; *out++='m'; *out++='p'; *out++=';'; }
else if( '^' == *in )
{ *out++='&'; *out++='q'; *out++='\u'; *out++='o'; *out++='\t'; *out++=';'; }
else
{ *out++=*in; }
in++;
wid--;
}
while( wid-- ) *out++ = ' ';
}

/* define indexes for the building of the forms */
/* defines for new order */
#define NO_WDID 0
#define NO_WID NO_WDID + 1
#define NO_DID NO_WID + 1
#define NO_DATE NO_DID + 1
#define NO_CID NO_DATE + 1
#define NO_LAST NO_CID + 1
#define NO_CREDIT NO_LAST + 1
#define NO_DISC NO_CREDIT + 1
#define NO_OID NO_DISC + 1
#define NO_LINES NO_OID + 1
#define NO_W_TAX NO_LINES + 1
#define NO_D_TAX NO_W_TAX + 1
#define NO_S_WID NO_D_TAX + 1
#define NO_IID NO_S_WID + 1
#define NO_INAME NO_IID + 1
#define NO_QTY NO_INAME + 1
#define NO_STOCK NO_QTY + 1
#define NO_BG NO_STOCK + 1
#define NO_PRICE NO_BG + 1
#define NO_AMT NO_PRICE + 1

#define NO_STAT NO_AMT + (14*8) + 1
#define NO_TOTAL NO_STAT + 1

/* defines for payment input form */
#define PT_WDID_INPUT 0
#define PT_WID_INPUT PT_WDID_INPUT + 1

/* defines for payment output form */
#define PT_WDID 0
#define PT_LONG_DATE PT_WDID + 1
#define PT_WID PT_LONG_DATE + 1
#define PT_DID PT_WID + 1
#define PT_W_ST_1 PT_DID + 1
#define PT_D_ST_1 PT_W_ST_1 + 1
#define PT_W_ST_2 PT_D_ST_1 + 1
#define PT_D_ST_2 PT_W_ST_2 + 1
#define PT_W_CITY PT_D_ST_2 + 1
#define PT_W_ST PT_W_CITY + 1
#define PT_W_ZIP PT_W_ST + 1
#define PT_D_CITY PT_W_ZIP + 1
#define PT_D_ST PT_D_CITY + 1
#define PT_D_ZIP PT_D_ST + 1
#define PT_CID PT_D_ZIP + 1
#define PT_C_WID PT_CID + 1
#define PT_C_DID PT_C_WID + 1
#define PT_FIRST PT_C_DID + 1
#define PT_MIDDLE PT_FIRST + 1
#define PT_LAST PT_MIDDLE + 1
#define PT_SM_DATE PT_LAST + 1
#define PT_C_STR_1 PT_SM_DATE + 1
#define PT_CREDIT PT_C_STR_1 + 1
#define PT_C_STR_2 PT_CREDIT + 1
#define PT_DISC PT_C_STR_2 + 1
#define PT_C_CITY PT_DISC + 1
#define PT_C_ST PT_C_CITY + 1
#define PT_C_ZIP PT_C_ST + 1
#define PT_C_PHONE PT_C_ZIP + 1
#define PT_AMT PT_C_PHONE + 1
#define PT_BAL PT_AMT + 1
#define PT_LIM PT_BAL + 1
#define PT_CUST_DATA PT_LIM + 1

/* defines for order status */
#define OS_WDID 0
#define OS_WID OS_WDID + 1
#define OS_DID OS_WID + 1
#define OS_CID OS_DID + 1
#define OS_FIRST OS_CID + 1
#define OS_MIDDLE OS_FIRST + 1
#define OS_LAST OS_MIDDLE + 1
#define OS_BAL OS_LAST + 1
#define OS_OID OS_BAL + 1
#define OS_DATE OS_OID + 1
#define OS_CAR_ID OS_DATE + 1
#define OS_S_WID OS_CAR_ID + 1
#define OS_IID OS_S_WID + 1
#define OS_QTY OS_IID + 1
#define OS_AMT OS_QTY + 1
#define OS_SM_DATE OS_AMT + 1
/* defines for delivery form */
#define D_WDID 0
#define D_WID D_WDID + 1
#define D_CAR D_WID + 1
#define D_QUEUE1 D_CAR + 1
#define D_DELTA1 D_QUEUE1 + 1
#define D_WID1 D_DELTA1 + 1
#define D_CAR1 D_WID1 + 1
#define D_OID10 D_CAR1 + 1
#define D_OID11 D_OID10 + 1
#define D_OID12 D_OID11 + 1
#define D_OID13 D_OID12 + 1
#define D_OID14 D_OID13 + 1
#define D_OID15 D_OID14 + 1
#define D_OID16 D_OID15 + 1
#define D_OID17 D_OID16 + 1
#define D_OID18 D_OID17 + 1
#define D_OID19 D_OID18 + 1
#define D_QUEUE2 D_OID19 + 1
#define D_DELTA2 D_QUEUE2 + 1
#define D_WID2 D_DELTA2 + 1

```

```

#define D_CAR2 D_WID2 + 1
#define D_OID20 D_CAR2 + 1
#define D_OID21 D_OID20 + 1
#define D_OID22 D_OID21 + 1
#define D_OID23 D_OID22 + 1
#define D_OID24 D_OID23 + 1
#define D_OID25 D_OID24 + 1
#define D_OID26 D_OID25 + 1
#define D_OID27 D_OID26 + 1
#define D_OID28 D_OID27 + 1
#define D_OID29 D_OID28 + 1

/* defines for stock level form */
#define SL_WDID 0
#define SL_WID SL_WDID + 1
#define SL_DID SL_WID + 1
#define SL_TH SL_DID + 1
#define SL_LOW SL_TH + 1

#define NUMBER_POOL_FORM_TYPES 5
#define DELIVERY_FORM 0
#define NEW_ORDER_FORM 1
#define ORDER_STATUS_FORM 2
#define PAYMENT_FORM 3
#define STOCK_LEVEL_FORM 4

#define NUMBER_POOL_RESPONSE_TYPES 5
#define DELIVERY_RESPONSE 0
#define NEW_ORDER_RESPONSE 1
#define ORDER_STATUS_RESPONSE 2
#define PAYMENT_RESPONSE 3
#define STOCK_LEVEL_RESPONSE 4

#ifdef FFE_DEBUG
#define FFE_ASSERT(arg) _ASSERT(arg)
#else
#define FFE_ASSERT(arg)
#endif

#define RESERVE_FORM(type,szForm)\
{\
    EnterCriticalSection( &gpForms->critSec[type] );\
    FFE_ASSERT( gpForms->iNextFreeForm[type] <= gpForms->iMaxIndex[type] );\
    szForm = gpForms->index[gpForms->iFirstFormIndex[type] +\
        gpForms->iNextFreeForm[type]++];\
    LeaveCriticalSection( &gpForms->critSec[type] );\
}

#define UNRESERVE_FORM(type,szForm)\
{\
    EnterCriticalSection( &gpForms->critSec[type] );\
    FFE_ASSERT( gpForms->iNextFreeForm[type] > 0 );\
    gpForms->index[gpForms->iFirstFormIndex[type] +\
        --gpForms->iNextFreeForm[type]] = szForm;\
    LeaveCriticalSection( &gpForms->critSec[type] );\
}

#define RESERVE_RESPONSE(type,szResponse)\
{\
    EnterCriticalSection( &gpResponses->critSec[type] );\
    FFE_ASSERT(gpResponses->iNextFreeResponse[type]<=gpResponses->iMaxIndex[type]);\
    szResponse = gpResponses->index[gpResponses->iFirstResponseIndex[type] +\
        gpResponses->iNextFreeResponse[type]++];\
    LeaveCriticalSection( &gpResponses->critSec[type] );\
}

#define UNRESERVE_RESPONSE(type,szResponse)\
{\
    EnterCriticalSection( &gpResponses->critSec[type] );\
    FFE_ASSERT(gpResponses->iNextFreeResponse[type] > 0 );\
    gpResponses->index[gpResponses->iFirstResponseIndex[type] +\
        --gpResponses->iNextFreeResponse[type]] = szResponse;\
    LeaveCriticalSection( &gpResponses->critSec[type] );\
}

#define RESERVE_PANIC_FORM(szForm)\
{\
    EnterCriticalSection( &gpPanicForms->critSec );\
    FFE_ASSERT( gpPanicForms->iNextFree <= gpPanicForms->iMaxIndex );\
    szForm = gpPanicForms->index[gpPanicForms->iNextFree++];\
    LeaveCriticalSection( &gpPanicForms->critSec );\
}

#define UNRESERVE_PANIC_FORM(szForm)\
{\
    EnterCriticalSection( &gpPanicForms->critSec );\
    FFE_ASSERT( gpPanicForms->iNextFree > 0 );\
    gpPanicForms->index[--gpPanicForms->iNextFree] = szForm;\
    LeaveCriticalSection( &gpPanicForms->critSec );\
}

#if 0
CMD 0
FORM ID 3
LOGIN WAREHOUSE 4
LOGIN DISTRICT 5
DELI QUEUE TIME 6
CARRIER ID 7
DISTRICT 8
CUSTOMER 9
NEWORDER FIELDS A-X,a-u
CUST LAST NAME Y
CUST WAREHOUSE Z
CUST DISTRICT v
AMOUNT PAID w
THRESHOLD x
#endif

#define MENU_BAR \
"<HR>"\
"<INPUT TYPE=submit NAME=0 VALUE=NewOrder>"\
"<INPUT TYPE=submit NAME=0 VALUE=Payment>"\
"<INPUT TYPE=submit NAME=0 VALUE=Delivery>"\
"<INPUT TYPE=submit NAME=0 VALUE=OrderStatus>"\
"<INPUT TYPE=submit NAME=0 VALUE=StockLevel>"\
"<INPUT TYPE=submit NAME=0 VALUE=Exit>"

static char szFormTemplate[] =
"<BODY><FORM ACTION=%s METHOD=GET>";

static char szWelcomeFormTemplate[] =
"<BODY><FORM ACTION=%s METHOD=GET>"
"<INPUT TYPE=hidden \"PAGE_STR/**/GREETING_PAGE_ID\"00>"
"Please Identify your Warehouse and District for this session.<BR>"
"Warehouse ID <INPUT NAME=4 SIZE=5><BR>"
"District ID <INPUT NAME=5 SIZE=2><BR>"
"<HR>"
"<INPUT TYPE=submit NAME=0 VALUE=Submit>"
"</FORM>"END_BODY_STR;

static char szWelcomeForm[sizeof(szWelcomeFormTemplate)+FILENAME_SIZE];
static int iWelcomeFormLen;

static char szMainMenuFormTemplate[] =
"<BODY><FORM ACTION=%s METHOD=GET>"
"<INPUT TYPE=hidden \"PAGE_STR/**/MENU_BAR_PAGE_ID\"%06d>"
"%55.55s<BR>"
"Select Desired Transaction.<BR>"
MENU_BAR
"</FORM>"END_BODY_STR;

static char szDeliveryFormTemp2i[] =
"<INPUT TYPE=hidden \"PAGE_STR/**/DY_FORM_PAGE_ID\"#####>"
"<INPUT TYPE=hidden NAME=6 VALUE=0>"
"<PRE> Delivery<BR>"
W_ID_STR"#####<BR><BR>"
"Carrier Number: <INPUT NAME=7 SIZE=1><BR><BR>"
EXECUTION_STATUS"<BR><PRE>"
"<HR><INPUT TYPE=submit NAME=0 VALUE=Process>"
"<INPUT TYPE=submit NAME=0 VALUE=Menu>"
"</FORM>"END_BODY_STR;

static char szDeliveryFormTemp2p[] =
"<INPUT TYPE=hidden \"PAGE_STR/**/DY_RESP_PAGE_ID\"#####>"
"<PRE> Delivery<BR>"
W_ID_STR"#####<BR><BR>"
"Carrier Number: ##<BR><BR>"
EXECUTION_STATUS"Delivery has been queued.<BR>"
DELI_DATA_STR_1

```



```

"Credit Limit:<BR><BR><Cust-Data: <BR><BR><BR><BR></PRE><HR>"
"<INPUT TYPE=submit NAME=0 VALUE=Process>"
"<INPUT TYPE=submit NAME=0 VALUE=Menu>"
"</FORM>"END_BODY_STR;

static char szPaymentFormTemp2p[] =
"<INPUT TYPE=hidden "PAGE_STR/**/PT_RESP_PAGE_ID"#####>"
"<PRE>
Payment<BR>"
"Date: #####<BR><BR>"
W_ID_STR"#### "D_ID_STR"##<BR>"
#####<BR>"
#####<BR>"
#####<BR>"
#####<BR>"
"<BR><BR>"
"Customer: #### Cust-Warehouse: ##### Cust-District: ##<BR>"
"Name: ##### Since: #####<BR>"
"##### Credit: ##<BR>"
"##### %Disc: #####<BR>"
"##### Phone: #####"
"<BR><BR>"
"Amount Paid: $##### New Cust Balance: $#####<BR>"
"Credit Limit: $#####<BR><BR>"
"Cust-Data: #####<BR>"
"#####<BR>"
"#####<BR>"
"#####<BR>"
"</PRE>"
MENU_BAR
"</FORM>"END_BODY_STR;

```

```

static char szStockLevelFormTemp2i[] =
"<INPUT TYPE=hidden "PAGE_STR/**/SL_FORM_PAGE_ID"#####>"
"<PRE>
Stock-Level<BR>"
W_ID_STR"#### "D_ID_STR"##<BR><BR>"
"Stock Level Threshold: <INPUT NAME=x SIZE=2><BR><BR>"
"low stock: <BR><HR>"
"<INPUT TYPE=submit NAME=0 VALUE=Process>"
"<INPUT TYPE=submit NAME=0 VALUE=Menu>"
"</FORM>"END_BODY_STR;

```

```

static char szStockLevelFormTemp2p[] =
"<INPUT TYPE=hidden "PAGE_STR/**/SL_RESP_PAGE_ID"#####>"
"<PRE>
Stock-Level<BR>"
W_ID_STR"#### "D_ID_STR"##<BR><BR>"
"Stock Level Threshold: ##<BR><BR>"
"low stock: ###"
"</PRE>"
MENU_BAR
"</FORM>"END_BODY_STR;

```

```

static char szErrorFormTemplate[] =
"<BODY><FORM ACTION=%s METHOD=GET>"
"<INPUT TYPE=hidden "PAGE_STR/**/ERROR_PAGE_ID"%06d>"
ERROR_VALUE_STR"%d: %s"
MENU_BAR
"</FORM>"END_BODY_STR;

```

```

static char szResponseHeaderTemplate[] =
"Connection: keep-alive\r\n"
"Content-Type: text/html\r\n"
"Content-Length: #####\r\n"
"\r\n";
static char szResponseHeader[sizeof(szResponseHeaderTemplate)];
FORM_INDEXES responseHeaderIndexes[1] = { 0 };
int responseHeaderLen = 0;

```

```

#define MATCHES_BEGIN(p) (B==p[0])
#define MATCHES_CHECKPOINT(p) \
(0==strcmp(p,"Checkpoint",strlen("Checkpoint")))
#define MATCHES_CHECKPOINT_STARTUP(p) \
(0==strcmp(p,"CheckpointStartup",strlen("CheckpointStartup")))
#define MATCHES_CHECKPOINT_SHUTDOWN(p) \
(0==strcmp(p,"CheckpointShutdown",strlen("CheckpointShutdown")))
#define MATCHES_CLEAR(p) (C==p[0]&&1==p[1])
#define MATCHES_DELIVERY(p) (D==p[0])
#define MATCHES_EXIT(p) (E==p[0])
#define MATCHES_MENU(p) (M==p[0])
#define MATCHES_NEWORDER(p) (N==p[0])

```

```

#define MATCHES_ORDERSTATUS(p) (O==p[0])
#define MATCHES_PAYMENT(p) (P==p[0]&&a==p[1])
#define MATCHES_PROCESS(p) (P==p[0]&&r==p[1])
#define MATCHES_STOCKLEVEL(p) (S==p[0]&&t==p[1])
#define MATCHES_SUBMIT(p) (S==p[0]&&u==p[1])
#define FFE_DEBUG
#define MATCHES_MEMORYCHECK(p) (!==p[0]&&M==p[1])
#endif

```

```

/* function prototypes */
void BeginCmd( EXTENSION_CONTROL_BLOCK *pECB );
void CheckpointCmd( EXTENSION_CONTROL_BLOCK *pECB, int w_id, int ld_id );
void CheckpointStartupCmd( EXTENSION_CONTROL_BLOCK *pECB, int w_id, int ld_id );
void CheckpointShutdownCmd( EXTENSION_CONTROL_BLOCK *pECB, int w_id, int ld_id );
void ClearCmd( EXTENSION_CONTROL_BLOCK *pECB );
void ExitCmd( EXTENSION_CONTROL_BLOCK *pECB, int w_id, int ld_id );
void MenuCmd( EXTENSION_CONTROL_BLOCK *pECB, int w_id, int ld_id );
void SubmitCmd( EXTENSION_CONTROL_BLOCK *pECB, int *w_id, int *ld_id );
void MemoryCheckCmd( EXTENSION_CONTROL_BLOCK *pECB, int w_id, int ld_id );

```

```

BOOL GetKeyValuePtr( char *szIPtr, char *szKey, char **pszOPtr );
BOOL GetCharKeyValuePtr( char *szIPtr, char *cKey, char **pszOPtr );
BOOL GetKeyValueString( char *szIPtr, char *szKey, char *szValue, int iSize );
BOOL GetWDID(char *ptr, int *lw_id, int *ld_id, char **optr);

```

```

int GetCallingThreadLimit( int *pCallingThreadLimit );
void Log( char *szType, char *szStr );
void MakePanicPool( DWORD dwResponseSize );
void MakeResponseHeader( void );
void MakeTemplatePool( DWORD dwFormSize, DWORD dwResponseSize );
void DeletePanicPool( void );
void DeleteTemplatePool( void );

```

```

int ProcessDeliveryQuery( EXTENSION_CONTROL_BLOCK *pECB, char *IpszQueryString, int w_id, int ld_id );
int ProcessNewOrderQuery( EXTENSION_CONTROL_BLOCK *pECB, char *IpszQueryString, int w_id, int ld_id );
int ProcessOrderStatusQuery( EXTENSION_CONTROL_BLOCK *pECB, char *IpszQueryString, int w_id, int ld_id );
int ProcessPaymentQuery( EXTENSION_CONTROL_BLOCK *pECB, char *IpszQueryString, int w_id, int ld_id );
int ProcessStockLevelQuery( EXTENSION_CONTROL_BLOCK *pECB, char *IpszQueryString, int w_id, int ld_id );

```

```

DWORD ProcessQueryString(EXTENSION_CONTROL_BLOCK *pECB);

void PutNumeric( int iInt, int iFieldSize, char *pChar );
void SendErrorResponse( EXTENSION_CONTROL_BLOCK *pECB, int iError, char *szMsg, int w_id, int ld_id, pConnData pConn );

```

```

void SendMainMenuForm( EXTENSION_CONTROL_BLOCK *pECB, int w_id, int ld_id, char *szStatus );
void SendResponse(EXTENSION_CONTROL_BLOCK *pECB, char *szStr, int iStrLen);
void SendWelcomeForm(EXTENSION_CONTROL_BLOCK *pECB);
#ifdef FFE_DEBUG
unsigned __stdcall CheckMemory(void *param);
#endif

```

```

/* typedefs */
typedef struct
{
char *szStr;
int iIndex;
int iFieldSize;
int iNewIndex;
int iNewFieldSize;
} PutStrStruct, *pPutStrStruct;
typedef struct

```

```

{
    CRITICAL_SECTION critSec;
#ifdef FFE_DEBUG
    int    iMaxIndex;
#endif
    int    iNextFree;
    char   *index[1];
    char   forms[PANIC_FORM_SIZE];
} PanicStruct, *pPanicStruct;

typedef struct
{
    CRITICAL_SECTION critSec[NUMBER_POOL_FORM_TYPER];
#ifdef FFE_DEBUG
    int    iMaxIndex[NUMBER_POOL_FORM_TYPER];
#endif
    int    iNextFreeForm[NUMBER_POOL_FORM_TYPER];
    int    iFirstFormIndex[NUMBER_POOL_FORM_TYPER];
    char   *index[1];
    char   forms[1];
} FormStruct, *pFormStruct;

typedef struct
{
    CRITICAL_SECTION critSec[NUMBER_POOL_RESPONSE_TYPER];
#ifdef FFE_DEBUG
    int    iMaxIndex[NUMBER_POOL_RESPONSE_TYPER];
#endif
    int    iNextFreeResponse[NUMBER_POOL_RESPONSE_TYPER];
    int    iFirstResponseIndex[NUMBER_POOL_RESPONSE_TYPER];
    char   *index[1];
    char   responses[1];
} ResponseStruct, *pResponseStruct;

/* global variables */
static int    iInitStatus    = ERR_SUCCESS;
static CRITICAL_SECTION startupCriticalSection;
static BOOL   startupFlag    = FALSE;

static BOOL   bLog           = FALSE;
static char   szModName[FILENAME_SIZE] = { '\0' };
static char   szPath[FILENAME_SIZE]    = { '\0' };

static pPanicStruct gpPanicForms    = NULL;
static int    giPanic                = 0;
static pFormStruct gpForms          = 0;
static int    giFormLen[NUMBER_POOL_FORM_TYPER] = { 0 };
static pResponseStruct gpResponses  = 0;
static int    giResponseLen[NUMBER_POOL_RESPONSE_TYPER] = { 0 };

/* FUNCTION: BOOL APIENTRY DllMain(HANDLE hModule, DWORD
ul_reason_for_call,
*
*                               LPVOID lpReserved)
*
* PURPOSE:      This is the main entry point to an ISAPI dll. All dll
*               global initializations should be done in this routine.
*
* ARGUMENTS:    HANDLE    hModule           dll
module handle
*               DWORD     ul_reason_for_call reason for call
*               LPVOID    lpReserved       reserved for future use
*
* RETURNS:      BOOL      Always TRUE      Errors in
initialization
*
*               are
presented at the first
*
*               screen to
the user.
* COMMENTS:    None
*
*/

BOOL APIENTRY
DllMain(HANDLE hModule, DWORD ul_reason_for_call, LPVOID lpRes)
{
    char   szTmpFileName[FILENAME_SIZE];
    DWORD  dwFileNameLen;
    char   *pChr;

    switch(ul_reason_for_call)
    {
        case DLL_PROCESS_ATTACH:
#ifdef FFE_DEBUG
            tmpDbgFlag = _CrtSetDbgFlag(_CRTDBG_REPORT_FLAG);
            tmpDbgFlag |= _CRTDBG_CHECK_CRIT_DF;
            tmpDbgFlag |= _CRTDBG_LEAK_CHECK_DF;
            tmpDbgFlag |= _CRTDBG_ALLOC_MEM_DF;
            tmpDbgFlag |= _CRTDBG_CHECK_ALWAYS_DF;
            _CrtSetDbgFlag(tmpDbgFlag);

            hMemFile = CreateFile( "MemErrors", GENERIC_WRITE, FILE_SHARE_READ,
NULL,
                                OPEN_ALWAYS,
FILE_ATTRIBUTE_NORMAL, NULL );

            _CrtSetReportMode( _CRT_WARN, _CRTDBG_MODE_FILE );
            _CrtSetReportFile( _CRT_WARN, hMemFile );
            _CrtSetReportMode( _CRT_ERROR, _CRTDBG_MODE_FILE );
            _CrtSetReportFile( _CRT_ERROR, hMemFile );
            _CrtSetReportMode( _CRT_ASSERT, _CRTDBG_MODE_FILE );
            _CrtSetReportFile( _CRT_ASSERT, hMemFile );
#endif
            #ifdef
            #endif
            #ifdef DEBUG_ENTRY
            *(int *)0 = 1;
            #endif
            InitializeCriticalSection( &startupCriticalSection );

            dwFileNameLen = GetModuleFileName( hModule, szTmpFileName,
FILENAME_SIZE-1);
            if( 0 == dwFileNameLen )
                return FALSE;

            pChr = strchr( szTmpFileName, '\\' );
            if( NULL == pChr )
                return FALSE;

            pChr++;
            dwFileNameLen = strlen( pChr );
            if( 0 >= dwFileNameLen )
                return FALSE;

            CopyMemory( szModName, pChr, dwFileNameLen+1 );

            iWelcomeFormLen = sprintf( szWelcomeForm, szWelcomeFormTemplate,
szModName);

            if( ERR_SUCCESS != iInitStatus )
                return TRUE;

            break;
        case DLL_THREAD_ATTACH:
            break;
        case DLL_THREAD_DETACH:
            break;
        case DLL_PROCESS_DETACH:

            pTPCCShutdown();

            pDeleteTransactionPool();
            DeleteTemplatePool();
            DeletePanicPool();

            DeleteCriticalSection( &startupCriticalSection );

            pTPCCCloseLog();

            break;
    }
    return TRUE;
}

/* FUNCTION: BOOL WINAPI GetExtensionVersion(HSE_VERSION_INFO
*pVersion)
*
* PURPOSE:      This function is called by the inet service when the DLL
is first loaded.
*
* ARGUMENTS:    HSE_VERSION_INFO *pVersion passed in structure in
which to
place expected

```

```

*
* version
number.
*
* RETURNS: TRUE expected
return value.
*
* COMMENTS: None
*/

BOOL WINAPI
GetExtensionVersion(HSE_VERSION_INFO *pVersion)
{
    pVersion->dwExtensionVersion =
    MAKELONG(HSE_VERSION_MINOR, HSE_VERSION_MAJOR);
    strncpy(pVersion->lpszExtensionDesc,
        "Digital TPC-C Server.",
        HSE_MAX_EXT_DLL_NAME_LEN-1);
    *(pVersion->lpszExtensionDesc) = '\0';

    return TRUE;
}

/* FUNCTION: DWORD WINAPI
HttpExtensionProc(EXTENSION_CONTROL_BLOCK *pECB)
*
* PURPOSE: This function is the main entry point for the TPCC DLL.
* The internet service calls this function passing in the
* http string.
*
* ARGUMENTS: EXTENSION_CONTROL_BLOCK *pECB structure
ptr containing the internet
service information.
*
* RETURNS: DWORD HSE_STATUS_SUCCESS
connection can be dropped if error
*
* HSE_STATUS_SUCCESS_AND_KEEP_CONN keep connect valid
comment
sent
*
* COMMENTS: None
*/

DWORD WINAPI
HttpExtensionProc(EXTENSION_CONTROL_BLOCK *pECB)
{
    #pragma message ("FIXME: If the server is set improperly, and the delivery servers
    fail to log in in a min TM sybase config, the failure is not reported until the user tries
    to log in.")
    int Len = sizeof( szPath ) - 1;
    StartupData Startup;
    pStartupData pStartup = &Startup;
    DWORD status;
    int dbstatus;
    int formPoolSize;
    int responsePoolSize;
    int panicPoolSize = 0;
    int transactionPoolSize;
    int transportThreadLimit;
    int callingThreadLimit;
    int transMode;
    #ifdef FFE_DEBUG
    unsigned long ulHandle;
    unsigned uTAddr;
    #endif

    if ( ! startupFlag ) {
        EnterCriticalSection( &startupCriticalSection );
        if ( ! startupFlag ) {
            if ( ERR_SUCCESS == iInitStatus ) {
                MakeResponseHeader( );
                pStartup->Path = szPath;
            }
            if ( ERR_SUCCESS == iInitStatus ) {
                iInitStatus = GetCallingThreadLimit( &callingThreadLimit );
            }
        }
    }

    if( ERR_SUCCESS == iInitStatus ) {
        iInitStatus = TPCCGetConfig( &bLog,
        &Len, pStartup->Path,
        &pStartup->Login, &pStartup-
        >loginDelay,
        &pStartup->Config,
        &pStartup->Transport,
        &pStartup->DeliveryTransport
    );
    }
    if ( ERR_SUCCESS == iInitStatus ) {
        iInitStatus = TPCCLoad( );
    }
    if ( ERR_SUCCESS == iInitStatus ) {
        pTPCCOpenLog( szPath );
    }
    if ( ERR_SUCCESS == iInitStatus ) {
        iInitStatus = pTPCCGetTransportMode( &transMode );
    }
    if( ERR_SUCCESS == iInitStatus ) {
        /* The transaction pool size represents the maximum number of */
        /* transactions that can be carried by any part of the system. */
        /* Start out with each calling thread able to carry a transaction. */
        transactionPoolSize = callingThreadLimit;
    }

    /* We need to see how we should run the transport. */
    pStartup->Transport.asynchronous &= ( TRANS_ASYNC == transMode
    );

    if( pStartup->Transport.generic ) {
        transportThreadLimit = pStartup->Transport.num_gc;
    }
    else {
        transportThreadLimit = pStartup->Transport.num_dy +
        pStartup->Transport.num_no + pStartup->Transport.num_os +
        pStartup->Transport.num_pt + pStartup->Transport.num_sl;
    }

    /* Menu transactions are only carried by the web server */
    /* and hence are limited by the count of web server threads. */
    formPoolSize = callingThreadLimit;

    if( pStartup->Transport.asynchronous ) {
        /* Delivery transactions and their interactive response */
        /* are carried by the web server threads since they are */
        /* synchronous. Database transactions and their responses */
        /* are limited by transport threads. Therefore the maximum */
        /* number of concurrent responses is the greater of the */
        /* web server and transport thread counts. */
        responsePoolSize = MAX( callingThreadLimit, transportThreadLimit );

        /* Panic forms are used either to report errors or to */
        /* handle the case where a response required the quoting */
        /* of a character that is an HTML special character. */
        /* The maximum number of these forms is also the greater of the */
        /* web server and transport thread counts. */
        panicPoolSize = MAX( callingThreadLimit, transportThreadLimit );

        /* Asynchronous transport threads can carry a transaction. */
        transactionPoolSize += transportThreadLimit;
    }
    else {
        /* If the transport runs synchronously, only web server */
        /* threads can generate any form of response. */
        responsePoolSize = callingThreadLimit;
        panicPoolSize = callingThreadLimit;
    }

    /* Add the transactions carried by the delivery subsystem. */
    transactionPoolSize += pStartup->DeliveryTransport.num_threads +
    pStartup->DeliveryTransport.num_queued_deliveries +
    pStartup->DeliveryTransport.num_queued_responses;

    MakeTemplatePool( formPoolSize, responsePoolSize );
    MakePanicPool( panicPoolSize );
    pMakeTransactionPool( transactionPoolSize );
    pStartup->pTPCCNewOrderResponse = TPCCNewOrderResponse;
    pStartup->pTPCCOrderStatusResponse = TPCCOrderStatusResponse;
    pStartup->pTPCCPaymentResponse = TPCCPaymentResponse;
}

```



```

pStartup->pTPCCStockLevelResponse = TPCCStockLevelResponse;
pStartup->pTPCCResponseComplete = TPCCResponseComplete;
dbstatus = pTPCCStartup( pStartup );
if( ERR_DB_SUCCESS != dbstatus ) {
    iInitStatus = dbstatus;
}
#ifdef FFE_DEBUG
    ulHandle = _beginthreadex( NULL, 0, CheckMemory, NULL, 0,
&uTAddr);
    _ASSERT( 0 != ulHandle );
#endif
}
startupFlag = TRUE;
}
LeaveCriticalSection( &startupCriticalSection );
}

if( ERR_SUCCESS != iInitStatus )
{
    if( NULL == gpPanicForms ) {
        MakePanicPool( 50 );
    }
    SendErrorResponse(pECB, iInitStatus, NULL, -1, -1, NULL);
    return HSE_STATUS_SUCCESS;
}

/* if registry setting is for html logging then show http string passed in.*/
if ( bLog )
{
    pTPCCLog( "%s %s\r\n", " * QUERY *", pECB->lpszQueryString );
}

/* process http query */
status = ProcessQueryString(pECB);

/* finish up with status returned by Processing functions */
return status;
}

/* FUNCTION: void SendErrorResponse( EXTENSION_CONTROL_BLOCK
*pECB, int iError,
char *szMsg,
int w_id, int ld_id )
*
* PURPOSE: This function displays an error form in the client browser.
*
* ARGUMENTS: EXTENSION_CONTROL_BLOCK *pECB IIS
context structure pointer
unique to
this connection.
int iError id of error
message
int w_id Login
warehouse ID.
int ld_id Login
district ID.
char *szMsg optional
error message string
used with
ERR_TYPE_SQL and
ERR_TYPE_DBLIB
*
* RETURNS: None
*
*/

void
SendErrorResponse( EXTENSION_CONTROL_BLOCK *pECB, int iError,
char *szMsg, int w_id, int ld_id, pConnData pConn )
{
    char *szForm;
    int iStrLen;
    char *szDefaultErr = "Unable to look up this error
code.";
    char *szErrorMsg;
    static char szNoMsg[] = "";

    if ( !szMsg )
        szMsg = szNoMsg;

```

```

RESERVE_PANIC_FORM( szForm );

szErrorMsg = ( NULL == pTPCCErrString ) ?
szDefaultErr : pTPCCErrString( iError );

if( NULL != pTPCCErr )
{
    if( NULL != pConn )
        pTPCCErr( "Transaction error. w_id: %d, ld_id: %d, CC: %I64x, "
"status: %d, dbstatus: %d, (%d): %s\r\n",
pConn->w_id, pConn->ld_id, pConn->CC,
pConn->status, pConn->dbstatus, iError, szErrorMsg );
    else
        pTPCCErr( "(%d): %s\r\n", iError, szErrorMsg );
}

iStrLen = sprintf( szForm, szErrorFormTemplate, szModName,
WDID(w_id,ld_id), iError, szErrorMsg );

SendResponse(pECB, szForm, iStrLen);

UNRESERVE_PANIC_FORM( szForm );
}

/* FUNCTION: void HandlePanic(pPutStrStruct pStruct,
char *szInput, int iInputSize,
char **szOutput, int *iOutputSize )
*
* PURPOSE: This routine handles the case where the output string contains
* at least one of the special characters double quote ("), ampersand (&),
* less than (<), or greater than (>). What it does is scan the strings
* to be output checking for all special characters. It then moves the
* input string template sections further along in the output string
* making enough room for the strings including their special quoted
* characters, then fills the new template with the output strings.
*
* ARGUMENTS:
*
* RETURNS: void
*
* COMMENTS:
*/

void
HandlePanic( pPutStrStruct pStruct,
char *szInput, int iInputSize,
char **szOutput, int *iOutputSize )
{
    pPutStrStruct pStructTmp1;
    pPutStrStruct pStructTmp2;
    char *pIChar;
    int iExtra;
    int iTotalExtra;
    char *szTmp;

    RESERVE_PANIC_FORM( szTmp );

    /* first, save what we've done so far */
    *szOutput = szTmp;
    memcpy( szTmp, szInput, pStruct->iIndex );

    /* save the original values for string moving */
    pStructTmp1 = pStruct;
    while( NULL != pStructTmp1->szStr ) {
        pStructTmp1->iNewIndex = pStructTmp1->iIndex;
        pStructTmp1->iNewFieldSize = pStructTmp1->iFieldSize;
        pStructTmp1++;
    }

    /* parse all remaining strings for special characters and fix indices */
    pStructTmp1 = pStruct;
    iTotalExtra = 0;
    while( NULL != pStructTmp1->szStr ) {
        pIChar = pStructTmp1->szStr;
        iExtra = 0;
        while( 0 != *pIChar )
        {
            if( "" == *pIChar )
                iExtra += 5;

```

```

else if( '&' == *pIChar )
    iExtra += 4;
else if( '<' == *pIChar )
    iExtra += 3;
else if( '>' == *pIChar )
    iExtra += 3;
pIChar++;
}

/* reset field width for this string */
pStructTmp1->iNewFieldSize += iExtra;

/* move all following indicies */
for( pStructTmp2 = pStructTmp1+1;
    NULL != pStructTmp2->szStr;
    pStructTmp2++)
    pStructTmp2->iNewIndex += iExtra;

pStructTmp1++;
iTotalExtra += iExtra;
}

/* update new string length */
*iOutputSize = iInputSize + iTotalExtra;

/* move end of string to new output string */
--pStructTmp1;
memcpy( &szTmp[pStructTmp1->iNewIndex + pStructTmp1->iNewFieldSize],
        &szInput[pStructTmp1->iIndex + pStructTmp1->iFieldSize],
        iInputSize - pStructTmp1->iIndex + pStructTmp1->iFieldSize);

/* move input string pieces to new locations in output string */
pStructTmp2 = pStructTmp1--;
while( pStruct != pStructTmp2 )
{
    memcpy( &szTmp[pStructTmp1->iNewIndex + pStructTmp1->iNewFieldSize],
            &szInput[pStructTmp1->iIndex + pStructTmp1->iFieldSize],
            pStructTmp2->iIndex -
            ( pStructTmp1->iIndex + pStructTmp1->iFieldSize ));
    pStructTmp2 = pStructTmp1--;
}

/* Now put in the strings */
pStructTmp1 = pStruct;
while( NULL != pStructTmp1->szStr ) {
    CONVERT_SPECIAL( &szTmp[pStructTmp1->iNewIndex], pStructTmp1->szStr,
                    pStructTmp1->iNewFieldSize );
    pStructTmp1++;
}
}

/* FUNCTION: void SendResponse(EXTENSION_CONTROL_BLOCK *pECB, char
*szForm,
*
*
* int iStrLen)
*
* PURPOSE:
* This function takes the forms generated by each transaction routine
* and calls the server callback function to pass it on to the browser.
*
* ARGUMENTS:
* EXTENSION_CONTROL_BLOCK *pECB Server
context structure.
* char *szForm form to pass to
browser.
* int iStrLen length of form
excluding null.
*
* RETURNS:
* None
*
* COMMENTS:
*/

void
SendResponse(EXTENSION_CONTROL_BLOCK *pECB, char *szForm, int
iStrLen)
{
    char szHeader1[sizeof(szResponseHeader)];
    static char szHeader[] = "200 Ok";
    static int iSize = sizeof(szHeader)-1;

```

```

int lpbSize;

lpbSize = iStrLen + 1;

if ( bLog )
    pTPCCLog( "%s %s\r\n", "** RESPONSE **", szForm );

CopyMemory( szHeader1, szResponseHeader, sizeof(szResponseHeader) );
PutNumeric(lpbSize, responseHeaderIndexes[0].iLen,
            &szHeader1[responseHeaderIndexes[0].iStartIndex]);

(*pECB->ServerSupportFunction)(pECB->ConnID,
HSE_REQ_SEND_RESPONSE_HEADER,
                                szHeader, &iSize,
(LPDWORD)szHeader1);
(*pECB->WriteClient)(pECB->ConnID, szForm, &lpbSize, 0);
}

/* FUNCTION: ParseTemplateString(char *szForm, int *pcurLen,
*
* char *formTemplate,
FORM_INDEXES *indexes)
*
* PURPOSE: This function parses the query string to find the ## signs
* that mark the positions for the values to be put, and
* stores these locations and lengths in the indexes structure.
*
* ARGUMENTS: char *szForm the resultant form
* int *pcurLen the current length of szForm
* char *formTemplate the form's template
* FORM_INDEXES *indexes ptr to the array of indexes for the
* tag values of the form
*
* RETURNS: void
*
* COMMENTS:
*/

void
ParseTemplateString(char *szForm, int *pcurLen,
                    char *formTemplate, FORM_INDEXES *indexes)
{
    int curIndex = 0;
    int ii = 0;
    int jj;
    int curLen;

    curLen = *pcurLen;
    while ( '\0' != formTemplate[ii] )
    {
        if( '#' != formTemplate[ii] )
        {
            szForm[curLen] = formTemplate[ii];
            ii++;
            curLen++;
        }
        else
        {
            jj = 0;
            indexes[curIndex].iStartIndex = curLen;
            while( '#' == formTemplate[ii] )
            {
                jj++;
                szForm[curLen] = formTemplate[ii];
                curLen++;
                ii++;
            }
            indexes[curIndex].iLen = jj;
            curIndex++;
        }
    }
    szForm[curLen] = '\0';
    *pcurLen = curLen;
}

/* FUNCTION: void PutNumeric(int iInt, int iFieldSize, char *pChar )
*
* PURPOSE: This function converts an integer to a char string.
*
* ARGUMENTS: int iInt the integer to convert
to string

```

```

*           int      iFieldSize  max size of char string to return.
*           char      *pChar      the string to put the int
into.
*
* RETURNS:      None
*
* COMMENTS:     If the Integer value exceeds the max field size, then
*               the string will be filled with iFieldSize "*" to signal
*               an error.
*/

```

```

void
PutNumeric( int iInt, int iFieldSize, char *pChar )
{

```

```

    int iSaveSize = iFieldSize;
    char *pSaveStart = pChar;
    char pAsterisk[] = "*****";
    BOOL bSignFlag = TRUE;

```

```

    pChar += (iFieldSize - 1);
    if(0 > iInt)
    {
        bSignFlag = FALSE;
        iInt = abs(iInt);
    }

```

```

do
{
    *pChar = ( iInt % 10 ) + '0';
    iInt /= 10;
    iFieldSize--;
    if( iFieldSize )
        pChar--;
} while( iFieldSize );

```

```

if( !bSignFlag )
{
    if('0' == *pChar)
        *pChar = '-';
    else
    {
        memcpy( pSaveStart, pAsterisk, iSaveSize );
        return;
    }
}

```

```

if( 0 != iInt )
{
    /* put in string of ** to signal error */
    memcpy( pSaveStart, pAsterisk, iSaveSize );
}
}

```

```

/* FUNCTION: void SendDeliveryForm( EXTENSION_CONTROL_BLOCK
*pECB,
*
*               int w_id, int ld_id )
*
* PURPOSE:      This function puts the data into the input form and then
*               returns the form to the browser.
*
* ARGUMENTS:    EXTENSION_CONTROL_BLOCK *pECB    structure
pointer to passed in
*
*               internet
service information.
*               int      w_id      Login
warehouse ID.
*               int      ld_id     Login
district ID.
&
* RETURNS:      None
*
* COMMENTS:     None
*/

```

```

void
SendDeliveryForm( EXTENSION_CONTROL_BLOCK *pECB, int w_id, int ld_id )
{
    char *deliveryForm;

```

```

RESERVE_FORM( DELIVERY_FORM, deliveryForm );

PutNumeric(WDID(w_id,ld_id),
            deliveryFormIndexesI[D_WDID].iLen,
            &deliveryForm[deliveryFormIndexesI[D_WDID].iStartIndex]);

PutNumeric(w_id,
            deliveryFormIndexesI[D_WID].iLen,
            &deliveryForm[deliveryFormIndexesI[D_WID].iStartIndex]);

SendResponse(pECB, deliveryForm, giFormLen[DELIVERY_FORM]);

UNRESERVE_FORM( DELIVERY_FORM, deliveryForm );
}

```

```

/* FUNCTION: void SendNewOrderForm( EXTENSION_CONTROL_BLOCK
*pECB,
*
*               int w_id, int ld_id )
*
* PURPOSE:      This function puts the data into the input form and then
*               returns the form to the browser.
*
* ARGUMENTS:    EXTENSION_CONTROL_BLOCK *pECB    pointer to
the structure that
*
*               is passed
in the internet
*               int      w_id      warehouse id
*               int      ld_id     login district id
*
* RETURNS:      None
*
* COMMENTS:     None
*/

```

```

void
SendNewOrderForm( EXTENSION_CONTROL_BLOCK *pECB, int w_id, int ld_id )
{
    char *newOrderForm;

    RESERVE_FORM( NEW_ORDER_FORM, newOrderForm );

    PutNumeric(WDID(w_id,ld_id),
                newOrderFormIndexes[NO_WDID].iLen,
                &newOrderForm[newOrderFormIndexes[NO_WDID].iStartIndex]);

    PutNumeric(w_id,
                newOrderFormIndexes[NO_WID].iLen,
                &newOrderForm[newOrderFormIndexes[NO_WID].iStartIndex]);

    SendResponse(pECB, newOrderForm, giFormLen[NEW_ORDER_FORM]);

    UNRESERVE_FORM( NEW_ORDER_FORM, newOrderForm );
}

```

```

/* FUNCTION: void SendPaymentForm(EXTENSION_CONTROL_BLOCK *pECB,
*
*               int w_id, int ld_id, DBContext
*pdb)
*
* PURPOSE:      This function puts the data into the input form and then
*               returns the form to the browser.
*
* ARGUMENTS:    EXTENSION_CONTROL_BLOCK *pECB    pointer to
structure passed in
*
*               the
internet
*               int      w_id
*               warehouse id
*               int      ld_id     login
district id
*
* RETURNS:      None
*
* COMMENTS:     None
*/

```

```

void
SendPaymentForm( EXTENSION_CONTROL_BLOCK *pECB, int w_id, int ld_id )
{

```

```

char      *paymentForm;

RESERVE_FORM( PAYMENT_FORM, paymentForm );

PutNumeric(WDID(w_id,ld_id),
           paymentFormIndexes[PT_WDID_INPUT].iLen,

&paymentForm[paymentFormIndexes[PT_WDID_INPUT].iStartIndex]);
/* the date field is before wid for the response so use 2 here */
PutNumeric(w_id,
           paymentFormIndexes[PT_WID_INPUT].iLen,

&paymentForm[paymentFormIndexes[PT_WID_INPUT].iStartIndex]);

SendResponse(pECB, paymentForm, giFormLen[PAYMENT_FORM]);

UNRESERVE_FORM( PAYMENT_FORM, paymentForm );
}

/* FUNCTION: void SendOrderStatusForm(EXTENSION_CONTROL_BLOCK
*pECB,
*
int w_id, int ld_id,
DBCContext *pdb)
*
* PURPOSE:      This function fills in data and then sends the order status
*               input form back to the browser.
*
* ARGUMENTS:    EXTENSION_CONTROL_BLOCK *pECB      ptr to
structure passed in the
*               internet.
*               int      w_id      warehouse id
*               int      ld_id     login district id
*
* RETURNS:      None
*
* COMMENTS:     None
*/

void
SendOrderStatusForm( EXTENSION_CONTROL_BLOCK *pECB, int w_id, int
ld_id )
{
char      *orderStatusForm;

RESERVE_FORM( ORDER_STATUS_FORM, orderStatusForm );

PutNumeric(WDID(w_id,ld_id),
           orderStatusFormIndexes[OS_WDID].iLen,
           &orderStatusForm[orderStatusFormIndexes[OS_WDID].iStartIndex]);
PutNumeric(w_id,
           orderStatusFormIndexes[OS_WID].iLen,
           &orderStatusForm[orderStatusFormIndexes[OS_WID].iStartIndex]);
SendResponse(pECB, orderStatusForm, giFormLen[ORDER_STATUS_FORM]);

UNRESERVE_FORM( ORDER_STATUS_FORM, orderStatusForm );
}

/* FUNCTION: void SendStockLevelForm(EXTENSION_CONTROL_BLOCK
*pECB,
*
int w_id, int d_id,
DBCContext *pdb)
*
* PURPOSE:      This function puts the data into the input form and then
*               returns the form to the browser.
*
* ARGUMENTS:    EXTENSION_CONTROL_BLOCK *pECB      structure
pointer to passed
*               in internet
service information
*               int      w_id
warehouse id
*               int      d_id      district id
*               DBCContext *pdb     pointer to database
context.
*
* RETURNS:      None
*
* COMMENTS:     None
*/

*/

void
SendStockLevelForm( EXTENSION_CONTROL_BLOCK *pECB, int w_id, int d_id )
{
char      *stockLevelForm;

RESERVE_FORM( STOCK_LEVEL_FORM, stockLevelForm );

PutNumeric(WDID(w_id,d_id),
           stockLevelFormIndexes[SL_WDID].iLen,
           &stockLevelForm[stockLevelFormIndexes[SL_WDID].iStartIndex]);
PutNumeric(w_id,
           stockLevelFormIndexes[SL_WID].iLen,
           &stockLevelForm[stockLevelFormIndexes[SL_WID].iStartIndex]);
PutNumeric(d_id,
           stockLevelFormIndexes[SL_DID].iLen,
           &stockLevelForm[stockLevelFormIndexes[SL_DID].iStartIndex]);

SendResponse(pECB, stockLevelForm, giFormLen[STOCK_LEVEL_FORM]);

UNRESERVE_FORM( STOCK_LEVEL_FORM, stockLevelForm );
}

/* FUNCTION: void SendMainMenuForm(EXTENSION_CONTROL_BLOCK
*pECB,
*
int w_id, int ld_id, char
*szStatus)
*
* PURPOSE:      This function sends the main menu form to the browser.
*
* ARGUMENTS:    EXTENSION_CONTROL_BLOCK *pECB      IIS
context structure pointer
*               unique to
this connection.
*               int      w_id
warehouse id
*               int      ld_id     login
district id
*               char      *szStatus      String to report
previous
*               operation
status.
*
* RETURNS:      None
*
* COMMENTS:     */

void
SendMainMenuForm( EXTENSION_CONTROL_BLOCK *pECB,
int w_id, int ld_id, char *szStatus )
{
char      *szForm;
int      iStrLen;
static char *szNoStatus = "";
char      *pszStatus;

pszStatus = ( NULL == szStatus ) ? szNoStatus : szStatus;

RESERVE_PANIC_FORM( szForm );

iStrLen = sprintf( szForm, szMainMenuFormTemplate,
szModName, WDID(w_id,ld_id), pszStatus );

SendResponse(pECB, szForm, iStrLen);

UNRESERVE_PANIC_FORM( szForm );
}

/* FUNCTION: void SendWelcomeForm(EXTENSION_CONTROL_BLOCK
*pECB)
*
* PURPOSE:      This function sends the welcome form to the browser.
*
* ARGUMENTS:    None
*/

```

```

* RETURNS:      None
*
* COMMENTS:     The welcome form is generated on initialization.
*/

void
SendWelcomeForm(EXTENSION_CONTROL_BLOCK *pECB)
{
    SendResponse( pECB, szWelcomeForm, iWelcomeFormLen );
}

/* FUNCTION: DWORD ProcessQueryString(EXTENSION_CONTROL_BLOCK
*pECB)
*
* PURPOSE:      This function extracts the relevant information out
*               of the http command passed in from the browser.
*
* ARGUMENTS:   EXTENSION_CONTROL_BLOCK *pECB    IIS
context structure pointer
*
* RETURNS:     DWORD
connection status code
*
* COMMENTS:    If this is the initial connection i.e. client is at
*               welcome screen then there will not be a terminal id or
*               current form id if this is the case then the pTermid and
*               pFormid return values are undefined.
*/

DWORD
ProcessQueryString(EXTENSION_CONTROL_BLOCK *pECB)
{
    static char *beginptr = "Begin";
    char *ptr;
    char *cmdptr;
    int cFormID;
    int w_id;
    int ld_id;
    DWORD status;
    int retcode;

    w_id = 0;
    ld_id = 0;

    if ( GetCharKeyValuePtr( pECB->lpszQueryString, '3', &ptr ) )
    {
        cFormID = *ptr++;
        if( !GetWDID( ptr, &w_id, &ld_id, &ptr ) ) {
            SendErrorResponse( pECB, ERR_W_ID_INVALID, NULL, w_id, ld_id, NULL );
            return HSE_STATUS_SUCCESS_AND_KEEP_CONN;
        }
    }
    else
        cFormID = '\0';

    /* now figure out what command we have and execute it */
    if ( !GetCharKeyValuePtr( ptr, '0', &cmdptr ) )
    {
        if( 0 == strlen( pECB->lpszQueryString ) ) {
            cmdptr = beginptr;
        }
        else {
            SendErrorResponse( pECB, ERR_COMMAND_UNDEFINED, NULL, w_id,
ld_id, NULL );
            return HSE_STATUS_SUCCESS_AND_KEEP_CONN;
        }
    }

    if( '\0' == cFormID && !MATCHES_BEGIN( cmdptr ) ) {
        SendErrorResponse( pECB, ERR_INVALID_FORM_AND_CMD_NOT_BEGIN,
NULL,
            w_id, ld_id, NULL );
        return HSE_STATUS_SUCCESS_AND_KEEP_CONN;
    }

    status = HSE_STATUS_SUCCESS_AND_KEEP_CONN;
    if( MATCHES_PROCESS( cmdptr ) )
    {

```

```

        if( 'N' == cFormID )
            retcode = ProcessNewOrderQuery( pECB, ptr, w_id, ld_id );
        else if( 'P' == cFormID )
            retcode = ProcessPaymentQuery( pECB, ptr, w_id, ld_id );
        else if( 'D' == cFormID )
            retcode = ProcessDeliveryQuery( pECB, ptr, w_id, ld_id );
        else if( 'O' == cFormID )
            retcode = ProcessOrderStatusQuery( pECB, ptr, w_id, ld_id );
        else if( 'S' == cFormID )
            retcode = ProcessStockLevelQuery( pECB, ptr, w_id, ld_id );
        else {
            SendErrorResponse( pECB, ERR_INVALID_FORM, NULL, w_id, ld_id, NULL
);
            return HSE_STATUS_SUCCESS_AND_KEEP_CONN;
        }

        if( ERR_DB_PENDING == retcode )
            status = HSE_STATUS_PENDING;
        else if( ERR_DB_SUCCESS != retcode ) {
            #pragma message ("FIXME: This is likely the second error report since the
Process*Query functions do their own error reporting!! This is bad because we put
two error messages on the wire and this could confuse the next transaction.")
            SendErrorResponse( pECB, retcode, NULL, w_id, ld_id, NULL );
            return HSE_STATUS_SUCCESS_AND_KEEP_CONN;
        }
    }
    else if( MATCHES_PAYMENT( cmdptr ) )
        SendPaymentForm( pECB, w_id, ld_id );
    else if( MATCHES_NEWORDER( cmdptr ) )
        SendNewOrderForm( pECB, w_id, ld_id );
    else if( MATCHES_DELIVERY( cmdptr ) )
        SendDeliveryForm( pECB, w_id, ld_id );
    else if( MATCHES_ORDERSTATUS( cmdptr ) )
        SendOrderStatusForm( pECB, w_id, ld_id );
    else if( MATCHES_STOCKLEVEL( cmdptr ) )
        SendStockLevelForm( pECB, w_id, ld_id );
    else if( MATCHES_EXIT( cmdptr ) )
        ExitCmd( pECB, w_id, ld_id );
    else if( MATCHES_SUBMIT( cmdptr ) )
        SubmitCmd( pECB, &w_id, &ld_id );
    else if( MATCHES_BEGIN( cmdptr ) )
        BeginCmd( pECB );
    else if( MATCHES_MENU( cmdptr ) )
        MenuCmd( pECB, w_id, ld_id );
    else if( MATCHES_CLEAR( cmdptr ) )
        ClearCmd( pECB );

    #pragma message ("FIXME: The ordering of the checkpoint commands is important,
because strcmp( 'CheckpointShutdown', 'Checkpoint', strlen( 'Checkpoint' )) is a
match.")
    else if( MATCHES_CHECKPOINT_STARTUP( cmdptr ) )
        CheckpointStartupCmd( pECB, w_id, ld_id );
    else if( MATCHES_CHECKPOINT_SHUTDOWN( cmdptr ) )
        CheckpointShutdownCmd( pECB, w_id, ld_id );
    else if( MATCHES_CHECKPOINT( cmdptr ) )
        CheckpointCmd( pECB, w_id, ld_id );
    #ifdef FFE_DEBUG
    else if( MATCHES_MEMORYCHECK( cmdptr ) )
        MemoryCheckCmd( pECB, w_id, ld_id );
    #endif
    else
        SendErrorResponse( pECB, ERR_COMMAND_UNDEFINED, NULL, w_id, ld_id,
NULL );

    return status;
}

/* FUNCTION: PutFloat2(double dVal, int iFieldSize, char *pChar )
*
* PURPOSE:      This function converts a double into a char string
*               in the format of xx.xx
*
* ARGUMENTS:   double        dVal            the value to convert to
char
*
*               int        iFieldSize       max size of char string
*               char       pChar           string where to put value
*
* RETURNS:     void
*
* COMMENTS:    If the double exceeds the max field size entered,
*               the char string will be filled with iFieldSize *'s

```

```

*
*          to signal an error
*/

void
PutFloat2( double dVal, int iFieldSize, char *pChar )
{
    int iInt;
    int iDecimal;
    BOOL bSignFlag = TRUE;
    int iSaveSize = iFieldSize;
    char *pSaveStart = pChar;
    char pAsterisk[] = "*****";

    pChar += (iFieldSize - 1);

    if(0 > dVal)
    {
        bSignFlag = FALSE;
        iInt = abs((int)( dVal * 100. ));
    }
    else
    {
        iInt = (int)( dVal * 100. );
    }
    iDecimal = 2;
    do
    {
        *pChar-- = ( iInt % 10 ) + '0';
        iInt /= 10;
        iFieldSize--;
    } while( --iDecimal );

    *pChar-- = '.';
    iFieldSize--;

    do
    {
        *pChar-- = ( iInt % 10 ) + '0';
        iInt /= 10;
        iFieldSize--;
    } while( iFieldSize && iInt != 0 );

    if( !iFieldSize && iInt != 0 )
    {
        /* put in string of ** to signal error */
        memcpy(pSaveStart, pAsterisk, iSaveSize);
        return;
    }
    if(!bSignFlag)
    {
        iFieldSize--;
        if( 0 >= iFieldSize )
        {
            /* put in string of ** to signal error */
            memcpy(pSaveStart, pAsterisk, iSaveSize);
            return;
        }
        *pChar-- = '-';
    }

    /* Fill in the remaining spaces in the field with blanks. */
    while( iFieldSize-- )
        *pChar-- = ' ';
}

/* FUNCTION: void PutHTMLStrings( pPutStrStruct pStruct,
*
*          char *szInput, int
iInputSize,
*
*          char **szOutput, int
*iOutputSize )
*
* PURPOSE: This routine takes a template output string and a data structure
*
* containing strings, positions, and field widths of strings to be
*
* compiled into the template. The routine scans all input strings to
*
* determine if any contain special charaters that need to be quoted
*
* in the output string. If none exist, the template is filled with
*
* the desired strings. If at least one special character exists in
*
* the output strings, a more expensive routine is called to build a
*
* new output string template containing the quoted strings.
*
* ARGUMENTS: pPutStrStruct    pStruct    pointer to structure containing the

```

```

*
*          strings, positions and
field lengths.
*
*          char          *szInput    pointer to input form
*          int          iInputSize  length of the input form
*          char          **szOutput  pointer to the new input form
*
*          it may or
may not be different
*
*          than the
input form.
*
*          int          iOutputSize length of the new input form.
*
* RETURNS: none
*
* COMMENTS: none
*/

void
PutHTMLStrings( pPutStrStruct pStruct,
                char *szInput, int iInputSize,
                char **szOutput, int *iOutputSize )
{
    char *pIChar;
    char *pOChar;
    int    iFieldSize;

    while( NULL != pStruct->szStr )
    {
        pIChar = pStruct->szStr;
        pOChar = szInput + pStruct->iIndex;
        iFieldSize = pStruct->iFieldSize;
        while( 0 != *pIChar && iFieldSize )
        {
            /* '>' is the highest ACSII value of the special characters. */
            /* If '>' is greater than the character is question, check further. */
            if( '>' > *pIChar )
            {
                if( '"' == *pIChar || '\'' == *pIChar ||
                    '<' == *pIChar || '>' == *pIChar )
                {
                    /* We have found at least one special character in the desired */
                    /* output string, go the the more expensive routine to build */
                    /* the desired output string. */
                    InterlockedIncrement(&gIPanic );
                    HandlePanic( pStruct, szInput, iInputSize, szOutput, iOutputSize );
                    return;
                }
                else
                    *pOChar = *pIChar;
            }
            else
                *pOChar = *pIChar;

            pIChar++;
            pOChar++;
            iFieldSize--;
        }

        /* Fill in the remaining spaces in the field with blanks. */
        while( iFieldSize-- )
            *pOChar++ = ' ';

        pStruct++;
    }

    /* The output string is the template and the length is unchanged */
    *szOutput = szInput;
    *iOutputSize = iInputSize;

    return;
}

/* FUNCTION: int TPCCDeliveryResponse( EXTENSION_CONTROL_BLOCK
*PECB,
*
*          int retcode,
*          DeliveryData
*deliveryData )
*
* PURPOSE: This function fills in the values and returns the
*
* response form to the browser.
*

```

```

* ARGUMENTS:      EXTENSION_CONTROL_BLOCK *pECB
*                 int                      retcode return code
from db
*                 DeliveryData             *deliveryData pointer
to the delivery
*
structure.
*
* RETURNS:        none
*
* COMMENTS:       none
*/

```

```

int
TPCCDeliveryResponse( int retcode, pDeliveryData pDelivery,
                    pDeliveryData
                    pCompletedDeliveries[DELIVERY_RESPONSE_COUNT] )
{
    int ssCnt = 0;
    char *szOutput;
    int iOutputLen;
    PutStrStruct StrStruct[2];
    char *deliveryForm;
    int ii, jj, index;
    pDeliveryData pCompletedDelivery;
    static DeliveryData blankDelivery = { 0 };
    EXTENSION_CONTROL_BLOCK *pECB;

    pECB = (EXTENSION_CONTROL_BLOCK *)pDelivery->CC;

    if ( ERR_DB_PENDING == retcode )
    {
        return( retcode );
    }
    else if ( ERR_DB_DEADLOCK_LIMIT == retcode )
    {
        SendErrorResponse( pECB, ERR_DELIVERY_NOT_PROCESSED, NULL,
                          pDelivery->w_id, pDelivery->ld_id,
                          (pConnData)pDelivery );
        TRANSACTION_DEBUG_STAGE( pDelivery, UNRESERVING );
        pUnreserveTransactionStruct( DELIVERY_TRANS, &pDelivery );
        for( ii = 0; ii < DELIVERY_RESPONSE_COUNT; ii++ )
        {
            if( NULL != pCompletedDeliveries[ii] )
            {
                TRANSACTION_DEBUG_STAGE( pCompletedDeliveries[ii],
                UNRESERVING );
                pUnreserveTransactionStruct( DELIVERY_TRANS,
                &pCompletedDeliveries[ii]);
            }
        }
    }
    else if ( ERR_DB_SUCCESS != retcode )
    {
        SendErrorResponse( pECB, ERR_DB_DELIVERY_NOT_QUEUED, NULL,
                          pDelivery->w_id, pDelivery->ld_id,
                          (pConnData)pDelivery );
        TRANSACTION_DEBUG_STAGE( pDelivery, UNRESERVING );
        pUnreserveTransactionStruct( DELIVERY_TRANS, &pDelivery );
        for( ii = 0; ii < DELIVERY_RESPONSE_COUNT; ii++ )
        {
            if( NULL != pCompletedDeliveries[ii] )
            {
                TRANSACTION_DEBUG_STAGE( pCompletedDeliveries[ii],
                UNRESERVING );
                pUnreserveTransactionStruct( DELIVERY_TRANS,
                &pCompletedDeliveries[ii]);
            }
        }
    }
    else
    {
        RESERVE_RESPONSE( DELIVERY_RESPONSE, deliveryForm );

        PutNumeric(WDID(pDelivery->w_id,pDelivery->ld_id),
                  deliveryFormIndexesP[D_WDID].iLen,
                  &deliveryForm[deliveryFormIndexesP[D_WDID].iStartIndex]);
        PutNumeric(pDelivery->w_id,
                  deliveryFormIndexesP[D_WID].iLen,
                  &deliveryForm[deliveryFormIndexesP[D_WID].iStartIndex]);
    }
}

```

```

PutNumeric(pDelivery->o_carrier_id,
            deliveryFormIndexesP[D_CAR].iLen,
            &deliveryForm[deliveryFormIndexesP[D_CAR].iStartIndex]);
TRANSACTION_DEBUG_STAGE( pDelivery, UNRESERVING );
pUnreserveTransactionStruct( DELIVERY_TRANS, &pDelivery );

index = D_QUEUE1;
for( ii = 0; ii < DELIVERY_RESPONSE_COUNT; ii++ ) {
    if( NULL == pCompletedDeliveries[ii] )
        pCompletedDelivery = &blankDelivery;
    else
        pCompletedDelivery = pCompletedDeliveries[ii];
    PutNumeric(pCompletedDelivery->queue_time,
              deliveryFormIndexesP[index].iLen,
              &deliveryForm[deliveryFormIndexesP[index].iStartIndex]);
    index++;
    PutNumeric(pCompletedDelivery->delta_time,
              deliveryFormIndexesP[index].iLen,
              &deliveryForm[deliveryFormIndexesP[index].iStartIndex]);
    index++;
    PutNumeric(pCompletedDelivery->w_id,
              deliveryFormIndexesP[index].iLen,
              &deliveryForm[deliveryFormIndexesP[index].iStartIndex]);
    index++;
    PutNumeric(pCompletedDelivery->o_carrier_id,
              deliveryFormIndexesP[index].iLen,
              &deliveryForm[deliveryFormIndexesP[index].iStartIndex]);
    index++;
    for( jj = 0; jj < DISTRICTS_PER_WAREHOUSE; jj++ ) {
        PutNumeric(pCompletedDelivery->o_id[jj],
                  deliveryFormIndexesP[index].iLen,
                  &deliveryForm[deliveryFormIndexesP[index].iStartIndex]);
        index++;
    }
    if( NULL != pCompletedDeliveries[ii] ) {
        TRANSACTION_DEBUG_STAGE( pCompletedDeliveries[ii],
        UNRESERVING );
        pUnreserveTransactionStruct( DELIVERY_TRANS,
        &pCompletedDeliveries[ii]);
    }
}

PUT_STRING(NULL, 0, 0, StrStruct[ssCnt]);
PutHTMLStrings(StrStruct, deliveryForm,
               giResponseLen[DELIVERY_RESPONSE],
               &szOutput, &iOutputLen);

SendResponse(pECB, szOutput, iOutputLen);

UNRESERVE_RESPONSE( DELIVERY_RESPONSE, deliveryForm );

if( szOutput != deliveryForm )
    UNRESERVE_PANIC_FORM( szOutput );
}

return( retcode );
}

/* FUNCTION: int TPCCNewOrderResponse(EXTENSION_CONTROL_BLOCK
*pECB,
*                                     int retcode,
*                                     NewOrderData
*                                     NewOrderData
*
* PURPOSE:      This function fills in the values and returns the
                response form to the browser.
*
* ARGUMENTS:    EXTENSION_CONTROL_BLOCK *pECB    pointer to
                the structure
*
                contains the internet
*
                service
                information.
*
                int                      retcode    return status from the
                db.
*
                NewOrderData             *newOrderData pointer to
                structure containing
*
                data
                about the current txn.

```

```

*
* RETURNS:      none
*
* COMMENTS:    none
*/

int
TPCCNewOrderResponse( int retcode, pNewOrderData pNewOrder )
{
    int i;
    char szDate[] = "xx-xx-xxxx xx:xx:xx";
    char szBlanks[] = " ";
    char szDollar[] = "$";
    PutStrStruct StrStruct[133];
    int ssCnt = 0;
    int jj;
    int kk;
    int mm;
    char *newOrderForm;
    char *szOutput;
    int iOutputLen;
    BOOL bValid;
    char *execution_status;
    EXTENSION_CONTROL_BLOCK *pECB;

    pECB = (EXTENSION_CONTROL_BLOCK *)pNewOrder->CC;

    if ( ERR_DB_PENDING == retcode )
    {
        return( retcode );
    }
    else if ( ERR_DB_DEADLOCK_LIMIT == retcode )
    {
        SendErrorResponse( pECB, ERR_NEW_ORDER_NOT_PROCESSED, NULL,
            pNewOrder->w_id, pNewOrder->ld_id,
            (pConnData)pNewOrder );
        TRANSACTION_DEBUG_STAGE( pNewOrder, UNRESERVING );
        pUnreserveTransactionStruct( NEW_ORDER_TRANS, &pNewOrder );
        return( retcode );
    }
    else if ( ERR_DB_SUCCESS != retcode && ERR_DB_NOT_COMMITED !=
retcode )
    {
        SendErrorResponse( pECB, retcode, NULL,
            pNewOrder->w_id, pNewOrder->ld_id,
            (pConnData)pNewOrder );
        TRANSACTION_DEBUG_STAGE( pNewOrder, UNRESERVING );
        pUnreserveTransactionStruct( NEW_ORDER_TRANS, &pNewOrder );
        return( retcode );
    }
    else if ( ERR_DB_SUCCESS == retcode )
    {
        bValid = TRUE;
        execution_status = TRANSACTION_COMMITTED;
    }
    else if ( ERR_DB_NOT_COMMITED == retcode )
    {
        /* This is the expected error code for a transaction specifying an */
        /* item id that is in the valid range, but not assigned to an actual */
        /* item. This is how the specification and therefore our test harness */
        /* validates the database is prepared to handle rollbacks. So that we */
        /* do not return a valid page indicating the request specified an */
        /* invalid item and then further along in the execution, return an */
        /* error page that would incorrectly satisfy the next transaction, */
        /* we need to clear the error code. */
        retcode = ERR_DB_SUCCESS;
        bValid = FALSE;
        execution_status = ITEM_NUMBER_INVALID;
    }

    RESERVE_RESPONSE( NEW_ORDER_RESPONSE, newOrderForm );

    PutNumeric(WDID(pNewOrder->w_id,pNewOrder->ld_id),
        newOrderResponseIndexes[NO_WDID].iLen,
        &newOrderForm[newOrderResponseIndexes[NO_WDID].iStartIndex]);
    PutNumeric(pNewOrder->w_id,
        newOrderResponseIndexes[NO_WID].iLen,
        &newOrderForm[newOrderResponseIndexes[NO_WID].iStartIndex]);
    PutNumeric(pNewOrder->d_id,
        newOrderResponseIndexes[NO_DID].iLen,
        &newOrderForm[newOrderResponseIndexes[NO_DID].iStartIndex]);

    if(bValid)
    {
        /* put the date in if valid */
        PutNumeric(pNewOrder->o_entry_d.day, 2, &szDate[0]);
        PutNumeric(pNewOrder->o_entry_d.month, 2, &szDate[3]);
        PutNumeric(pNewOrder->o_entry_d.year, 4, &szDate[6]);
        PutNumeric(pNewOrder->o_entry_d.hour, 2, &szDate[11]);
        PutNumeric(pNewOrder->o_entry_d.minute, 2, &szDate[14]);
        PutNumeric(pNewOrder->o_entry_d.second, 2, &szDate[17]);
        memcpy(&newOrderForm[newOrderResponseIndexes[NO_DATE].iStartIndex],
            szDate, newOrderResponseIndexes[NO_DATE].iLen);
    }
    else
    {
        /* put in blanks for the date if not valid */
        memcpy(&newOrderForm[newOrderResponseIndexes[NO_DATE].iStartIndex],
            szBlanks, newOrderResponseIndexes[NO_DATE].iLen);
    }
    /* put in value for the customer id. */
    PutNumeric(pNewOrder->c_id,
        newOrderResponseIndexes[NO_CID].iLen,
        &newOrderForm[newOrderResponseIndexes[NO_CID].iStartIndex]);

    /* put in the values for the last name and credit rating */
    PUT_STRING(pNewOrder->c_last,
        newOrderResponseIndexes[NO_LAST].iLen,
        newOrderResponseIndexes[NO_LAST].iStartIndex,
        StrStruct[ssCnt]);
    ssCnt++;
    PUT_STRING(pNewOrder->c_credit,
        newOrderResponseIndexes[NO_CREDIT].iLen,
        newOrderResponseIndexes[NO_CREDIT].iStartIndex,
        StrStruct[ssCnt]);
    ssCnt++;

    if(bValid)
    {
        /* put in the values */
        PutFloat2(pNewOrder->c_discount,
            newOrderResponseIndexes[NO_DISC].iLen,
            &newOrderForm[newOrderResponseIndexes[NO_DISC].iStartIndex]);
    }
    else
    {
        /* If the transaction is rolled back, we need to blank out fields. */
        /* spaces for discount */
        memcpy(&newOrderForm[newOrderResponseIndexes[NO_DISC].iStartIndex],
            szBlanks, newOrderResponseIndexes[NO_DISC].iLen);
    }

    /* Per 2.4.3.4 of the specification, provide the order id regardless of */
    /* whether the transaction was committed or rolled back. */
    PutNumeric(pNewOrder->o_id,
        newOrderResponseIndexes[NO_OID].iLen,
        &newOrderForm[newOrderResponseIndexes[NO_OID].iStartIndex]);

    if(bValid)
    {
        PutNumeric(pNewOrder->o_ol_cnt,
            newOrderResponseIndexes[NO_LINES].iLen,
            &newOrderForm[newOrderResponseIndexes[NO_LINES].iStartIndex]);
        PutFloat2(pNewOrder->w_tax,
            newOrderResponseIndexes[NO_W_TAX].iLen,
            &newOrderForm[newOrderResponseIndexes[NO_W_TAX].iStartIndex]);
        PutFloat2(pNewOrder->d_tax,
            newOrderResponseIndexes[NO_D_TAX].iLen,
            &newOrderForm[newOrderResponseIndexes[NO_D_TAX].iStartIndex]);
    }

    for(i=0; i<pNewOrder->o_ol_cnt; i++)
    {
        PutNumeric(pNewOrder->o_ol[i].ol_supply_w_id,
            newOrderResponseIndexes[NO_S_WID+(i*8)].iLen,

```



```

&newOrderForm[newOrderResponseIndexes[NO_S_WID+(i*8)].iStartIndex];
    PutNumeric(pNewOrder->o_ol[i].ol_i_id,
              newOrderResponseIndexes[NO_IID+(i*8)].iLen,

&newOrderForm[newOrderResponseIndexes[NO_IID+(i*8)].iStartIndex];
    PUT_STRING(pNewOrder->o_ol[i].i_name,
              newOrderResponseIndexes[NO_INAME+(i*8)].iLen,
              newOrderResponseIndexes[NO_INAME+(i*8)].iStartIndex,
              StrStruct[ssCnt]);

    ssCnt++;
    PutNumeric(pNewOrder->o_ol[i].ol_quantity,
              newOrderResponseIndexes[NO_QTY+(i*8)].iLen,

&newOrderForm[newOrderResponseIndexes[NO_QTY+(i*8)].iStartIndex];

    PutNumeric(pNewOrder->o_ol[i].s_quantity,
              newOrderResponseIndexes[NO_STOCK+(i*8)].iLen,

&newOrderForm[newOrderResponseIndexes[NO_STOCK+(i*8)].iStartIndex];
    PUT_STRING(pNewOrder->o_ol[i].b_g,
              newOrderResponseIndexes[NO_BG+(i*8)].iLen,
              newOrderResponseIndexes[NO_BG+(i*8)].iStartIndex,
              StrStruct[ssCnt]);

    ssCnt++;

memcpy(&newOrderForm[newOrderResponseIndexes[NO_PRICE+(i*8)].iStartIndex-1],
      szDollar, 1);
    PutFloat2(pNewOrder->o_ol[i].i_price,
             newOrderResponseIndexes[NO_PRICE+(i*8)].iLen,

&newOrderForm[newOrderResponseIndexes[NO_PRICE+(i*8)].iStartIndex]);

memcpy(&newOrderForm[newOrderResponseIndexes[NO_AMT+(i*8)].iStartIndex-1],
      szDollar, 1);
    PutFloat2(pNewOrder->o_ol[i].ol_amount,
             newOrderResponseIndexes[NO_AMT+(i*8)].iLen,

&newOrderForm[newOrderResponseIndexes[NO_AMT+(i*8)].iStartIndex]);

}
/* need to blank out the rest of the unused item rows */
jj = NO_AMT + ((i-1)*8) + 1;
for(kk=i; kk<MAX_OL; kk++)
{
    /* there are 8 items per row - 6 plain and 2 with $ */
    for(mm=0; mm<6; mm++)
    {
        memcpy(&newOrderForm[newOrderResponseIndexes[jj].iStartIndex],
              szBlanks, newOrderResponseIndexes[jj].iLen);
        jj++;
    }
    /* blank out the '$' for the blank $values */
    for(mm=0; mm<2; mm++)
    {
        memcpy(&newOrderForm[newOrderResponseIndexes[jj].iStartIndex-1],
              szBlanks, newOrderResponseIndexes[jj].iLen+1);
        jj++;
    }
}
else
{
    /* spaces in the o_ol_cnt, w_tax, and d_tax fields */
    for(kk=0; kk<3; kk++)
    {
        memcpy(&newOrderForm[newOrderResponseIndexes[NO_LINES+kk].iStartIndex],
              szBlanks, newOrderResponseIndexes[NO_LINES+kk].iLen);
    }
    /* spaces for each of the fields in the row items */
    jj = NO_S_WID;
    for(kk=0; kk<MAX_OL; kk++)
    {
        /* there are 8 items per row - 6 plain and 2 with $ */
        for(mm=0; mm<6; mm++)
        {
            memcpy(&newOrderForm[newOrderResponseIndexes[jj].iStartIndex],
                  szBlanks, newOrderResponseIndexes[jj].iLen);
            jj++;
        }
        /* blank out the '$' for the blank $values */
        for(mm=0; mm<2; mm++)
        {
            memcpy(&newOrderForm[newOrderResponseIndexes[jj].iStartIndex-1],
                  szBlanks, newOrderResponseIndexes[jj].iLen+1);
            jj++;
        }
    }
}

if(bValid)
{
    /* total */
    PutFloat2(pNewOrder->total_amount,
             newOrderResponseIndexes[NO_TOTAL].iLen,

&newOrderForm[newOrderResponseIndexes[NO_TOTAL].iStartIndex]);
}
else
{
    /* put blanks for total */
    memcpy(&newOrderForm[newOrderResponseIndexes[NO_TOTAL].iStartIndex],
          szBlanks, newOrderResponseIndexes[NO_TOTAL].iLen);
}
PUT_STRING(NULL, 0, 0, StrStruct[ssCnt]);
PutHTMLStrings(StrStruct, newOrderForm,
               giResponseLen[NEW_ORDER_RESPONSE],
               &szOutput, &iOutputLen);

TRANSACTION_DEBUG_STAGE( pNewOrder, UNRESERVING );

pUnreserveTransactionStruct( NEW_ORDER_TRANS, &pNewOrder );

SendResponse(pECB, szOutput, iOutputLen);

UNRESERVE_RESPONSE( NEW_ORDER_RESPONSE, newOrderForm );

if( szOutput != newOrderForm )
    UNRESERVE_PANIC_FORM( szOutput );

return( retcode );
}

/* FUNCTION: int TPCCPaymentResponse(EXTENSION_CONTROL_BLOCK
*pECB,
*
*
*paymentData)
*
* PURPOSE: This function fills in the values and returns the
response form to the browser.
*
* ARGUMENTS: EXTENSION_CONTROL_BLOCK *pECB pointer to
structure that
*
* internet service
*
* information.
*
* int retcode return status from the
db call
*
* PaymentData *paymentData pointer to
structure containing
*
* the data
for this transaction.
*
* RETURNS: none
*
* COMMENTS: none

```

```

*/
int
TPCCPaymentResponse( int retcode, pPaymentData pPayment )
{
    char *ptr;
    char szcdata[4][64];
    char szW_Zip[26];
    char szD_Zip[26];
    char szC_Zip[26];
    char szC_Phone[26];
    int i;
    int l;
    char *szZipPic = "XXXXX-XXXX";
    char szLongDate[] = "XX-XX-XXXX XX:XX:XX";
    char szDate[] = "xx-xx-xxxx";
    char szBlanks[] = " ";
    PutStrStruct StrStruct[34];
    int ssCnt = 0;
    char *paymentForm;
    char *szOutput;
    int iOutputLen;
    EXTENSION_CONTROL_BLOCK *pECB;

    pECB = (EXTENSION_CONTROL_BLOCK *)pPayment->CC;

    if ( ERR_DB_PENDING == retcode )
    {
        return( retcode );
    }
    else if ( ERR_DB_DEADLOCK_LIMIT == retcode )
    {
        SendErrorResponse( pECB, ERR_PAYMENT_NOT_PROCESSED, NULL,
            pPayment->w_id, pPayment->ld_id,
            (pConnData)pPayment );
        TRANSACTION_DEBUG_STAGE( pPayment, UNRESERVING );
        pUnreserveTransactionStruct( PAYMENT_TRANS, &pPayment );
        return( retcode );
    }
    else if ( ERR_DB_NOT_COMMITED == retcode )
    {
        SendErrorResponse( pECB, ERR_PAYMENT_INVALID_CUSTOMER, NULL,
            pPayment->w_id, pPayment->ld_id,
            (pConnData)pPayment );
        TRANSACTION_DEBUG_STAGE( pPayment, UNRESERVING );
        pUnreserveTransactionStruct( PAYMENT_TRANS, &pPayment );
        return( retcode );
    }
    else if ( ERR_DB_SUCCESS != retcode )
    {
        SendErrorResponse( pECB, retcode, NULL,
            pPayment->w_id, pPayment->ld_id,
            (pConnData)pPayment );
        TRANSACTION_DEBUG_STAGE( pPayment, UNRESERVING );
        pUnreserveTransactionStruct( PAYMENT_TRANS, &pPayment );
        return( retcode );
    }

    RESERVE_RESPONSE( PAYMENT_RESPONSE, paymentForm );

    PutNumeric(WDID(pPayment->w_id,pPayment->ld_id,
        paymentResponseIndexes[PT_WDID].iLen,
        &paymentForm[paymentResponseIndexes[PT_WDID].iStartIndex]);
    PutNumeric(pPayment->h_date.day, 2,
        &szLongDate[0]);
    PutNumeric(pPayment->h_date.month, 2,
        &szLongDate[3]);
    PutNumeric(pPayment->h_date.year, 4,
        &szLongDate[6]);
    PutNumeric(pPayment->h_date.hour, 2,
        &szLongDate[11]);
    PutNumeric(pPayment->h_date.minute, 2,
        &szLongDate[14]);
    PutNumeric(pPayment->h_date.second, 2,
        &szLongDate[17]);
    memcpy(&paymentForm[paymentResponseIndexes[PT_LONG_DATE].iStartIndex],
        szLongDate, paymentResponseIndexes[PT_LONG_DATE].iLen);

    PutNumeric(pPayment->w_id,
        paymentResponseIndexes[PT_WID].iLen,
        &paymentForm[paymentResponseIndexes[PT_WID].iStartIndex]);
    PutNumeric(pPayment->d_id,
        paymentResponseIndexes[PT_DID].iLen,
        &paymentForm[paymentResponseIndexes[PT_DID].iStartIndex]);
    PUT_STRING(pPayment->w_street_1,
        paymentResponseIndexes[PT_W_ST_1].iLen,
        paymentResponseIndexes[PT_W_ST_1].iStartIndex,
        StrStruct[ssCnt]);
    ssCnt++;
    PUT_STRING(pPayment->d_street_1,
        paymentResponseIndexes[PT_D_ST_1].iLen,
        paymentResponseIndexes[PT_D_ST_1].iStartIndex,
        StrStruct[ssCnt]);
    ssCnt++;
    PUT_STRING(pPayment->w_street_2,
        paymentResponseIndexes[PT_W_ST_2].iLen,
        paymentResponseIndexes[PT_W_ST_2].iStartIndex,
        StrStruct[ssCnt]);
    ssCnt++;
    PUT_STRING(pPayment->d_street_2,
        paymentResponseIndexes[PT_D_ST_2].iLen,
        paymentResponseIndexes[PT_D_ST_2].iStartIndex,
        StrStruct[ssCnt]);
    ssCnt++;
    PUT_STRING(pPayment->w_city,
        paymentResponseIndexes[PT_W_CITY].iLen,
        paymentResponseIndexes[PT_W_CITY].iStartIndex,
        StrStruct[ssCnt]);
    ssCnt++;
    PUT_STRING(pPayment->w_state,
        paymentResponseIndexes[PT_W_ST].iLen,
        paymentResponseIndexes[PT_W_ST].iStartIndex,
        StrStruct[ssCnt]);
    ssCnt++;
    FormatString(szW_Zip, szZipPic, pPayment->w_zip);
    memcpy(&paymentForm[paymentResponseIndexes[PT_W_ZIP].iStartIndex],
        szW_Zip, paymentResponseIndexes[PT_W_ZIP].iLen);
    PUT_STRING(pPayment->d_city,
        paymentResponseIndexes[PT_D_CITY].iLen,
        paymentResponseIndexes[PT_D_CITY].iStartIndex,
        StrStruct[ssCnt]);
    ssCnt++;
    PUT_STRING(pPayment->d_state,
        paymentResponseIndexes[PT_D_ST].iLen,
        paymentResponseIndexes[PT_D_ST].iStartIndex,
        StrStruct[ssCnt]);
    ssCnt++;
    FormatString(szD_Zip, szZipPic, pPayment->d_zip);
    memcpy(&paymentForm[paymentResponseIndexes[PT_D_ZIP].iStartIndex],
        szD_Zip, paymentResponseIndexes[PT_D_ZIP].iLen);
    PutNumeric(pPayment->c_id,
        paymentResponseIndexes[PT_CID].iLen,
        &paymentForm[paymentResponseIndexes[PT_CID].iStartIndex]);
    PutNumeric(pPayment->c_w_id,
        paymentResponseIndexes[PT_C_WID].iLen,
        &paymentForm[paymentResponseIndexes[PT_C_WID].iStartIndex]);
    PutNumeric(pPayment->c_d_id,
        paymentResponseIndexes[PT_C_DID].iLen,
        &paymentForm[paymentResponseIndexes[PT_C_DID].iStartIndex]);
    PUT_STRING(pPayment->c_first,
        paymentResponseIndexes[PT_FIRST].iLen,
        paymentResponseIndexes[PT_FIRST].iStartIndex,
        StrStruct[ssCnt]);
    ssCnt++;
    PUT_STRING(pPayment->c_middle,
        paymentResponseIndexes[PT_MIDDLE].iLen,
        paymentResponseIndexes[PT_MIDDLE].iStartIndex,
        StrStruct[ssCnt]);
    ssCnt++;
    PUT_STRING(pPayment->c_last,
        paymentResponseIndexes[PT_LAST].iLen,
        paymentResponseIndexes[PT_LAST].iStartIndex,
        StrStruct[ssCnt]);
    ssCnt++;
    PutNumeric(pPayment->c_since.day, 2, &szDate[0]);
    PutNumeric(pPayment->c_since.month, 2, &szDate[3]);
    PutNumeric(pPayment->c_since.year, 4, &szDate[6]);

```

```

memcpy(&paymentForm[paymentResponseIndexes[PT_SM_DATE].iStartIndex],
szDate,
    paymentResponseIndexes[PT_SM_DATE].iLen);

PUT_STRING(pPayment->c_street_1,
    paymentResponseIndexes[PT_C_STR_1].iLen,
    paymentResponseIndexes[PT_C_STR_1].iStartIndex,
    StrStruct[ssCnt]);
ssCnt++;
PUT_STRING(pPayment->c_credit,
    paymentResponseIndexes[PT_CREDIT].iLen,
    paymentResponseIndexes[PT_CREDIT].iStartIndex,
    StrStruct[ssCnt]);
ssCnt++;

PUT_STRING(pPayment->c_street_2,
    paymentResponseIndexes[PT_C_STR_2].iLen,
    paymentResponseIndexes[PT_C_STR_2].iStartIndex,
    StrStruct[ssCnt]);
ssCnt++;

PutFloat2(pPayment->c_discount,
    paymentResponseIndexes[PT_DISC].iLen,
    &paymentForm[paymentResponseIndexes[PT_DISC].iStartIndex]);

PUT_STRING(pPayment->c_city,
    paymentResponseIndexes[PT_C_CITY].iLen,
    paymentResponseIndexes[PT_C_CITY].iStartIndex,
    StrStruct[ssCnt]);
ssCnt++;

PUT_STRING(pPayment->c_state,
    paymentResponseIndexes[PT_C_ST].iLen,
    paymentResponseIndexes[PT_C_ST].iStartIndex,
    StrStruct[ssCnt]);
ssCnt++;

FormatString(szC_Zip, szZipPic, pPayment->c_zip);
memcpy(&paymentForm[paymentResponseIndexes[PT_C_ZIP].iStartIndex],
szC_Zip,
    paymentResponseIndexes[PT_C_ZIP].iLen);
FormatString(szC_Phone, "XXXXXX-XXX-XXX-XXXX",
    pPayment->c_phone);
memcpy(&paymentForm[paymentResponseIndexes[PT_C_PHONE].iStartIndex],
szC_Phone, paymentResponseIndexes[PT_C_PHONE].iLen);

PutFloat2(pPayment->h_amount,
    paymentResponseIndexes[PT_AMT].iLen,
    &paymentForm[paymentResponseIndexes[PT_AMT].iStartIndex]);
PutFloat2(pPayment->c_balance,
    paymentResponseIndexes[PT_BAL].iLen,
    &paymentForm[paymentResponseIndexes[PT_BAL].iStartIndex]);

PutFloat2(pPayment->c_credit_lim,
    paymentResponseIndexes[PT_LIM].iLen,
    &paymentForm[paymentResponseIndexes[PT_LIM].iStartIndex]);

ptr = pPayment->c_credit;
if ( *ptr == 'B' && *(ptr+1) == 'C' )
{
    ptr = pPayment->c_data;
    l = strlen( ptr ) / 50;
    for(i=0; i<4; i++, ptr += 50)
    {
        if ( i <= 1 )
        {
            strncpy(szcddata[i], ptr, 50);
            szcddata[i][50] = '\0';
        }
        else
            szcddata[i][0] = 0;

        PUT_STRING(szcddata[i],
            paymentResponseIndexes[PT_CUST_DATA+i].iLen,
            paymentResponseIndexes[PT_CUST_DATA+i].iStartIndex,
            StrStruct[ssCnt]);
        ssCnt++;
    }
}
else

```

```

{
    for(i=0; i<4; i++)
    {
        memcpy(&paymentForm[paymentResponseIndexes[PT_CUST_DATA+i].iStartIndex],
            szBlanks, paymentResponseIndexes[PT_CUST_DATA+i].iLen);
    }
}

PUT_STRING(NULL, 0, 0, StrStruct[ssCnt]);

PutHTMLStrings(StrStruct, paymentForm,
    giResponseLen[PAYMENT_RESPONSE],
    &szOutput, &iOutputLen);

TRANSACTION_DEBUG_STAGE( pPayment, UNRESERVING );
pUnreserveTransactionStruct( PAYMENT_TRANS, &pPayment );

SendResponse(pECB, szOutput, iOutputLen);

UNRESERVE_RESPONSE( PAYMENT_RESPONSE, paymentForm );

if( szOutput != paymentForm )
    UNRESERVE_PANIC_FORM( szOutput );

return( retcode );
}

/* FUNCTION: int TPCCOrderStatusResponse( int retcode,
*
* OrderStatusData
* OrderStatusData)
*
* PURPOSE: This function fills in the values and returns the
* response form to the browser.
*
* ARGUMENTS: EXTENSION_CONTROL_BLOCK *pECB pointer to
* structure containing internet
* service information.
* int retcode return status from db call
* OrderStatusData *orderStatusData pointer to structure
* of data for this txn.
*
* RETURNS: none
*
* COMMENTS: none
*/

int
TPCCOrderStatusResponse( int retcode, pOrderStatusData pOrderStatus )
{
    int i;
    int jj;
    int kk;
    int mm;
    char szLongDate[] = "XX-XX-XXXX XX:XX:XX";
    char szDate[] = "XX-XX-XXXX";
    char szBlanks[] = " ";
    char szDollar[] = "$";
    PutStrStruct StrStruct[4];
    int ssCnt = 0;
    char *orderStatusForm;
    char *szOutput;
    int iOutputLen;
    EXTENSION_CONTROL_BLOCK *pECB;

    pECB = (EXTENSION_CONTROL_BLOCK *)pOrderStatus->CC;

    if ( ERR_DB_PENDING == retcode )
    {
        return( retcode );
    }
    else if ( ERR_DB_DEADLOCK_LIMIT == retcode )
    {
        SendErrorResponse( pECB, ERR_ORDER_STATUS_NOT_PROCESSED, NULL,
            pOrderStatus->w_id, pOrderStatus->ld_id,
            (pConnData)pOrderStatus );
        TRANSACTION_DEBUG_STAGE( pOrderStatus, UNRESERVING );
    }
}

```

```

pUnreserveTransactionStruct( ORDER_STATUS_TRANS, &pOrderStatus );
return( retcode );
}
else if ( ERR_DB_NOT_COMMITED == retcode )
{
SendErrorResponse( pECB, ERR_NOSUCH_CUSTOMER, NULL,
pOrderStatus->w_id, pOrderStatus->ld_id,
(pConnData)pOrderStatus );
TRANSACTION_DEBUG_STAGE( pOrderStatus, UNRESERVING );
pUnreserveTransactionStruct( ORDER_STATUS_TRANS, &pOrderStatus );
return( retcode );
}
else if ( ERR_DB_SUCCESS != retcode )
{
SendErrorResponse( pECB, retcode, NULL,
pOrderStatus->w_id, pOrderStatus->ld_id,
(pConnData)pOrderStatus );
TRANSACTION_DEBUG_STAGE( pOrderStatus, UNRESERVING );
pUnreserveTransactionStruct( ORDER_STATUS_TRANS, &pOrderStatus );
return( retcode );
}
}

RESERVE_RESPONSE( ORDER_STATUS_RESPONSE, orderStatusForm );

PutNumeric(WDID(pOrderStatus->w_id,pOrderStatus->ld_id),
orderStatusResponseIndexes[OS_WDID].iLen,

&orderStatusForm[orderStatusResponseIndexes[OS_WDID].iStartIndex]);
PutNumeric(pOrderStatus->w_id,
orderStatusResponseIndexes[OS_WID].iLen,

&orderStatusForm[orderStatusResponseIndexes[OS_WID].iStartIndex]);
PutNumeric(pOrderStatus->d_id,
orderStatusResponseIndexes[OS_DID].iLen,

&orderStatusForm[orderStatusResponseIndexes[OS_DID].iStartIndex]);
PutNumeric(pOrderStatus->c_id,
orderStatusResponseIndexes[OS_CID].iLen,

&orderStatusForm[orderStatusResponseIndexes[OS_CID].iStartIndex]);
PUT_STRING(pOrderStatus->c_first,
orderStatusResponseIndexes[OS_FIRST].iLen,
orderStatusResponseIndexes[OS_FIRST].iStartIndex,
StrStruct[ssCnt]);
ssCnt++;
PUT_STRING(pOrderStatus->c_middle,
orderStatusResponseIndexes[OS_MIDDLE].iLen,
orderStatusResponseIndexes[OS_MIDDLE].iStartIndex,
StrStruct[ssCnt]);
ssCnt++;
PUT_STRING(pOrderStatus->c_last,
orderStatusResponseIndexes[OS_LAST].iLen,
orderStatusResponseIndexes[OS_LAST].iStartIndex,
StrStruct[ssCnt]);
ssCnt++;
PutFloat2(pOrderStatus->c_balance,
orderStatusResponseIndexes[OS_BAL].iLen,

&orderStatusForm[orderStatusResponseIndexes[OS_BAL].iStartIndex]);
PutNumeric(pOrderStatus->o_id,
orderStatusResponseIndexes[OS_OID].iLen,

&orderStatusForm[orderStatusResponseIndexes[OS_OID].iStartIndex]);

PutNumeric(pOrderStatus->o_entry_d.day, 2, &szLongDate[0]);
PutNumeric(pOrderStatus->o_entry_d.month, 2, &szLongDate[3]);
PutNumeric(pOrderStatus->o_entry_d.year, 4, &szLongDate[6]);
PutNumeric(pOrderStatus->o_entry_d.hour, 2, &szLongDate[11]);
PutNumeric(pOrderStatus->o_entry_d.minute, 2, &szLongDate[14]);
PutNumeric(pOrderStatus->o_entry_d.second, 2, &szLongDate[17]);
memcpy(&orderStatusForm[orderStatusResponseIndexes[OS_DATE].iStartIndex],
szLongDate, orderStatusResponseIndexes[OS_DATE].iLen);
PutNumeric(pOrderStatus->o_carrier_id,
orderStatusResponseIndexes[OS_CAR_ID].iLen,

&orderStatusForm[orderStatusResponseIndexes[OS_CAR_ID].iStartIndex]);

for(i=0; i<pOrderStatus->o_ol_cnt; i++)
{
PutNumeric(pOrderStatus->s_ol[i].ol_supply_w_id,
orderStatusResponseIndexes[OS_S_WID+(i*5)].iLen,

&orderStatusForm[orderStatusResponseIndexes[OS_S_WID+(i*5)].iStartIndex]);
PutNumeric(pOrderStatus->s_ol[i].ol_i_id,
orderStatusResponseIndexes[OS_IID+(i*5)].iLen,

&orderStatusForm[orderStatusResponseIndexes[OS_IID+(i*5)].iStartIndex]);
PutNumeric(pOrderStatus->s_ol[i].ol_quantity,
orderStatusResponseIndexes[OS_QTY+(i*5)].iLen,

&orderStatusForm[orderStatusResponseIndexes[OS_QTY+(i*5)].iStartIndex]);

memcpy(&orderStatusForm[orderStatusResponseIndexes[OS_AMT+(i*5)].iStartIndex-1],
szDollar, 1);
PutFloat2(pOrderStatus->s_ol[i].ol_amount,
orderStatusResponseIndexes[OS_AMT+(i*5)].iLen,

&orderStatusForm[orderStatusResponseIndexes[OS_AMT+(i*5)].iStartIndex]);
PutNumeric(pOrderStatus->s_ol[i].ol_delivery_d.day,
2, &szDate[0]);
PutNumeric(pOrderStatus->s_ol[i].ol_delivery_d.month,
2, &szDate[3]);
PutNumeric(pOrderStatus->s_ol[i].ol_delivery_d.year,
4, &szDate[6]);

memcpy(&orderStatusForm[orderStatusResponseIndexes[OS_SM_DATE+(i*5)].iStartIndex],
szDate, orderStatusResponseIndexes[OS_SM_DATE+(i*5)].iLen);
}
/* need to blank out the rest of the unused item rows */
jj = OS_SM_DATE + ((i-1)*5) + 1;
for(kk=i; kk<MAX_OL; kk++)
{
/* there are 5 items per row - 4 plain and 1 with $*/
for(mm=0; mm<3; mm++)
{
memcpy(&orderStatusForm[orderStatusResponseIndexes[jj].iStartIndex],
szBlanks, orderStatusResponseIndexes[jj].iLen);
jj++;
}
/* blank out the '$' for the blank $values */
memcpy(&orderStatusForm[orderStatusResponseIndexes[jj].iStartIndex-1],
szBlanks, orderStatusResponseIndexes[jj].iLen+1);
jj++;
memcpy(&orderStatusForm[orderStatusResponseIndexes[jj].iStartIndex],
szBlanks, orderStatusResponseIndexes[jj].iLen);
jj++;
}

PUT_STRING(NULL, 0, 0, StrStruct[ssCnt]);
PutHTMLStrings(StrStruct, orderStatusForm,
giResponseLen[ORDER_STATUS_RESPONSE],
&szOutput, &iOutputLen);

TRANSACTION_DEBUG_STAGE( pOrderStatus, UNRESERVING );
pUnreserveTransactionStruct( ORDER_STATUS_TRANS, &pOrderStatus );

SendResponse(pECB, szOutput, iOutputLen);

UNRESERVE_RESPONSE( ORDER_STATUS_RESPONSE, orderStatusForm );

if( szOutput != orderStatusForm )
UNRESERVE_PANIC_FORM( szOutput );

return( retcode );
}

/* FUNCTION: int TPCCStockLevelResponse(int retcode,
*
* StockLevelData
* stockLevelData)
*
* PURPOSE: This function puts the response data for the transaction
* into the form and sends the form back to the browser.
*
* ARGUMENTS: EXTENSION_CONTROL_BLOCK *pECB pointer to
* structure containing internet
* service information.
*
* int retcode return status from db call

```

```

*          StockLevelData      *stockLevelData      pointer to
structure containing
*          data for
this transaction.
*
* RETURNS:      none
*
* COMMENTS:     none
*/

int
TPCCStockLevelResponse( int retcode, StockLevelData *pStockLevel )
{
char *stockLevelForm;
EXTENSION_CONTROL_BLOCK *pECB;

pECB = (EXTENSION_CONTROL_BLOCK *)pStockLevel->CC;

if ( ERR_DB_PENDING == retcode )
{
return( retcode );
}
else if ( ERR_DB_DEADLOCK_LIMIT == retcode )
{
SendErrorResponse( pECB, ERR_STOCKLEVEL_NOT_PROCESSED, NULL,
pStockLevel->w_id, pStockLevel->ld_id,
(pConnData)pStockLevel );
TRANSACTION_DEBUG_STAGE( pStockLevel, UNRESERVING );
pUnreserveTransactionStruct( STOCK_LEVEL_TRANS, &pStockLevel );
return( retcode );
}
else if ( ERR_DB_SUCCESS != retcode )
{
SendErrorResponse( pECB, retcode, NULL,
pStockLevel->w_id, pStockLevel->ld_id,
(pConnData)pStockLevel );
TRANSACTION_DEBUG_STAGE( pStockLevel, UNRESERVING );
pUnreserveTransactionStruct( STOCK_LEVEL_TRANS, &pStockLevel );
return( retcode );
}

RESERVE_RESPONSE( STOCK_LEVEL_RESPONSE, stockLevelForm );

PutNumeric(WDID(pStockLevel->w_id,pStockLevel->ld_id),
stockLevelResponseIndexes[SL_WDID].iLen,

&stockLevelForm[stockLevelResponseIndexes[SL_WDID].iStartIndex]);
PutNumeric(pStockLevel->w_id,
stockLevelResponseIndexes[SL_WID].iLen,

&stockLevelForm[stockLevelResponseIndexes[SL_WID].iStartIndex]);
PutNumeric(pStockLevel->ld_id,
stockLevelResponseIndexes[SL_DID].iLen,

&stockLevelForm[stockLevelResponseIndexes[SL_DID].iStartIndex]);
PutNumeric(pStockLevel->threshold,
stockLevelResponseIndexes[SL_TH].iLen,
&stockLevelForm[stockLevelResponseIndexes[SL_TH].iStartIndex]);
PutNumeric(pStockLevel->low_stock,
stockLevelResponseIndexes[SL_LOW].iLen,

&stockLevelForm[stockLevelResponseIndexes[SL_LOW].iStartIndex]);

TRANSACTION_DEBUG_STAGE( pStockLevel, UNRESERVING );
pUnreserveTransactionStruct( STOCK_LEVEL_TRANS, &pStockLevel );

SendResponse(pECB, stockLevelForm,
giResponseLen[STOCK_LEVEL_RESPONSE]);

UNRESERVE_RESPONSE( STOCK_LEVEL_RESPONSE, stockLevelForm );

return( retcode );
}

/* FUNCTION: void TPCCResponseComplete( EXTENSION_CONTROL_BLOCK
*pECB )
*
* PURPOSE:
* This function completes the asynchronous web transaction.
*/

*
* ARGUMENTS:
* EXTENSION_CONTROL_BLOCK *pECB      Server
context structure.
*
* RETURNS:
* None
*
* COMMENTS:
*/

void
TPCCResponseComplete( CallersContext CC )
{
DWORD status;
EXTENSION_CONTROL_BLOCK *pECB;

pECB = (EXTENSION_CONTROL_BLOCK *)CC;
status = HSE_STATUS_SUCCESS_AND_KEEP_CONN;
(pECB->ServerSupportFunction)(pECB->ConnID,
HSE_REQ_DONE_WITH_SESSION,
&status, NULL, NULL);
}

int
ParseDeliveryQuery( char *lpszQueryString, pDeliveryData pDelivery )
{
char *ptr;
char *deliveryVals[MAXDELIVERYVALS];

PARSE_QUERY_STRING(lpszQueryString, MAXDELIVERYVALS,
deliveryStrs, deliveryVals);

if ( !GetValuePtr(deliveryVals, QUEUETIME, &ptr) )
return ERR_DELIVERY_MISSING_QUEUEETIME_KEY;

if ( !GetNumeric(ptr, &pDelivery->queue_time) )
return ERR_DELIVERY_QUEUEETIME_INVALID;

if ( !GetValuePtr(deliveryVals, OCD, &ptr) )
return ERR_DELIVERY_MISSING_OCD_KEY;

if ( !GetNumeric(ptr, &pDelivery->o_carrier_id) )
return ERR_DELIVERY_CARRIER_INVALID;

if ( pDelivery->o_carrier_id < 1 ||
pDelivery->o_carrier_id > DISTRICTS_PER_WAREHOUSE )
return ERR_DELIVERY_CARRIER_ID_RANGE;

return( ERR_SUCCESS );
}

int
ParseStockLevelQuery( char *lpszQueryString, pStockLevelData pStockLevel )
{
char *ptr;
char *stockLevelVals[MAXSTOCKLEVELVALS];

PARSE_QUERY_STRING(lpszQueryString, MAXSTOCKLEVELVALS,
stockLevelStrs, stockLevelVals);

if ( !GetValuePtr(stockLevelVals, TT, &ptr) )
return ERR_STOCKLEVEL_MISSING_THRESHOLD_KEY;

if ( !GetNumeric(ptr, &pStockLevel->threshold) )
return ERR_STOCKLEVEL_THRESHOLD_INVALID;

if ( pStockLevel->threshold >= 100 || pStockLevel->threshold < 0 )
return ERR_STOCKLEVEL_THRESHOLD_RANGE;

return( ERR_SUCCESS );
}

/* FUNCTION: int ProcessDeliveryQuery( EXTENSION_CONTROL_BLOCK
*pECB,
*
* PURPOSE:      This function parses the query string, validates the data,
and sends the request to the db/transport and returns
a response to the browser.
*/

```

```

* ARGUMENTS:      EXTENSION_CONTROL_BLOCK *pECB    ptr to the
structure
*
*                containing the internet server
*                information.
*
* RETURNS:        int                               status
*
* COMMENTS:       None
*
*/

int
ProcessDeliveryQuery( EXTENSION_CONTROL_BLOCK *pECB, char
*IpszQueryString,
                    int w_id, int ld_id )
{
    int                retcode;
    pDeliveryData     pDelivery;
    pDeliveryData     pCompletedDeliveries[DELIVERY_RESPONSE_COUNT];

    pDelivery = pReserveTransactionStruct( DELIVERY_TRANS );

    pDelivery->w_id = w_id;
    pDelivery->ld_id = ld_id;
    pDelivery->CC = (CallersContext)pECB;

    if ( ERR_SUCCESS != ( retcode = ParseDeliveryQuery( IpszQueryString,
pDelivery )))
    {
        pUnreserveTransactionStruct( DELIVERY_TRANS, &pDelivery );
        return( retcode );
    }

    TRANSACTION_DEBUG_STAGE( pDelivery, CALLING_LH );

    retcode = pTPCCDelivery( &pDelivery, pCompletedDeliveries );

#ifdef FFE_DEBUG
    _ASSERT(VALID_DB_ERR(retcode));
#endif

    TRANSACTION_DEBUG_STAGE( pDelivery, CALLING_RESP );

    retcode = TPCCDeliveryResponse( retcode, pDelivery, pCompletedDeliveries );

    return( retcode );
}

/* FUNCTION: int ProcessNewOrderQuery( EXTENSION_CONTROL_BLOCK
*pECB,
*
* PURPOSE:        This function parses the query string, validates the data,
*                and sends the request to the db/transport and returns
*                a response to the browser.
*
* ARGUMENTS:      EXTENSION_CONTROL_BLOCK *pECB    ptr to
structure containing
*                server info
*                internet
* RETURNS:        int                               status
*
* COMMENTS:       None
*
*/

int
ProcessNewOrderQuery( EXTENSION_CONTROL_BLOCK *pECB, char
*IpszQueryString,
                    int w_id, int ld_id )
{
    int                retcode;
    NewOrderData      *pNewOrder;

    pNewOrder = pReserveTransactionStruct( NEW_ORDER_TRANS );

```

```

pNewOrder->w_id = w_id;
pNewOrder->ld_id = ld_id;
pNewOrder->CC = (CallersContext)pECB;

if ( ERR_SUCCESS != ( retcode = ParseNewOrderQuery( IpszQueryString,
pNewOrder )))
{
    pUnreserveTransactionStruct( NEW_ORDER_TRANS, &pNewOrder );
    return( retcode );
}

TRANSACTION_DEBUG_STAGE( pNewOrder, CALLING_LH );

retcode = pTPCCNewOrder( &pNewOrder );

#ifdef FFE_DEBUG
    _ASSERT(VALID_DB_ERR(retcode));
#endif

TRANSACTION_DEBUG_STAGE( pNewOrder, CALLING_RESP );

retcode = TPCCNewOrderResponse( retcode, pNewOrder );

return( retcode );
}

/* FUNCTION: int ProcessOrderStatusQuery( EXTENSION_CONTROL_BLOCK
*pECB,
*
* PURPOSE:        This function parses the query string, validates the data,
*                and sends the request to the db/transport and returns
*                a response to the browser.
*
* ARGUMENTS:      EXTENSION_CONTROL_BLOCK *pECB    ptr to
structure that contains
*                the
*                internet server info.
* RETURNS:        int                               status
*
* COMMENTS:       None
*
*/

int
ProcessOrderStatusQuery( EXTENSION_CONTROL_BLOCK *pECB, char
*IpszQueryString,
                    int w_id, int ld_id )
{
    int                retcode;
    OrderStatusData   *pOrderStatus;

    pOrderStatus = pReserveTransactionStruct( ORDER_STATUS_TRANS );

    pOrderStatus->w_id = w_id;
    pOrderStatus->ld_id = ld_id;
    pOrderStatus->CC = (CallersContext)pECB;

    if( ERR_SUCCESS != ( retcode = ParseOrderStatusQuery( IpszQueryString,
pOrderStatus )))
    {
        pUnreserveTransactionStruct( ORDER_STATUS_TRANS, &pOrderStatus );
        return( retcode );
    }

    TRANSACTION_DEBUG_STAGE( pOrderStatus, CALLING_LH );

    retcode = pTPCCOrderStatus( &pOrderStatus );

#ifdef FFE_DEBUG
    _ASSERT(VALID_DB_ERR(retcode));
#endif

    TRANSACTION_DEBUG_STAGE( pOrderStatus, CALLING_RESP );

    retcode = TPCCOrderStatusResponse( retcode, pOrderStatus );

    return( retcode );
}

```

```

}

/* FUNCTION: int ProcessPaymentQuery( EXTENSION_CONTROL_BLOCK
*pECB,
*
* PURPOSE:          This function gets and validates the input data from the
*                  payment form filling in the required input variables.
*                  It then calls the SQLPayment transaction, constructs the
*                  output form and writes it back to client browser.
*
* ARGUMENTS:       EXTENSION_CONTROL_BLOCK *pECB   ptr to
structure that contains
*                  the
internet server info.
*
* RETURNS:         int          status
*
* COMMENTS:        None
*/

int
ProcessPaymentQuery( EXTENSION_CONTROL_BLOCK *pECB, char
*IpszQueryString,
                    int w_id, int ld_id )
{
    int          retcode;
    PaymentData *pPayment;

    pPayment = pReserveTransactionStruct( PAYMENT_TRANS );

    pPayment->w_id = w_id;
    pPayment->ld_id = ld_id;
    pPayment->CC = (CallersContext)pECB;

    if( ERR_SUCCESS != ( retcode = ParsePaymentQuery( IpszQueryString,
pPayment )))
    {
        pUnreserveTransactionStruct( PAYMENT_TRANS, &pPayment );
        return( retcode );
    }

    TRANSACTION_DEBUG_STAGE( pPayment, CALLING_LH );

    retcode = pTPCCPayment( &pPayment );

#ifdef FFE_DEBUG
    _ASSERT(VALID_DB_ERR(retcode));
#endif

    TRANSACTION_DEBUG_STAGE( pPayment, CALLING_RESP );

    retcode = TPCCPaymentResponse( retcode, pPayment );

    return( retcode );
}

/* FUNCTION: int ProcessStockLevelQuery( EXTENSION_CONTROL_BLOCK
*pECB,
*
* PURPOSE:          This function gets and validates the input data from the
*                  Stock Level form filling in the required input variables.
*                  It then calls the SQLStockLevel transaction, constructs
*                  the output form and writes it back to client browser.
*
* ARGUMENTS:       EXTENSION_CONTROL_BLOCK *pECB   ptr to
structure that contains
*                  the
internet server info.
*                  int          iSyncId          client
browser sync id
*
* RETURNS:         int          status
*
* COMMENTS:        None
*/

int

```

```

ProcessStockLevelQuery( EXTENSION_CONTROL_BLOCK *pECB, char
*IpszQueryString,
                        int w_id, int ld_id )
{
    int          retcode;
    StockLevelData *pStockLevel;

    pStockLevel = pReserveTransactionStruct( STOCK_LEVEL_TRANS );

    pStockLevel->w_id = w_id;
    pStockLevel->ld_id = ld_id;
    pStockLevel->CC = (CallersContext)pECB;

    if ( ERR_SUCCESS != ( retcode = ParseStockLevelQuery( IpszQueryString,
pStockLevel )))
    {
        pUnreserveTransactionStruct( STOCK_LEVEL_TRANS, &pStockLevel );
        return( retcode );
    }

    TRANSACTION_DEBUG_STAGE( pStockLevel, CALLING_LH );

    retcode = pTPCCStockLevel( &pStockLevel );

#ifdef FFE_DEBUG
    _ASSERT(VALID_DB_ERR(retcode));
#endif

    TRANSACTION_DEBUG_STAGE( pStockLevel, CALLING_RESP );

    retcode = TPCCStockLevelResponse( retcode, pStockLevel );

    return( retcode );
}

/* FUNCTION: BOOL GetValuePtr(char *pProcessedQuery[], int iIndex,
*                            char **pValue)
*
* PURPOSE:          This function passes back a pointer to the char ptr to the
*                  value requested.
*
* ARGUMENTS:       char *pProcessedQuery[] char* array of query string values
*                  int iIndex index into the ProcessedQuery array
*                  char *pValue character ptr into to the key's value
*
* RETURNS:         BOOL FALSE there is no valid ptr for this value
*                  TRUE the ptr returned is valid
*
* COMMENTS:        none.
*/

BOOL
GetValuePtr(char *pProcessedQuery[], int iIndex, char **pValue)
{
    *pValue = pProcessedQuery[iIndex];

    if(NULL == *pValue)return FALSE;

    return TRUE;
}

/* FUNCTION: void MakeDeliveryTemplates( char *deliveryForm,
*                                       char
*deliveryResponse )
*
* PURPOSE:          This function constructs the templates for the
*                  Delivery input and response HTML forms.
*
* ARGUMENTS:       char *deliveryForm pointer to the HTML input form.
*                  char *deliveryResponse pointer to the HTML response
form.
*
* RETURNS:         None
*
* COMMENTS:        None
*/

void

```

```

MakeDeliveryTemplates( char *deliveryForm, char *deliveryResponse )
{
    int    curLen;

    /* first make the input form template */
    curLen = sprintf(deliveryForm, szFormTemplate, szModName);
    ParseTemplateString(deliveryForm, &curLen, szDeliveryFormTemp2i,
        deliveryFormIndexesI);
    giFormLen[DELIVERY_FORM] = curLen;

    /* now make the process form template */
    curLen = sprintf(deliveryResponse, szFormTemplate, szModName);
    ParseTemplateString(deliveryResponse, &curLen, szDeliveryFormTemp2p,
        deliveryFormIndexesP);
    giResponseLen[DELIVERY_RESPONSE] = curLen;
}

/* FUNCTION: void MakeNewOrderTemplates(char *newOrderForm,
char
*newOrderResponse )
*
* PURPOSE:      This function constructs the templates for both the input
*               and the response HTML forms for NewOrder function.
*
* ARGUMENTS:   char    *newOrderForm    pointer to the input
HTML form.
*               char    *newOrderResponse pointer to the response
HTML form.
*
* RETURNS:     none
*
* COMMENTS:    none.
*/

void
MakeNewOrderTemplates( char *newOrderForm, char *newOrderResponse )
{
    int    curLen;

    /* first make the input template */
    curLen = sprintf(newOrderForm, szFormTemplate, szModName);
    ParseTemplateString(newOrderForm, &curLen, szNewOrderFormTemp2i,
        newOrderFormIndexes);
    giFormLen[NEW_ORDER_FORM] = curLen;

    /* now make the process template */
    curLen = sprintf(newOrderResponse, szFormTemplate, szModName);
    ParseTemplateString(newOrderResponse, &curLen, szNewOrderFormTemp2p,
        newOrderResponseIndexes);
    giResponseLen[NEW_ORDER_RESPONSE] = curLen;
}

/* FUNCTION: void MakeOrderStatusTemplates(char *orderStatusForm,
char *orderStatusResponse)
*
* PURPOSE:      This function constructs the template HTML forms
for Order Status.
*
* ARGUMENTS:   char *orderStatusForm    pointer to the input HTML form
*               char *orderStatusResponse pointer to the response HTML
form
*
* RETURNS:     none
*
* COMMENTS:    none
*/

void
MakeOrderStatusTemplates(char *orderStatusForm, char *orderStatusResponse)
{
    int    curLen;

    /* first make the input form template */
    curLen = sprintf(orderStatusForm, szFormTemplate, szModName);
    ParseTemplateString(orderStatusForm, &curLen, szOrderStatusFormTemp2i,
        orderStatusFormIndexes);
    giFormLen[ORDER_STATUS_FORM] = curLen;

    /* now make the process template */
    curLen = sprintf(orderStatusResponse, szFormTemplate, szModName);

```

```

ParseTemplateString(orderStatusResponse, &curLen, szOrderStatusFormTemp2p,
    orderStatusResponseIndexes);
giResponseLen[ORDER_STATUS_RESPONSE] = curLen;
}

/* FUNCTION: void MakePaymentTemplates(char *paymentForm,
char
*paymentResponse)
*
* PURPOSE:      This function constructs the templates for the
Payment input and response HTML forms.
*
* ARGUMENTS:   char    *paymentForm    pointer to the input
HTML form.
*               char    *paymentResponse pointer to the response
HTML form.
*
* RETURNS:     none
*
* COMMENTS:    none
*/

void
MakePaymentTemplates(char *paymentForm, char *paymentResponse)
{
    int    curLen;

    /* first make the input form template */
    curLen = sprintf(paymentForm, szFormTemplate, szModName);
    ParseTemplateString(paymentForm, &curLen, szPaymentFormTemp2i,
        paymentFormIndexes);
    giFormLen[PAYMENT_FORM] = curLen;

    /* now make the process form template */
    curLen = sprintf(paymentResponse, szFormTemplate, szModName);
    ParseTemplateString(paymentResponse, &curLen, szPaymentFormTemp2p,
        paymentResponseIndexes);
    giResponseLen[PAYMENT_RESPONSE] = curLen;
}

/* FUNCTION: void MakeStockLevelTemplates(char *stockLevelForm,
char *stockLevelResponse)
*
* PURPOSE:      This function constructs the templates for the
input and response Stock Level HTML pages.
*
* ARGUMENTS:   char    *stockLevelForm    pointer to the input
HTML form
*               char    *stockLevelResponse pointer to the response
HTML form
*
* RETURNS:     none
*
* COMMENTS:    none
*/

void
MakeStockLevelTemplates(char *stockLevelForm, char *stockLevelResponse)
{
    int    curLen;

    /* first make the input template */
    curLen = sprintf(stockLevelForm, szFormTemplate, szModName);
    ParseTemplateString(stockLevelForm, &curLen, szStockLevelFormTemp2i,
        stockLevelFormIndexes);
    giFormLen[STOCK_LEVEL_FORM] = curLen;

    /* now make the process template */
    curLen = sprintf(stockLevelResponse, szFormTemplate, szModName);
    ParseTemplateString(stockLevelResponse, &curLen, szStockLevelFormTemp2p,
        stockLevelResponseIndexes);
    giResponseLen[STOCK_LEVEL_RESPONSE] = curLen;
}

/* FUNCTION: void MakeResponseHeader(void)
*
* PURPOSE:      This function constructs the HTML response header.
*
* ARGUMENTS:   char    *responseString    pointer to the
header string
*

```



```

* RETURNS:      none
*
* COMMENTS:    none
*/
void
MakeResponseHeader(void)
{
    ParseTemplateString(szResponseHeader, &responseHeaderLen,
        szResponseHeaderTemplate, responseHeaderIndexes);
}

```

```

/* FUNCTION: void MakePanicPool( DWORD dwResponseSize )
*
* PURPOSE:      This function builds the array of panic forms to be used
*               by the threads as they need an oversize form, or to report
*               an error.
*
* ARGUMENTS:    none
*
* RETURNS:      none
*
* COMMENTS:    none
*/

```

```

void
MakePanicPool( DWORD dwResponseSize )
{
    int iMallocSize;
    char *pForm;
    DWORD ii;

    /* set up area for forms (including errors) that are built on the fly. */
    iMallocSize = (((char *)&gpPanicForms->index - (char *)&gpPanicForms) +
        (((char *)&gpPanicForms->forms - (char *)&gpPanicForms-
>index)
            * dwResponseSize) +
        (((char *)&gpPanicForms->forms[PANIC_FORM_SIZE] -
            (char *)&gpPanicForms->forms[0]) * dwResponseSize));
    gpPanicForms = malloc( iMallocSize );
    InitializeCriticalSection( &gpPanicForms->critSec );
#ifdef FFE_DEBUG
    gpPanicForms->iMaxIndex = dwResponseSize - 1;
#endif
    gpPanicForms->iNextFree = 0;
    pForm =
        ((char *)&gpPanicForms->index[0] +
        (((char *)&gpPanicForms->forms[0] - (char *)&gpPanicForms->index[0]) *
            dwResponseSize));

    for( ii = 0; ii < dwResponseSize; ii++ )
    {
        gpPanicForms->index[ii] = pForm;
        pForm += PANIC_FORM_SIZE;
    }
}

```

```

/* FUNCTION: void DeletePanicPool( void )
*
* PURPOSE:      This function destroys the array of panic forms to be used
*               by the threads as they need an oversize or error form.
*
* ARGUMENTS:    none
*
* RETURNS:      none
*
* COMMENTS:    none
*/
void
DeletePanicPool( void )
{
    DeleteCriticalSection( &gpPanicForms->critSec );
    free( gpPanicForms );
}

```

```

/* FUNCTION: void MakeTemplatePool( DWORD dwFormSize, DWORD
dwResponseSize )
*
* PURPOSE:      This function builds the array of forms to be used
*               by the threads as they need a form. The forms are
*               reserved and released by each thread as needed.

```

```

*
* ARGUMENTS:    none
*
* RETURNS:      none
*
* COMMENTS:    none
*/

```

```

void
MakeTemplatePool( DWORD dwFormSize, DWORD dwResponseSize )
{
    char szDeliveryForm[sizeof(szFormTemplate)+FILENAME_SIZE+
        sizeof(szDeliveryFormTemp2i)];
    char szNewOrderForm[sizeof(szFormTemplate)+FILENAME_SIZE+
        sizeof(szNewOrderFormTemp2i)];
    char szOrderStatusForm[sizeof(szFormTemplate)+FILENAME_SIZE+
        sizeof(szOrderStatusFormTemp2i)];
    char szPaymentForm[sizeof(szFormTemplate)+FILENAME_SIZE+
        sizeof(szPaymentFormTemp2i)];
    char szStockLevelForm[sizeof(szFormTemplate)+FILENAME_SIZE+
        sizeof(szStockLevelFormTemp2i)];
    char szDeliveryResponse[sizeof(szFormTemplate)+FILENAME_SIZE+
        sizeof(szDeliveryFormTemp2p)];
    char szNewOrderResponse[sizeof(szFormTemplate)+FILENAME_SIZE+
        sizeof(szNewOrderFormTemp2p)];
    char szOrderStatusResponse[sizeof(szFormTemplate)+FILENAME_SIZE+
        sizeof(szOrderStatusFormTemp2p)];
    char szPaymentResponse[sizeof(szFormTemplate)+FILENAME_SIZE+
        sizeof(szPaymentFormTemp2p)];
    char szStockLevelResponse[sizeof(szFormTemplate)+FILENAME_SIZE+
        sizeof(szStockLevelFormTemp2p)];

    int iFormLen[NUMBER_POOL_FORM_TYPES];
    int iResponseLen[NUMBER_POOL_RESPONSE_TYPES];
    int iMallocSize;
    int iRowSize;
    DWORD ii;
    int jj;
    char *pForm;
    char *pResponse;

```

```

/* now build the forms that are static */
MakeDeliveryTemplates( szDeliveryForm, szDeliveryResponse );
MakeNewOrderTemplates( szNewOrderForm, szNewOrderResponse );
MakeOrderStatusTemplates( szOrderStatusForm, szOrderStatusResponse );
MakePaymentTemplates( szPaymentForm, szPaymentResponse );
MakeStockLevelTemplates( szStockLevelForm, szStockLevelResponse );

```

```

/* calculate the size of one row of forms */

```

```

iRowSize = 0;
for( jj = 0; jj < NUMBER_POOL_FORM_TYPES; jj++ )
{
    iFormLen[jj] = ( giFormLen[jj] + 8 ) & ( ~(int)7 );
    iRowSize += iFormLen[jj];
}

```

```

iMallocSize = (((char *)&gpForms->index - (char *)&gpForms) +
        (((char *)&gpForms->forms - (char *)&gpForms->index)
            * dwFormSize * NUMBER_POOL_FORM_TYPES ) +
        (((char *)&gpForms->forms[iRowSize * dwFormSize] -
            (char *)&gpForms->forms[0]));
gpForms = malloc( iMallocSize );

```

```

for( jj = 0; jj < NUMBER_POOL_FORM_TYPES; jj++ )
{
    InitializeCriticalSection( &gpForms->critSec[jj] );
    gpForms->iNextFreeForm[jj] = 0;
    gpForms->iFirstFormIndex[jj] = jj * dwFormSize;
#ifdef FFE_DEBUG
    gpForms->iMaxIndex[jj] = dwFormSize - 1;
#endif
}

```

```

pForm = ((char *)&gpForms->index[0] +
        (((char *)&gpForms->forms[0] - (char *)&gpForms->index[0]) *
            NUMBER_POOL_FORM_TYPES * dwFormSize));
for( ii = 0; ii < dwFormSize; ii++ )
{
    for( jj = 0; jj < NUMBER_POOL_FORM_TYPES; jj++ )
    {
        gpForms->index[jj*dwFormSize+ii] = pForm;
    }
}

```

```

    pForm += iFormLen[jj];
}
}

/* load the first row with the templates */
pForm = gpForms->index[0];

memcpy( pForm, szDeliveryForm, iFormLen[DELIVERY_FORM] );
pForm += iFormLen[DELIVERY_FORM];

memcpy( pForm, szNewOrderForm, iFormLen[NEW_ORDER_FORM] );
pForm += iFormLen[NEW_ORDER_FORM];

memcpy( pForm, szOrderStatusForm, iFormLen[ORDER_STATUS_FORM] );
pForm += iFormLen[ORDER_STATUS_FORM];

memcpy( pForm, szPaymentForm, iFormLen[PAYMENT_FORM] );
pForm += iFormLen[PAYMENT_FORM];

memcpy( pForm, szStockLevelForm, iFormLen[STOCK_LEVEL_FORM] );
pForm += iFormLen[STOCK_LEVEL_FORM];

/* copy the first row to all the other rows */
pForm = gpForms->index[0];
for( ii = 1; ii < dwFormSize; ii++ )
{
    memcpy( gpForms->index[ii], pForm, iRowSize );
}

/* calculate the size of one row of responses */
iRowSize = 0;
for( jj = 0; jj < NUMBER_POOL_RESPONSE_TYPES; jj++ )
{
    iResponseLen[jj] = ( giResponseLen[jj] + 8 ) & ( ~(int)7 );
    iRowSize += iResponseLen[jj];
}

iMallocSize = (((char *)&gpResponses->index - (char *)gpResponses) +
                (((char *)gpResponses->responses - (char *)gpResponses-
>index)
                * dwResponseSize *
NUMBER_POOL_RESPONSE_TYPES) +
                (((char *)&gpResponses->responses[iRowSize *
dwResponseSize] -
                (char *)&gpResponses->responses[0]));
gpResponses = malloc( iMallocSize );

for( jj = 0; jj < NUMBER_POOL_RESPONSE_TYPES; jj++ )
{
    InitializeCriticalSection( &gpResponses->critSec[jj] );
#ifdef FFE_DEBUG
    gpResponses->iMaxIndex[jj] = dwResponseSize - 1;
#endif
    gpResponses->iNextFreeResponse[jj] = 0;
    gpResponses->iFirstResponseIndex[jj] = jj * dwResponseSize;
}

pResponse = ((char *)&gpResponses->index[0] +
              (((char *)&gpResponses->responses[0] -
              (char *)&gpResponses->index[0]) *
              NUMBER_POOL_RESPONSE_TYPES * dwResponseSize));
for( ii = 0; ii < dwResponseSize; ii++ )
{
    for( jj = 0; jj < NUMBER_POOL_RESPONSE_TYPES; jj++ )
    {
        gpResponses->index[jj*dwResponseSize+ii] = pResponse;
        pResponse += iResponseLen[jj];
    }
}

/* load the first row with the templates */
pResponse = gpResponses->index[0];

memcpy( pResponse, szDeliveryResponse, iResponseLen[DELIVERY_RESPONSE]
);
pResponse += iResponseLen[DELIVERY_RESPONSE];

memcpy( pResponse, szNewOrderResponse,
iResponseLen[NEW_ORDER_RESPONSE] );
pResponse += iResponseLen[NEW_ORDER_RESPONSE];

```

```

    memcpy(pResponse, szOrderStatusResponse,
iResponseLen[ORDER_STATUS_RESPONSE]);
pResponse += iResponseLen[ORDER_STATUS_RESPONSE];

    memcpy( pResponse, szPaymentResponse, iResponseLen[PAYMENT_RESPONSE]
);
pResponse += iResponseLen[PAYMENT_RESPONSE];

    memcpy( pResponse, szStockLevelResponse,
iResponseLen[STOCK_LEVEL_RESPONSE] );
pResponse += iResponseLen[STOCK_LEVEL_RESPONSE];

/* copy the first row to all the other rows */
pResponse = gpResponses->index[0];
for( ii = 1; ii < dwResponseSize; ii++ )
{
    memcpy( gpResponses->index[ii], pResponse, iRowSize );
}

/* FUNCTION: void DeleteTemplatePool( void )
*
* PURPOSE:          This function destroys the array of forms to be used
*                  by the threads as they need a form.
*
* ARGUMENTS:       none
*
* RETURNS:         none
*
* COMMENTS:        none
*/
void
DeleteTemplatePool( void )
{
    int                jj;

    for( jj = 0; jj < NUMBER_POOL_RESPONSE_TYPES; jj++ )
    {
        DeleteCriticalSection( &gpResponses->critSec[jj] );
    }
    free( gpResponses );

    for( jj = 0; jj < NUMBER_POOL_FORM_TYPES; jj++ )
    {
        DeleteCriticalSection( &gpForms->critSec[jj] );
    }
    free( gpForms );

    DeleteCriticalSection( &gpPanicForms->critSec );
    free( gpPanicForms );
}

/* FUNCTION: void BeginCmd( EXTENSION_CONTROL_BLOCK *pECB )
*
* PURPOSE:          This routine is executed in response to the browser query
*                  'CMD=Begin&Server=?????'.
*
* ARGUMENTS:       EXTENSION_CONTROL_BLOCK *pECB    IIS
                  context structure pointer
*
* RETURNS:         None
*
* COMMENTS:        Specification of a server machine is required.
*/
void
BeginCmd( EXTENSION_CONTROL_BLOCK *pECB )
{
    SendWelcomeForm(pECB);
}

/* FUNCTION: void CheckpointCmd(EXTENSION_CONTROL_BLOCK *pECB,
*
* PURPOSE:          This function causes a checkpoint to occur in the database
*
* ARGUMENTS:       EXTENSION_CONTROL_BLOCK *pECB    IIS
                  context structure pointer

```

```

*
* unique to
this connection.
*
* RETURNS:      None
*
* COMMENTS:    none
*/

void
CheckpointCmd(EXTENSION_CONTROL_BLOCK *pECB, int w_id, int ld_id )
{
    int                retcode;
    CheckpointData    *pCheckpoint;

    pCheckpoint = pReserveTransactionStruct( CHECKPOINT_TRANS );

    pCheckpoint->w_id = w_id;
    pCheckpoint->ld_id = ld_id;
    pCheckpoint->CC = (CallersContext)pECB;

    retcode = pTPCCCheckpoint( &pCheckpoint );
    if ( ERR_DB_SUCCESS == retcode ) {
        SendMainMenuForm(pECB, w_id, ld_id,
            "Checkpoint issued (non-blocking), completed
(blocking).");
    }
    else {
        SendErrorResponse( pECB, retcode, NULL, w_id, ld_id, NULL );
    }

    pUnreserveTransactionStruct( CHECKPOINT_TRANS, &pCheckpoint );
}

/* FUNCTION: void CheckpointShutdownCmd(EXTENSION_CONTROL_BLOCK
*pECB,
*
* PURPOSE:      This function causes initialization of the checkpoint
command.
*
* ARGUMENTS:    EXTENSION_CONTROL_BLOCK *pECB    IIS
context structure pointer
*
* unique to
this connection.
*
* RETURNS:      None
*
* COMMENTS:    none
*/

void
CheckpointShutdownCmd(EXTENSION_CONTROL_BLOCK *pECB, int w_id, int
ld_id )
{
    int                retcode;
    pConnData          pConn;

    pConn = pReserveTransactionStruct( DISCONNECT_TRANS );

    pConn->w_id = w_id;
    pConn->ld_id = ld_id;
    pConn->CC = (CallersContext)pECB;

    if( ERR_DB_SUCCESS != ( retcode = pTPCCCheckpointDisconnect( &pConn )))
    {
        SendErrorResponse( pECB, retcode, NULL, w_id, ld_id, NULL );
    }
    else
    {
        SendMainMenuForm(pECB, w_id, ld_id, "Checkpoint Shutdown Succeeded.");
    }

    pUnreserveTransactionStruct( DISCONNECT_TRANS, &pConn );
}

/* FUNCTION: void CheckpointStartupCmd(EXTENSION_CONTROL_BLOCK
*pECB,
*
* PURPOSE:      This function causes initialization of the checkpoint
command.
*
* ARGUMENTS:    EXTENSION_CONTROL_BLOCK *pECB    IIS
context structure pointer
*
* unique to
this connection.
*
* RETURNS:      None
*
* COMMENTS:    none
*/

void
CheckpointStartupCmd(EXTENSION_CONTROL_BLOCK *pECB, int w_id, int ld_id )
{
    int                retcode;
    pLoginData         pLogin;

    pLogin = pReserveTransactionStruct( CONNECT_TRANS );

    pLogin->w_id = w_id;
    pLogin->ld_id = ld_id;
    pLogin->CC = (CallersContext)pECB;

    if( ERR_SUCCESS != ( retcode = GetLoginDataCheckpoint( pLogin )) ||
ERR_DB_SUCCESS != ( retcode = pTPCCCheckpointConnect( &pLogin )))
    {
        SendErrorResponse( pECB, retcode, NULL, w_id, ld_id, NULL );
    }
    else
    {
        SendMainMenuForm(pECB, w_id, ld_id, "Checkpoint Startup Succeeded.");
    }

    pUnreserveTransactionStruct( CONNECT_TRANS, &pLogin );
}

/* FUNCTION: void ClearCmd(EXTENSION_CONTROL_BLOCK *pECB)
*
* PURPOSE:      This resets all terminals and resets the log file.
*
* ARGUMENTS:    EXTENSION_CONTROL_BLOCK *pECB    IIS
context structure pointer
*
* unique to
this connection.
*
* RETURNS:      None
*
* COMMENTS:    This function resets the connection information for the
dll. Any "users" with current connections will be given
an error message on their next transaction.
*/

void
ClearCmd(EXTENSION_CONTROL_BLOCK *pECB)
{
    pTPCCCloseLog( );
    pTPCCOpenLog( szPath );

    SendWelcomeForm(pECB);
}

/* FUNCTION: void ExitCmd(EXTENSION_CONTROL_BLOCK *pECB,
*
* PURPOSE:      This function deallocates the terminal associated with
the browser and presents the login screen.
*
* ARGUMENTS:    EXTENSION_CONTROL_BLOCK *pECB    IIS
context structure pointer
*
* unique to
this connection.
*
* RETURNS:      None
*
* COMMENTS:    None
*/

void
ExitCmd( EXTENSION_CONTROL_BLOCK *pECB, int w_id, int ld_id )
{

```

```

ConnData          *pConn;

pConn = pReserveTransactionStruct( DISCONNECT_TRANS );

pConn->w_id = w_id;
pConn->ld_id = ld_id;
pConn->CC = (CallersContext)pECB;

pTPCCDisconnect( &pConn );

pUnreserveTransactionStruct( DISCONNECT_TRANS, &pConn );

SendWelcomeForm( pECB );
}

/* FUNCTION: void MenuCmd( EXTENSION_CONTROL_BLOCK *pECB,
 * PURPOSE:          This function displays the main menu.
 * ARGUMENTS:       EXTENSION_CONTROL_BLOCK *pECB    IIS
 *                  context structure pointer
 *                  unique to
 * this connection.
 * RETURNS:         None
 * COMMENTS:        None
 */

void
MenuCmd( EXTENSION_CONTROL_BLOCK *pECB, int w_id, int ld_id )
{
    SendMainMenuForm(pECB, w_id, ld_id, NULL);
}

/* FUNCTION: void SubmitCmd( EXTENSION_CONTROL_BLOCK *pECB )
 * PURPOSE:          This function assigns a unique terminal id to the calling
 *                  browser.
 * ARGUMENTS:       EXTENSION_CONTROL_BLOCK *pECB    IIS
 *                  context structure pointer
 *                  unique to
 * this connection.
 * RETURNS:         None
 * COMMENTS:        A terminal id can be allocated but still be invalid if the
 *                  requested warehouse number is outside the range specified
 *                  in the registry. This then will force the client id
 *                  to be invalid and an error message sent to the users browser.
 */

void
SubmitCmd( EXTENSION_CONTROL_BLOCK *pECB, int *w_id, int *ld_id )
{
    int    iStatus;
    LoginData *pLogin;
    char   *ptr;

    if ( !GetCharKeyValuePtr( pECB->lpszQueryString, '4', &ptr ) ||
        ( 0 == ( *w_id = atoi( ptr ) ) ) ||
        ( *w_id < 0 ) )
    {
        SendErrorResponse( pECB, ERR_W_ID_INVALID, NULL, *w_id, -1, NULL );
        goto SubmitDone;
    }

    if ( !GetCharKeyValuePtr( pECB->lpszQueryString, '5', &ptr ) ||
        ( 0 == ( *ld_id = atoi( ptr ) ) ) ||
        ( *ld_id > 10 ) ||
        ( *ld_id < 0 ) )
    {
        SendErrorResponse( pECB, ERR_D_ID_INVALID, NULL, *w_id, *ld_id, NULL
    );
        goto SubmitDone;
    }

    pLogin = pReserveTransactionStruct( CONNECT_TRANS );

    pLogin->w_id = *w_id;

```

```

pLogin->ld_id = *ld_id;
pLogin->CC = (CallersContext)pECB;

if( ERR_SUCCESS != ( iStatus = GetLoginData( pLogin ) ) ||
    ERR_DB_SUCCESS != ( iStatus = pTPCCConnect( &pLogin ) ) )
{
    SendErrorResponse( pECB, iStatus, NULL, *w_id, *ld_id, NULL );
}
else
{
    SendMainMenuForm(pECB, *w_id, *ld_id, NULL);
}

pUnreserveTransactionStruct( CONNECT_TRANS, &pLogin );

SubmitDone:
    return;
}

/* FUNCTION: void MemoryCheckCmd( EXTENSION_CONTROL_BLOCK
 *pECB,
 * PURPOSE:          This function displays the main menu.
 * ARGUMENTS:       EXTENSION_CONTROL_BLOCK *pECB    IIS
 *                  context structure pointer
 *                  unique to
 * this connection.
 * RETURNS:         None
 * COMMENTS:        None
 */

void
MemoryCheckCmd( EXTENSION_CONTROL_BLOCK *pECB, int w_id, int ld_id )
{
    _ASSERT( !_CrtCheckMemory() );

    SendErrorResponse( pECB, ERR_SUCCESS, NULL, w_id, ld_id, NULL );
}

/* FUNCTION: BOOL GetKeyValuePtr( char *szIPtr, char *szKey, char **pszOPtr )
 * PURPOSE:          This function searches the input string for the key
 *                  specified. If found, it returns a pointer to the value.
 * ARGUMENTS:       char *szIPtr                    pointer to string to
 *                  char *szKey                      pointer to key to find.
 *                  char **pszOPtr                  pointer to value.
 * RETURNS:         BOOL FALSE                        if key is not found.
 *                  TRUE                             if key is found.
 * COMMENTS:        A side affect of this routine is that the output string
 *                  pointer will either point at the start of the value being
 *                  searched or at the *start* point where ptr originated.
 */
BOOL
GetKeyValuePtr( char *szIPtr, char *szKey, char **pszOPtr )
{
    char *szPtr1, *szPtr2;

    *pszOPtr = szIPtr;
    while ( *szIPtr )
    {
        szPtr1 = szIPtr;
        szPtr2 = szKey;

        while ( *szPtr1 && *szPtr2 && 0 == ( *szPtr1 - *szPtr2 ) )
            szPtr1++, szPtr2++;

        if ( '=' == *szPtr1 && '\0' == *szPtr2 )
        {
            *pszOPtr = ++szPtr1;
            return TRUE;
        }
    }

    szIPtr++;

```

```

}

return FALSE;
}

/* FUNCTION: BOOL GetKeyValueCharPtr( char *szIPtr, char cKey, char **pszOPtr )
*
* PURPOSE:      This function searches the input string for the single char key
*               specified. If found, it returns a pointer to the value.
*
* ARGUMENTS:   char *szIPtr      pointer to string to
check.          char cKey        pointer to key to find.
*               char **pszOPtr   pointer to value.
*
* RETURNS:     BOOL FALSE       if key is not found.
*               TRUE            if key is found.
*
* COMMENTS:    A side affect of this routine is that the output string
*               pointer will either point at the start of the value being
*               searched or at the *start* point where ptr originated.
*/
BOOL
GetCharKeyValuePtr( char *szIPtr, char cKey, char **pszOPtr )
{
    BOOL bGotStart;

    *pszOPtr = szIPtr;
    bGotStart = FALSE;
    while( *szIPtr )
    {
        if( cKey == *szIPtr && '\0' == *++szIPtr )
        {
            *pszOPtr = ++szIPtr;
            return TRUE;
        }
        while( *szIPtr )
        {
            if( '&' == *szIPtr )
            {
                szIPtr++;
                break;
            }
            szIPtr++;
        }
    }

    return FALSE;
}

/* FUNCTION: BOOL GetNumeric(char *ptr, int *iValue)
*
* PURPOSE:      This function converts the string value to integer, and
*               determines if the string is terminated properly. If it
*               contains non-numeric characters or if any characters
*               other than '&' or '\0' terminate the integer portion
*               of the string, this function fails.
*
* ARGUMENTS:   char *ptr pointer to string to check.
*
* RETURNS:     BOOL FALSE   if string is not all numeric and
properly       TRUE        terminated.
*               TRUE        if string contains only numeric
characters    i.e. '0' - '9' and is properly
terminated.
*
* COMMENTS:    None
*
*/
BOOL
GetNumeric(char *ptr, int *iValue)
{
    int c;          /* current char */
    int total;     /* current total */
    BOOL bGotSomething = FALSE;

    c = (int)(unsigned char)*ptr++;

```

```

total = 0;

while ((c >= '0') && (c <= '9'))
{
    total = 10 * total + (c - '0'); /* accumulate digit */
    c = (int)(unsigned char)*ptr++; /* get next char */
    bGotSomething = TRUE;
}
if(('\0' == c) || ('\0' == c) && bGotSomething)
{
    *iValue = total;
    return (TRUE); /* return result */
}
else
{
    *iValue = 0;
    return(FALSE);
}

/* FUNCTION: BOOL GetWDID(char *ptr, int *lw_id, int *ld_id, char **optr)
*
* PURPOSE:      This function converts the string value to a pair of integers
*               where the ascii numeric field represents an encoded
warehouse
*               and district id. The least significant digit is one less than
*               the actual local district id, and the remaining high order
*               digits are 10 times the actual local warehouse id.
*
* ARGUMENTS:   char *ptr pointer to string to check.
*
* RETURNS:     BOOL FALSE   if string is not all numeric and
properly       TRUE        terminated.
*               TRUE        if string contains only numeric
characters    i.e. '0' - '9' and is properly
terminated.
*
* COMMENTS:    A side affect of this routine is that the output string
*               pointer will either point at the end of the values being
*               searched or at the *start* point where ptr originated.
*/
BOOL
GetWDID(char *ptr, int *lw_id, int *ld_id, char **optr)
{
    int c;          /* current char */
    int pc;         /* previous character */
    int total;     /* current total */
    BOOL bGotSomething = FALSE;

    *lw_id = 0;
    *ld_id = 0;
    total = 0;

    *optr = ptr;
    pc = (int)(unsigned char)*ptr++;
    if((pc < '0') || (pc > '9'))
        return FALSE;

    c = (int)(unsigned char)*ptr++;

    while ((c >= '0') && (c <= '9'))
    {
        total = 10 * total + (pc - '0'); /* accumulate digit */
        pc = c;
        c = (int)(unsigned char)*ptr++; /* get next char */
        bGotSomething = TRUE;
    }
    if(('\0' == c) || ('\0' == c) && bGotSomething)
    {
        *lw_id = total;
        *ld_id = (pc - '0') + 1;
        *optr = ptr;
        return TRUE; /* return result */
    }
    else
        return FALSE;
}

```

```

}

/* FUNCTION: BOOL GetKeyValueString(char *szIPtr, char *szKey,
*                                     char *szValue, int iSize)
*
* PURPOSE:          This function searches for the key specified and returns
*                   the string value associated with it.
*
* ARGUMENTS:       char    *szIPtr           string to
search              char    *szKey           key to
search for          char    *szValue        location to store value
*                   int     iSize           size of
output array.
*
* RETURNS:         BOOL    FALSE            key not
found
*                   TRUE     key
found, value stored
*
* COMMENTS:        http keys are formatted either KEY=value& or
KEY=value{0.
*                   This DLL formats TPC-C input fields in such a manner that
the keys can be extracted in the above manner.
*/

BOOL
GetKeyValueString(char *szIPtr, char *szKey,
                  char *szValue, int iSize)
{
    char *ptr;

    if( !GetKeyValuePtr( szIPtr, szKey, &ptr ))
        return FALSE;

    /* force zero termination of output string */
    iSize--;

    while( '\0' != *ptr && '&' != *ptr && iSize)
    {
        *szValue++ = *ptr++;
        iSize--;
    }
    *szValue = 0;
    return TRUE;
}

int
GetCallingThreadLimit( int *pCallingThreadLimit )
{
    int          Status;
    int          size;

    size = sizeof( *pCallingThreadLimit );
    Status = GetRegValue( INETINFO_CLASS, "PoolThreadLimit",
                        &size, (char *)pCallingThreadLimit );

    if( ERR_SUCCESS != Status )
    {
        return ERR_CANT_FIND_POOLTHREADLIMIT;
    }
}

#ifdef FFE_DEBUG
/* FUNCTION: void CheckMemory(void *param)
*
* PURPOSE:          This function loops calling _CrtCheckMemory()
*
* ARGUMENTS:       void    *param           not used
*
* RETURNS:         nothing
*
* COMMENTS:
*/

unsigned __stdcall
CheckMemory(void *param)
{

```

```

while (TRUE)
{
    _ASSERT( !_CrtCheckMemory( ) );
    Sleep( 1000 );
}
return 0;
}
#endif

```

Appendix B

add_log2.sh

```
#!/bin/sh
date
svrmgrl <<!
  connect internal
  alter database add logfile thread 2 group 3 (?/dbs/tpcc_disks/log1_1) size 11264M
reuse,
  group 4 (?/dbs/tpcc_disks/log1_2) size 11264M reuse;
  alter database enable public thread 2;
exit;
!
date
```

add_log3.sh

```
#!/bin/sh
date
svrmgrl <<!
  connect internal
  alter database add logfile thread 3 group 5 (?/dbs/tpcc_disks/log2_1) size 11264M
reuse,
  group 6 (?/dbs/tpcc_disks/log2_2) size 11264M reuse;
  alter database enable public thread 3;
exit;
!
date
```

add_log4.sh

```
#!/bin/sh
date
svrmgrl <<!
  connect internal
  alter database add logfile thread 4 group 7 (?/dbs/tpcc_disks/log3_1) size 11264M
reuse,
  group 8 (?/dbs/tpcc_disks/log3_2) size 11264M reuse;
  alter database enable public thread 4;
exit;
!
date
```

add_log5.sh

```
#!/bin/sh
date
svrmgrl <<!
  connect internal
  alter database add logfile thread 5 group 9 (?/dbs/tpcc_disks/log4_1) size 11264M
reuse,
  group 10 (?/dbs/tpcc_disks/log4_2) size 11264M reuse;
  alter database enable public thread 5;
exit;
!
date
```

add_log6.sh

```
#!/bin/sh
date
svrmgrl <<!
  connect internal
  alter database add logfile thread 6 group 11 (?/dbs/tpcc_disks/log5_1) size 11264M
reuse,
  group 12 (?/dbs/tpcc_disks/log5_2) size 11264M reuse;
  alter database enable public thread 6;
exit;
!
date
```

add_log7.sh

```
#!/bin/sh
date
svrmgrl <<!
  connect internal
  alter database add logfile thread 7 group 13 (?/dbs/tpcc_disks/log6_1) size 11264M
reuse,
  group 14 (?/dbs/tpcc_disks/log6_2) size 11264M reuse;
  alter database enable public thread 7;
exit;
!
date
```

add_log8.sh

```
#!/bin/sh
date
svrmgrl <<!
  connect internal
  alter database add logfile thread 8 group 15 (?/dbs/tpcc_disks/log7_1) size 11264M
reuse,
  group 16 (?/dbs/tpcc_disks/log7_2) size 11264M reuse;
  alter database enable public thread 8;
exit;
!
date
```

add_new_log0_1.sh

```
#!/bin/sh
set -x
date
svrmgrl <<!
  connect internal
  alter database add logfile group 1 (?/dbs/tpcc_disks/log0_1) size 11264M reuse;
exit;
!
date
```

add_new_log0_2.sh

```
#!/bin/sh
set -x
date
svrmgrl <<!
```

```

connect internal
alter database add logfile group 2 ('?/dbs/tpcc_disks/log0_2') size 11264M reuse;
exit;
!
date

```

addfile.sh

```

#!sh

$SHELLPLUS tpcc/tpcc <<!
  spool step5addfile_$.log
  set echo on
  alter tablespace $1 add datafile '$2' size $3 reuse autoextend on;
  set echo off
  spool off
  exit ;
!

```

addtempfile.sh

```

#!sh

$SHELLPLUS tpcc/tpcc <<!
  spool step5addfile_$.log
  set echo on
  alter tablespace $1 add tempfile '$2' size $3 reuse;
  set echo off
  spool off
  exit ;
!

```

addtempets.sh

```

#!sh

$SHELLPLUS tpcc/tpcc <<!
  spool step5createts_$.log
  set echo on
  drop tablespace $1 including contents;
  create temporary tablespace $1 tempfile '$2' size $3 reuse extent management local
  uniform size $4;
  set echo off
  spool off
  exit ;
!

```

addts.sh

```

#!sh

$SHELLPLUS tpcc/tpcc <<!
  spool step5createts_$.log
  set echo on
  drop tablespace $1 including contents;
  create tablespace $1 datafile '$2' size $3 reuse autoextend on extent management
  local uniform size $4 nologging ;
  set echo off
  spool off
  exit ;
!

```

buffer_pool_on.sh

```

#!/bin/sh
./undml.sh
svrmgrl <<!
  connect tpcc/tpcc;
  alter cluster custcluster storage (buffer_pool recycle);
  alter table hist storage (buffer_pool recycle);
  alter cluster itemcluster storage (buffer_pool keep);
  alter cluster stokcluster storage (buffer_pool keep);

exit;
!
./dml.sh

```

build_index.sh

```

#!/bin/sh
./step36createiordr2.sh
./step38createiordl.sh

```

cre_tab.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   cre_tab.sql
rem DESCRIPTION
rem   Create temporary tables for consistency tests.
rem
=====
====
rem
rem Usage:  sqlplus tpcc/tpcc @cre_tab
rem
connect tpcc/tpcc;
set echo on;

drop table temp_o1;
drop table temp_no;
drop table temp_o2;
drop table temp_o1;
drop table tpcc_audit_tab;

create table temp_o1 (
  o_w_id integer,
  o_d_id integer,
  o_o_id integer);

create table temp_no (
  no_w_id integer,
  no_d_id integer,
  no_o_id integer);

create table temp_o2 (
  o_w_id integer,
  o_d_id integer,
  o_count integer);

```



```

create table temp_ol (
  ol_w_id integer,
  ol_d_id integer,
  ol_count integer);

create table tpcc_audit_tab (starttime date);

delete from tpcc_audit_tab;

set echo off;

```

create_cache_views.sql

```

rem This script creates four views that when queried will return
rem the total number of buffers in the buffer cache and the total
rem number of cloned buffers from each of the database's tablespaces.
rem
rem This assumes that each table and index is in its own tablespace.
rem If this is not the case, another query can be used which uses the
rem database's object tables to decipher the different objects. However,
rem this query is slower.
rem
rem This script assumes 7.3.x. If you are using V7.2.x or below, please
rem replace svrmgrl with sqldb lmode=y.
rem
rem Modification History:
rem
rem wbattist 16-Jun-1996 Create two additional views to keep
rem track of the number of clones in each
rem tablespace.
rem
rem wbattist 24-May-1995 Add the state check for the cbf view
rem to ensure that cloned blocks are not
rem counted.
rem

connect internal/internal;
set echo on;
drop view cbf;
create view cbf as
select distinct(dbarfil) file#, count(1) blocks
from x$bhh
  where dbarfil > 0 and state <> 3
group by dbarfil;
drop view cbt;
create view cbt as
select ts$.name name,sum(cbf.blocks) buffers
from cbf, file$, ts$
  where cbf.file#=file$.file# and file$.ts#=ts$.ts#
group by file$.ts#, ts$.name;
drop view cbfcln;
create view cbfcln as
select distinct(dbarfil) file#, count(1) blocks
from x$bhh
  where dbarfil > 0
group by dbarfil;
drop view cbtn;
create view cbtn as
select ts$.name name,sum(cbfcln.blocks) buffers
from cbfcln, file$, ts$
  where cbfcln.file#=file$.file# and file$.ts#=ts$.ts#
group by file$.ts#, ts$.name;

set echo off;

```

create_rollback_0.sql

```

spool createrollsegs_0.log
set echo on

create rollback segment t_0_1 tablespace roll_0_0;
create rollback segment t_0_2 tablespace roll_0_1;

```

```

create rollback segment t_0_3 tablespace roll_0_0;
create rollback segment t_0_4 tablespace roll_0_1;
create rollback segment t_0_5 tablespace roll_0_0;
create rollback segment t_0_6 tablespace roll_0_1;
create rollback segment t_0_7 tablespace roll_0_0;
create rollback segment t_0_8 tablespace roll_0_1;
create rollback segment t_0_9 tablespace roll_0_0;
create rollback segment t_0_10 tablespace roll_0_1;
create rollback segment t_0_11 tablespace roll_0_0;
create rollback segment t_0_12 tablespace roll_0_1;
create rollback segment t_0_13 tablespace roll_0_0;
create rollback segment t_0_14 tablespace roll_0_1;
create rollback segment t_0_15 tablespace roll_0_0;
create rollback segment t_0_16 tablespace roll_0_1;
create rollback segment t_0_17 tablespace roll_0_0;
create rollback segment t_0_18 tablespace roll_0_1;
create rollback segment t_0_19 tablespace roll_0_0;
create rollback segment t_0_20 tablespace roll_0_1;
create rollback segment t_0_21 tablespace roll_0_0;
create rollback segment t_0_22 tablespace roll_0_1;
create rollback segment t_0_23 tablespace roll_0_0;
create rollback segment t_0_24 tablespace roll_0_1;
create rollback segment t_0_25 tablespace roll_0_0;
create rollback segment t_0_26 tablespace roll_0_1;
create rollback segment t_0_27 tablespace roll_0_0;
create rollback segment t_0_28 tablespace roll_0_1;
create rollback segment t_0_29 tablespace roll_0_0;
create rollback segment t_0_30 tablespace roll_0_1;
create rollback segment t_0_31 tablespace roll_0_0;
create rollback segment t_0_32 tablespace roll_0_1;
create rollback segment t_0_33 tablespace roll_0_0;
create rollback segment t_0_34 tablespace roll_0_1;
create rollback segment t_0_35 tablespace roll_0_0;
create rollback segment t_0_36 tablespace roll_0_1;
create rollback segment t_0_37 tablespace roll_0_0;
create rollback segment t_0_38 tablespace roll_0_1;
create rollback segment t_0_39 tablespace roll_0_0;
create rollback segment t_0_40 tablespace roll_0_1;
create rollback segment t_0_41 tablespace roll_0_0;
create rollback segment t_0_42 tablespace roll_0_1;
create rollback segment t_0_43 tablespace roll_0_0;
create rollback segment t_0_44 tablespace roll_0_1;
create rollback segment t_0_45 tablespace roll_0_0;
create rollback segment t_0_46 tablespace roll_0_1;
create rollback segment t_0_47 tablespace roll_0_0;
create rollback segment t_0_48 tablespace roll_0_1;
create rollback segment t_0_49 tablespace roll_0_0;
create rollback segment t_0_50 tablespace roll_0_1;
create rollback segment t_0_51 tablespace roll_0_0;
create rollback segment t_0_52 tablespace roll_0_1;
create rollback segment t_0_53 tablespace roll_0_0;
create rollback segment t_0_54 tablespace roll_0_1;
create rollback segment t_0_55 tablespace roll_0_0;
create rollback segment t_0_56 tablespace roll_0_1;
create rollback segment t_0_57 tablespace roll_0_0;
create rollback segment t_0_58 tablespace roll_0_1;
create rollback segment t_0_59 tablespace roll_0_0;
create rollback segment t_0_60 tablespace roll_0_1;
create rollback segment t_0_61 tablespace roll_0_0;
create rollback segment t_0_62 tablespace roll_0_1;
create rollback segment t_0_63 tablespace roll_0_0;
create rollback segment t_0_64 tablespace roll_0_1;
create rollback segment t_0_65 tablespace roll_0_0;
create rollback segment t_0_66 tablespace roll_0_1;
create rollback segment t_0_67 tablespace roll_0_0;
create rollback segment t_0_68 tablespace roll_0_1;
create rollback segment t_0_69 tablespace roll_0_0;
create rollback segment t_0_70 tablespace roll_0_1;
create rollback segment t_0_71 tablespace roll_0_0;
create rollback segment t_0_72 tablespace roll_0_1;
create rollback segment t_0_73 tablespace roll_0_0;
create rollback segment t_0_74 tablespace roll_0_1;
create rollback segment t_0_75 tablespace roll_0_0;
create rollback segment t_0_76 tablespace roll_0_1;
create rollback segment t_0_77 tablespace roll_0_0;
create rollback segment t_0_78 tablespace roll_0_1;
create rollback segment t_0_79 tablespace roll_0_0;
create rollback segment t_0_80 tablespace roll_0_1;
create rollback segment t_0_81 tablespace roll_0_0;
create rollback segment t_0_82 tablespace roll_0_1;

```



```
create rollback segment t_7_199 tablespace roll_7_0;
create rollback segment t_7_200 tablespace roll_7_1;
```

```
spool off
set echo off
```

dml.sh

```
#!/bin/sh
svrmgrl <<!  
connect tpcc/tpcc;  
  
set echo on;  
alter table ware disable table lock;  
alter table dist disable table lock;  
alter table cust disable table lock;  
alter table hist disable table lock;  
alter table item disable table lock;  
alter table stok disable table lock;  
alter table ordr disable table lock;  
alter table nord disable table lock;  
alter table ordl disable table lock;  
alter table tpcc_back_res disable table lock;  
alter table tpcc_del_res disable table lock;  
alter table tpcc_new_res disable table lock;  
alter table tpcc_ord_res disable table lock;  
alter table tpcc_pay_res disable table lock;  
alter table tpcc_run_desc disable table lock;  
alter table tpcc_run_int disable table lock;  
alter table tpcc_sto_res disable table lock;  
alter table tpcc_tpm disable table lock;  
alter table tpcc_user_res disable table lock;  
alter table bench_del_res disable table lock;  
alter table bench_new_res disable table lock;  
alter table bench_ord_res disable table lock;  
alter table bench_pay_res disable table lock;  
alter table bench_run_int disable table lock;  
alter table bench_sto_res disable table lock;  
alter table bench_user_res disable table lock;  
  
set echo off;  
exit;  
!
```

driver.sh

```
#!/sh  
  
STEP=1  
START=0  
END=0  
CONTINUE=1  
PROGNAME="driver.sh"  
STOPFILE="stop"  
TRACEFILE="log/trace.log"  
JUNKFILE="junk"  
  
usage()  
{  
echo ""  
echo "Usage: $PROGNAME [<startstepno> <stopstepno>] [<startstepno>] [-step  
<stepno>]"  
echo "    [<startstepno> <stopstepno>] - allows user to run a specified"  
echo "        range of steps."  
echo "    [<startstepno>] - 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 "    1    Create Database."  
echo "    2    Create Rollback Segments for Build."
```

```
echo "    3    Shutdown Database."  
echo "    4    Startup Database for Build"  
echo "    5    Create User TPCC."  
echo "    6    Create Tablespaces."  
echo "    7    Assign Temporary Tablespace to user TPCC."  
echo "    8    Create Data Dictionary Views."  
echo "    9    Create Warehouse."  
echo "   10    Create District."  
echo "   11    Create Customer."  
echo "   12    Create History."  
echo "   13    Create Order."  
echo "   14    Create Neworder."  
echo "   15    Create Orderline."  
echo "   16    Create Stock."  
echo "   17    Create Item."  
echo "   18    Load Warehouse."  
echo "   19    Load District."  
echo "   20    Load Item."  
echo "   21    Load History"  
echo "   22    Load Neworder"  
echo "   23    Load Order/Orderline"  
echo "   24    Load Customer"  
echo "   25    Load Stock"  
echo "   26    Create Warehouse Index."  
echo "   27    Create District Index."  
echo "   28    Create Item Index."  
echo "   29    Create Customer1 Index."  
echo "   30    Create Customer2 Index."  
echo "   31    Create Stock Index."  
echo "   32    Create Orders1 Index."  
echo "   33    Create Orders2 Index."  
echo "   34    Create Neworder Index."  
echo "   35    Create Orderline Index."  
echo "   36    Analyze Tables/Clusters/Indexes."  
echo "   37    Create Statistics Tables."  
echo "   38    Load Stored Procedures."  
echo "   39    Create Rollback Segments for Runs."  
echo "   40    Generate Space Report."  
echo "   41    Misc."  
echo "   42    Offline Rollback segments for Build."  
echo "-----"
```

```
exit 1;  
}
```

```
torun()  
{  
mv -f *.log* log > junk 2>&1  
rm -f $JUNKFILE*  
}
```

```
if test -f $STOPFILE  
then  
echo "An error has occurred, please look into the $TRACEFILE file."  
echo "OR you need to remove the 'stop' file found in the current directory."  
echo "The 'stop' file need to be removed after an error occurs and before resuming."  
exit 1;  
fi
```

```
if test $STEP -ge $START  
then  
if test $STEP -le $END  
then  
STEP='expr $STEP + 1'  
return 0  
else  
if test $CONTINUE -eq 0  
then  
STEP='expr $STEP + 1'  
return 0  
fi  
fi  
STEP='expr $STEP + 1'  
return 1  
}
```

```
case $# in  
0) usage;  
;;  
1) case $1 in  
-h) usage
```

```

        ;;
        [0-9]*) START=$1
        CONTINUE=0
        ;;
        *) usage
        ;;
    esac
    ;;
2) case $1 in
    -step) shift
        case $1 in
            [0-9]*) ;;
            *) usage
            ;;
        esac
        START=$1
        END=$1
        CONTINUE=1
        ;;
        [0-9]*) START=$1
        shift
        case $1 in
            [0-9]*) ;;
            *) usage
            ;;
        esac
        END=$1
        CONTINUE=1
        ;;
        *) usage
        ;;
    esac
esac

if torun
then
echo "Creating the Database ..."
echo "Creating the Database ..." `date` "\n" >> $TRACEFILE
./step2createdb.sh
if test $? -ne 0
then
echo "Creating the Database failed." `date` "\n" >> $TRACEFILE
echo "Look at log/step2createdb.log for more details." `date` "\n" >> $TRACEFILE
echo "Stopped" >> $STOPFILE
echo "Creating the Database failed ..."
else
echo "Creating the Database done." `date` "\n" >> $TRACEFILE
echo "Creating the Database done ..."
fi
fi

if torun
then
echo "Creating the Rollback Segments ..."
echo "Creating the Rollback Segments ..." `date` "\n" >> $TRACEFILE
./step3creatorollback.sh
if test $? -ne 0
then
echo "Creating the Rollback Segments failed." `date` "\n" >> $TRACEFILE
echo "Look at log/step3creatorollback.log for more details." `date` "\n" >>
$TRACEFILE
echo "Stopped" >> $STOPFILE
echo "Creating the Rollback Segments failed ..."
else
echo "Creating the Rollback Segments done." `date` "\n" >> $TRACEFILE
echo "Creating the Rollback Segments done ..."
fi
fi

if torun
then
echo "Shutting down the Database ..."
echo "Shutting down the Database ..." `date` "\n" >> $TRACEFILE
./stepshut.sh
if test $? -ne 0
then
echo "Shutting down the Database failed." `date` "\n" >> $TRACEFILE

```

```

echo "Look at log/stepshut.log for more details." `date` "\n" >> $TRACEFILE
echo "Stopped" >> $STOPFILE
echo "Shutting down the Database failed ..."
else
echo "Shutting down the Database done." `date` "\n" >> $TRACEFILE
echo "Shutting down the Database done ..."
fi
fi

if torun
then
echo "Start up Database for Build ..."
echo "Start up Database for Build ..." `date` "\n" >> $TRACEFILE
./stepstartb.sh
if test $? -ne 0
then
echo "Start up Database for Build failed." `date` "\n" >> $TRACEFILE
echo "Look at log/stepstartb.log for more details." `date` "\n" >> $TRACEFILE
echo "Stopped" >> $STOPFILE
echo "Start up Database for Build failed ..."
else
echo "Start up Database for Build done." `date` "\n" >> $TRACEFILE
echo "Start up Database for Build done ..."
fi
fi

if torun
then
echo "Create User TPCC ..."
echo "Create User TPCC ..." `date` "\n" >> $TRACEFILE
./stepcreateuser.sh
if test $? -ne 0
then
echo "Create User TPCC failed." `date` "\n" >> $TRACEFILE
echo "Look at log/stepcreateuser.log for more details." `date` "\n" >> $TRACEFILE
echo "Stopped" >> $STOPFILE
echo "Create User TPCC failed ..."
else
echo "Create User TPCC done." `date` "\n" >> $TRACEFILE
echo "Create User TPCC done ..."
fi
fi

if torun
then
echo "Create Tablespaces ..."
echo "Create Tablespaces ..." `date` "\n" >> $TRACEFILE
./step5createts.sh
if test $? -ne 0
then
echo "Create Tablespaces failed." `date` "\n" >> $TRACEFILE
echo "Look at log/step5createts*.log for more details." `date` "\n" >> $TRACEFILE
echo "Stopped" >> $STOPFILE
echo "Create Tablespaces failed ..."
else
echo "Create Tablespaces done." `date` "\n" >> $TRACEFILE
echo "Create Tablespaces done ..."
fi
fi

if torun
then
echo "Assign Temporary Tablespace to user TPCC ..."
echo "Assign Temporary Tablespace to user TPCC ..." `date` "\n" >> $TRACEFILE
./stepusertemp.sh
if test $? -ne 0
then
echo "Assign Temporary Tablespace to user TPCC failed." `date` "\n" >>
$TRACEFILE
echo "Look at log/stepusertemp.log for more details." `date` "\n" >> $TRACEFILE
echo "Stopped" >> $STOPFILE
echo "Assign Temporary Tablespace to user TPCC failed ..."
else
echo "Assign Temporary Tablespace to user TPCC done." `date` "\n" >>
$TRACEFILE
echo "Assign Temporary Tablespace to user TPCC done ..."
fi
fi

if torun

```

```

then
echo "Create Data Dictionary views ..."
echo "Create Data Dictionary views ..." 'date' "\n" >> $TRACEFILE
./step6createddviews.sh
if test $? -ne 0
then
echo "Create Data Dictionary views failed." 'date' "\n" >> $TRACEFILE
echo "Look at log/step6createddviews.log for more details." 'date' "\n" >>
$TRACEFILE
echo "Stopped" >> $STOPFILE
echo "Create Data Dictionary views failed ..."
else
echo "Create Data Dictionary views done." 'date' "\n" >> $TRACEFILE
echo "Create Data Dictionary views done ..."
fi
fi

if torun
then
echo "Create Warehouse ..."
echo "Create Warehouse ..." 'date' "\n" >> $TRACEFILE
./step9createware.sh
if test $? -ne 0
then
echo "Create Warehouse failed." 'date' "\n" >> $TRACEFILE
echo "Look at log/step9createware.log for more details." 'date' "\n" >>
$TRACEFILE
echo "Stopped" >> $STOPFILE
echo "Create Warehouse failed ..."
else
echo "Create Warehouse done." 'date' "\n" >> $TRACEFILE
echo "Create Warehouse done ..."
fi
fi

if torun
then
echo "Create District ..."
echo "Create District ..." 'date' "\n" >> $TRACEFILE
./step10createdist.sh
if test $? -ne 0
then
echo "Create District failed." 'date' "\n" >> $TRACEFILE
echo "Look at log/step10createdist.log for more details." 'date' "\n" >>
$TRACEFILE
echo "Stopped" >> $STOPFILE
echo "Create District failed ..."
else
echo "Create District done." 'date' "\n" >> $TRACEFILE
echo "Create District done ..."
fi
fi

if torun
then
echo "Create Customer ..."
echo "Create Customer ..." 'date' "\n" >> $TRACEFILE
./step11createcust.sh
if test $? -ne 0
then
echo "Create Customer failed.\n" 'date' "\n" >> $TRACEFILE
echo "Look at log/step11createcust.log for more details." 'date' "\n" >>
$TRACEFILE
echo "Stopped" >> $STOPFILE
echo "Create Customer failed ..."
else
echo "Create Customer done." 'date' "\n" >> $TRACEFILE
echo "Create Customer done ..."
fi
fi

if torun
then
echo "Create History ..."
echo "Create History ..." 'date' "\n" >> $TRACEFILE
./step12createhist.sh
if test $? -ne 0
then
echo "Create History failed." 'date' "\n" >> $TRACEFILE
echo "Look at log/step12createhist.log for more details." 'date' "\n" >>
$TRACEFILE
echo "Stopped" >> $STOPFILE
echo "Create History failed ..."
else
echo "Create History done." 'date' "\n" >> $TRACEFILE
echo "Create History done ..."
fi
fi

if torun
then
echo "Create Order ..."
echo "Create Order ..." 'date' "\n" >> $TRACEFILE
./step13createordr.sh
if test $? -ne 0
then
echo "Create Order failed." 'date' "\n" >> $TRACEFILE
echo "Look at log/step13createordr.log for more details." 'date' "\n" >>
$TRACEFILE
echo "Stopped" >> $STOPFILE
echo "Create Order failed ..."
else
echo "Create Order done." 'date' "\n" >> $TRACEFILE
echo "Create Order done ..."
fi
fi

if torun
then
echo "Create Neworder ..."
echo "Create Neworder ..." 'date' "\n" >> $TRACEFILE
./step14createnord.sh
if test $? -ne 0
then
echo "Create Neworder failed." 'date' "\n" >> $TRACEFILE
echo "Look at log/step14createnord.log for more details." 'date' "\n" >>
$TRACEFILE
echo "Stopped" >> $STOPFILE
echo "Create Neworder failed ..."
else
echo "Create Neworder done." 'date' "\n" >> $TRACEFILE
echo "Create Neworder done ..."
fi
fi

if torun
then
echo "Create Orderline ..."
echo "Create Orderline ..." 'date' "\n" >> $TRACEFILE
./step15createordl.sh
if test $? -ne 0
then
echo "Create Orderline failed." 'date' "\n" >> $TRACEFILE
echo "Look at log/step15createordl.log for more details." 'date' "\n" >>
$TRACEFILE
echo "Stopped" >> $STOPFILE
echo "Create Orderline failed ..."
else
echo "Create Orderline done." 'date' "\n" >> $TRACEFILE
echo "Create Orderline done ..."
fi
fi

if torun
then
echo "Create Stock ..."
echo "Create Stock ..." 'date' "\n" >> $TRACEFILE
./step16createstok.sh
if test $? -ne 0
then
echo "Create Stock failed." 'date' "\n" >> $TRACEFILE
echo "Look at log/step16createstok.log for more details." 'date' "\n" >>
$TRACEFILE
echo "Stopped" >> $STOPFILE
echo "Create Stock failed ..."
else
echo "Create Stock done." 'date' "\n" >> $TRACEFILE
echo "Create Stock done ..."
fi
fi

```

```

fi

if torun
then
echo "Create Item ..."
echo "Create Item ..." 'date' "\n" >> $TRACEFILE
./step17createitem.sh
if test $? -ne 0
then
echo "Create Item failed." 'date' "\n" >> $TRACEFILE
echo "Look at log/step17createitem.log for more details." 'date' "\n" >>
$TRACEFILE
echo "Stopped" >> $STOPFILE
echo "Create Item failed ..."
else
echo "Create Item done." 'date' "\n" >> $TRACEFILE
echo "Create Item done ..."
fi
fi

if torun
then
echo "Load Warehouse ..."
echo "Load Warehouse ..." 'date' "\n" >> $TRACEFILE
./step20loadware.sh
if test $? -ne 0
then
echo "Load Warehouse failed." 'date' "\n" >> $TRACEFILE
echo "Look at log/step20loadware.log for more details." 'date' "\n" >>
$TRACEFILE
echo "Stopped" >> $STOPFILE
echo "Load Warehouse failed ..."
else
echo "Load Warehouse done." 'date' "\n" >> $TRACEFILE
echo "Load Warehouse done ..."
fi
fi

if torun
then
echo "Load District ..."
echo "Load District ..." 'date' "\n" >> $TRACEFILE
./step21loaddist.sh
if test $? -ne 0
then
echo "Load District failed." 'date' "\n" >> $TRACEFILE
echo "Look at log/step21loaddist.log for more details." 'date' "\n" >> $TRACEFILE
echo "Stopped" >> $STOPFILE
echo "Load District failed ..."
else
echo "Load District done." 'date' "\n" >> $TRACEFILE
echo "Load District done ..."
fi
fi

if torun
then
echo "Load Item ..."
echo "Load Item ..." 'date' "\n" >> $TRACEFILE
./step22loaditem.sh
if test $? -ne 0
then
echo "Load Item failed." 'date' "\n" >> $TRACEFILE
echo "Look at log/step22loaditem.log for more details." 'date' "\n" >>
$TRACEFILE
echo "Stopped" >> $STOPFILE
echo "Load Item failed ..."
else
echo "Load Item done." 'date' "\n" >> $TRACEFILE
echo "Load Item done ..."
fi
fi

if torun
then
echo "Load History ..."
echo "Load History ..." 'date' "\n" >> $TRACEFILE
./step23loadhist.sh
if test $? -ne 0
then
echo "Load History failed." 'date' "\n" >> $TRACEFILE
echo "Look at log/step23loadhist*.log for more details." 'date' "\n" >>
$TRACEFILE
echo "Stopped" >> $STOPFILE
echo "Load History failed ..."
else
echo "Load History done." 'date' "\n" >> $TRACEFILE
echo "Load History done ..."
fi
fi

if torun
then
echo "Load Neworder ..."
echo "Load Neworder ..." 'date' "\n" >> $TRACEFILE
./step24loadord.sh
if test $? -ne 0
then
echo "Load Neworder failed." 'date' "\n" >> $TRACEFILE
echo "Look at log/step24loadord*.log for more details." 'date' "\n" >>
$TRACEFILE
echo "Stopped" >> $STOPFILE
echo "Load Neworder failed ..."
else
echo "Load Neworder done." 'date' "\n" >> $TRACEFILE
echo "Load Neworder done ..."
fi
fi

if torun
then
echo "Load Order/Orderline ..."
echo "Load Order/Orderline ..." 'date' "\n" >> $TRACEFILE
./step25loadordrdrd1.sh
if test $? -ne 0
then
echo "Load Order/Orderline failed." 'date' "\n" >> $TRACEFILE
echo "Look at log/step25loadordrdrd1*.log for more details." 'date' "\n" >>
$TRACEFILE
echo "Stopped" >> $STOPFILE
echo "Load Order/Orderline failed ..."
else
echo "Load Order/Orderline done." 'date' "\n" >> $TRACEFILE
echo "Load Order/Orderline done ..."
fi
fi

if torun
then
echo "Load Customer ..."
echo "Load Customer ..." 'date' "\n" >> $TRACEFILE
./step26loadcust.sh
if test $? -ne 0
then
echo "Load Customer failed." 'date' "\n" >> $TRACEFILE
echo "Look at log/step26loadcust*.log for more details." 'date' "\n" >>
$TRACEFILE
echo "Stopped" >> $STOPFILE
echo "Load Customer failed ..."
else
echo "Load Customer done." 'date' "\n" >> $TRACEFILE
echo "Load Customer done ..."
fi
fi

if torun
then
echo "Load Stock ..."
echo "Load Stock ..." 'date' "\n" >> $TRACEFILE
./step27loadstok.sh
if test $? -ne 0
then
echo "Load Stock failed." 'date' "\n" >> $TRACEFILE
echo "Look at log/step27loadstok*.log for more details." 'date' "\n" >>
$TRACEFILE
echo "Stopped" >> $STOPFILE
echo "Load Stock failed ..."
else
echo "Load Stock done." 'date' "\n" >> $TRACEFILE
echo "Load Stock done ..."

```

```

fi
fi

if torun
then
echo "Create Warehouse Index ..."
echo "Create Warehouse Index ..." 'date' "\n" >> $TRACEFILE
./step29createiware.sh
if test $? -ne 0
then
echo "Create Warehouse Index failed." 'date' "\n" >> $TRACEFILE
echo "Look at log/step29createiware.log for more details." 'date' "\n" >>
$TRACEFILE
echo "Stopped" >> $STOPFILE
echo "Create Warehouse Index failed ..."
else
echo "Create Warehouse Index done." 'date' "\n" >> $TRACEFILE
echo "Create Warehouse Index done ..."
fi
fi

if torun
then
echo "Create District Index ..."
echo "Create District Index ..." 'date' "\n" >> $TRACEFILE
./step30createidist.sh
if test $? -ne 0
then
echo "Create District Index failed." 'date' "\n" >> $TRACEFILE
echo "Look at log/step30createidist.log for more details." 'date' "\n" >>
$TRACEFILE
echo "Stopped" >> $STOPFILE
echo "Create District Index failed ..."
else
echo "Create District Index done." 'date' "\n" >> $TRACEFILE
echo "Create District Index done ..."
fi
fi

if torun
then
echo "Create Item Index ..."
echo "Create Item Index ..." 'date' "\n" >> $TRACEFILE
./step31createiitem.sh
if test $? -ne 0
then
echo "Create Item Index failed." 'date' "\n" >> $TRACEFILE
echo "Look at log/step31createiitem.log for more details." 'date' "\n" >>
$TRACEFILE
echo "Stopped" >> $STOPFILE
echo "Create Item Index failed ..."
else
echo "Create Item Index done." 'date' "\n" >> $TRACEFILE
echo "Create Item Index done ..."
fi
fi

if torun
then
echo "Create Customer1 Index ..."
echo "Create Customer1 Index ..." 'date' "\n" >> $TRACEFILE
./step32createicust1.sh
if test $? -ne 0
then
echo "Create Customer1 Index failed." 'date' "\n" >> $TRACEFILE
echo "Look at log/step32createicust1.log for more details." 'date' "\n" >>
$TRACEFILE
echo "Stopped" >> $STOPFILE
echo "Create Customer1 Index failed ..."
else
echo "Create Customer1 Index done." 'date' "\n" >> $TRACEFILE
echo "Create Customer1 Index done ..."
fi
fi

if torun
then
echo "Create Customer2 Index ..."
echo "Create Customer2 Index ..." 'date' "\n" >> $TRACEFILE
./step33createicust2.sh
if test $? -ne 0
then
echo "Create Customer2 Index failed." 'date' "\n" >> $TRACEFILE
echo "Look at log/step33createicust2.log for more details." 'date' "\n" >>
$TRACEFILE
echo "Stopped" >> $STOPFILE
echo "Create Customer2 Index failed ..."
else
echo "Create Customer2 Index done." 'date' "\n" >> $TRACEFILE
echo "Create Customer2 Index done ..."
fi
fi

if torun
then
echo "Create Stock Index ..."
echo "Create Stock Index ..." 'date' "\n" >> $TRACEFILE
./step34createistok.sh
if test $? -ne 0
then
echo "Create Stock Index failed." 'date' "\n" >> $TRACEFILE
echo "Look at log/step34createistok.log for more details." 'date' "\n" >>
$TRACEFILE
echo "Stopped" >> $STOPFILE
echo "Create Stock Index failed ..."
else
echo "Create Stock Index done." 'date' "\n" >> $TRACEFILE
echo "Create Stock Index done ..."
fi
fi

if torun
then
echo "Create Order1 Index ..."
echo "Create Order1 Index ..." 'date' "\n" >> $TRACEFILE
./step35createiordr1.sh
if test $? -ne 0
then
echo "Create Order1 Index failed." 'date' "\n" >> $TRACEFILE
echo "Look at log/step35createiordr1.log for more details." 'date' "\n" >>
$TRACEFILE
echo "Stopped" >> $STOPFILE
echo "Create Order1 Index failed ..."
else
echo "Create Order1 Index done." 'date' "\n" >> $TRACEFILE
echo "Create Order1 Index done ..."
fi
fi

if torun
then
echo "Create Order2 Index ..."
echo "Create Order2 Index ..." 'date' "\n" >> $TRACEFILE
./step36createiordr2.sh
if test $? -ne 0
then
echo "Create Order2 Index failed." 'date' "\n" >> $TRACEFILE
echo "Look at log/step36createiordr2.log for more details." 'date' "\n" >>
$TRACEFILE
echo "Stopped" >> $STOPFILE
echo "Create Order2 Index failed ..."
else
echo "Create Order2 Index done." 'date' "\n" >> $TRACEFILE
echo "Create Order2 Index done ..."
fi
fi

if torun
then
echo "Create Neworder Index ..."
echo "Create Neworder Index ..." 'date' "\n" >> $TRACEFILE
./step37createinord.sh
if test $? -ne 0
then
echo "Create Neworder Index failed." 'date' "\n" >> $TRACEFILE
echo "Look at log/step37createinord.log for more details." 'date' "\n" >>
$TRACEFILE
echo "Stopped" >> $STOPFILE
echo "Create Neworder Index failed ..."
else

```



```

    echo "Create Neworder Index done." 'date' "\n" >> $TRACEFILE
    echo "Create Neworder Index done ..."
    fi
fi

if torun
then
    echo "Create Orderline Index ..."
    echo "Create Orderline Index ..." 'date' "\n" >> $TRACEFILE
    ./step38createordl.sh
    if test $? -ne 0
    then
        echo "Create Orderline Index failed." 'date' "\n" >> $TRACEFILE
        echo "Look at log/step38createordl.log for more details." 'date' "\n" >>
$TRACEFILE
        echo "Stopped" >> $STOPFILE
        echo "Create Orderline Index failed ..."
    else
        echo "Create Orderline Index done." 'date' "\n" >> $TRACEFILE
        echo "Create Orderline Index done ..."
    fi
fi

if torun
then
    echo "Analyze Tables/Clusters/Indexes ..."
    echo "Analyze Tables/Clusters/Indexes ..." 'date' "\n" >> $TRACEFILE
    ./step39analyze.sh
    if test $? -ne 0
    then
        echo "Analyze Tables/Clusters/Indexes failed." 'date' "\n" >> $TRACEFILE
        echo "Look at log/step39analyze.log for more details." 'date' "\n" >> $TRACEFILE
        echo "Stopped" >> $STOPFILE
        echo "Analyze Tables/Clusters/Indexes failed ..."
    else
        echo "Analyze Tables/Clusters/Indexes done." 'date' "\n" >> $TRACEFILE
        echo "Analyze Tables/Clusters/Indexes done ..."
    fi
fi

if torun
then
    echo "Create Statistics Tables ..."
    echo "Create Statistics Tables ..." 'date' "\n" >> $TRACEFILE
    ./step40createstats.sh
    if test $? -ne 0
    then
        echo "Create Statistics Tables failed." 'date' "\n" >> $TRACEFILE
        echo "Look at log/step40createstats.log for more details." 'date' "\n" >>
$TRACEFILE
        echo "Stopped" >> $STOPFILE
        echo "Create Statistics Tables failed ..."
    else
        echo "Create Statistics Tables done." 'date' "\n" >> $TRACEFILE
        echo "Create Statistics Tables done ..."
    fi
fi

if torun
then
    echo "Load Stored Procedures ..."
    echo "Load Stored Procedures ..." 'date' "\n" >> $TRACEFILE
    ./step41createstoreprocs.sh
    if test $? -ne 0
    then
        echo "Load Stored Procedures failed." 'date' "\n" >> $TRACEFILE
        echo "Look at log/step41createstoreprocs.log for more details." 'date' "\n" >>
$TRACEFILE
        echo "Stopped" >> $STOPFILE
        echo "Load Stored Procedures failed ..."
    else
        echo "Load Stored Procedures done." 'date' "\n" >> $TRACEFILE
        echo "Load Stored Procedures done ..."
    fi
fi

if torun
then
    echo "Create Rollback Segments for Runs ..."
    echo "Create Rollback Segments for Runs ..." 'date' "\n" >> $TRACEFILE
    ./step18createrollsegs.sh
    if test $? -ne 0
    then
        echo "Create Rollback Segments for Runs failed." 'date' "\n" >> $TRACEFILE
        echo "Look at log/step18createrollsegs.log for more details." 'date' "\n" >>
$TRACEFILE
        echo "Stopped" >> $STOPFILE
        echo "Create Rollback Segments for Runs failed ..."
    else
        echo "Create Rollback Segments for Runs done." 'date' "\n" >> $TRACEFILE
        echo "Create Rollback Segments for Runs done ..."
    fi
fi

if torun
then
    echo "Generate Space Reports ..."
    echo "Generate Space Reports ..." 'date' "\n" >> $TRACEFILE
    ./step42createspacestats.sh
    if test $? -ne 0
    then
        echo "Generate Space Reports failed." 'date' "\n" >> $TRACEFILE
        echo "Look at log/step42createspacestats.log for more details." 'date' "\n" >>
$TRACEFILE
        echo "Stopped" >> $STOPFILE
        echo "Generate Space Reports failed ..."
    else
        echo "Generate Space Reports done." 'date' "\n" >> $TRACEFILE
        echo "Generate Space Reports done ..."
    fi
fi

if torun
then
    echo "Misc ..."
    echo "Misc ..." 'date' "\n" >> $TRACEFILE
    ./step43createmisc.sh
    if test $? -ne 0
    then
        echo "Misc failed." 'date' "\n" >> $TRACEFILE
        echo "Look at log/step43createmisc.log for more details." 'date' "\n" >>
$TRACEFILE
        echo "Stopped" >> $STOPFILE
        echo "Misc failed ..."
    else
        echo "Misc done." 'date' "\n" >> $TRACEFILE
        echo "Misc done ..."
    fi
fi

if torun
then
    echo "Offline Rollback Segments for Build ..."
    echo "Offline Rollback Segments for Build ..." 'date' "\n" >> $TRACEFILE
    ./step47offlinerollsegs.sh
    if test $? -ne 0
    then
        echo "Offline Rollback Segments for Build failed." 'date' "\n" >> $TRACEFILE
        echo "Look at log/step47offlinerollsegs.log for more details." 'date' "\n" >>
$TRACEFILE
        echo "Stopped" >> $STOPFILE
        echo "Offline Rollback Segments for Build failed ..."
    else
        echo "Offline Rollback Segments for Build done." 'date' "\n" >> $TRACEFILE
        echo "Offline Rollback Segments for Build done ..."
    fi
fi

torun

extent.sql

REM=====
=====+
REM      Copyright (c) 1994 Oracle Corp, Belmont, CA      |
REM      OPEN SYSTEMS PERFORMANCE GROUP                  |
REM      All Rights Reserved                               |

```

```

REM=====
=====+
REM FILENAME
REM extent.sql
REM DESCRIPTION
REM List all extents in all the TPCC tablespaces.
REM
REM Usage: sqlplus internal/internal @extent [<block size in bytes>]
REM=====
=====*/

set space 2
set pagesize 2000
set echo off
set termout off
set verify off
set feedback off
spool extent.rpt

select substr(tablespace_name,1,8) tspace,
       substr(segment_name,1,11) segment, substr(segment_type,1,15) type,
       substr(extent_id,1,5) eid, substr(file_id,1,5) fid, blocks, blocks * &&1 / 1048576
size_MB
from dba_extents
where owner = 'TPCC' AND ( segment_type = 'INDEX' OR
       segment_type = 'INDEX PARTITION' OR segment_type = 'CLUSTER'
       OR segment_type = 'TABLE' OR segment_type = 'TABLE PARTITION')
       AND tablespace_name <> 'SYSTEM'
order by tablespace_name, segment_name, extent_id, file_id;

select substr(tablespace_name,1,8) tspace,
       substr(segment_name,1,11) segment,
       sum(blocks) tot_blk, sum(blocks) * &&1 / 1048576 size_MB
from dba_extents
where owner = 'TPCC' AND ( segment_type = 'INDEX' OR
       segment_type = 'INDEX PARTITION' OR segment_type = 'CLUSTER'
       OR segment_type = 'TABLE' OR segment_type = 'TABLE PARTITION')
       AND tablespace_name <> 'SYSTEM'
group by tablespace_name, segment_name
order by tablespace_name, segment_name;

spool off;

```

freext.sql

```

REM=====
=====+
REM Copyright (c) 1994 Oracle Corp, Belmont, CA |
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REM=====
=====+
REM FILENAME
REM freext.sql
REM DESCRIPTION
REM List all free extents in all the TPCC tablespace
REM
REM Usage: sqlplus internal/internal @freext [<block size in bytes>]
REM=====
=====*/

set space 2
set pagesize 2000
set echo off
set termout off
set verify off
set feedback off
spool freextent.rpt

select substr(tablespace_name,1,8) tspace, file_id, block_id, blocks,
       blocks * &&1 / 1048576 size_MB
from dba_free_space
order by tablespace_name, file_id, block_id;

select substr(tablespace_name,1,8) tspace, sum(blocks) tot_blk,
       sum(blocks) * &&1 / 1048576 size_MB
from dba_free_space

```

```

group by tablespace_name
order by tablespace_name;

```

initnew.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

```

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;
/
show errors;

```

```

CREATE OR REPLACE PACKAGE BODY initpay AS
PROCEDURE pay_init IS
BEGIN
NULL;
END pay_init;
END initpay;
/
show errors;

```

p_build.ora

```

control_files = ?/dbs/tpcc_disks/control_001
compatible = 8.1.7
db_name = tpcc
db_files = 900
db_block_size = 4096
#_enable_NUMA_optimization = FALSE
db_block_lru_latches = 8
db_block_buffers = 10000
sort_area_size = 10485760
parallel_max_servers = 100
recovery_parallelism = 40

```

```

dml_locks = 500
log_buffer = 1048576
_allocate_creation_order= TRUE
processes = 798
sessions = 400
transactions = 400
shared_pool_size = 15000000
cursor_space_for_time = TRUE
max_rollback_segments = 220
open_cursors = 320
rollback_segments =
(s1,s2,s3,s4,s5,s6,s7,s8,s9,s10,s11,s12,s13,s14,s15,s16,s17,s18,s19,s20,s21,s22,s23,s24
,s25,s26,s27,s28,s29)

```

p_create.ora

```

compatible = 8.1.7.0.0
db_name = tpcc
control_files = (?/dbs/tpcc_disks/control_001
db_files = 900
db_block_buffers = 10000
dml_locks = 500
log_buffer = 1048576
processes = 200
db_block_size = 4096
_allocate_creation_order= TRUE

```

p_load.ora

```

control_files = (?/dbs/tpcc_disks/control_001)
compatible = 8.1.7
db_name = tpcc
db_files = 900
db_block_lru_latches = 16
db_block_size = 4096
db_block_buffers = 393216
sort_area_size = 10485760
parallel_max_servers = 48
recovery_parallelism = 48
dml_locks = 500
log_buffer = 4194304
_allocate_creation_order= TRUE
processes = 235
sessions = 200
transactions = 300
shared_pool_size = 15000000
cursor_space_for_time = TRUE
max_rollback_segments = 220
open_cursors = 320
rollback_segments =
(t_0_1,t_0_2,t_0_3,t_0_4,t_0_5,t_0_6,t_0_7,t_0_8,t_0_9,t_0_10,t_0_11,t_0_12,t_0_13
,t_0_14,t_0_15,t_0_16,t_0_17,t_0_18,t_0_19,t_0_20,t_0_21,t_0_22,t_0_23,t_0_24,t_0
_25,t_0_26,t_0_27,t_0_28,t_0_29,
t_0_30,t_0_31,t_0_32,t_0_33,t_0_34,t_0_35,t_0_36,t_0_37,t_0_38,t_0_39,t_0_40,
t_0_41,t_0_42,t_0_43,t_0_44,t_0_45,t_0_46,t_0_47,t_0_48,t_0_49,t_0_50,t_0_51,t_0
_52,t_0_53,t_0_54,t_0_55,t_0_56,t_0_57,t_0_58,t_0_59,t_0_60,t_0_61,t_0_62,
t_0_63,t_0_64,t_0_65,t_0_66,t_0_67,t_0_68,t_0_69,t_0_70,t_0_71,t_0_72,t_0_73,t_0
_74,t_0_75,t_0_76,t_0_77,t_0_78,t_0_79,t_0_80,t_0_81,t_0_82,t_0_83,t_0_84,t_0_85
,t_0_86,t_0_87,t_0_88,t_0_89,t_0_90,t_0_91,t_0_92,t_0_93,t_0_94,t_0_95,t_0_96,t_0
_97,t_0_98,t_0_99,t_0_100)

```

plsql_mon.sql

```

rem
rem
=====
====+
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```

```

rem
=====
====+
rem FILENAME
rem plsql_mon.sql
rem DESCRIPTION
rem SQL script to create a stored package for PL/SQL stored
rem procedures to dump messages.
rem
=====
====
rem
rem Usage: sqlplus tpcc/tpcc @plsql_mon
rem

```

```

connect tpcc/tpcc;
set echo on;
CREATE OR REPLACE PACKAGE plsql_mon_pack
IS
    PROCEDURE print
    (
        info    VARCHAR2
    );
END;
/
show errors;

CREATE OR REPLACE PACKAGE BODY plsql_mon_pack
IS
    PROCEDURE print
    (
        info    VARCHAR2
    )
    IS
        s      NUMBER;
    BEGIN
        dbms_pipe.pack_message (info);
        s := dbms_pipe.send_message ('plsql_mon');
        IF (s <> 0) THEN
            raise_application_error (-20000, 'Error:' || to_char(s) ||
                ' sending on pipe');
        END IF;
    END;
END;
/
show errors;

set echo off;

```

post_restore.sh

```

#!/bin/sh
go_create
svrmgrl <<!
connect internal;
startup pfile=p_load.ora;
exit;
!
date
./resize_log0.sh>resize_log0.log &
./add_log3.sh>add_log3.log&
./add_log4.sh>add_log4.log&
./add_log5.sh>add_log5.log&
./add_log6.sh>add_log6.log&
./add_log7.sh>add_log7.log&
./add_log8.sh>add_log8.log&
./undml.sh
svrmgrl <<!
connect tpcc/tpcc;
alter cluster stokcluster deallocate unused;
alter cluster custcluster deallocate unused;
alter cluster itemcluster deallocate unused;
alter table hist deallocate unused;
alter table ordr deallocate unused;
alter table ordl deallocate unused;
alter table nord deallocate unused;
alter index icust1 deallocate unused;

```

```

alter index icust2 deallocate unused;
alter index istok deallocate unused;
alter index iordr1 deallocate unused;
alter index iordr2 deallocate unused;
alter index iordl deallocate unused;
alter index iitem deallocate unused;
alter index istok deallocate unused;
alter cluster stokcluster noparallel;
alter cluster custcluster noparallel;
alter cluster itemcluster noparallel;
alter table hist noparallel;
alter table ordr noparallel;
alter table ordl noparallel;
alter table nord noparallel;
alter index icust1 noparallel;
alter index icust2 noparallel;
alter index iordr1 noparallel;
alter index iordr2 noparallel;
alter index iordl noparallel;
alter index iitem noparallel;
alter index istok noparallel;
alter tablespace SYSTEM coalesce;
alter tablespace stok_0 coalesce;
alter tablespace istok_0 coalesce;
alter tablespace ord_0 coalesce;
alter tablespace item_0 coalesce;
alter tablespace iitem_0 coalesce;
alter tablespace ordl_0 coalesce;
alter tablespace nord_0 coalesce;
alter tablespace temp_perm_0 coalesce;
alter tablespace hist_0 coalesce;
alter tablespace IORDR1_0 coalesce;
alter tablespace IWARE_0 coalesce;
alter tablespace icust1_0 coalesce;
alter tablespace icust2_0 coalesce;
alter tablespace idist_0 coalesce;
alter tablespace iordl_0 coalesce;
alter tablespace iordr1_0 coalesce;
alter tablespace iordr2_0 coalesce;
alter tablespace cust_0 coalesce;
alter tablespace temp_perm_0 coalesce;
alter tablespace temp_perm_1 coalesce;
alter tablespace temp_perm_2 coalesce;
alter tablespace temp_perm_3 coalesce;
alter tablespace temp_perm_4 coalesce;
alter tablespace temp_perm_5 coalesce;
alter tablespace temp_perm_6 coalesce;
alter tablespace temp_perm_7 coalesce;
alter tablespace roll_0 coalesce;
alter table ware enable row movement;
alter table dist enable row movement;
alter table item enable row movement;
alter table hist enable row movement;
alter table ordr enable row movement;
alter table ordl enable row movement;
alter table nord enable row movement;
alter table stok enable row movement;
alter table cust enable row movement;
exit
#!
#!
#! run new_part_dist.sh for new partitioned tables
#!
./dml.sh
./buffer_pool_on.sh
#
# Wait for add_logs to complete
wait
date
svrmgrl <<!
connect internal;
shutdown;
exit;
#!

```

resize_log0.sh

```

#!/bin/sh
set -x
date
svrmgrl <<!
connect internal
alter database add logfile group 3 (?/dbs/tpcc_disks/log1_1) size 1024M reuse;
alter database add logfile group 4 (?/dbs/tpcc_disks/log1_2) size 1024M reuse;
alter system switch logfile;
alter system switch logfile;
alter system checkpoint;
alter database drop logfile group 1;
alter database drop logfile group 2;
exit;
!
add_new_log0_1.sh &
add_new_log0_2.sh &
wait
svrmgrl <<!
connect internal
alter system switch logfile;
alter system switch logfile;
alter system checkpoint;
alter database drop logfile group 3;
alter database drop logfile group 4;
exit;
!
./add_log2.sh>add_log2.log&
date

```

space_get.sql

```

REM=====
=====+
REM      Copyright (c) 1995 Oracle Corp. Redwood Shores, CA   |
REM      OPEN SYSTEMS PERFORMANCE GROUP                       |
REM      All Rights Reserved                                   |
REM=====
=====+
REM FILENAME
REM      space_get.sql
REM DESCRIPTION
REM      Get sizes of tables, indexes and tablespaces.
REM Usage: sqlplus internal/internal @space_get [<tpm> <# of warehouses>]
REM=====
=====*/

set echo on;
delete from tpcc_data;
delete from tpcc_space;
delete from tpcc_totSPACE;

insert into tpcc_data
select substr(segment_name,1,11), substr(segment_type,1,15),
       sum(blocks),
       round(sum(blocks) * 0.05), 0,
       sum(blocks) + round(sum(blocks) * 0.05)
from   dba_extents
where  owner = 'TPCC' AND ( segment_type = 'INDEX' OR
                          segment_type = 'INDEX PARTITION' OR segment_type = 'CLUSTER'
                          OR segment_type = 'TABLE' OR segment_type = 'TABLE PARTITION')
      AND tablespace_name <> 'SYSTEM'
group by segment_name, segment_type;

insert into tpcc_data
select 'SYSTEM', 'SYS', sum(blocks), 0, 0, sum(blocks)
from   dba_data_files
where  tablespace_name = 'SYSTEM';

insert into tpcc_data
select 'ROLL_SEG', 'SYS';

```

```

        sum(blocks), 0, 0, sum(blocks)
    from dba_data_files
    where tablespace_name like 'ROLL%'
    group by tablespace_name;

update tpcc_data
set five_pct = 0,
    daily_grow = round(blocks * &&1 / 62.5 / &&2),
    total = blocks + round(blocks * &&1 / 62.5 / &&2)
where segment = 'HIST' OR segment = 'ORDR' OR
    segment = 'ORDL';

insert into tpcc_space
select substr(ex$.name,1,11), sum(sp$.sz_blocks), 0, 0, 0, 0
from
(select tablespace_name , sum(blocks) sz_blocks
 from dba_data_files
 where tablespace_name <> 'SYSTEM'
 group by tablespace_name
 ) sp$,
(select distinct tablespace_name, segment_name name
 from dba_extents
 where owner = 'TPCC'
 and (segment_type = 'CLUSTER' or segment_type = 'TABLE'
 or segment_type = 'TABLE PARTITION' or segment_type = 'INDEX'
 or segment_type = 'INDEX PARTITION')
 and tablespace_name <> 'SYSTEM'
 ) ex$
where sp$.tablespace_name = ex$.tablespace_name
group by ex$.name;

insert into tpcc_space
select substr(tablespace_name,1,11), sum(blocks), 0, 0, 0, 0
from dba_data_files
where tablespace_name = 'SYSTEM'
group by tablespace_name;

update tpcc_space
set required =
(
select sum(total)
 from tpcc_data
 where tpcc_data.segment = tpcc_space.segment
)
where segment in
(
select segment from tpcc_data
);

update tpcc_space
set static =
(
select sum(total)
 from tpcc_data
 where tpcc_data.segment = tpcc_space.segment
)
where segment in
(
select segment from tpcc_data
);

update tpcc_space
set static = 0,
    dynamic =
(
select sum(blocks)
 from tpcc_data
 where tpcc_data.segment = tpcc_space.segment
)
where segment in ('HIST', 'ORDR', 'ORDL');

update tpcc_space
set oversize = blocks - required;

insert into tpcc_totSPACE
select &&1, &&2, sum(static), sum(dynamic), sum(oversize), 0, 0, 0
from tpcc_space;

update tpcc_totSPACE
set daily_grow =

```

```

(
select sum(daily_grow)
 from tpcc_data
);

update tpcc_totSPACE
set space180 = static + 180 * daily_grow;

set echo off;

```

space_init.sql

```

REM=====
=====+
REM FILENAME
REM   space_init.sql
REM DESCRIPTION
REM   Create tables for space calculations.
REM   Usage: sqlplus internal/internal @space_init.sql
REM=====
=====*/

set echo on;
drop table tpcc_data;
drop table tpcc_space;
drop table tpcc_totSPACE;

create table tpcc_data (
    segment   varchar2(11),
    type      varchar2(15),
    blocks    number,
    five_pct  number,
    daily_grow number,
    total     number
);

create table tpcc_space (
    segment   varchar2(11),
    blocks    number,
    required  number,
    static    number,
    dynamic   number,
    oversize  number
);

create table tpcc_totSPACE (
    tpm       number,
    nware     number,
    static    number,
    dynamic   number,
    oversize  number,
    daily_grow number,
    daily_spre number,
    space180  number
);

create unique index itpcc_data on tpcc_data (segment);
create unique index itpcc_space on tpcc_space (segment);
set echo off;

```

space_rpt.sql

```

REM=====
=====+
REM   Copyright (c) 1995 Oracle Corp. Redwood Shores, CA   |
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REM   All Rights Reserved                                   |
REM=====
=====+
REM FILENAME
REM   space_rpt.sql
REM DESCRIPTION
REM   Generate space report and save it in space.rpt

```

```

REM Usage: sqlplus internal/internal @space_rpt.sql
REM=====
=====*/

set space 2
set pagesize 2000
set echo off
set termout off
set verify off
set feedback off
spool space.rpt

```

```

select tpm, nware from tpcc_totospace;

select * from tpcc_data order by segment;

select * from tpcc_space order by segment;

select static, dynamic, oversize, daily_grow, daily_spre, space180
from tpcc_totospace;

spool off;

```

startbld

```

#!/bin/sh

svrmgrl <<!

connect internal;
startup pfile=p_build.ora;
exit;
!

```

startload

```

#!/bin/sh

svrmgrl <<!

connect internal;
startup pfile=p_load.ora;
exit;
!

```

step10createdist.sh

```

#!/sh
$SHELLPLUS tpcc/tpcc @step10createdist > junk 2>&1

if test $? -ne 0
then
exit 1;
else
exit 0;
fi

```

step10createdist.sql

```

spool step10createdist.log;
set echo on;

set timing on

rem
rem DISTRICT table

```

```

rem
create table dist (
  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)
)
partition by range(d_w_id)
(
  partition dist_0 values less than (2353)
  tablespace dist_1_0,
  partition dist_1 values less than (4705)
  tablespace dist_1_1,
  partition dist_2 values less than (7057)
  tablespace dist_1_2,
  partition dist_3 values less than (9409)
  tablespace dist_1_3,
  partition dist_4 values less than (11761)
  tablespace dist_1_4,
  partition dist_5 values less than (14113)
  tablespace dist_1_5,
  partition dist_6 values less than (16465)
  tablespace dist_1_6,
  partition dist_7 values less than (maxvalue)
  tablespace dist_1_7
)
initrans 4
pctfree 99
pctused 0
storage ( freelists 22 freelist groups 9 );

spool off;
set echo off;
exit sql.sqlcode;

```

step11createcust.sh

```

#!/sh
$SHELLPLUS tpcc/tpcc @step11createcust > junk 2>&1

if test $? -ne 0
then
exit 1;
else
exit 0;
fi

```

step11createcust.sql

```

spool step11createcust.log;
set echo on;
drop cluster custcluster including tables;

set timing on;

create cluster custcluster (
  c_id      number(5,0)
  ,c_d_id   number(2,0)
  ,c_w_id   number(5,0)
)
single table
hashkeys 564480000
hash is (c_w_id * 30000 + c_id * 10 + c_d_id - 30011)
size 850
initrans 3

```

```
pctfree 0
storage ( buffer_pool recycle freelists 22 freelist groups 9 )
tablespace cust_0;
```

```
create table cust (
  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 custcluster (c_id
,c_d_id
,c_w_id
);
spool off;
set echo off;
exit;
```

step12createhist.sh

```
#!/sh
$SHELLPLUS tpcc/tpcc @step12createhist > junk 2>&1

if test $? -ne 0
then
  exit 1;
else
  exit 0;
fi
```

step12createhist.sql

```
spool step12createhist.log;
set echo on;
drop table hist;

set timing on;

create table hist (
  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)
)
partition by range(h_w_id)
(
  partition hist_0 values less than (2353)
  tablespace hist_0,
  partition hist_1 values less than (4705)
  tablespace hist_1,
  partition hist_2 values less than (7057)
  tablespace hist_2,
```

```
partition hist_3 values less than (9409)
  tablespace hist_3,
  partition hist_4 values less than (11761)
  tablespace hist_4,
  partition hist_5 values less than (14113)
  tablespace hist_5,
  partition hist_6 values less than (16465)
  tablespace hist_6,
  partition hist_7 values less than (maxvalue)
  tablespace hist_7
)
initrans 4
pctfree 5
storage ( freelists 22 freelist groups 9 );
spool off;
set echo off;
exit sql.sqlcode;
```

step13createodr.sh

```
#!/sh
$SHELLPLUS tpcc/tpcc @step13createodr > junk 2>&1

if test $? -ne 0
then
  exit 1;
else
  exit 0;
fi
```

step13createodr.sql

```
spool step13createodr.log;
set echo on;
drop table odr;

set timing on;

create table odr (
  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
)
partition by range(o_w_id)
(
  partition odr_0 values less than (2353)
  tablespace odr_0,
  partition odr_1 values less than (4705)
  tablespace odr_1,
  partition odr_2 values less than (7057)
  tablespace odr_2,
  partition odr_3 values less than (9409)
  tablespace odr_3,
  partition odr_4 values less than (11761)
  tablespace odr_4,
  partition odr_5 values less than (14113)
  tablespace odr_5,
  partition odr_6 values less than (16465)
  tablespace odr_6,
  partition odr_7 values less than (maxvalue)
  tablespace odr_7
)
initrans 4
pctfree 5
storage ( freelists 22 freelist groups 9 );
spool off;
set echo off;
exit sql.sqlcode;
```

step14createnord.sh

```
#!/sh
$SHELLPLUS tpcc/tpcc @step14createnord > junk 2>&1

if test $? -ne 0
then
  exit 1;
else
  exit 0;
fi
```

step14createnord.sql

```
spool step14createnord.log;
set echo on;
drop table nord;

set timing on;

create table nord (
  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
partition by range(no_w_id)
(
  partition nord_0 values less than (2353)
  tablespace nord_0,
  partition nord_1 values less than (4705)
  tablespace nord_1,
  partition nord_2 values less than (7057)
  tablespace nord_2,
  partition nord_3 values less than (9409)
  tablespace nord_3,
  partition nord_4 values less than (11761)
  tablespace nord_4,
  partition nord_5 values less than (14113)
  tablespace nord_5,
  partition nord_6 values less than (16465)
  tablespace nord_6,
  partition nord_7 values less than (maxvalue)
  tablespace nord_7
)
initrans 4
pctfree 5
storage ( freelists 22 freelist groups 9 );
spool off;
set echo off;
exit sql.sqlcode;
```

step15createordl.sh

```
#!/sh
$SHELLPLUS tpcc/tpcc @step15createordl > junk 2>&1

if test $? -ne 0
then
  exit 1;
else
  exit 0;
fi
```

step15createordl.sql

```
spool step15createordl.log;
set echo on;
drop table ordl;

set timing on;

create table ordl (
  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)
)
partition by range(ol_w_id)
(
  partition ordl_0 values less than (2353)
  tablespace ordl_0,
  partition ordl_1 values less than (4705)
  tablespace ordl_1,
  partition ordl_2 values less than (7057)
  tablespace ordl_2,
  partition ordl_3 values less than (9409)
  tablespace ordl_3,
  partition ordl_4 values less than (11761)
  tablespace ordl_4,
  partition ordl_5 values less than (14113)
  tablespace ordl_5,
  partition ordl_6 values less than (16465)
  tablespace ordl_6,
  partition ordl_7 values less than (maxvalue)
  tablespace ordl_7
)
initrans 4
pctfree 5
storage ( freelists 22 freelist groups 9 );
spool off;
set echo off;
exit sql.sqlcode;
```

step16createstok.sh

```
#!/sh
$SHELLPLUS tpcc/tpcc @step16createstok > junk 2>&1

if test $? -ne 0
then
  exit 1;
else
  exit 0;
fi
```

step16createstok.sql

```
spool step16createstok.log;
set echo on;
drop table stok;
drop cluster stokcluster including tables;

set timing on;

create cluster stokcluster (
  s_i_id number(6,0)
```



```

,s_w_id number(5,0)
)
single table
hashkeys 1881600000
hash is (abs(s_i_id - 1) * 2352 + mod((s_w_id - 1), 2352) + trunc ((s_w_id- 1) /
2352) * 235200000)
size 350
initrans 3
pctfree 0
storage ( buffer_pool keep freelists 22 freelist groups 9 )
tablespace stok_0;

```

```

create table stok (
  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 stokcluster (s_i_id
,s_w_id
);
spool off;
set echo off;
exit;

```

step17createitem.sh

```

#!/sh
$SQLPLUS tpcc/tpcc @step17createitem > junk 2>&1

if test $? -ne 0
then
  exit 1;
else
  exit 0;
fi

```

step17createitem.sql

```

spool step17createitem.log;
set echo on;
drop table item;
drop cluster itemcluster including tables;

set timing on;

create cluster itemcluster (
  i_id number(6,0)
)
single table
hashkeys 100000
hash is (i_id + 1)
size 120
initrans 3
pctfree 0
storage ( buffer_pool keep freelists 22 freelist groups 9 )
tablespace item_0;

create table item (
  i_id number(6,0),

```

```

  i_name varchar2(24),
  i_price number,
  i_data varchar2(50),
  i_im_id number
)
cluster itemcluster (i_id
);
spool off;
set echo off;
exit sql.sqlcode;

```

step18createrollsegs.sh

```

#!/sh
sqlplus sys/change_on_install @create_rollback_1
sqlplus sys/change_on_install @create_rollback_2
sqlplus sys/change_on_install @create_rollback_3
sqlplus sys/change_on_install @create_rollback_4
sqlplus sys/change_on_install @create_rollback_5
sqlplus sys/change_on_install @create_rollback_6
sqlplus sys/change_on_install @create_rollback_7

#$SQLPLUS tpcc/tpcc @step18createrollsegs > junk 2>&1

#if test $? -ne 0
#then
#  exit 1;
#else
#  exit 0;
#fi

```

step18createrollsegs.sql

```

spool step18createrollsegs.log
set echo on

alter rollback segment t_0_1 offline;

alter rollback segment t_0_2 offline;

alter rollback segment t_0_3 offline;

alter rollback segment t_0_4 offline;

alter rollback segment t_0_5 offline;

alter rollback segment t_0_6 offline;

alter rollback segment t_0_7 offline;

alter rollback segment t_0_8 offline;

alter rollback segment t_0_9 offline;

alter rollback segment t_0_10 offline;

alter rollback segment t_0_11 offline;

alter rollback segment t_0_12 offline;

alter rollback segment t_0_13 offline;

alter rollback segment t_0_14 offline;

alter rollback segment t_0_15 offline;

alter rollback segment t_0_16 offline;

alter rollback segment t_0_17 offline;

alter rollback segment t_0_18 offline;

```



```

create rollback segment t_0_112 tablespace roll_0;
create rollback segment t_0_113 tablespace roll_0;
create rollback segment t_0_114 tablespace roll_0;
create rollback segment t_0_115 tablespace roll_0;
create rollback segment t_0_116 tablespace roll_0;
create rollback segment t_0_117 tablespace roll_0;
create rollback segment t_0_118 tablespace roll_0;
create rollback segment t_0_119 tablespace roll_0;
create rollback segment t_0_120 tablespace roll_0;
create rollback segment t_0_121 tablespace roll_0;
create rollback segment t_0_122 tablespace roll_0;
create rollback segment t_0_123 tablespace roll_0;
create rollback segment t_0_124 tablespace roll_0;
create rollback segment t_0_125 tablespace roll_0;
create rollback segment t_0_126 tablespace roll_0;
create rollback segment t_0_127 tablespace roll_0;
create rollback segment t_0_128 tablespace roll_0;
create rollback segment t_0_129 tablespace roll_0;
create rollback segment t_0_130 tablespace roll_0;
create rollback segment t_0_131 tablespace roll_0;
create rollback segment t_0_132 tablespace roll_0;
create rollback segment t_0_133 tablespace roll_0;
create rollback segment t_0_134 tablespace roll_0;
create rollback segment t_0_135 tablespace roll_0;
create rollback segment t_0_136 tablespace roll_0;
create rollback segment t_0_137 tablespace roll_0;
create rollback segment t_0_138 tablespace roll_0;
create rollback segment t_0_139 tablespace roll_0;
create rollback segment t_0_140 tablespace roll_0;
create rollback segment t_0_141 tablespace roll_0;
create rollback segment t_0_142 tablespace roll_0;
create rollback segment t_0_143 tablespace roll_0;
create rollback segment t_0_144 tablespace roll_0;
create rollback segment t_0_145 tablespace roll_0;
create rollback segment t_0_146 tablespace roll_0;
create rollback segment t_0_147 tablespace roll_0;
create rollback segment t_0_148 tablespace roll_0;
create rollback segment t_0_149 tablespace roll_0;
create rollback segment t_0_150 tablespace roll_0;
create rollback segment t_0_151 tablespace roll_0;
create rollback segment t_0_152 tablespace roll_0;
create rollback segment t_0_153 tablespace roll_0;
create rollback segment t_0_154 tablespace roll_0;
create rollback segment t_0_155 tablespace roll_0;
create rollback segment t_0_156 tablespace roll_0;
create rollback segment t_0_157 tablespace roll_0;
create rollback segment t_0_158 tablespace roll_0;
create rollback segment t_0_159 tablespace roll_0;
create rollback segment t_0_160 tablespace roll_0;
create rollback segment t_0_161 tablespace roll_0;
create rollback segment t_0_162 tablespace roll_0;
create rollback segment t_0_163 tablespace roll_0;
create rollback segment t_0_164 tablespace roll_0;
create rollback segment t_0_165 tablespace roll_0;
create rollback segment t_0_166 tablespace roll_0;
create rollback segment t_0_167 tablespace roll_0;
create rollback segment t_0_168 tablespace roll_0;
create rollback segment t_0_169 tablespace roll_0;
create rollback segment t_0_170 tablespace roll_0;
create rollback segment t_0_171 tablespace roll_0;
create rollback segment t_0_172 tablespace roll_0;
create rollback segment t_0_173 tablespace roll_0;
create rollback segment t_0_174 tablespace roll_0;
create rollback segment t_0_175 tablespace roll_0;
create rollback segment t_0_176 tablespace roll_0;
create rollback segment t_0_177 tablespace roll_0;
create rollback segment t_0_178 tablespace roll_0;
create rollback segment t_0_179 tablespace roll_0;
create rollback segment t_0_180 tablespace roll_0;
create rollback segment t_0_181 tablespace roll_0;
create rollback segment t_0_182 tablespace roll_0;
create rollback segment t_0_183 tablespace roll_0;
create rollback segment t_0_184 tablespace roll_0;
create rollback segment t_0_185 tablespace roll_0;
create rollback segment t_0_186 tablespace roll_0;
create rollback segment t_0_187 tablespace roll_0;
create rollback segment t_0_188 tablespace roll_0;
create rollback segment t_0_189 tablespace roll_0;
create rollback segment t_0_190 tablespace roll_0;
create rollback segment t_0_191 tablespace roll_0;

```

```

create rollback segment t_0_192 tablespace roll_0;
create rollback segment t_0_193 tablespace roll_0;
create rollback segment t_0_194 tablespace roll_0;
create rollback segment t_0_195 tablespace roll_0;
create rollback segment t_0_196 tablespace roll_0;
create rollback segment t_0_197 tablespace roll_0;
create rollback segment t_0_198 tablespace roll_0;
create rollback segment t_0_199 tablespace roll_0;
create rollback segment t_0_200 tablespace roll_0;

```

```

spool off
set echo off
exit sql.sqlcode

```

step1tpccenv.sh

```

#!sh
SQLDBA=svrmgrl
export SQLDBA
SQLPLUS=sqlplus
export SQLPLUS
cp benchrun/bin/tpccload.exe .
TPCCLOAD=tpccload.exe
export TPCCLOAD
ORACLE_SID=tpcc
export ORACLE_SID

```

step20loadware.sh

```

#!sh
$TPCCLOAD -M 18816 -w > step20loadware.log 2>&1

if test $? -ne 0
then
    exit 1;
else
    exit 0;
fi

```

step21loaddist.sh

```

#!sh
$TPCCLOAD -M 18816 -d > step21loaddist.log 2>&1

if test $? -ne 0
then
    exit 1;
else
    exit 0;
fi

```

step22loaditem.sh

```

#!sh
$TPCCLOAD -M 18816 -i > step22loaditem.log 2>&1

if test $? -ne 0
then
    exit 1;
else
    exit 0;
fi

```

step23loadhist.sh

```
#!/sh
$TPCCLOAD -M 18816 -h -b 1 -e 2352 > step23loadhist.log0 2>&1 &
proc0=$!
$TPCCLOAD -M 18816 -h -b 2353 -e 4704 > step23loadhist.log1 2>&1 &
proc1=$!
$TPCCLOAD -M 18816 -h -b 4705 -e 7056 > step23loadhist.log2 2>&1 &
proc2=$!
$TPCCLOAD -M 18816 -h -b 7057 -e 9408 > step23loadhist.log3 2>&1 &
proc3=$!
$TPCCLOAD -M 18816 -h -b 9409 -e 11760 > step23loadhist.log4 2>&1 &
proc4=$!
$TPCCLOAD -M 18816 -h -b 11761 -e 14112 > step23loadhist.log5 2>&1 &
proc5=$!
$TPCCLOAD -M 18816 -h -b 14113 -e 16464 > step23loadhist.log6 2>&1 &
proc6=$!
$TPCCLOAD -M 18816 -h -b 16465 -e 18816 > step23loadhist.log7 2>&1 &
proc7=$!
wait $proc0
proc0=$?
wait $proc1
proc1=$?
wait $proc2
proc2=$?
wait $proc3
proc3=$?
wait $proc4
proc4=$?
wait $proc5
proc5=$?
wait $proc6
proc6=$?
wait $proc7
proc7=$?
proc='expr $proc0 + $proc1 + $proc2 + $proc3 + $proc4 + $proc5 + $proc6 + $proc7 + 0'
proc='expr $proc % 127'

if test $proc -ne 0
then
  exit 1;
else
  exit 0;
fi
```

step24loadnord.sh

```
#!/sh
$TPCCLOAD -M 18816 -n -b 1 -e 2352 >step24loadnord.log0 2>&1 &
proc0=$!
$TPCCLOAD -M 18816 -n -b 2353 -e 4704 >step24loadnord.log1 2>&1 &
proc1=$!
$TPCCLOAD -M 18816 -n -b 4705 -e 7056 >step24loadnord.log2 2>&1 &
proc2=$!
$TPCCLOAD -M 18816 -n -b 7057 -e 9408 >step24loadnord.log3 2>&1 &
proc3=$!
$TPCCLOAD -M 18816 -n -b 9409 -e 11760 >step24loadnord.log4 2>&1 &
proc4=$!
$TPCCLOAD -M 18816 -n -b 11761 -e 14112 >step24loadnord.log5 2>&1 &
proc5=$!
$TPCCLOAD -M 18816 -n -b 14113 -e 16464 >step24loadnord.log6 2>&1 &
proc6=$!
$TPCCLOAD -M 18816 -n -b 16465 -e 18816 >step24loadnord.log7 2>&1 &
proc7=$!
wait $proc0
proc0=$?
wait $proc1
proc1=$?
wait $proc2
proc2=$?
wait $proc3
proc3=$?
```

```
wait $proc4
proc4=$?
wait $proc5
proc5=$?
wait $proc6
proc6=$?
wait $proc7
proc7=$?
proc='expr $proc0 + $proc1 + $proc2 + $proc3 + $proc4 + $proc5 + $proc6 + $proc7 + 0'
proc='expr $proc % 127'

if test $proc -ne 0
then
  exit 1;
else
  exit 0;
fi
```

step25loadordrordl.sh

```
#!/sh
$TPCCLOAD -M 18816 -o ?/dbs/tpcc_disks/dummy1.dat -b 1 -e 588
>step25loadordrordl.log0 2>&1 &
proc0=$!
$TPCCLOAD -M 18816 -o ?/dbs/tpcc_disks/dummy2.dat -b 589 -e 1176
>step25loadordrordl.log1 2>&1 &
proc1=$!
$TPCCLOAD -M 18816 -o ?/dbs/tpcc_disks/dummy3.dat -b 1177 -e 1764
>step25loadordrordl.log2 2>&1 &
proc2=$!
$TPCCLOAD -M 18816 -o ?/dbs/tpcc_disks/dummy4.dat -b 1765 -e 2352
>step25loadordrordl.log3 2>&1 &
proc3=$!
$TPCCLOAD -M 18816 -o ?/dbs/tpcc_disks/dummy5.dat -b 2353 -e 2940
>step25loadordrordl.log4 2>&1 &
proc4=$!
$TPCCLOAD -M 18816 -o ?/dbs/tpcc_disks/dummy6.dat -b 2941 -e 3528
>step25loadordrordl.log5 2>&1 &
proc5=$!
$TPCCLOAD -M 18816 -o ?/dbs/tpcc_disks/dummy7.dat -b 3529 -e 4116
>step25loadordrordl.log6 2>&1 &
proc6=$!
$TPCCLOAD -M 18816 -o ?/dbs/tpcc_disks/dummy8.dat -b 4117 -e 4704
>step25loadordrordl.log7 2>&1 &
proc7=$!
$TPCCLOAD -M 18816 -o ?/dbs/tpcc_disks/dummy9.dat -b 4705 -e 5292
>step25loadordrordl.log8 2>&1 &
proc8=$!
$TPCCLOAD -M 18816 -o ?/dbs/tpcc_disks/dummy10.dat -b 5292 -e 5880
>step25loadordrordl.log9 2>&1 &
proc9=$!
$TPCCLOAD -M 18816 -o ?/dbs/tpcc_disks/dummy11.dat -b 5881 -e 6468
>step25loadordrordl.log10 2>&1 &
proc10=$!
$TPCCLOAD -M 18816 -o ?/dbs/tpcc_disks/dummy12.dat -b 6469 -e 7056
>step25loadordrordl.log11 2>&1 &
proc11=$!
$TPCCLOAD -M 18816 -o ?/dbs/tpcc_disks/dummy13.dat -b 7057 -e 7644
>step25loadordrordl.log12 2>&1 &
proc12=$!
$TPCCLOAD -M 18816 -o ?/dbs/tpcc_disks/dummy14.dat -b 7645 -e 8232
>step25loadordrordl.log13 2>&1 &
proc13=$!
$TPCCLOAD -M 18816 -o ?/dbs/tpcc_disks/dummy15.dat -b 8233 -e 8820
>step25loadordrordl.log14 2>&1 &
proc14=$!
$TPCCLOAD -M 18816 -o ?/dbs/tpcc_disks/dummy16.dat -b 8821 -e 9408
>step25loadordrordl.log15 2>&1 &
proc15=$!
$TPCCLOAD -M 18816 -o ?/dbs/tpcc_disks/dummy17.dat -b 9409 -e 9996
>step25loadordrordl.log16 2>&1 &
proc16=$!
$TPCCLOAD -M 18816 -o ?/dbs/tpcc_disks/dummy18.dat -b 9997 -e 10584
>step25loadordrordl.log17 2>&1 &
proc17=$!
```

```

$TPCCLOAD -M 18816 -o ?/dbs/tpcc_disks/dummy19.dat -b 10585 -e 11172
>step25loadordrordl.log18 2>&1 &
proc18=$!
$TPCCLOAD -M 18816 -o ?/dbs/tpcc_disks/dummy20.dat -b 11173 -e 11760
>step25loadordrordl.log19 2>&1 &
proc19=$!
$TPCCLOAD -M 18816 -o ?/dbs/tpcc_disks/dummy21.dat -b 11761 -e 12348
>step25loadordrordl.log20 2>&1 &
proc20=$!
$TPCCLOAD -M 18816 -o ?/dbs/tpcc_disks/dummy22.dat -b 12349 -e 12936
>step25loadordrordl.log21 2>&1 &
proc21=$!
$TPCCLOAD -M 18816 -o ?/dbs/tpcc_disks/dummy23.dat -b 12937 -e 13524
>step25loadordrordl.log22 2>&1 &
proc22=$!
$TPCCLOAD -M 18816 -o ?/dbs/tpcc_disks/dummy24.dat -b 13525 -e 14112
>step25loadordrordl.log23 2>&1 &
proc23=$!
$TPCCLOAD -M 18816 -o ?/dbs/tpcc_disks/dummy25.dat -b 14113 -e 14700
>step25loadordrordl.log24 2>&1 &
proc24=$!
$TPCCLOAD -M 18816 -o ?/dbs/tpcc_disks/dummy26.dat -b 14701 -e 15288
>step25loadordrordl.log25 2>&1 &
proc25=$!
$TPCCLOAD -M 18816 -o ?/dbs/tpcc_disks/dummy27.dat -b 15289 -e 15876
>step25loadordrordl.log26 2>&1 &
proc26=$!
$TPCCLOAD -M 18816 -o ?/dbs/tpcc_disks/dummy28.dat -b 15877 -e 16464
>step25loadordrordl.log27 2>&1 &
proc27=$!
$TPCCLOAD -M 18816 -o ?/dbs/tpcc_disks/dummy29.dat -b 16465 -e 17052
>step25loadordrordl.log28 2>&1 &
proc28=$!
$TPCCLOAD -M 18816 -o ?/dbs/tpcc_disks/dummy30.dat -b 17053 -e 17640
>step25loadordrordl.log29 2>&1 &
proc29=$!
$TPCCLOAD -M 18816 -o ?/dbs/tpcc_disks/dummy31.dat -b 17641 -e 18228
>step25loadordrordl.log30 2>&1 &
proc30=$!
$TPCCLOAD -M 18816 -o ?/dbs/tpcc_disks/dummy32.dat -b 18229 -e 18816
>step25loadordrordl.log31 2>&1 &
proc31=$!
wait $proc0
proc0=$?
wait $proc1
proc1=$?
wait $proc2
proc2=$?
wait $proc3
proc3=$?
wait $proc4
proc4=$?
wait $proc5
proc5=$?
wait $proc6
proc6=$?
wait $proc7
proc7=$?
wait $proc8
proc8=$?
wait $proc9
proc9=$?
wait $proc10
proc10=$?
wait $proc11
proc11=$?
wait $proc12
proc12=$?
wait $proc13
proc13=$?
wait $proc14
proc14=$?
wait $proc15
proc15=$?
wait $proc16
proc16=$?
wait $proc17
proc17=$?
wait $proc18
proc18=$?

```

```

wait $proc19
proc19=$?
wait $proc20
proc20=$?
wait $proc21
proc21=$?
wait $proc22
proc22=$?
wait $proc23
proc23=$?
wait $proc24
proc24=$?
wait $proc25
proc25=$?
wait $proc26
proc26=$?
wait $proc27
proc27=$?
wait $proc28
proc28=$?
wait $proc29
proc29=$?
wait $proc30
proc30=$?
wait $proc31
proc31=$?
proc='expr $proc0 + $proc1 + $proc2 + $proc3 + $proc4 + $proc5 + $proc6 + $proc7
+ $proc8 + $proc9 + $proc10 + $proc11 + $proc12 + $proc13 + $proc14 + $proc15 +
0'
proc='expr $proc % 127'

if test $proc -ne 0
then
    exit 1;
else
    exit 0;
fi

```

step26loadcust.sh

```

#!/sh
$TPCCLOAD -M 18816 -c -b 1 -e 1176 >step26loadcust.log0 2>&1 &
proc0=$!
$TPCCLOAD -M 18816 -c -b 1177 -e 2352 >step26loadcust.log1 2>&1 &
proc1=$!
$TPCCLOAD -M 18816 -c -b 2353 -e 3528 >step26loadcust.log2 2>&1 &
proc2=$!
$TPCCLOAD -M 18816 -c -b 3529 -e 4704 >step26loadcust.log3 2>&1 &
proc3=$!
$TPCCLOAD -M 18816 -c -b 4705 -e 5880 >step26loadcust.log4 2>&1 &
proc4=$!
$TPCCLOAD -M 18816 -c -b 5881 -e 7056 >step26loadcust.log5 2>&1 &
proc5=$!
$TPCCLOAD -M 18816 -c -b 7057 -e 8232 >step26loadcust.log6 2>&1 &
proc6=$!
$TPCCLOAD -M 18816 -c -b 8233 -e 9408 >step26loadcust.log7 2>&1 &
proc7=$!
$TPCCLOAD -M 18816 -c -b 9409 -e 10584 >step26loadcust.log8 2>&1 &
proc8=$!
$TPCCLOAD -M 18816 -c -b 10585 -e 11760 >step26loadcust.log9 2>&1 &
proc9=$!
$TPCCLOAD -M 18816 -c -b 11761 -e 12936 >step26loadcust.log10 2>&1 &
proc10=$!
$TPCCLOAD -M 18816 -c -b 12937 -e 14112 >step26loadcust.log11 2>&1 &
proc11=$!
$TPCCLOAD -M 18816 -c -b 14113 -e 15288 >step26loadcust.log12 2>&1 &
proc12=$!
$TPCCLOAD -M 18816 -c -b 15289 -e 16464 >step26loadcust.log13 2>&1 &
proc13=$!
$TPCCLOAD -M 18816 -c -b 16465 -e 17640 >step26loadcust.log14 2>&1 &
proc14=$!
$TPCCLOAD -M 18816 -c -b 17641 -e 18816 >step26loadcust.log15 2>&1 &
proc15=$!
wait $proc0
proc0=$?
wait $proc1
proc1=$?

```

```

wait $proc2
proc2=$?
wait $proc3
proc3=$?
wait $proc4
proc4=$?
wait $proc5
proc5=$?
wait $proc6
proc6=$?
wait $proc7
proc7=$?
wait $proc8
proc8=$?
wait $proc9
proc9=$?
wait $proc10
proc10=$?
wait $proc11
proc11=$?
wait $proc12
proc12=$?
wait $proc13
proc13=$?
wait $proc14
proc14=$?
wait $proc15
proc15=$?
proc='expr $proc0 + $proc1 + $proc2 + $proc3 + $proc4 + $proc5 + $proc6 + $proc7
+ $proc8 + $proc9 + $proc10 + $proc11 + $proc12 + $proc13 + $proc14 + $proc15 +
0'
proc='expr $proc % 127'

if test $proc -ne 0
then
exit 1;
else
exit 0;
fi

```

step27loadstok.sh

```

#!/sh
$TPCCLOAD -M 18816 -S -j 1 -k 6250 >step27loadstok.log0 2>&1 &
proc0=$!
$TPCCLOAD -M 18816 -S -j 6251 -k 12500 >step27loadstok.log1 2>&1 &
proc1=$!
$TPCCLOAD -M 18816 -S -j 12501 -k 18750 >step27loadstok.log2 2>&1 &
proc2=$!
$TPCCLOAD -M 18816 -S -j 18751 -k 25000 >step27loadstok.log3 2>&1 &
proc3=$!
$TPCCLOAD -M 18816 -S -j 25001 -k 31250 >step27loadstok.log4 2>&1 &
proc4=$!
$TPCCLOAD -M 18816 -S -j 31251 -k 37500 >step27loadstok.log5 2>&1 &
proc5=$!
$TPCCLOAD -M 18816 -S -j 37501 -k 43750 >step27loadstok.log6 2>&1 &
proc6=$!
$TPCCLOAD -M 18816 -S -j 43751 -k 50000 >step27loadstok.log7 2>&1 &
proc7=$!
$TPCCLOAD -M 18816 -S -j 50001 -k 56250 >step27loadstok.log8 2>&1 &
proc8=$!
$TPCCLOAD -M 18816 -S -j 56251 -k 62500 >step27loadstok.log9 2>&1 &
proc9=$!
$TPCCLOAD -M 18816 -S -j 62501 -k 68750 >step27loadstok.log10 2>&1 &
proc10=$!
$TPCCLOAD -M 18816 -S -j 68751 -k 75000 >step27loadstok.log11 2>&1 &
proc11=$!
$TPCCLOAD -M 18816 -S -j 75001 -k 81250 >step27loadstok.log12 2>&1 &
proc12=$!
$TPCCLOAD -M 18816 -S -j 81251 -k 87500 >step27loadstok.log13 2>&1 &
proc13=$!
$TPCCLOAD -M 18816 -S -j 87501 -k 93750 >step27loadstok.log14 2>&1 &
proc14=$!
$TPCCLOAD -M 18816 -S -j 93751 -k 100000 >step27loadstok.log15 2>&1 &
proc15=$!
wait $proc0
proc0=$?

```

```

wait $proc1
proc1=$?
wait $proc2
proc2=$?
wait $proc3
proc3=$?
wait $proc4
proc4=$?
wait $proc5
proc5=$?
wait $proc6
proc6=$?
wait $proc7
proc7=$?
wait $proc8
proc8=$?
wait $proc9
proc9=$?
wait $proc10
proc10=$?
wait $proc11
proc11=$?
wait $proc12
proc12=$?
wait $proc13
proc13=$?
wait $proc14
proc14=$?
wait $proc15
proc15=$?
proc='expr $proc0 + $proc1 + $proc2 + $proc3 + $proc4 + $proc5 + $proc6 + $proc7
+ $proc8 + $proc9 + $proc10 + $proc11 + $proc12 + $proc13 + $proc14 + $proc15 +
0'
proc='expr $proc % 127'

if test $proc -ne 0
then
exit 1;
else
exit 0;
fi

```

```

if test $proc -ne 0
then
exit 1;
else
exit 0;
fi

```

step29createiware.sh

```

#!/sh
$SQLPLUS tpcc/tpcc @step29createiware > junk 2>&1

```

```

if test $? -ne 0
then
exit 1;
else
exit 0;
fi

```

step29createiware.sql

```

spool step29createiware.log;
set echo on;
drop index iware;

set timing on;
create unique index iware on ware (w_id)
local
(
partition iware_0 tablespace iware_0,
partition iware_1 tablespace iware_1,
partition iware_2 tablespace iware_2,
partition iware_3 tablespace iware_3,
partition iware_4 tablespace iware_4,
partition iware_5 tablespace iware_5,
partition iware_6 tablespace iware_6,
partition iware_7 tablespace iware_7
)

```



```

initrans 3
parallel 8
pctfree 1
storage ( freelists 22 freelist groups 9 );

```

```

spool off;
set echo off;
exit sql.sqlcode;

```

step2createdb.sh

```

#!sh
$SQLPLUS internal/internal @step2createdb > junk 2>&1

```

```

if test $? -ne 0
then
  exit 1;
else
  exit 0;
fi

```

step2createdb.sql

```

spool step2createdb.log

```

```

set echo on

```

```

startup pfile=p_create.ora nomount
create database tpcc
  controlfile reuse
  maxdatafiles 854
  maxinstances 8
  datafile '?/dbs/tpcc_disks/system_001' size 1024M reuse
  logfile ('?/dbs/tpcc_disks/log0_1') size 7000M reuse,
  ('?/dbs/tpcc_disks/log0_2') size 7000M reuse;
spool off
set echo off
exit sql.sqlcode

```

step30createidist.sh

```

#!sh
$SQLPLUS tpcc/tpcc @step30createidist > junk 2>&1

```

```

if test $? -ne 0
then
  exit 1;
else
  exit 0;
fi

```

step30createidist.sql

```

spool step30createidist.log;

```

```

set echo on;
drop index idist;

```

```

set timing on;
create unique index idist on dist (d_w_id, d_id)
local
(
  partition idist_0 tablespace idist_0,
  partition idist_1 tablespace idist_1,
  partition idist_2 tablespace idist_2,
  partition idist_3 tablespace idist_3,
  partition idist_4 tablespace idist_4,

```

```

  partition idist_5 tablespace idist_5,
  partition idist_6 tablespace idist_6,
  partition idist_7 tablespace idist_7
)
initrans 3
parallel 8
pctfree 5
storage ( freelists 22 freelist groups 9 );

```

```

spool off;
set echo off;
exit sql.sqlcode;

```

step31createiitem.sh

```

#!sh
$SQLPLUS tpcc/tpcc @step31createiitem > junk 2>&1

```

```

if test $? -ne 0
then
  exit 1;
else
  exit 0;
fi

```

step31createiitem.sql

```

spool step31createiitem.log;

```

```

set echo on;
drop index iitem;

```

```

set timing on;

```

```

create unique index iitem on item (i_id)
initrans 4
parallel 8
pctfree 5
storage ( freelists 22 freelist groups 9 )
tablespace iitem_0;
spool off;
set echo off;
exit sql.sqlcode;

```

step32createicust1.sh

```

#!sh
$SQLPLUS tpcc/tpcc @step32createicust1 > junk 2>&1

```

```

if test $? -ne 0
then
  exit 1;
else
  exit 0;
fi

```

step32createicust1.sql

```

spool step32createicust1.log;

```

```

set echo on;
drop index icust1;
alter user tpcc temporary tablespace temp_0;
set timing on;

```

```

create unique index icust1 on cust (c_w_id, c_d_id, c_id)
initrans 3
parallel 16

```

```

pctfree 1
storage ( freelists 22 freelist groups 9 )
tablespace icust1_0;
spool off;
set echo off;
exit sql.sqlcode;

```

step33createicust2.sh

```

#!/sh
$SQLPLUS tpcc/tpcc @step33createicust2 > junk 2>&1

if test $? -ne 0
then
  exit 1;
else
  exit 0;
fi

```

step33createicust2.sql

```

spool step33createicust2.log;
set echo on;
drop index icust2;

set timing on;

create unique index icust2 on cust (c_last, c_w_id, c_d_id, c_first, c_id)
  initrans 3
  parallel 16
  pctfree 1
  storage ( freelists 22 freelist groups 9 )
  tablespace icust2_0;
spool off;
set echo off;
exit sql.sqlcode;

```

step34createistok.sh

```

#!/sh
$SQLPLUS tpcc/tpcc @step34createistok > junk 2>&1

if test $? -ne 0
then
  exit 1;
else
  exit 0;
fi

```

step34createistok.sql

```

spool step34createistok.log;
set echo on;
drop index istok;

set timing on;

create unique index istok on stok (s_i_id, s_w_id)
  initrans 3
  nologging
  parallel 32
  pctfree 1
  storage ( freelists 22 freelist groups 9 )
  tablespace istok_0;
spool off;
set echo off;

```

```

exit sql.sqlcode;

```

step35createiordr1.sh

```

#!/sh
$SQLPLUS tpcc/tpcc @step35createiordr1 > junk 2>&1

if test $? -ne 0
then
  exit 1;
else
  exit 0;
fi

```

step35createiordr1.sql

```

spool step35createiordr1.log;
set echo on;
drop index iordr1;

set timing on;

create unique index iordr1 on ordr (o_w_id, o_d_id, o_id)
  local
  (
    partition iordr1_0 tablespace iordr1_0,
    partition iordr1_1 tablespace iordr1_1,
    partition iordr1_2 tablespace iordr1_2,
    partition iordr1_3 tablespace iordr1_3,
    partition iordr1_4 tablespace iordr1_4,
    partition iordr1_5 tablespace iordr1_5,
    partition iordr1_6 tablespace iordr1_6,
    partition iordr1_7 tablespace iordr1_7
  )
  initrans 3
  parallel 8
  pctfree 1
  storage ( freelists 22 freelist groups 9 )
  tablespace iordr1_0;
spool off;
set echo off;
exit sql.sqlcode;

```

step36createiordr2.sh

```

#!/sh
$SQLPLUS tpcc/tpcc @step36createiordr2 > junk 2>&1

if test $? -ne 0
then
  exit 1;
else
  exit 0;
fi

```

step36createiordr2.sql

```

spool step36createiordr2.log;
set echo on;
drop index iordr2;

set timing on;

create unique index iordr2 on ordr (o_w_id, o_d_id, o_c_id, o_id)
  local
  (

```

```

partition iordr2_0 tablespace iordr2_0,
partition iordr2_1 tablespace iordr2_1,
partition iordr2_2 tablespace iordr2_2,
partition iordr2_3 tablespace iordr2_3,
partition iordr2_4 tablespace iordr2_4,
partition iordr2_5 tablespace iordr2_5,
partition iordr2_6 tablespace iordr2_6,
partition iordr2_7 tablespace iordr2_7
)
initrans 4
parallel 8
pctfree 25
storage ( freelists 22 freelist groups 9 )
tablespace iordr2_0;
spool off;
set echo off;
exit sql.sqlcode;

```

step37createinord.sh

```

#!sh
$SHELLPLUS tpcc/tpcc @step37createinord > junk 2>&1

```

```

if test $? -ne 0
then
exit 1;
else
exit 0;
fi

```

step37createinord.sql

```

exit sql.sqlcode;

```

step38createiordl.sh

```

#!sh
$SHELLPLUS tpcc/tpcc @step38createiordl > junk 2>&1

```

```

if test $? -ne 0
then
exit 1;
else
exit 0;
fi

```

step38createiordl.sql

```

spool step38createiordl.log;
set echo on;
drop index iordl;

set timing on;

create unique index iordl on ordl (ol_w_id, ol_d_id, ol_o_id, ol_number)
local
(
partition iordl_0 tablespace iordl_0,
partition iordl_1 tablespace iordl_1,
partition iordl_2 tablespace iordl_2,
partition iordl_3 tablespace iordl_3,
partition iordl_4 tablespace iordl_4,
partition iordl_5 tablespace iordl_5,
partition iordl_6 tablespace iordl_6,
partition iordl_7 tablespace iordl_7
)

```

```

initrans 3
nologging
parallel 8
pctfree 1
storage ( freelists 22 freelist groups 9 )
tablespace iordl_0;
spool off;
set echo off;
exit sql.sqlcode;

```

step39analyze.sh

```

#!sh
$SHELLPLUS tpcc/tpcc @step39analyze > junk 2>&1

```

```

if test $? -ne 0
then
exit 1;
else
exit 0;
fi

```

step39analyze.sql

```

spool step39analyze.log;
set echo on;
analyze cluster stokcluster estimate statistics;
analyze index istok estimate statistics;
analyze table ware compute statistics;
analyze cluster itemcluster estimate statistics;
analyze index iordl estimate statistics;
analyze index iordr1 estimate statistics;
analyze index iordr2 estimate statistics;
analyze index inord estimate statistics;
analyze table dist compute statistics;
analyze table ordr estimate statistics;
analyze table hist estimate statistics;
analyze index iitem estimate statistics;
analyze index iware compute statistics;
analyze index icust1 estimate statistics;
analyze index icust2 estimate statistics;
analyze index idist compute statistics;
analyze cluster custcluster estimate statistics;

```

```

set echo off;
spool off;

```

```

exit sql.sqlcode;

```

step3createrollback.sh

```

#!sh
$SHELLPLUS internal/internal @step3createrollback > junk 2>&1

```

```

if test $? -ne 0
then
exit 1;
else
exit 0;
fi

```

step3createrollback.sql

```

spool step3createrollback.log
set echo on

```

```

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);

```

```

spool off
set echo off
exit sql.sqlcode

```

step40createstats.sh

```

#!/sh
$SHELLPLUS internal/internal @step40createstats > junk 2>&1

if test $? -ne 0
then
  exit 1;
else
  exit 0;
fi

```

step40createstats.sql

```

spool step40createstats.log
@orst_cre
@c_stat
@pst_c
spool off
exit sql.sqlcode;

```

step41createstoredprocs.sh

```

#!/sh
$SHELLPLUS tpcc/tpcc @step41createstoredprocs > junk 2>&1

if test $? -ne 0
then
  exit 1;
else
  exit 0;
fi

```

step41createstoredprocs.sql

```

spool step41createstoredprocs.log
@initpay
@initnew
spool off
exit sql.sqlcode;

```

step42createspacestats.sh

```

#!/sh
$SHELLPLUS internal/internal @step42createspacestats > junk 2>&1

if test $? -ne 0
then
  exit 1;
else
  exit 0;
fi

```

step42createspacestats.sql

```

spool step42createspacestats.log
@space_init
@space_get 12 7000
@space_rpt
spool off
exit sql.sqlcode;

```

step43createmisc.sh

```

#!/sh
$SHELLPLUS internal/internal @step43createmisc > junk 2>&1

if test $? -ne 0
then
  exit 1;
else
  exit 0;
fi

```

step43createmisc.sql

```

spool step43createmisc.log
set echo on;
alter user tpcc temporary tablespace system;
alter user sys temporary tablespace system;
alter user tpcc default tablespace temp_perm_0;
grant execute on dbms_lock to public;
grant execute on dbms_pipe to public;
grant select on v_$parameter to public;
@plsql_mon
@cre_tab
@create_cache_views
@views
@dml
rem @extent 4096
rem @freeext 4096
spool off
exit sql.sqlcode;

```

step47offlinerollsegs.sh

```
#!/sh
$SQLPLUS internal/internal @step47offlinerollsegs > junk 2>&1

if test $? -ne 0
then
  exit 1;
else
  exit 0;
fi
```

step47offlinerollsegs.sql

```
spool step47offlinerollsegs.log
set echo on
```

```
alter rollback segment t1 offline;
alter rollback segment t2 offline;
alter rollback segment t3 offline;
alter rollback segment t4 offline;
alter rollback segment t5 offline;
alter rollback segment t6 offline;
alter rollback segment t7 offline;
alter rollback segment t8 offline;
alter rollback segment t9 offline;
alter rollback segment t10 offline;
alter rollback segment t11 offline;
alter rollback segment t12 offline;
alter rollback segment t13 offline;
alter rollback segment t14 offline;
alter rollback segment t15 offline;
alter rollback segment t16 offline;
alter rollback segment t17 offline;
alter rollback segment t18 offline;
alter rollback segment t19 offline;
alter rollback segment t20 offline;
alter rollback segment t21 offline;
alter rollback segment t22 offline;
alter rollback segment t23 offline;
alter rollback segment t24 offline;
alter rollback segment t25 offline;
alter rollback segment t26 offline;
alter rollback segment t27 offline;
alter rollback segment t28 offline;
alter rollback segment t29 offline;
alter rollback segment t30 offline;
```

```
spool off
set echo off
exit sqlcode
```

step5createts.sh

```
#!/sh
addts.sh ware_1_0 \?/dbs/tpcc_disks/ware_1_0 5M 4714K
addts.sh ware_1_1 \?/dbs/tpcc_disks/ware_1_1 5M 4714K
addts.sh ware_1_2 \?/dbs/tpcc_disks/ware_1_2 5M 4714K
addts.sh ware_1_3 \?/dbs/tpcc_disks/ware_1_3 5M 4714K
addts.sh ware_1_4 \?/dbs/tpcc_disks/ware_1_4 5M 4714K
addts.sh ware_1_5 \?/dbs/tpcc_disks/ware_1_5 5M 4714K
addts.sh ware_1_6 \?/dbs/tpcc_disks/ware_1_6 5M 4714K
addts.sh ware_1_7 \?/dbs/tpcc_disks/ware_1_7 5M 4714K
```

```
addts.sh dist_1_0 \?/dbs/tpcc_disks/dist_1_0 47M 47050K
addts.sh dist_1_1 \?/dbs/tpcc_disks/dist_1_1 47M 47050K
addts.sh dist_1_2 \?/dbs/tpcc_disks/dist_1_2 47M 47050K
addts.sh dist_1_3 \?/dbs/tpcc_disks/dist_1_3 47M 47050K
addts.sh dist_1_4 \?/dbs/tpcc_disks/dist_1_4 47M 47050K
```

```
addts.sh dist_1_5 \?/dbs/tpcc_disks/dist_1_5 47M 47050K
addts.sh dist_1_6 \?/dbs/tpcc_disks/dist_1_6 47M 47050K
addts.sh dist_1_7 \?/dbs/tpcc_disks/dist_1_7 47M 47050K
```

```
addts.sh item_0 \?/dbs/tpcc_disks/item_0_0 7M 5894K
addfile.sh item_0 \?/dbs/tpcc_disks/item_0_1 7M
addfile.sh item_0 \?/dbs/tpcc_disks/item_0_2 7M
```

```
addts.sh iitem_0 \?/dbs/tpcc_disks/iitem_0_0 5M 32k
```

```
addts.sh stok_0 \?/dbs/tpcc_disks/stok_0_0 3361M 3421101K
addfile.sh stok_0 \?/dbs/tpcc_disks/stok_0_1 3361M &
sleep 10
addfile.sh stok_0 \?/dbs/tpcc_disks/stok_0_2 3361M &
sleep 10
addfile.sh stok_0 \?/dbs/tpcc_disks/stok_0_3 3361M &
sleep 10
addfile.sh stok_0 \?/dbs/tpcc_disks/stok_0_4 3361M &
sleep 10
addfile.sh stok_0 \?/dbs/tpcc_disks/stok_0_5 3361M &
sleep 10
addfile.sh stok_0 \?/dbs/tpcc_disks/stok_0_6 3361M &
sleep 10
addfile.sh stok_0 \?/dbs/tpcc_disks/stok_0_7 3361M &
sleep 10
addfile.sh stok_0 \?/dbs/tpcc_disks/stok_0_8 3361M &
sleep 10
addfile.sh stok_0 \?/dbs/tpcc_disks/stok_0_9 3361M &
sleep 10
addfile.sh stok_0 \?/dbs/tpcc_disks/stok_0_10 3361M &
sleep 10
addfile.sh stok_0 \?/dbs/tpcc_disks/stok_0_11 3361M &
sleep 10
addfile.sh stok_0 \?/dbs/tpcc_disks/stok_0_12 3361M &
sleep 10
addfile.sh stok_0 \?/dbs/tpcc_disks/stok_0_13 3361M &
sleep 10
addfile.sh stok_0 \?/dbs/tpcc_disks/stok_0_14 3361M &
sleep 10
addfile.sh stok_0 \?/dbs/tpcc_disks/stok_0_15 3361M &
sleep 10
addfile.sh stok_0 \?/dbs/tpcc_disks/stok_0_16 3361M &
sleep 10
addfile.sh stok_0 \?/dbs/tpcc_disks/stok_0_17 3361M &
sleep 10
addfile.sh stok_0 \?/dbs/tpcc_disks/stok_0_18 3361M &
sleep 10
addfile.sh stok_0 \?/dbs/tpcc_disks/stok_0_19 3361M &
sleep 10
addfile.sh stok_0 \?/dbs/tpcc_disks/stok_0_20 3361M &
sleep 10
addfile.sh stok_0 \?/dbs/tpcc_disks/stok_0_21 3361M &
sleep 10
addfile.sh stok_0 \?/dbs/tpcc_disks/stok_0_22 3361M &
sleep 10
addfile.sh stok_0 \?/dbs/tpcc_disks/stok_0_23 3361M &
sleep 10
addfile.sh stok_0 \?/dbs/tpcc_disks/stok_0_24 3361M &
wait
addfile.sh stok_0 \?/dbs/tpcc_disks/stok_0_25 3361M &
sleep 10
addfile.sh stok_0 \?/dbs/tpcc_disks/stok_0_26 3361M &
sleep 10
addfile.sh stok_0 \?/dbs/tpcc_disks/stok_0_27 3361M &
sleep 10
addfile.sh stok_0 \?/dbs/tpcc_disks/stok_0_28 3361M &
sleep 10
addfile.sh stok_0 \?/dbs/tpcc_disks/stok_0_29 3361M &
sleep 10
addfile.sh stok_0 \?/dbs/tpcc_disks/stok_0_30 3361M &
sleep 10
addfile.sh stok_0 \?/dbs/tpcc_disks/stok_0_31 3361M &
sleep 10
addfile.sh stok_0 \?/dbs/tpcc_disks/stok_0_32 3361M &
sleep 10
addfile.sh stok_0 \?/dbs/tpcc_disks/stok_0_33 3361M &
sleep 10
addfile.sh stok_0 \?/dbs/tpcc_disks/stok_0_34 3361M &
sleep 10
addfile.sh stok_0 \?/dbs/tpcc_disks/stok_0_35 3361M &
```



```

addtempfile.sh temp_0 \?/dbs/tpcc_disks/temp_0_30 5700M &
addtempfile.sh temp_0 \?/dbs/tpcc_disks/temp_0_31 5700M &
addtempfile.sh temp_0 \?/dbs/tpcc_disks/temp_0_32 5700M &
addtempfile.sh temp_0 \?/dbs/tpcc_disks/temp_0_33 5700M &
addtempfile.sh temp_0 \?/dbs/tpcc_disks/temp_0_34 5700M &
addtempfile.sh temp_0 \?/dbs/tpcc_disks/temp_0_35 5700M &
addtempfile.sh temp_0 \?/dbs/tpcc_disks/temp_0_36 5700M &
addtempfile.sh temp_0 \?/dbs/tpcc_disks/temp_0_37 5700M &
addtempfile.sh temp_0 \?/dbs/tpcc_disks/temp_0_38 5700M &
addtempfile.sh temp_0 \?/dbs/tpcc_disks/temp_0_39 5700M &
addtempfile.sh temp_0 \?/dbs/tpcc_disks/temp_0_40 5700M &
addtempfile.sh temp_0 \?/dbs/tpcc_disks/temp_0_41 5700M &
addtempfile.sh temp_0 \?/dbs/tpcc_disks/temp_0_42 5700M &
addtempfile.sh temp_0 \?/dbs/tpcc_disks/temp_0_43 5700M &
addtempfile.sh temp_0 \?/dbs/tpcc_disks/temp_0_44 5700M &
addtempfile.sh temp_0 \?/dbs/tpcc_disks/temp_0_45 5700M &
addtempfile.sh temp_0 \?/dbs/tpcc_disks/temp_0_46 5700M &
addtempfile.sh temp_0 \?/dbs/tpcc_disks/temp_0_47 5700M &
addtempfile.sh temp_0 \?/dbs/tpcc_disks/temp_0_48 5700M &
addtempfile.sh temp_0 \?/dbs/tpcc_disks/temp_0_49 5700M &
addtempfile.sh temp_0 \?/dbs/tpcc_disks/temp_0_50 5700M &
addtempfile.sh temp_0 \?/dbs/tpcc_disks/temp_0_51 5700M &
addtempfile.sh temp_0 \?/dbs/tpcc_disks/temp_0_52 5700M &
addtempfile.sh temp_0 \?/dbs/tpcc_disks/temp_0_53 5700M &
addtempfile.sh temp_0 \?/dbs/tpcc_disks/temp_0_54 5700M &
addtempfile.sh temp_0 \?/dbs/tpcc_disks/temp_0_55 5700M &
addtempfile.sh temp_0 \?/dbs/tpcc_disks/temp_0_56 5700M &
addtempfile.sh temp_0 \?/dbs/tpcc_disks/temp_0_57 5700M &
addtempfile.sh temp_0 \?/dbs/tpcc_disks/temp_0_58 5700M &
addtempfile.sh temp_0 \?/dbs/tpcc_disks/temp_0_59 5700M &
addtempfile.sh temp_0 \?/dbs/tpcc_disks/temp_0_60 5700M &
addtempfile.sh temp_0 \?/dbs/tpcc_disks/temp_0_61 5700M &
addtempfile.sh temp_0 \?/dbs/tpcc_disks/temp_0_62 5700M &
addtempfile.sh temp_0 \?/dbs/tpcc_disks/temp_0_63 5700M &
addtempfile.sh temp_0 \?/dbs/tpcc_disks/temp_0_64 5700M &
addtempfile.sh temp_0 \?/dbs/tpcc_disks/temp_0_65 5700M &
addtempfile.sh temp_0 \?/dbs/tpcc_disks/temp_0_66 5700M &
addtempfile.sh temp_0 \?/dbs/tpcc_disks/temp_0_67 5700M &
addtempfile.sh temp_0 \?/dbs/tpcc_disks/temp_0_68 5700M &
addtempfile.sh temp_0 \?/dbs/tpcc_disks/temp_0_69 5700M &
addtempfile.sh temp_0 \?/dbs/tpcc_disks/temp_0_70 5700M &
addtempfile.sh temp_0 \?/dbs/tpcc_disks/temp_0_71 5700M &
addtempfile.sh temp_0 \?/dbs/tpcc_disks/temp_0_72 5700M &
addtempfile.sh temp_0 \?/dbs/tpcc_disks/temp_0_73 5700M &
addtempfile.sh temp_0 \?/dbs/tpcc_disks/temp_0_74 5700M &
addtempfile.sh temp_0 \?/dbs/tpcc_disks/temp_0_75 5700M &
addtempfile.sh temp_0 \?/dbs/tpcc_disks/temp_0_76 5700M &
addtempfile.sh temp_0 \?/dbs/tpcc_disks/temp_0_77 5700M &
addtempfile.sh temp_0 \?/dbs/tpcc_disks/temp_0_78 5700M &
addtempfile.sh temp_0 \?/dbs/tpcc_disks/temp_0_79 5700M &
addtempfile.sh temp_0 \?/dbs/tpcc_disks/temp_0_80 5700M &
addtempfile.sh temp_0 \?/dbs/tpcc_disks/temp_0_81 5700M &
addtempfile.sh temp_0 \?/dbs/tpcc_disks/temp_0_82 5700M &
addtempfile.sh temp_0 \?/dbs/tpcc_disks/temp_0_83 5700M &
addtempfile.sh temp_0 \?/dbs/tpcc_disks/temp_0_84 5700M &
addtempfile.sh temp_0 \?/dbs/tpcc_disks/temp_0_85 5700M &
addtempfile.sh temp_0 \?/dbs/tpcc_disks/temp_0_86 5700M &
addtempfile.sh temp_0 \?/dbs/tpcc_disks/temp_0_87 5700M &
addtempfile.sh temp_0 \?/dbs/tpcc_disks/temp_0_88 5700M &
wait

```

step6createddviews.sh

```

#!sh
$SQLPLUS internal/internal @step6createddviews > junk 2>&1

if test $? -ne 0
then
  exit 1;
else
  exit 0;
fi

```

step6createddviews.sql

```

spool step6createddviews.log
@$ORACLE_HOME/rdbms/admin/catalog
@$ORACLE_HOME/rdbms/admin/catproc
@$ORACLE_HOME/rdbms/admin/catparr
connect system/manager
@$ORACLE_HOME/sqlplus/admin/publd
spool off
exit sql.sqlcode;

```

step9createware.sh

```

#!sh
$SQLPLUS tpcc/tpcc @step9createware > junk 2>&1

if test $? -ne 0
then
  exit 1;
else
  exit 0;
fi

```

step9createware.sql

```

spool step9createware.log;
set echo on;

set timing on

rem
rem WAREHOUSE table
rem
create table ware(
  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)
)
partition by range(w_id)
(
  partition ware_0 values less than (2353)
  tablespace ware_1_0,
  partition ware_1 values less than (4705)
  tablespace ware_1_1,
  partition ware_2 values less than (7057)
  tablespace ware_1_2,
  partition ware_3 values less than (9409)
  tablespace ware_1_3,
  partition ware_4 values less than (11761)
  tablespace ware_1_4,
  partition ware_5 values less than (14113)
  tablespace ware_1_5,
  partition ware_6 values less than (16465)
  tablespace ware_1_6,
  partition ware_7 values less than (maxvalue)
  tablespace ware_1_7
)
intrans 2
pctfree 98
pctused 0
storage ( freelists 22 freelist groups 9);

spool off;

```

```
set echo off;
exit sql.sqlcode;
```

stepchkpt.sh

```
#!/sh
$SHELLPLUS internal/internal @stepchkpt
```

stepchkpt.sql

```
spool stepchkpt.log;

set echo on;

alter system switch logfile;
alter system switch logfile;

set echo off;
spool off;

exit ;
```

stepcreateuser.sh

```
#!/sh
$SHELLPLUS internal/internal @stepcreateuser > junk 2>&1

if test $? -ne 0
then
  exit 1;
else
  exit 0;
fi
```

stepcreateuser.sql

```
spool stepcreateuser.log;

set echo on;
@$ORACLE_HOME/rdbms/admin/catalog
@$ORACLE_HOME/rdbms/admin/catproc
@$ORACLE_HOME/rdbms/admin/catparr
connect system/manager
@$ORACLE_HOME/sqlplus/admin/pupbld

create user tpcc identified by tpcc;

grant dba to tpcc;

set echo off;
spool off;

exit ;
```

stepshut.sh

```
#!/sh
$SHELLPLUS internal/internal @stepshut > junk 2>&1

if test $? -ne 0
```

```
then
  exit 1;
else
  exit 0;
fi
```

stepshut.sql

```
spool stepshut.log;

set echo on;

alter system switch logfile;
alter system switch logfile;

shutdown immediate;

set echo off;
spool off;

exit ;
```

stepstartb.sh

```
#!/sh
$SHELLPLUS internal/internal @stepstartb > junk 2>&1

if test $? -eq 0
then
  exit 1;
else
  exit 0;
fi
```

stepstartb.sql

```
spool stepstartb.log;

set echo on;

startup pfile=p_build.ora open;

set echo off;
spool off;

exit sql.sqlcode;
```

stepusertemp.sh

```
#!/sh
$SHELLPLUS internal/internal @stepusertemp > junk 2>&1

if test $? -ne 0
then
  exit 1;
else
  exit 0;
fi
```

stepusertemp.sql

```

spool stepusertemp.log;

set echo on;

alter user tpcc temporary tablespace temp_0;

set echo off;
spool off;

exit ;

```

```

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 stok s, item i
where i.i_id = s.s_i_id;

set echo off;

```

undm1.sh

```

#!/bin/sh
svrmgrl <<!
connect tpcc/tpcc;
set echo on;
alter table ware enable table lock;
alter table dist enable table lock;
alter table cust enable table lock;
alter table hist enable table lock;
alter table item enable table lock;
alter table stok enable table lock;
alter table ordr enable table lock;
alter table nord enable table lock;
alter table ordl enable table lock;
alter table tpcc_back_res enable table lock;
alter table tpcc_del_res enable table lock;
alter table tpcc_new_res enable table lock;
alter table tpcc_ord_res enable table lock;
alter table tpcc_pay_res enable table lock;
alter table tpcc_run_desc enable table lock;
alter table tpcc_run_int enable table lock;
alter table tpcc_sto_res enable table lock;
alter table tpcc_tpm enable table lock;
alter table tpcc_user_res enable table lock;
alter table bench_del_res enable table lock;
alter table bench_new_res enable table lock;
alter table bench_ord_res enable table lock;
alter table bench_pay_res enable table lock;
alter table bench_run_int enable table lock;
alter table bench_sto_res enable table lock;
alter table bench_user_res enable table lock;
set echo off;
exit;
!

```

views.sql

```

connect tpcc/tpcc;
set echo on;

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 cust c, ware 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 dist d, ware 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,

```


Appendix C

scr_util.c

```
/*_+*****
*****
*
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RELIABILITY OF ITS *
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*
*
*
*****
*****/
#include <stdio.h>
#include <stdlib.h>
#include <math.h>
#include <string.h>
#include <ctype.h>
#include <stdarg.h>
#include <stdtypes.h>

#ifdef _WIN32
#include <nt_lib.h>
#endif

#include <prte.h>

#include <common.h>

#include <tpcstruct.h>
#include <tpccerr.h>
#include <config.h>

#define SCR_UTIL_C
#include <scr_util.h>

/* Static functions */
static print_getnet_debug(char *name, char *ret_string, char *def_string);
```

int

```
GetCallingThreadLimit( int *pCallingThreadLimit )
{
    *pCallingThreadLimit = PRTEget_worker_thread_limit( );

    return( ERR_SUCCESS );
}
```

```
int
GetConfigValue( char *Name, int *Len, char *Value )
{
    int
        Status;

    Status = GetConfigValueTX( Name, Len, Value );
    if( SCR_E_SUCCESS == Status )
    {
        /* Convert to FFE style error code. */
        Status = ERR_SUCCESS;
    }

    return( Status );
}
```

```
int
GetConfigValueTX( char *Name, int *Len, char *Value )
{
    char
        *locValue;
    int
        locLen;
    char
        FullName[PRTE_MAX_NET_VAR_NAME_LENGTH+1];

    strcpy( FullName, Sut_name );
    strcat( FullName, "_" );
    strcat( FullName, Name );
    locValue = PRTEget_network_variable( FullName );

    if( NULL == locValue )
    {
        Value[0] = '\0';
        *Len = 0;
        return( ERR_CANT_FIND_VALUE );
    }
    else
    {
        locLen = strlen( locValue );
        if( locLen < *Len )
        {
            memcpy( Value, locValue, locLen+1 );
            *Len = locLen;
            return( SCR_E_SUCCESS );
        }
        else
        {
            return( ERR_VALUE_TOO_LONG );
        }
    }
}
```

```
*****
*****/
/*
Name: GetConnectInfo
Purpose: This routine gets all the information about the FEs that we
need.
Inputs:
Outputs:
Function Value:
Notes:
*****/
*****
```

```

int32
GetConnectInfo( int32 RunMode, int32 *pTpccUsers, int32 *pNumFEs,
                int32 *pAdminUsers,
                int32 *pNumConnects, connect_t **ppConnects )
{
#define COUNT_UNSPECIFIED -1
#define CONNECT_INFO      "CONNECT%d"
  char      Field[11];
  int       Index;
  char      NetVarName[50];
  int32     NetVarNum;
  int       NumCountUnspec;
  char      *pConnect;
  char      Script[PATH_MAX];
  char      *pTmpChar;
  int       Remainder;
  int       UcntSpec;
  int       TotalUcnt;
  int       TotalDcnt;
  int       Ucnt;

  /* Get the name of the user emulation script. */
  if( NULL == ( pTmpChar = PRTEget_network_variable( "USER_SCRIPT_NAME"
  )))
  {
    Script[0] = '\0';
  }
  else
  {
    strcpy( Script, pTmpChar );
  }

  /* Get total count of districts. */
  if( NULL == ( pTmpChar = PRTEget_network_variable(
  "TOTAL_DISTRICT_COUNT" )))
  {
    return( SCRerr( SCR_E_TOTAL_DISTRICT_COUNT_NOT_SET ));
  }
  else
  {
    TotalDcnt = atoi( pTmpChar );
  }

  /* Get total count of users. */
  if( NULL == ( pTmpChar = PRTEget_network_variable( "TOTAL_USER_COUNT"
  )))
  {
    TotalUcnt = COUNT_UNSPECIFIED;
  }
  else
  {
    TotalUcnt = atoi( pTmpChar );
  }

  /* Collect user connect info */
  *pNumConnects = 0;
  NetVarNum = 1;
  while( TRUE )
  {
    sprintf( NetVarName, CONNECT_INFO, NetVarNum++ );
    if( NULL == ( pConnect = PRTEget_network_variable( NetVarName )))
    {
      break;
    }
    /* Check if there is a placeholder. I.e. an FE not to be used. */
    if( '\0' == pConnect[0] )
    {
      continue;
    }
    (*pNumConnects)++;
  }
  if( 0 == *pNumConnects )
  {
    return( SCRerr( SCR_E_NO_CONNECTS ));
  }

  /* Now we know how many connects there are, so we can allocate space. */
  *ppConnects = ( connect_t * ) malloc( *pNumConnects * sizeof( **ppConnects ));
  if( NULL == *ppConnects )
  {
    return( SCRerr( SCR_E_MALLOC_CONNECT_ARRAY ));
  }

  /* Now we need to get the connect info */
  *pNumFEs = 0;
  *pAdminUsers = 0;
  NumCountUnspec = 0;
  UcntSpec = 0;
  Index = 0;
  NetVarNum = 1;
  while( TRUE )
  {
    sprintf( NetVarName, CONNECT_INFO, NetVarNum++ );
    if( NULL == ( pConnect = PRTEget_network_variable( NetVarName )))
    {
      break;
    }
    /* Check if there is a placeholder. I.e. an entry not to be used. */
    if( '\0' == pConnect[0] )
    {
      continue;
    }

    /* Parse the connect information */
    pTmpChar = SCR_next_list_element( pConnect, (*ppConnects)[Index].RTENAME
  );
    if( '\0' == (*ppConnects)[Index].RTENAME[0] )
    {
      free( *ppConnects );
      SCRlog( "Parsing %s.", NetVarName );
      return( SCRerr( SCR_E_NO_RTE_IN_CONNECT ));
    }

    pTmpChar = SCR_next_list_element( pTmpChar, (*ppConnects)[Index].FENAME );

    pTmpChar = SCR_next_list_element( pTmpChar, Field );
    if( (*ppConnects)[Index].ConfConn = ( 'T' == Field[0] || 't' == Field[0] ) )
    {
      (*pNumFEs)++;
    }

    pTmpChar = SCR_next_list_element( pTmpChar, Field );
    if( (*ppConnects)[Index].AdminConn = ( 'T' == Field[0] || 't' == Field[0] ) )
    {
      (*pAdminUsers)++;
    }

    pTmpChar = SCR_next_list_element( pTmpChar, Field );
    if( '\0' == Field[0] )
    {
      (*ppConnects)[Index].Ucnt = COUNT_UNSPECIFIED;
      NumCountUnspec++;
    }
    else
    {
      UcntSpec += (*ppConnects)[Index].Ucnt = atoi( Field );
    }

    pTmpChar = SCR_next_list_element( pTmpChar, (*ppConnects)[Index].SCRIPT );
    if( '\0' == (*ppConnects)[Index].SCRIPT[0] )
    {
      if( '\0' == Script[0] )
      {
        free( *ppConnects );
        SCRlog( "Parsing %s.", NetVarName );
        return( SCRerr( SCR_E_USER_SCRIPT_NAME_NOT_SET ));
      }
      strcpy( (*ppConnects)[Index].Script, Script );
    }
    Index++;
  }

  /* Check that all specified user counts agree. */
  if( 0 == NumCountUnspec )
  {
    if( COUNT_UNSPECIFIED != TotalUcnt && UcntSpec != TotalUcnt )
    {
      free( *ppConnects );
      return( SCRerr( SCR_E_USER_COUNT_MISMATCH ));
    }
  }
}

```

```

    *pTpccUsers = UcntSpec;
}
else
{
    if( COUNT_UNSPECIFIED == TotalUcnt )
    {
        TotalUcnt = TotalDcnt;
    }
    /* Distribute the user counts */
    *pTpccUsers = 0;
    Ucnt = ( TotalUcnt - UcntSpec ) / NumCountUnspec;
    Remainder = ( TotalUcnt - UcntSpec ) % NumCountUnspec;
    for( Index = 0; Index < *pNumConnects; Index++ )
    {
        if( COUNT_UNSPECIFIED == (*ppConnects)[Index].Ucnt )
        {
            (*ppConnects)[Index].Ucnt = Ucnt + ( Remainder-- > 0 ? 1 : 0 );
        }
        *pTpccUsers += (*ppConnects)[Index].Ucnt;
    }
}

/* Make sure all specified counts are in sync. */
if( END_TO_END_MODE == RunMode &&
    TotalDcnt != *pTpccUsers )
{
    free( *ppConnects );
    return( SCRerr( SCR_E_DISTRICT_USER_COUNT_MISMATCH ) );
}

# pragma message ("FIXME: GetConnectInfo: Should warn tester if user count won't
fully access all districts for the last warehouse.")
# pragma message ("FIXME: GetConnectInfo: Should warn tester if user count on a
given network card exceeds limit (currently 1023).")

return( SCR_E_SUCCESS );
}

int32
SCRerr( int32 ErrCode )
{
    char          ErrFmt[] = "\007ERROR( %d ) : %s\n\n";
    int32         Idx;
    char          *ErrString;

    Idx = 0;
    while( '\0' != ScrErrMsgs[Idx].ErrMsg[0] &&
        ErrCode != ScrErrMsgs[Idx].ErrCode )
    {
        Idx++;
    }
    if( '\0' != ScrErrMsgs[Idx].ErrMsg[0] )
    {
        ErrString = ScrErrMsgs[Idx].ErrMsg;
    }
    else
    {
        /* No SCR error message defined for this error code, check TPCC errors. */
        Idx = 0;
        while( '\0' != errorMsgs[Idx].szMsg[0] &&
            ErrCode != errorMsgs[Idx].iError )
        {
            Idx++;
        }
        if( '\0' != errorMsgs[Idx].szMsg[0] )
        {
            ErrString = errorMsgs[Idx].szMsg;
        }
        else
        {
            ErrString = ScrErrMsgs[SCR_E_NO_ERR_MSG - SCR_E_BASE].ErrMsg;
        }
    }

    SCRlog( ErrFmt, ErrCode, ErrString );
    return( ErrCode );
}

```

```

void
SCRlog( char *Format, ... )
{
    char          Buf[8192];
    va_list       VarArgs;

    /* Expand the format string and arguments */
    if( NULL != Format ) {
        va_start( VarArgs, Format );
        vsprintf( Buf, Format, VarArgs );
        va_end( VarArgs );
    }
    else
    {
        strcpy( Buf, "[NULL]" );
    }

    PRTEsend_console_message( Buf );
    PRTEto_log( 555, Buf );

    return;
}

/* SCR_inverse_random
Inputs: Mean - average value needed from function
       lexp - pointer to double for storage of result
Return: NONE
Implementation: Does inverse-random function using drand48.
               Will try again if value calculated is > Max
*/
void
SCR_inverse_random(double Mean, double Max, double *lexp) {
    double Randval, lval;

    do {
        Randval = drand48();
        if( 0.0 == Randval )
        {
            /* We have to treat a zero value returned from the random number */
            /* generator as a special case because log( 0.0 ) would result in */
            /* an infinite negative number. Passing an infinite negative number */
            /* onto the following equation would result in a floating point */
            /* exception. However, mathematically, negating an infinite negative */
            /* number and then scaling it by the desired mean value would still */
            /* result in an infinite positive number which would exceed the maximum */
            /* requested value. Exceeding the maximum requested value causes a */
            /* loop to get a new random value, which is what we shall do now. */
            continue;
        }
        lval = log(Randval);
        *lexp = -1.0 * Mean * lval;

    } while ( *lexp > Max );
}

char *
SCR_getnet_int ( char *varname, char *default_str, int *pInt) {
    char *pnet;

    if (!varname) return NULL;

    pnet = PRTEget_network_variable (varname);
    if (pnet) *pInt = atoi(pnet);
    else *pInt = atoi(default_str);
#ifdef DEBUG
    print_getnet_debug(varname,pnet,default_str);
#endif

    return pnet;
}

char *
SCR_getnet_long ( char *varname, char *default_str, long *pLong) {
    char *pnet;

```

```

if (!varname) return NULL;

pnet = PRTEget_network_variable (varname);
if (pnet) *pLong = atol(pnet);
else *pLong = atol(default_str);
#ifdef DEBUG
print_getnet_debug(varname,pnet,default_str);
#endif

return pnet;
}

char *
SCR_getnet_float ( char *varname, char *default_str, float *pFloat) {
char *pnet;

if (!varname) return NULL;

pnet = PRTEget_network_variable (varname);
if (pnet) *pFloat = (float) atof(pnet);
else *pFloat = (float) atof(default_str);
#ifdef DEBUG
print_getnet_debug(varname,pnet,default_str);
#endif

return pnet;
}

char *
SCR_getnet_double ( char *varname, char *default_str, double *pDouble) {
char *pnet;

if (!varname) return NULL;

pnet = PRTEget_network_variable (varname);
if (pnet) *pDouble = atof(pnet);
else *pDouble = atof(default_str);

return pnet;
}

char *
SCR_getnet_string ( char *varname, char *default_str, char *pString) {
char *pnet;

if (!varname) return NULL;

pnet = PRTEget_network_variable (varname);

if (pnet != NULL) strcpy(pString,pnet);

else {
if (default_str != NULL) strcpy(pString,default_str);
else (pString[0] = '\0');
}
#ifdef DEBUG
print_getnet_debug(varname,pnet,default_str);
#endif

return pString;
}

char *
SCR_getnet_bool ( char *varname, char *default_str, BOOL *pBool) {
char *pnet;
char first_letter;

if (!varname) return NULL;

pnet = PRTEget_network_variable (varname);
if (pnet)
{
first_letter = pnet[0];
}
else
{
first_letter = default_str[0];
pnet = default_str;
}

```

```

switch (first_letter)
{
case 't':
case 'T':
case '1':
*pBool = TRUE;
break;

case 'f':
case 'F':
case '0':
default:
*pBool = FALSE;
break;
}
#ifdef DEBUG
print_getnet_debug(varname,pnet,default_str);
#endif

return pnet;
}

#ifdef DEBUG
static
print_getnet_debug(char *name, char *ret_string, char *def_string) {
char temp_string[256];

SCRlog( "Netvar: name = %s netvar = %s, default = %s\n",
name, ret_string, def_string );
}
#endif

/*****
*****/
/* Name: SCR_next_list_element */
/* Purpose: Return an element in Element and a pointer to the next element */
/* in a comma separated list */
/* Inputs: List -- pointer to list */
/* Element-- pointer to string for storing element */
/* Outputs: Returns pointer to next element in list */
/*****
*****/

char
*SCR_next_list_element( char *List, char *Element )
{
#define EAT_LEADING_WHITESPACE(p) while( isspace(*(p)) ) (p)++
#define EAT_TRAILING_WHITESPACE(p) while( isspace(*(p-1)) ) (p)--
#define IS_SEPARATOR(c) (( ',' == (c) ))
char *pTmpChar;

pTmpChar = Element;
if( NULL != pTmpChar )
{
*pTmpChar = '\0'; /* Null terminate Element */
}

if( List && *List )
{
EAT_LEADING_WHITESPACE( List );
while( '\0' != *List && !IS_SEPARATOR( *List ) )
{
if( '\\' == *List )
{
List++; /* Skip the escape char */
}

if( '\0' == *List )
{
break;
}
}
if( NULL != pTmpChar )
{
*pTmpChar++ = *List; /* Copy the element to Element */
}
List++;
}

```

```

}
if( NULL != pTmpChar )
{
    EAT_TRAILING_WHITESPACE( pTmpChar );
    *pTmpChar = '\0';          /* Null terminate Element */
}

/* Now eat up trailing separator */
if( IS_SEPARATOR( *List ) )
{
    List++;
}

return( List );
}
else
{
    return( NULL );
}
}

/*****
*****/
/* Name: SCR_count_elements */
/* Purpose: Return count of elements in an element list */
/* Inputs: List -- pointer to list */
/* Outputs: Returns count of elements */
/*****
*****/

int
SCR_count_elements( char *List )
{
    char *pTmpChar;
    int Count = 0;

    /* Now count elements */
    pTmpChar = List;
    while( NULL != ( pTmpChar = SCR_next_list_element( pTmpChar, NULL ) ) )
    {
        Count++;
    }

    /* This is a bit of a hack. If the list contains one zero length element, */
    /* the count will return 0. What we really want is 1. So update the count.*/
    if( 0 == Count )
    {
        Count++;
    }

    return Count;
}

void
SCR_make_delta_time_string( char *timestr, double DeltaSeconds )
{
#define ONE_MINUTE 60
#define ONE_HOUR (60*ONE_MINUTE)
    int Hours;
    int Minutes;
    int Seconds;
    int MilliSeconds;

    Seconds = (int)DeltaSeconds;
    MilliSeconds = (int)( DeltaSeconds*1000.0 - Seconds*1000.0 );

    Hours = Seconds / ONE_HOUR;
    Seconds = Seconds % ONE_HOUR;

    Minutes = Seconds / ONE_MINUTE;
    Seconds = Seconds % ONE_MINUTE;

    sprintf(timestr,"%2d:%02d:%02d.%03d", Hours, Minutes, Seconds, MilliSeconds);
}

```

```

int
SetConfigValueTX( char *Name, char *Value )
{
    char
        FullName[PRTE_MAX_NET_VAR_NAME_LENGTH+1];

    strcpy( FullName, Sut_name );
    strcat( FullName, "-" );
    strcat( FullName, Name );

    PRTEset_network_variable( FullName, Value );

    return( SCR_E_SUCCESS );
}

```

scr_util.h

```

#ifndef SCR_UTIL_H
#define SCR_UTIL_H
/*****
*****/
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 *
 *
 *****/

#define ATOI(pStr,pNext,val)
{
    int ival;
    char *pSrc = (pStr);
    ival = 0;
    while ('0' <= *pSrc && *pSrc <= '9')
    {
        ival = (ival * 10) + (*pSrc - '0');
        pSrc++;
    }
    (pNext) = pSrc;
    (val) = ival;
}

#define ITOA(val,pStr,pNext)
{
    int ival;
    char *pDst = (pStr);
    char Tmp[12]; /* size of base 10 32 bit # -2,147,483,648 */
    char *pTmp = &Tmp[0];
    ival = (val);
}

```

```

if( 0 > ival )
{
    *pDst++ = '~';\
    ival = -ival;\
}\
*pTmp++ = '\0';\
if( 0 == ival )\
{\
    *pTmp++ = '0';\
}\
while( 0 < ival )\
{\
    *pTmp++ = ( ival % 10 ) + '0';\
    ival /= 10;\
}\
while( '\0' != ( *pDst++ = *--pTmp ) )\
(pNext = pDst;\
}

typedef struct _connect_t
{
    BOOL                ConfConn;
    BOOL                ConfMod;
    BOOL                AdminConn;
    int32               AideID;
    char                RTEName[MAXHOSTNAMELEN];
    char                FENName[MAXHOSTNAMELEN];
    int32               Ucnt;
    char                Script[PATH_MAX];
} connect_t;

union dataptr {
    double *pDouble;
    int *pInt;
    float *pFloat;
};

int GetCallingThreadLimit( int *pCallingThreadLimit );
int32 GetConnectInfo( int32 RunMode, int32 *pTpcUsers, int32 *pNumFEs,
                    int32 *pAdminUsers,
                    int32 *pNumConnects, connect_t **ppConnects );

void SCR_inverse_random( double Mean, double Max, double *Iexp);

char *SCR_getnet_int   (char *varname, char *default_str, int *pInt);
char *SCR_getnet_float (char *varname, char *default_str, float *pFloat);
char *SCR_getnet_long  (char *varname, char *default_str, long *pLong);
char *SCR_getnet_double(char *varname, char *default_str, double *pDouble);
char *SCR_getnet_bool  (char *varname, char *default_str, BOOL *pBool);
char *SCR_getnet_string(char *varname, char *default_str, char *pString);
void SCRlog( char *Format, ... );
int32 SCRerr( int32 ErrCode );
char *SCR_next_list_element( char *List, char *Element);
int SCR_count_elements( char *List);
void SCR_make_delta_time_string( char *timestr, double DeltaSeconds );
int SetConfigValueTX( char *Name, char *Value );
int GetConfigValueTX( char *Name, int *Len, char *Value );

/* #define's for all errors we can detect. */

#define SCR_E_SUCCESS
(0)

#define SCR_E_BASE                200000

#define SCR_E_NO_ERR_MSG
(SCR_E_BASE+1)
#define SCR_E_INIT
(SCR_E_BASE+2)
#define SCR_E_MAKING_RUN_DIR
(SCR_E_BASE+3)
#define SCR_E_NO_REDUCER
(SCR_E_BASE+4)
#define SCR_E_CKPT_INT_TOO_LONG
(SCR_E_BASE+5)
#define SCR_E_CKPT_INT_GREATER_THAN_MEASUREMENT_INT
(SCR_E_BASE+6)

#define SCR_E_MEASUREMENT_NOT_INTEGRAL_MULTIPLE
(SCR_E_BASE+7)
#define SCR_E_WARMUP_TOO_SHORT
(SCR_E_BASE+8)
#define SCR_E_CANT_PARSE_SERVICE_CONTROL_PAGE
(SCR_E_BASE+9)
#define SCR_E_CANT_STOP_WEB
(SCR_E_BASE+10)
#define SCR_E_CANT_START_WEB
(SCR_E_BASE+11)
#define SCR_E_AIDE_TIMEOUT_STOP_FE
(SCR_E_BASE+12)
#define SCR_E_GET_BE_INFO
(SCR_E_BASE+13)
#define SCR_E_INVALID_RUN_MODE
(SCR_E_BASE+14)
#define SCR_E_AUDIT_FUNC_NETVARS
(SCR_E_BASE+15)
#define SCR_E_BE_NAMES
(SCR_E_BASE+16)
#define SCR_E_MALLOC_BE_ARRAY
(SCR_E_BASE+17)
#define SCR_E_CODE_VERSION_NOT_SET
(SCR_E_BASE+18)
#define SCR_E_RUN_DIR_NOT_SET
(SCR_E_BASE+19)
#define SCR_E_CODE_VERSION_MISMATCH
(SCR_E_BASE+20)
#define SCR_E_OPEN_BIN_LOG_FILE
(SCR_E_BASE+21)
#define SCR_E_WRITE_BIN_LOG_FILE_HEADER_SIZE
(SCR_E_BASE+22)
#define SCR_E_WRITE_BIN_LOG_FILE_HEADER
(SCR_E_BASE+23)
#define SCR_E_MASTER_ID_NOT_SET
(SCR_E_BASE+24)
#define SCR_E_RUN_NUMBER_NOT_SET
(SCR_E_BASE+25)
#define SCR_E_VERSION_NUMBER_NOT_SET
(SCR_E_BASE+26)
#define SCR_E_REDUCER_UPDATE_INTERVAL_NOT_SET
(SCR_E_BASE+27)
#define SCR_E_REDUCER_HEADER_INTERVAL_NOT_SET
(SCR_E_BASE+28)
#define SCR_E_OPEN_AIDE_DATA_FILE
(SCR_E_BASE+29)
#define SCR_E_DATABASE_TYPE_NOT_SET
(SCR_E_BASE+30)
#define SCR_E_INVALID_DATABASE_TYPE
(SCR_E_BASE+31)
#define SCR_E_AIDE_INIT_TIMEOUT
(SCR_E_BASE+32)
#define SCR_E_TOTAL_DISTRICT_COUNT_NOT_SET
(SCR_E_BASE+33)
#define SCR_E_NO_CONNECTS
(SCR_E_BASE+34)
#define SCR_E_NO_RTE_IN_CONNECT
(SCR_E_BASE+35)
#define SCR_E_CALC_VALID_TXN_MIX
(SCR_E_BASE+36)
#define SCR_E_REDUCER_INIT_TIMEOUT
(SCR_E_BASE+37)
#define SCR_E_LOAD_FE_TIMEOUT
(SCR_E_BASE+38)
#define SCR_E_CONNECT_APPLICATION
(SCR_E_BASE+39)
#define SCR_E_SEND
(SCR_E_BASE+40)
#define SCR_E_WAIT_FOR
(SCR_E_BASE+41)
#define SCR_E_HTTP_STATUS_OFFSET
(SCR_E_BASE+42)
#define SCR_E_FORM_TYPE_OFFSET
(SCR_E_BASE+43)
#define SCR_E_WEB_PAGE_TOO_SHORT
(SCR_E_BASE+44)
#define SCR_E_WEB_PAGE_STATUS_CODE
(SCR_E_BASE+45)
#define SCR_E_ERROR_STATUS_CODE
(SCR_E_BASE+46)

```

```

#define SCR_E_ERROR_WEB_PAGE
  (SCR_E_BASE+47)
#define SCR_E_WRONG_WEB_PAGE
  (SCR_E_BASE+48)
#define SCR_E_AIDE_TASK_TIMEOUT
  (SCR_E_BASE+49)
#define SCR_E_AIDES_FAILED_TASK
  (SCR_E_BASE+50)
#define SCR_E_BE_CKPT_TIMEOUT
  (SCR_E_BASE+51)
#define SCR_E_BE_CKPT_FAILED
  (SCR_E_BASE+52)
#define SCR_E_AIDE_CKPT_INIT_TIMEOUT
  (SCR_E_BASE+53)
#define SCR_E_USER_LOGIN_TIMEOUT
  (SCR_E_BASE+54)
#define SCR_E_USER_LOGIN_FAILED
  (SCR_E_BASE+55)
#define SCR_E_LOG_DIR_NOT_SET
  (SCR_E_BASE+56)
#define SCR_E_CGI_SCRIPT_NAME_NOT_SET
  (SCR_E_BASE+57)
#define SCR_E_INVALID_TXN_TYPE_REQUESTED
  (SCR_E_BASE+58)
#define SCR_E_USER_START_FAILED
  (SCR_E_BASE+59)
#define SCR_E_USER_START_TIMEOUT
  (SCR_E_BASE+60)
#define SCR_E_USER_STOP_FAILED
  (SCR_E_BASE+61)
#define SCR_E_USER_STOP_TIMEOUT
  (SCR_E_BASE+62)
#define SCR_E_AIDE_TIMEOUT_START_FE
  (SCR_E_BASE+63)
#define SCR_E_AIDES_FAILED_START
  (SCR_E_BASE+64)
#define SCR_E_UNUSED_4
  (SCR_E_BASE+65)
#define SCR_E_UNUSED_5
  (SCR_E_BASE+66)
#define SCR_E_AIDE_CKPT_RUN_TIMEOUT
  (SCR_E_BASE+67)
#define SCR_E_AIDE_CKPT_STOP_TIMEOUT
  (SCR_E_BASE+68)
#define SCR_E_WRITE_SENDERS_ID
  (SCR_E_BASE+69)
#define SCR_E_WRITE_MSG_TYPE
  (SCR_E_BASE+70)
#define SCR_E_WRITE_MSG_SIZE
  (SCR_E_BASE+71)
#define SCR_E_WRITE_MSG
  (SCR_E_BASE+72)
#define SCR_E_AIDE_EXIT_TIMEOUT
  (SCR_E_BASE+73)
#define SCR_E_OPEN_C_LAST_FILE
  (SCR_E_BASE+74)
#define SCR_E_SYNC_USER_TIMEOUT
  (SCR_E_BASE+75)
#define SCR_E_MALLOC_CONNECT_ARRAY
  (SCR_E_BASE+76)
#define SCR_E_MALLOC_USER_STOP_ARRAY
  (SCR_E_BASE+77)
#define SCR_E_AIDES_FAILED_STOP
  (SCR_E_BASE+78)
#define SCR_E_ACTION_NOT_SET
  (SCR_E_BASE+79)
#define SCR_E_UNUSED_1
  (SCR_E_BASE+80)
#define SCR_E_DELI_OFFSET
  (SCR_E_BASE+81)
#define SCR_E_DURA_PARSE_WAREHOUSE
  (SCR_E_BASE+82)
#define SCR_E_DURA_PARSE_DISTRICT
  (SCR_E_BASE+83)
#define SCR_E_DURA_PARSE_ORDER_ID
  (SCR_E_BASE+84)
#define SCR_E_GREETING
  (SCR_E_BASE+85)
#define SCR_E_CONNECT_ABORTED
  (SCR_E_BASE+86)

#define SCR_E_MENU_BAR
  (SCR_E_BASE+87)
#define SCR_E_AIDE_GET_LOG_SIZE
  (SCR_E_BASE+88)
#define SCR_E_RUN_ID_NOT_SET
  (SCR_E_BASE+89)
#define SCR_E_AIDE_SKIPPING_STATS
  (SCR_E_BASE+90)
#define SCR_E_AIDE_SWITCH_LOG
  (SCR_E_BASE+91)
#define SCR_E_NO_VALUE
  (SCR_E_BASE+92)
#define SCR_E_NO_TYPE
  (SCR_E_BASE+93)
#define SCR_E_NO_DATA
  (SCR_E_BASE+94)
#define SCR_E_UNUSED_6
  (SCR_E_BASE+95)
#define SCR_E_REDUCER_ID_NOT_SET
  (SCR_E_BASE+96)
#define SCR_E_RTE_NAMES_NOT_SET
  (SCR_E_BASE+97)
#define SCR_E_USER_COUNT_MISMATCH
  (SCR_E_BASE+98)
#define SCR_E_LOAD_FE_FAILURE
  (SCR_E_BASE+99)
#define SCR_E_USER_CREATE_FAILED
  (SCR_E_BASE+100)
#define SCR_E_USER_INIT_FAILED
  (SCR_E_BASE+101)
#define SCR_E_USER_INIT_TIMEOUT
  (SCR_E_BASE+102)
#define SCR_E_FIRST_USER_ID_NOT_SET
  (SCR_E_BASE+103)
#define SCR_E_VALUE_MODIFIED
  (SCR_E_BASE+104)
#define SCR_E_CANT_PARSE_GET_REG_PAGE
  (SCR_E_BASE+105)
#define SCR_E_CANT_INIT_TIME_COUNTER
  (SCR_E_BASE+106)
#define SCR_E_USER_SCRIPT_NAME_NOT_SET
  (SCR_E_BASE+107)
#define SCR_E_WRONG_DATA_ITEM_COUNT
  (SCR_E_BASE+108)
#define SCR_E_AIDE_TIMEOUT_CONFIG_FE
  (SCR_E_BASE+109)
#define SCR_E_AIDES_FAILED_CONFIG
  (SCR_E_BASE+110)
#define SCR_E_NOT_CORRECT_TRANS
  (SCR_E_BASE+111)
#define SCR_E_INVALID_CONNECT
  (SCR_E_BASE+112)
#define SCR_E_INVALID_DISCONNECT
  (SCR_E_BASE+113)
#define SCR_E_UI_NOT_SET
  (SCR_E_BASE+114)
#define SCR_E_UI_LOAD_FAILED
  (SCR_E_BASE+115)
#define SCR_E_NO_PARSE_INIT_FAILED
  (SCR_E_BASE+116)
#define SCR_E_DURA_PARSE_EXECUTION_STATUS
  (SCR_E_BASE+117)
#define SCR_E_UI_UNLOAD_FAILED
  (SCR_E_BASE+118)
#define SCR_E_AIDE_CKPT_DISCONNECT_TIMEOUT
  (SCR_E_BASE+119)
#define SCR_E_DISTRICT_USER_COUNT_MISMATCH
  (SCR_E_BASE+120)
#define SCR_E_REDUCER_CREATE_FAILED
  (SCR_E_BASE+121)
#define SCR_E_AIDE_CREATE_FAILED
  (SCR_E_BASE+122)

#define SCR_E_MAX_ERROR
  (SCR_E_BASE+122)

/* Error message struct. */
typedef struct _scr_e_msg_t
{
  int32          ErrCode; /* error id of message */

```

```

char          ErrMsg[256];          /* message to sent to browser */
} scr_e_msg_t;

#ifdef SCR_UTIL_C
/* Error messages for all errors we can detect. */
scr_e_msg_t ScrErrMsgs[] =
{
  { SCR_E_SUCCESS, "Success, no error." },
  { SCR_E_NO_ERR_MSG, "No error message available for this error code." },
  { SCR_E_INIT, "Failed to initialize." },
  { SCR_E_MAKING_RUN_DIR, "Failed to make the run directory." },
  { SCR_E_NO_REDUCER, "Failed to get the reducer's PRTE user id." },
  { SCR_E_CKPT_INT_TOO_LONG, "Checkpoint interval > 1800 seconds, this
violates the benchmark specification." },
  { SCR_E_CKPT_INT_GREATER_THAN_MEASUREMENT_INT, "Checkpoint
interval > measurement interval, this violates the benchmark specification." },
  { SCR_E_MEASUREMENT_NOT_INTEGRAL_MULTIPLE, "Measurement
interval is not an integral multiple of checkpoint interval, this violates the benchmark
specification." },
  { SCR_E_WARMUP_TOO_SHORT, "The warmup interval is too short to support
requested checkpoint interval." },
  { SCR_E_CANT_PARSE_SERVICE_CONTROL_PAGE, "Error parsing the service
control response page." },
  { SCR_E_CANT_STOP_WEB, "Unable to stop the Web Server." },
  { SCR_E_CANT_START_WEB, "Unable to start the Web Server." },
  { SCR_E_AIDE_TIMEOUT_STOP_FE, "Timed out waiting for aides to stop
application code." },
  { SCR_E_GET_BE_INFO, "Problem getting back end information." },
  { SCR_E_INVALID_RUN_MODE, "Invalid run mode specified." },
  { SCR_E_AUDIT_FUNC_NETVARS, "Problem getting audit function network
variables." },
  { SCR_E_BE_NAMES, "Unable to get BE_NAMES network variable." },
  { SCR_E_MALLOC_BE_ARRAY, "Unable to malloc space for BE array." },
  { SCR_E_CODE_VERSION_NOT_SET, "Code version network variable not set." },
  { SCR_E_RUN_DIR_NOT_SET, "Run directory network variable not set." },
  { SCR_E_CODE_VERSION_MISMATCH, "Code version mismatch with Master."
},
  { SCR_E_OPEN_BIN_LOG_FILE, "Failed to open the binary data log file." },
  { SCR_E_WRITE_BIN_LOG_FILE_HEADER_SIZE, "Error writing binary data log
file header size." },
  { SCR_E_WRITE_BIN_LOG_FILE_HEADER, "Error writing binary data log file
header." },
  { SCR_E_MASTER_ID_NOT_SET, "Master ID network variable not set." },
  { SCR_E_RUN_NUMBER_NOT_SET, "Run number network variable not set." },
  { SCR_E_VERSION_NUMBER_NOT_SET, "Version number network variable not
set." },
  { SCR_E_REDUCER_UPDATE_INTERVAL_NOT_SET, "Reducer update interval
network variable not set." },
  { SCR_E_REDUCER_HEADER_INTERVAL_NOT_SET, "Reducer header update
interval network variable not set." },
  { SCR_E_OPEN_AIDE_DATA_FILE, "Error opening aide data file." },
  { SCR_E_DATABASE_TYPE_NOT_SET, "Database type network variable not
set." },
  { SCR_E_INVALID_DATABASE_TYPE, "Invalid database type" },
  { SCR_E_AIDE_INIT_TIMEOUT, "Timed out waiting for Aides to initialize." },
  { SCR_E_TOTAL_DISTRICT_COUNT_NOT_SET, "TOTAL_DISTRICT_COUNT
network variable not set." },
  { SCR_E_NO_CONNECTS, "No connect network variables have been specified." },
  { SCR_E_NO RTE_IN_CONNECT, "No RTE was specified in a CONNECT
network variable." },
  { SCR_E_CALC_VALID_TXN_MIX, "Failed to calculate a valid transaction mix."
},
  { SCR_E_REDUCER_INIT_TIMEOUT, "Timed out waiting for Reducer to
initialize." },
  { SCR_E_LOAD_FE_TIMEOUT, "Timed out waiting for FE(s) to load." },
  { SCR_E_CONNECT_APPLICATION, "Error trying to connect to the application
(SUT)."},
  { SCR_E_SEND, "Error sending data to the application (SUT)."},
  { SCR_E_WAIT_FOR, "Error waiting for reply from application (SUT)."},
  { SCR_E_HTTP_STATUS_OFFSET, "Couldn't determine HTTP status offset." },
  { SCR_E_FORM_TYPE_OFFSET, "Couldn't determine the form type offset." },
  { SCR_E_WEB_PAGE_TOO_SHORT, "Received a web page that is too short to be
from our dll." },
  { SCR_E_WEB_PAGE_STATUS_CODE, "Couldn't find form status code in web
page." },
  { SCR_E_ERROR_STATUS_CODE, "Received an error page from our dll, but
couldn't parse the status code." },
  { SCR_E_ERROR_WEB_PAGE, "Received an error page from our dll." },
  { SCR_E_WRONG_WEB_PAGE, "Received a valid web page from our dll, but it
isn't the one we expected." },

```

```

  { SCR_E_AIDE_TASK_TIMEOUT, "Timed out waiting for all aides to perform a
task." },
  { SCR_E_AIDES_FAILED_TASK, "One or more aides failed to perform a task." },
  { SCR_E_BE_CKPT_TIMEOUT, "Timed out waiting for all aides to do their
backend checkpoint init." },
  { SCR_E_BE_CKPT_FAILED, "One or more aides failed to do their backend
checkpoint init." },
  { SCR_E_AIDE_CKPT_INIT_TIMEOUT, "Timed out waiting for all aides to do
their checkpoint init." },
  { SCR_E_USER_LOGIN_TIMEOUT, "Timed out waiting for all users to confirm
login." },
  { SCR_E_USER_LOGIN_FAILED, "A user failed to log in successfully." },
  { SCR_E_LOG_DIR_NOT_SET, "Log dir network variable not set." },
  { SCR_E_CGI_SCRIPT_NAME_NOT_SET, "CGI script name network variable not
set." },
  { SCR_E_INVALID_TXN_TYPE_REQUESTED, "An invalid transaction type was
requested." },
  { SCR_E_USER_START_FAILED, "User(s) failed to start doing transactions." },
  { SCR_E_USER_START_TIMEOUT, "Timed out waiting for all users to start doing
transactions." },
  { SCR_E_USER_STOP_FAILED, "User(s) failed to confirm stop." },
  { SCR_E_USER_STOP_TIMEOUT, "Timed out waiting for all users to confirm
stop." },
  { SCR_E_AIDE_TIMEOUT_START_FE, "Timed out waiting for aides to start
application code." },
  { SCR_E_AIDES_FAILED_START, "Not all aides successfully started application
code." },
  { SCR_E_UNUSED_4, "Unused message 4." },
  { SCR_E_UNUSED_5, "Unused message 5." },
  { SCR_E_AIDE_CKPT_RUN_TIMEOUT, "Timed out waiting for aides to start
checkpoint loop." },
  { SCR_E_AIDE_CKPT_STOP_TIMEOUT, "Timed out waiting for aides to stop
checkpoint loop." },
  { SCR_E_WRITE_SENDERS_ID, "Failed to write sender's id to binary log file." },
  { SCR_E_WRITE_MSG_TYPE, "Failed to write message type to binary log file." },
  { SCR_E_WRITE_MSG_SIZE, "Failed to write message size to binary log file." },
  { SCR_E_WRITE_MSG, "Failed to write message to binary log file." },
  { SCR_E_AIDE_EXIT_TIMEOUT, "Timed out waiting for all aides to exit." },
  { SCR_E_OPEN_C_LAST_FILE, "Unable to open file to write C_LAST constant."
},
  { SCR_E_SYNC_USER_TIMEOUT, "Timed out on delay to allow users to catch up
with in sync offset." },
  { SCR_E_MALLOC_CONNECT_ARRAY, "Unable to malloc space for the connect
array." },
  { SCR_E_MALLOC_USER_STOP_ARRAY, "Unable to malloc space for the user
stop array." },
  { SCR_E_AIDES_FAILED_STOP, "Not all aides successfully stopped application
code." },
  { SCR_E_ACTION_NOT_SET, "Action network variable not set." },
  { SCR_E_UNUSED_1, "Unused message 1." },
  { SCR_E_DELI_OFFSET, "Couldn't determine deli record offset." },
  { SCR_E_DURA_PARSE_WAREHOUSE, "Couldn't locate warehouse ID in
response page." },
  { SCR_E_DURA_PARSE_DISTRICT, "Couldn't locate district ID in response
page." },
  { SCR_E_DURA_PARSE_ORDER_ID, "Couldn't locate order ID in response page."
},
  { SCR_E_GREETING, "Failed to get the Greeting Form." },
  { SCR_E_CONNECT_ABORTED, "Asked to stop while logging in." },
  { SCR_E_MENU_BAR, "Failed to get the Menu Bar Form." },
  { SCR_E_AIDE_GET_LOG_SIZE, "Failed to get log size." },
  { SCR_E_RUN_ID_NOT_SET, "Run ID network variable not set." },
  { SCR_E_AIDE_SKIPPING_STATS, "WARNING: Unable to read file -- skipping
Oracle stats." },
  { SCR_E_AIDE_SWITCH_LOG, "Failed to switch log." },
  { SCR_E_NO_VALUE, "No value found." },
  { SCR_E_NO_TYPE, "No type found." },
  { SCR_E_NO_DATA, "No data found." },
  { SCR_E_UNUSED_6, "Unused message 6." },
  { SCR_E_REDUCER_ID_NOT_SET, "REDUCER_ID network variable not set." },
  { SCR_E RTE_NAMES_NOT_SET, "RTE names network variable not set." },
  { SCR_E_USER_COUNT_MISMATCH, "The count of users in each CONNECT do
not sum to the TOTAL_USER_COUNT." },
  { SCR_E_LOAD_FE_FAILURE, "FE(s) failed to load correctly." },
  { SCR_E_USER_CREATE_FAILED, "The creation of TPC-C users failed." },
  { SCR_E_USER_INIT_FAILED, "User(s) failed to confirm initialization." },
  { SCR_E_USER_INIT_TIMEOUT, "Timed out waiting for all users to confirm
initialization." },
  { SCR_E_FIRST_USER_ID_NOT_SET, "FIRST_USER_ID network variable not
set." },

```



```

{ SCR_E_VALUE_MODIFIED, "Registry setting was modified." },
{ SCR_E_CANT_PARSE_GET_REG_PAGE, "Error parsing GetRegistry response
page." },
{ SCR_E_CANT_INIT_TIME_COUNTER, "Error initializing time value used for
scale calculation of tpmC." },
{ SCR_E_USER_SCRIPT_NAME_NOT_SET, "User script name not specified in
CONNECT nor is USER_SCRIPT_NAME network variable set." },
{ SCR_E_WRONG_DATA_ITEM_COUNT, "Configuration value list must have
either one value or match the number of CONNECT# statements." },
{ SCR_E_AIDE_TIMEOUT_CONFIG_FE, "Timed out waiting for all aides to
configure FEs." },
{ SCR_E_AIDES_FAILED_CONFIG, "Not all aides successfully configured FEs."
},
{ SCR_E_NOT_CORRECT_TRANS, "Did not receive the expected transaction
response." },
{ SCR_E_INVALID_CONNECT, "The specified connection mode is invalid." },
{ SCR_E_INVALID_DISCONNECT, "The specified disconnect mode is invalid." },
{ SCR_E_UI_NOT_SET, "The UI network variable is either not defined or not
properly defined." },
{ SCR_E_UI_LOAD_FAILED, "UI load failed." },
{ SCR_E_NO_PARSE_INIT_FAILED, "Unable to initialize NewOrder parsing
function." },
{ SCR_E_DURA_PARSE_EXECUTION_STATUS, "Unable to initialize durability
parsing function." },
{ SCR_E_UI_UNLOAD_FAILED, "UI unload failed." },
{ SCR_E_AIDE_CKPT_DISCONNECT_TIMEOUT, "Timed out waiting for all
aides to do their checkpoint disconnect." },
{ SCR_E_DISTRICT_USER_COUNT_MISMATCH, "The specified district and
user count(s) don't agree." },
{ SCR_E_REDUCER_CREATE_FAILED, "Failed to create Reducer." },
{ SCR_E_AIDE_CREATE_FAILED, "Failed to create Aides." },
{ 0, "" }
};
#else
extern scr_e_msg_t ScrErrMsgs[];
#endif /* SCR_UTIL_C */

#endif /* SCR_UTIL_H */

```

tpcc.c

```

/*+
FILE: TPCC.C
Microsoft TPC-C Kit Ver. 3.00.000
Audited 08/23/96 By Francois Raab

Copyright Microsoft, 1996
Copyright Digital Equipment Corp., 1997

PURPOSE: Main module for TPCC.DLL which is an ISAPI service dll.
Author: Philip Durr
philipdu@Microsoft.com

MODIFICATIONS:

Routines substantially modified by:
Anne Bradley Digital Equipment
Corp. Bill Carr Digital Equipment Corp.
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```

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*

```

*****/

```

#include <windows.h>
#include <stdio.h>
#include <stdarg.h>
#include <malloc.h>
#include <stdlib.h>
#include <string.h>
#include <time.h>
#include <sys\timeb.h>
#include <io.h>

#define TPCC_C

#include <tpccerr.h>
#include <tpccstruct.h>
#include <tpccapi.h>
#include <htpext.h>

#include <tpcc.h>
#include <web_ui.h>

```

```

/* FUNCTION: void FormatString(char *szDest, char *szPic, char *szSrc)
*
* PURPOSE: This function formats a character string for inclusion in the
HTML formatted page being constructed.
*
* ARGUMENTS: char *szDest
Destination buffer where
*
* string is to be formatted
*
* char *szPic
string which describes
*
* character value is to be placed
*
* formatted.
*
* char *szSrc
string value.
*
* RETURNS: None
*
* COMMENTS: This functions is used to format TPC-C phone and zip value
strings.
*
*/

```

```

void FormatString(char *szDest, char *szPic, char *szSrc)
{
while( *szPic )
{
if ( *szPic == 'X' )
{
if ( *szSrc )
*szDest++ = *szSrc++;
else
*szDest++ = ' ';
}
else
*szDest++ = *szPic;
}
}

```

```

    szPic++;
}
*szDest = 0;

return;
}

/* FUNCTION: int ParseNewOrderQuery( char *pProcessedQuery[],
 *                                     NewOrderData
 *pNewOrderData )
 *
 * PURPOSE:      This function extracts and validates the new order query
 *               from an http command string.
 *
 * ARGUMENTS:   char      *pProcessedQuery[]   array of char* that
 *               points to
 *               the value
 *               of each name-value
 *               pair.
 *               NewOrderData *pNewOrderData   pointer to new order
 *               data
 *               structure
 *
 * RETURNS:     int      ERR_SUCCESS           input data
 *               successfully parsed
 *               error_code                   reason for failure
 *
 * COMMENTS:    None
 */

int ParseNewOrderQuery(char *pQueryString, NewOrderData *pNewOrderData)
{
    char *ptr;
    int i;
    short items;
    char *pProcessedQuery[MAXNEWORDERVALS];

    PARSE_QUERY_STRING(pQueryString, MAXNEWORDERVALS,
                       newOrderStrs, pProcessedQuery);

    if ( !GetValuePtr(pProcessedQuery, DID, &ptr) )
        return ERR_NEWORDER_FORM_MISSING_DID;

    GetNumeric(ptr, &pNewOrderData->d_id);
    if(0 == pNewOrderData->d_id)
        return ERR_NEWORDER_DISTRICT_INVALID;

    if ( !GetValuePtr(pProcessedQuery, CID, &ptr) )
        return ERR_NEWORDER_CUSTOMER_KEY;

    if( !GetNumeric(ptr, &pNewOrderData->c_id) )
        return ERR_NEWORDER_CUSTOMER_INVALID;

    pNewOrderData->o_all_local = 1;

    for(i=0, items=0; i<MAX_OL; i++)
    {
        if( !GetValuePtr(pProcessedQuery, i*3+IID00, &ptr))
            return ERR_NEWORDER_MISSING_IID_KEY;
        if(*ptr != '&' && *ptr)
        {
            if(!GetNumeric(ptr, &pNewOrderData->o_ol[items].ol_i_id))
                return ERR_NEWORDER_ITEMID_INVALID;

            if(!GetValuePtr(pProcessedQuery, i*3+SP00, &ptr))
                return ERR_NEWORDER_MISSING_SUPPW_KEY;
            if(!GetNumeric(ptr, &pNewOrderData->o_ol[items].ol_supply_w_id))
                return ERR_NEWORDER_SUPPW_INVALID;
            if ( pNewOrderData->o_all_local &&
                 pNewOrderData->o_ol[items].ol_supply_w_id !=
                 pNewOrderData->w_id )
                pNewOrderData->o_all_local = 0;
            if(!GetValuePtr(pProcessedQuery, i*3+QTY00, &ptr))
                return ERR_NEWORDER_MISSING_QTY_KEY;
            if(!GetNumeric(ptr, &pNewOrderData->o_ol[items].ol_quantity))
                return ERR_NEWORDER_QTY_INVALID;
        }
    }
}

```

```

    if ( pNewOrderData->o_ol[items].ol_i_id >= 1000000 ||
         pNewOrderData->o_ol[items].ol_i_id < 1 )
        return ERR_NEWORDER_ITEMID_RANGE;
    if ( pNewOrderData->o_ol[items].ol_quantity >= 100 ||
         pNewOrderData->o_ol[items].ol_quantity < 1 )
        return ERR_NEWORDER_QTY_RANGE;

    items++;
}
else
{
    if(!GetValuePtr(pProcessedQuery, i*3+SP00, &ptr))
        return ERR_NEWORDER_MISSING_SUPPW_KEY;
    if(*ptr != '&' && *ptr)
        return ERR_NEWORDER_SUPPW_WITHOUT_ITEMID;

    if(!GetValuePtr(pProcessedQuery, i*3+QTY00, &ptr))
        return ERR_NEWORDER_MISSING_QTY_KEY;
    if(*ptr != '&' && *ptr)
        return ERR_NEWORDER_QTY_WITHOUT_ITEMID;
}
}
if ( items == 0 )
    return ERR_NEWORDER_NOITEMS_ENTERED;

pNewOrderData->o_ol_cnt = items;

return ERR_SUCCESS;
}

/* FUNCTION: int ParseOrderStatusQuery( char *pProcessedQuery[],
 *                                     OrderStatusData
 *pOrderStatusData )
 *
 * PURPOSE:      This function extracts and validates the order status query
 *               from an http command string.
 *
 * ARGUMENTS:   char      *pProcessedQuery[]   array of char* that
 *               points to
 *               the value
 *               of each name-value
 *               pair.
 *               OrderStatusData *pOrderStatusData pointer to new order
 *               data
 *               structure
 *
 * RETURNS:     int      ERR_SUCCESS           input data
 *               successfully parsed
 *               error_code                   reason for failure
 *
 * COMMENTS:    None
 */

int ParseOrderStatusQuery(char *pQueryString,
                          OrderStatusData *pOrderStatusData)
{
    char szTmp[26];
    char *ptr;
    char *pSzTmp;
    char *pProcessedQuery[MAXORDERSTATUSVALS];

    PARSE_QUERY_STRING(pQueryString, MAXORDERSTATUSVALS,
                       orderStatusStrs, pProcessedQuery);

    if ( !GetValuePtr(pProcessedQuery, DID, &ptr) )
        return ERR_ORDERSTATUS_MISSING_DID_KEY;
    if ( !GetNumeric(ptr, &pOrderStatusData->d_id) )
        return ERR_ORDERSTATUS_DID_INVALID;

    if ( !GetValuePtr(pProcessedQuery, CID, &ptr) )
        return ERR_ORDERSTATUS_MISSING_CID_KEY;

    if ( *ptr == '&' || !(*ptr) )
    {
        pSzTmp = szTmp;
        pOrderStatusData->c_id = INVALID_C_ID;
        if ( !GetValuePtr(pProcessedQuery, CLT_O, &ptr) )
            return ERR_ORDERSTATUS_MISSING_CLT_KEY;
        while(*ptr != '&' && *ptr)
        {

```

```

    *pSzTmp = *ptr;
    pSzTmp++;
    ptr++;
}
*pSzTmp = \0';
_strdupr( szTmp );
strcpy(pOrderStatusData->c_last, szTmp);
if ( strlen(pOrderStatusData->c_last) > 16 )
    return ERR_ORDERSTATUS_CLT_RANGE;
}
else
{
    if (!GetNumeric(ptr, &pOrderStatusData->c_id))
        return ERR_ORDERSTATUS_CID_INVALID;
    if (!GetValuePtr(pProcessedQuery, CLT_O, &ptr))
        return ERR_ORDERSTATUS_MISSING_CLT_KEY;
    if (*ptr != '&' && *ptr)
        return ERR_ORDERSTATUS_CID_AND_CLT;
}
}

return ERR_SUCCESS;
}

/* FUNCTION: int ParsePaymentQuery( char *pProcessedQuery[],
*                                     PaymentData *pPaymentData )
*
* PURPOSE:          This function extracts and validates the payment query
*                   from an http command string.
*
* ARGUMENTS:       char      *pProcessedQuery[]   array of char* that
*                   points to
*                   the value
*                   of each name-value
*                   pair.
*                   PaymentData *pPaymentData    pointer to payment
*                   data
*                   structure
*
* RETURNS:         int      ERR_SUCCESS          input data
*                   successfully parsed
*                   error_code                 reason for failure
*
* COMMENTS:       None
*/

int ParsePaymentQuery(char *pQueryString, PaymentData *pPaymentData)
{
    char      szTmp[26];
    char      *ptr;
    char      *pPtr;
    char      *pSzTmp;
    char      *pProcessedQuery[MAXPAYMENTVALS];

    PARSE_QUERY_STRING(pQueryString, MAXPAYMENTVALS,
        paymentStrs, pProcessedQuery);

    if (!GetValuePtr(pProcessedQuery, DID, &ptr))
        return ERR_PAYMENT_MISSING_DID_KEY;
    if (!GetNumeric(ptr, &pPaymentData->d_id))
        return ERR_PAYMENT_DISTRICT_INVALID;

    if (!GetValuePtr(pProcessedQuery, CID, &ptr))
        return ERR_PAYMENT_MISSING_CID_KEY;

    if(*ptr == '&' || !(*ptr))
    {
        pPaymentData->c_id = INVALID_C_ID;
        pSzTmp = szTmp;
        if (!GetValuePtr(pProcessedQuery, CLT_P, &ptr))
            return ERR_PAYMENT_MISSING_CLT;
        if (*ptr == '&' || !(*ptr))
            return ERR_PAYMENT_MISSING_CID_CLT;
        while(*ptr != '&' && *ptr)
        {
            *pSzTmp = *ptr;
            pSzTmp++;
            ptr++;
        }
    }
}

```

```

    }
    *pSzTmp = \0';
    _strupr( szTmp );

    strcpy(pPaymentData->c_last, szTmp);
    if ( strlen(pPaymentData->c_last) > 16 )
        return ERR_PAYMENT_LAST_NAME_TO_LONG;
}
else
{
    if (!GetNumeric(ptr, &pPaymentData->c_id))
        return ERR_PAYMENT_CUSTOMER_INVALID;
    if (!GetValuePtr(pProcessedQuery, CLT_P, &ptr))
        return ERR_PAYMENT_MISSING_CLT_KEY;
    if(*ptr != '&' && *ptr)
        return ERR_PAYMENT_CID_AND_CLT;
}

if (!GetValuePtr(pProcessedQuery, CDI, &ptr))
    return ERR_PAYMENT_MISSING_CDI_KEY;
if (!GetNumeric(ptr, &pPaymentData->c_d_id))
    return ERR_PAYMENT_CDI_INVALID;

if (!GetValuePtr(pProcessedQuery, CWI, &ptr))
    return ERR_PAYMENT_MISSING_CWI_KEY;

if (!GetNumeric(ptr, &pPaymentData->c_w_id))
    return ERR_PAYMENT_CWI_INVALID;

if (!GetValuePtr(pProcessedQuery, HAM, &ptr))
    return ERR_PAYMENT_MISSING_HAM_KEY;

pPtr = ptr;
while(*pPtr != '&' && *pPtr)
{
    if (*pPtr == '.')
    {
        pPtr++;
        if (!*pPtr)
            break;
        if (*pPtr < '0' || *pPtr > '9')
            return ERR_PAYMENT_HAM_INVALID;
        pPtr++;
        if (!*pPtr)
            break;
        if (*pPtr < '0' || *pPtr > '9')
            return ERR_PAYMENT_HAM_INVALID;
        if (!*pPtr)
            return ERR_PAYMENT_HAM_INVALID;
    }
    else if (*pPtr < '0' || *pPtr > '9')
        return ERR_PAYMENT_HAM_INVALID;
    pPtr++;
}

pPaymentData->h_amount = atof(ptr);
if ( pPaymentData->h_amount >= 10000.00 || pPaymentData->h_amount < 0 )
    return ERR_PAYMENT_HAM_RANGE;

return ERR_SUCCESS;
}

```

tpcc.h

```

#ifndef TPCC_H
#define TPCC_H

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```

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```

```

*****
*****/

```

```

/*+
* Abstract: This is the header file for web_ui.c. it contains the
* function prototypes for the routines that are called outside web_ui.c
*
* Author: A Bradley
* Creation Date: May 1997
*
* Modified history:
*
*
*/

```

```

#if defined WEB_UI_C || defined TPCC_C

```

```

void FormatString(char *szDest, char *szPic, char *szSrc);

```

```

int ParseNewOrderQuery(char *pQueryString, NewOrderData *pNewOrderData);
int ParsePaymentQuery(char *pQueryString, PaymentData *pPaymentData);
int ParseOrderStatusQuery(char *pQueryString,
                          OrderStatusData *pOrderStatusData);
#endif /* defined WEB_UI_C || defined TPCC_C */

```

```

#endif /* TPCC_H */

```

tpcc_gen.c

```

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*
*
*

```

```

*****
*****/

```

```

#include <stdio.h>
#include <math.h>
#include <string.h>
#include <time.h>
#include <stdtypes.h>

```

```

#ifdef _WIN32
# include <nt_lib.h>
#else
# include <sys/param.h> /* to get MAXHOSTNAMELEN */
#endif

```

```

#include <common.h>

```

```

#include <tpccstruct.h>
#include <tpccapi.h>
#include <tpccerr.h>

```

```

#include <scr_util.h>

```

```

#include <msg.h>
#include <tx_api.h>
#include <tpcc_gen.h>

```

```

/* Constants used in NURand functions */

```

```

#define C_ID_CONST 511
#define ITEM_CONST 4093

```

```

/* Values used to generate random data */

```

```

#define PCT_C_LAST 60

```

```

/* Macro to do random number functions */

```

```

#define NURand(A, x, y, C) \
    (((random_int(0, A) | random_int(x, y)) + C) % (y-x+1)) + x)

```

```

/* Values needed to make lastnames */

```

```

const char *c_table[10] = {"BAR", "OUGHT", "ABLE", "PRI", "PRES", "ESE",
                          "ANTI", "CALLY", "ATION", "EING"};
const int c_length[10] = {3,5,4,3,4,3,4,5,5,4};

```

```

void
get_wdid( txn_context_t *pContext, int *pw_id, int *pd_id )
{
    if( BACKEND_MODE == pContext->RunMode )
    {
        *pw_id = random_int( 1, pContext->max_w_id );
        *pd_id = random_int( 1, DISTRICTS_PER_WAREHOUSE );
    }
    else
    {
        *pw_id = pContext->w_id;
        *pd_id = pContext->d_id;
    }
}

```

```

void
get_no_data( txn_context_t *pContext, pNewOrderData pNewOrder,
             int *context )
{

```

```

    int remote_txn = 0;
    int line;

```

```

    pNewOrder->CC = (CallersContext)pContext;

```

```

    *context = NEW_ORDER_TXN;

```

```

get_wdid( pContext, &pNewOrder->w_id, &pNewOrder->ld_id );

pNewOrder->d_id = random_int( 1, DISTRICTS_PER_WAREHOUSE );

pNewOrder->c_id = NURand( 1023, 1, MAX_C_ID, C_ID_CONST );

pNewOrder->o_ol_cnt = random_int( MIN_OL, MAX_OL );
for( line = 0; line < pNewOrder->o_ol_cnt; line++ )
{
    /* o_l_supplying warehouse is remote 1% of the time */
    if( ( random_int( 0, 999 ) < 990 ) || ( pContext->max_w_id == 1 ) )
    {
        pNewOrder->o_ol[line].ol_supply_w_id = pNewOrder->w_id;
    }
    else
    {
        remote_txn++;
        pNewOrder->o_ol[line].ol_supply_w_id =
            random_int( 1, pContext->max_w_id-1 );
        if( pNewOrder->o_ol[line].ol_supply_w_id >= pNewOrder->w_id )
        {
            pNewOrder->o_ol[line].ol_supply_w_id++;
        }
    }

    /* set last pNewOrder->o_ol[line].ol_i_id to ILLEGAL if rollback required */
    if( ( line == pNewOrder->o_ol_cnt-1 ) &&
        ( random_int( 0, 999 ) < 10 ) )
    {
        pNewOrder->o_ol[line].ol_i_id = ILLEGAL_ITEM;
        *context |= ILLEGAL_ITEM_TXN;
    }
    else
    {
        pNewOrder->o_ol[line].ol_i_id =
            NURand( 8191, 1, MAX_I_ID_POPULATED, ITEM_CONST );
    }

    pNewOrder->o_ol[line].ol_quantity = random_int( 1, MAX_OL_QUANTITY );
}

/* for loop */

*context |= ( pNewOrder->o_ol_cnt << OL_CNT_BIT_POS );
*context |= ( remote_txn << REMOTE_TXN_BIT_POS );
}

/* get_no_data */

void
get_pt_data( txn_context_t *pContext, pPaymentData pPayment,
            int *context )
{
    char          *ptr;
    int           index, i1, i2, i3;

    pPayment->CC = (CallersContext)pContext;

    *context = PAYMENT_TXN;

    get_wdid( pContext, &pPayment->w_id, &pPayment->ld_id );

    pPayment->d_id = random_int( 1, DISTRICTS_PER_WAREHOUSE );

    pPayment->c_id = INVALID_C_ID;

    ptr = pPayment->c_last;
    if( random_int( 0,99 ) < PCT_C_LAST )
    {
        /* use C_LAST */
        *context |= NON_KEY_ACCESS;
        index = NURand( 255, 0, 999, pContext->CLast );
        i1 = index/100;
        i2 = ( index - i1 * 100 ) / 10;
        i3 = index - ( i1 * 100 ) - ( i2 * 10 ); /* ones digit */

        memcpy( ptr, c_table[i1], c_length[i1] );
        ptr += c_length[i1];
        memcpy( ptr, c_table[i2], c_length[i2] );
        ptr += c_length[i2];
        memcpy( ptr, c_table[i3], c_length[i3] );
    }
    else
    {
        /* use c_id within [1..MAX_C_ID] */
        pOrderStatus->c_id = NURand( 1023, 1, MAX_C_ID, C_ID_CONST );
    }

    /* get_os_data */

    void
    get_dy_data( txn_context_t *pContext, pDeliveryData pDelivery,
                int *context )
    {
        pDelivery->CC = (CallersContext)pContext;

```

```

ptr += c_length[i3];
*ptr = '\0';
}
else
{
    /* use c_id within [1..MAX_C_ID] */
    pPayment->c_id = NURand( 1023, 1, MAX_C_ID, C_ID_CONST );
}

/* 15% remote payment */
if( ( random_int( 0,999 ) < 850 ) || ( pContext->max_w_id == 1 ) )
{
    pPayment->c_w_id = pPayment->w_id;
    pPayment->c_d_id = pPayment->ld_id;
}
else
{
    *context |= REMOTE_PAYMENT;
    pPayment->c_w_id = random_int( 1, pContext->max_w_id-1 );
    if( pPayment->c_w_id >= pPayment->w_id )
    {
        pPayment->c_w_id++;
    }
    pPayment->c_d_id = random_int( 1, DISTRICTS_PER_WAREHOUSE );
}

/* h_amount in the within [1.00..MAX_PT_AMOUNT_CENTS/100] */
pPayment->h_amount = ((double)random_int( 100, MAX_PT_AMOUNT_CENTS )
/ 100.0);

}

/* get_pt_data */

void
get_os_data( txn_context_t *pContext, pOrderStatusData pOrderStatus,
            int *context )
{
    char          *ptr;
    int           index, i1, i2, i3;

    pOrderStatus->CC = (CallersContext)pContext;

    *context = ORDER_STATUS_TXN;

    get_wdid( pContext, &pOrderStatus->w_id, &pOrderStatus->ld_id );

    pOrderStatus->d_id = random_int( 1, DISTRICTS_PER_WAREHOUSE );

    pOrderStatus->c_id = INVALID_C_ID;

    ptr = pOrderStatus->c_last;
    if( random_int( 0,99 ) < PCT_C_LAST )
    {
        /* use C_LAST */
        *context |= NON_KEY_ACCESS;
        index = NURand( 255, 0, 999, pContext->CLast );
        i1 = index/100;
        i2 = ( index - i1 * 100 ) / 10;
        i3 = index - ( i1 * 100 ) - ( i2 * 10 ); /* ones digit */

        memcpy( ptr, c_table[i1], c_length[i1] );
        ptr += c_length[i1];
        memcpy( ptr, c_table[i2], c_length[i2] );
        ptr += c_length[i2];
        memcpy( ptr, c_table[i3], c_length[i3] );
        ptr += c_length[i3];
        *ptr = '\0';
    }
    else
    {
        /* use c_id within [1..MAX_C_ID] */
        pOrderStatus->c_id = NURand( 1023, 1, MAX_C_ID, C_ID_CONST );
    }

    /* get_os_data */

    void
    get_dy_data( txn_context_t *pContext, pDeliveryData pDelivery,
                int *context )
    {
        pDelivery->CC = (CallersContext)pContext;

```

```

*context = INT_DELIVERY_TXN;

get_wdid( pContext, &pDelivery->w_id, &pDelivery->ld_id );

/* generate o_carrier_id in the range [1..MAX_CARRIER_ID] */
pDelivery->o_carrier_id = random_int( 1, MAX_CARRIER_ID );

/* enter time of request */
pDelivery->queue_time = time( NULL );
}

/* get_dy_data */

void
get_sl_data( txn_context_t *pContext, pStockLevelData pStockLevel,
            int *context )
{
    pStockLevel->CC = (CallersContext)pContext;

    *context = STOCK_LEVEL_TXN;

    get_wdid( pContext, &pStockLevel->w_id, &pStockLevel->ld_id );

    /* generate threshold in the range
    [MIN_SL_THRESHOLD..MAX_SL_THRESHOLD] */
    pStockLevel->threshold = random_int( MIN_SL_THRESHOLD,
    MAX_SL_THRESHOLD );
}

/* get_sl_data */

void
get_cp_data( txn_context_t *pContext, pCheckpointData pCheckpoint,
            int *context )
{
    pCheckpoint->CC = (CallersContext)pContext;

    *context = CHECKPOINT_TXN;

    get_wdid( pContext, &pCheckpoint->w_id, &pCheckpoint->ld_id );

    pCheckpoint->how_many = 1;
    pCheckpoint->interval = 0;
}

/* get_cp_data */

```

tpcc_gen.h

```

#ifndef TPCC_GEN_H
#define TPCC_GEN_H
/*+*****
*****
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```

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

void get_wdid( txn_context_t *pContext, int *pw_id, int *pd_id );
void get_no_data( txn_context_t *pUdata, pNewOrderData pNewOrder, int *context);
void get_pt_data( txn_context_t *pUdata, pPaymentData pPayment, int *context);
void get_os_data( txn_context_t *pUdata, pOrderStatusData pOrderStatus,
                int *context);
void get_dy_data( txn_context_t *pUdata, pDeliveryData pDelivery, int *context);
void get_sl_data( txn_context_t *pUdata, pStockLevelData pStockLevel,
                int *context);
void get_cp_data( txn_context_t *pUdata, pCheckpointData pCheckpoint,
                int *context);

#endif

```

tpcc_master.c

```

/*+*****
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*
*
*****
*****/

/*
* Abstract: The Master script is the script responsible for timing when
* the users should be logged in, when they should rampup, how
* long their steady state is, etc...
*
* Author: ???
*
* Creation Date: ???
*
* Modification history:
*
* X-1 W. Carr 17-Jan-1997
* Added new format header. Checked in code that prevents the audit
* scripts from running. Added new code to pass counter reset message
* to all scripts as part of run-time data reduction code.
*
*/

```

```

#include <math.h>
#include <stdio.h>
#include <stdlib.h>
#include <string.h>
#include <ctype.h>
#include <sys/stat.h>
#include <sys/types.h>
#include <time.h>

#ifdef _WIN32
#include <direct.h>
#include <nt_lib.h>
#include <windows.h>
#include <process.h>
#else
#include <dirent.h>
#include <sys/time.h>
#include <unistd.h>
#endif

#include <stdtypes.h>
#include <prte.h>
#include <common.h>

#include <tpccstruct.h>
#include <tpccapi.h>
#include <tpccerr.h>
#include <reg.h>
#include <config.h>

#include <scr_util.h>

#define NEED_MSG_NAMES
#include <msg.h>
#include <netvar.h>
#include <audit_util.h>

#ifdef _WIN32
#define MKDIR(Dir,Mode) mkdir(Dir)
typedef int mode_t;
#else
#define MKDIR(Dir,Mode) mkdir(Dir,Mode)
#endif

#define MAX_RUN_DIR_NAME_LEN 3 /* Number padded with leading 0's */
#define LOG_DIR "logs" /* appended to the run dir */
#define maximum(A,B) ((A) > (B) ? (A) : (B))

#define NODELAY

#define REG_KEY_STR "CONF_FE_NT_REG_KEY_"
#define REG_VALUE_STR "CONF_FE_NT_REG_VALUE_"
#define REG_TYPE_STR "CONF_FE_NT_REG_TYPE_"
#define REG_DATA_STR "CONF_FE_NT_REG_DATA_"

typedef struct _be_t
{
char Name[MAXHOSTNAMELEN];
double LogSize;
double LogUsed;
} be_t;

/* This is the master data structure. It contains all relevant information
for coordinating the testing. */
typedef struct _master_data_t
{
int32 AdminUsers;
int32 RequestsSent;
int32 RepliesReceived;
int32 AidesStatus;
BOOL MsgTimedOut;
double MsgTimeout;

char CgiScriptName[PATH_MAX];
BOOL DoCheckpoints;
double CkptStartOffset;

```

```

/* FE Info */
int32 RunMode;
int32 TpcUsers;
int32 NumFES;
int32 NumConnects;
connect_t *pConnects;
BOOL FERestartViaReboot;
int32 RestartFES;

double Proximity;
pid_t OsPid;
char RunDir[PATH_MAX];
int CheckpointInterval;

double WarmUpTime;
double SteadyStateTime;
double MeasurementInterval;
double CoolDownTime;
int ReducerID;
int32 ReducerStatus;
char ReducerScriptName[PATH_MAX];
char ReducerScriptNode[MAXHOSTNAMELEN];
char OutputDir[PATH_MAX];
char RunNumStr[8];
int VersionNum;
long MasterSeed;
char *pVersion; /* Holds the System Version. */
int32 NumBE;
be_t *pBEs;
char AideScriptName[PATH_MAX];

char BeUname[32];
char DbUname[32];
char DbPassword[32];
char DbName[32];
char OraStatScriptPath[PATH_MAX];
char CustomBeforeTestScript[PATH_MAX];
char CustomAfterTestScript[PATH_MAX];

task_data_t BeTasksData;
} master_data_t;

/* Prototypes */
void BinMsgHandler( void *Context, int SendersID, int Len, void *Msg );
int32 Config( master_data_t *pContext );
int32 ConfigFES( master_data_t *pContext );
int32 ConfigFESSendMsg( master_data_t *pContext,
config_fe_msg_t *pConfigFEMsg, char
*pDataVar );
int32 GetBeInfo(master_data_t *pContext);
void GetFeUserCounts(master_data_t *pContext, int32 State);
void GetSeed( master_data_t *pContext );
int32 Init( master_data_t *pContext );
int32 InitAides( master_data_t *pContext );
int32 InitFES( master_data_t *pContext );
int32 InitReducer( master_data_t *pContext );
int32 MakeRunDir(char *DirName, char *RunDir);
int32 ParseUsersPerFE(master_data_t *pContext, char *string);
int32 PreTestHook(master_data_t *pContext);
int32 StartFES( master_data_t *pContext );
int32 StopAides( master_data_t *pContext );
int32 StopFES( master_data_t *pContext );
int32 StopReducer( master_data_t *pContext );
void TellAidesTo(master_data_t *pContext, int32 Task, int32 State);
int32 TestPeriod( master_data_t *pContext );

void
main(int argc, char *argv[])
{
master_data_t Context;
master_data_t *pContext = &Context;
int32 Status;

/* Initialize with PRTE. */
PRTEInit( argc, argv );

/* Initialize. */
if( SCR_E_SUCCESS != ( Status = Init( pContext )))

```

```

{
  ( void ) SCRerr( Status );
  ( void ) SCRerr( SCR_E_INIT );
}

/* Select the proper routine for the run mode. */
if( SCR_E_SUCCESS == Status )
{
  switch( pContext->RunMode )
  {
    case END_TO_END_MODE:
    case BACKEND_MODE:
      Status = TestPeriod( pContext );
      break;
    case CONFIG_MODE:
      Status = Config( pContext );
      break;
    default:
      break;
  }
}

SCRlog( "Master: Blowing this popsicle stand." );

PRTEexit();
}

/*****
*****/
/* Name: BinMsgHandler */
/* Purpose: This is the message handler that gets registered with PRTE for processing binary messages sent to the Master. */
/* Inputs: Context: Pointer to the context structure. This structure is set up elsewhere, and registered with PRTE to be passed in. SendersID: User ID number of the user that sent us the binary message. Len: Length of the binary message in bytes. Msg: Pointer to the actual data being sent. Outputs: None. Function Value: void Notes: This funtion is called on our behalf by PRTE. In order for this to happen, we must be inside a call to some PRTE function. If we are running code outside a PRTE function, PRTE will not interrupt us (i.e. no signal is sent). It is only when we are inside a PRTE function call (e.g. PRTEdelay, etc.) that PRTE will check to see if we have a message that needs processing. *****/
void
BinMsgHandler( void *Context, int SendersID, int Len, void *Msg )
{
  int32 Index;
  checkpoint_status_msg_t *pCheckpointStatusMsg;
  master_data_t *pContext;
  generic_msg_t *pMsg;
  generic_status_msg_t *pStatusMsg;
  char TmpStr[256];

  /* Effectively convert void * parameters to correct types. */
  pMsg = Msg;
  pContext = Context;

  /* Process messaged based on its type. */
  switch( pMsg->Type )
  {
    case DATA_PROCESSING_LOOP_OVER:
      PRTEresume();
      break;

```

```

case DATA_POST_PROCESS_REPLY_MSG:
  pStatusMsg = (generic_status_msg_t *) Msg;
  if( SCR_E_SUCCESS == pStatusMsg->Status )
  {
    SCRlog( "\tTest results successfully generated." );
  }
  else
  {
    SCRlog( "\tError generating test results ( %d ).",
      pStatusMsg->Status );
  }
  PRTEresume();

  break;

case AIDELOG_POST_PROCESS_REPLY_MSG:
  pStatusMsg = (generic_status_msg_t *) Msg;
  if( ERR_SUCCESS == pStatusMsg->Status )
  {
    SCRlog( "\tAide logs successfully processed." );
  }
  else
  {
    SCRlog( "\tError processing aide logs( %d ).",
      pStatusMsg->Status );
  }
  PRTEresume_users( User_id, User_id );

  break;

case AIDE_EXIT_REPLY_MSG:
  pStatusMsg = (generic_status_msg_t *) Msg;
  pContext->RepliesReceived++;
  if( SCR_E_SUCCESS != pStatusMsg->Status &&
    SCR_E_SUCCESS == pContext->AidesStatus )
  {
    /* Note that we've had a failure. */
    pContext->AidesStatus = pStatusMsg->Status;
  }
  if( pContext->RepliesReceived == pContext->RequestsSent )
  {
    /* We've heard back from everyone, so break ourselves out of delay. */
    pContext->MsgTimedOut = FALSE;
    PRTEdelay( 0.0 );
  }
  break;

case AIDE_INIT_REPLY_MSG:
  pStatusMsg = (generic_status_msg_t *) Msg;
  if( SCR_E_SUCCESS != pStatusMsg->Status &&
    SCR_E_SUCCESS == pContext->AidesStatus )
  {
    /* Note that we've had a failure. */
    pContext->AidesStatus = pStatusMsg->Status;
  }
  pContext->RepliesReceived++;
  if( pContext->RepliesReceived == pContext->RequestsSent )
  {
    /* We've heard back from everyone, so break ourselves out of delay. */
    pContext->MsgTimedOut = FALSE;
    PRTEdelay( 0.0 );
  }
  break;

case CHECKPOINT_CONNECT_REPLY_MSG:
  pCheckpointStatusMsg = (checkpoint_status_msg_t *) Msg;
  pContext->RepliesReceived++;

  if( SCR_E_SUCCESS == pCheckpointStatusMsg->Data.Status )
  {
    SCRlog( "\t\t%s - checkpoint sub-system initialized.",
      pCheckpointStatusMsg->Data.FENName );
  }
  else
  {
    if( SCR_E_SUCCESS == pContext->AidesStatus )
    {
      pContext->AidesStatus = pCheckpointStatusMsg->Data.Status;
    }
  }

```



```

        SCRLog( "\t\t%s - checkpoint subsystem initialization FAILED ( %d ).",
                pCheckpointStatusMsg->Data.FENName,
                pCheckpointStatusMsg->Data.Status );
    }
}
if( pContext->RepliesReceived == pContext->RequestsSent )
{
    /* We've heard back from everyone, so break ourselves out of delay. */
    pContext->MsgTimedOut = FALSE;
    PRTEdelay( 0.0 );
}
break;
case CHECKPOINT_RUN_REPLY_MSG:
pCheckpointStatusMsg = (checkpoint_status_msg_t *) Msg;
pContext->RepliesReceived++;
if( SCR_E_SUCCESS == pCheckpointStatusMsg->Data.Status )
{
    SCRLog( "\t\t%s - checkpoint loop started.",
            pCheckpointStatusMsg->Data.FENName );
}
else
{
    if( SCR_E_SUCCESS == pContext->AidesStatus )
    {
        pContext->AidesStatus = pCheckpointStatusMsg->Data.Status;
    }
    SCRLog( "\t\t%s - checkpoint loop NOT entered ( %d ).",
            pCheckpointStatusMsg->Data.FENName,
            pCheckpointStatusMsg->Data.Status );
}
if( pContext->RepliesReceived == pContext->RequestsSent )
{
    /* We've heard back from everyone, so break ourselves out of delay. */
    pContext->MsgTimedOut = FALSE;
    PRTEdelay( 0.0 );
}
break;
case CHECKPOINT_STOP_REPLY_MSG:
pCheckpointStatusMsg = (checkpoint_status_msg_t *) Msg;
pContext->RepliesReceived++;
if( SCR_E_SUCCESS == pCheckpointStatusMsg->Data.Status )
{
    SCRLog( "\t\t%s - checkpoint loop ran successfully.",
            pCheckpointStatusMsg->Data.FENName );
}
else
{
    if( SCR_E_SUCCESS == pContext->AidesStatus )
    {
        pContext->AidesStatus = pCheckpointStatusMsg->Data.Status;
    }
    SCRLog( "\t\t%s - checkpoint loop FAILED ( %d ).",
            pCheckpointStatusMsg->Data.FENName,
            pCheckpointStatusMsg->Data.Status );
}
if( pContext->RepliesReceived == pContext->RequestsSent )
{
    /* We've heard back from everyone, so break ourselves out of delay. */
    pContext->MsgTimedOut = FALSE;
    PRTEdelay( 0.0 );
}
break;
case CHECKPOINT_DISCONNECT_REPLY_MSG:
pCheckpointStatusMsg = (checkpoint_status_msg_t *) Msg;
pContext->RepliesReceived++;
if( SCR_E_SUCCESS == pCheckpointStatusMsg->Data.Status )
{
    SCRLog( "\t\t%s - checkpoint sub-system shutdown.",
            pCheckpointStatusMsg->Data.FENName );
}
}
else
{
    if( SCR_E_SUCCESS == pContext->AidesStatus )
    {
        pContext->AidesStatus = pCheckpointStatusMsg->Data.Status;
    }
    SCRLog( "\t\t%s - checkpoint subsystem shutdown FAILED ( %d ).",
            pCheckpointStatusMsg->Data.FENName,
            pCheckpointStatusMsg->Data.Status );
}
}
if( pContext->RepliesReceived == pContext->RequestsSent )
{
    /* We've heard back from everyone, so break ourselves out of delay. */
    pContext->MsgTimedOut = FALSE;
    PRTEdelay( 0.0 );
}
break;
case CONFIG_FE_REPLY_MSG:
pStatusMsg = (generic_status_msg_t *) Msg;
pContext->RepliesReceived++;
if( SCR_E_VALUE_MODIFIED == pStatusMsg->Status )
{
    for( Index = 0; Index < pContext->NumConnects; Index++ )
    {
        if( SendersID == pContext->pConnects[Index].AideID )
        {
            pContext->pConnects[Index].ConfMod = TRUE;
            break;
        }
    }
}
else if( SCR_E_SUCCESS != pStatusMsg->Status &&
        SCR_E_SUCCESS == pContext->AidesStatus )
{
    /* Note that we've had a failure. */
    pContext->AidesStatus = pStatusMsg->Status;
}
if( pContext->RepliesReceived == pContext->RequestsSent )
{
    /* We've heard back from everyone, so break ourselves out of delay. */
    pContext->MsgTimedOut = FALSE;
    PRTEdelay( 0.0 );
}
break;
case ORA_SWITCHLOG_REPLY_MSG:
case GET_LOGSIZE_REPLY_MSG:
case ORA_DOSTATS_REPLY_MSG:
case DO_CUSTOM_SCRIPT_REPLY_MSG:
case INIT_AUDIT_TABLE_REPLY_MSG:
case BE_CKPTDATA_REPLY_MSG:
pStatusMsg = (generic_status_msg_t *) Msg;
if( SCR_E_SUCCESS != pStatusMsg->Status &&
    SCR_E_SUCCESS == pContext->AidesStatus )
{
    /* Note that we've had a failure. */
    pContext->AidesStatus = pStatusMsg->Status;
}
pContext->RepliesReceived++;
if( pContext->RepliesReceived == pContext->RequestsSent )
{
    /* We've heard back from everyone, so break ourselves out of delay. */
    pContext->MsgTimedOut = FALSE;
    PRTEdelay( 0.0 );
}
break;
case START_FE_REPLY_MSG:
pStatusMsg = (generic_status_msg_t *) Msg;
pContext->RepliesReceived++;
if( SCR_E_SUCCESS != pStatusMsg->Status &&
    SCR_E_SUCCESS == pContext->AidesStatus )
{
    /* Note that we've had a failure. */
    pContext->AidesStatus = pStatusMsg->Status;
}
}
}

```

```

if( pContext->RepliesReceived == pContext->RequestsSent )
{
    /* We've heard back from everyone, so break ourselves out of delay. */
    pContext->MsgTimedOut = FALSE;
    PRTEdelay( 0.0 );
}
break;

case STOP_FE_REPLY_MSG:
pStatusMsg = (generic_status_msg_t *) Msg;
pContext->RepliesReceived++;
if( SCR_E_SUCCESS != pStatusMsg->Status &&
    SCR_E_SUCCESS == pContext->AidesStatus )
{
    /* Note that we've had a failure. */
    pContext->AidesStatus = pStatusMsg->Status;
}
if( pContext->RepliesReceived == pContext->RequestsSent )
{
    /* We've heard back from everyone, so break ourselves out of delay. */
    pContext->MsgTimedOut = FALSE;
    PRTEdelay( 0.0 );
}
break;

case REDUCER_INIT_REPLY_MSG:
pStatusMsg = (generic_status_msg_t *) Msg;
pContext->ReducerStatus = pStatusMsg->Status;
pContext->MsgTimedOut = FALSE;
PRTEdelay( 0.0 );
break;

case USER_LOGIN_REPLY_MSG:
case USER_START_REPLY_MSG:
case USER_STOP_REPLY_MSG:
pStatusMsg = (generic_status_msg_t *) Msg;
pContext->ReducerStatus = pStatusMsg->Status;
PRTEResume( );
break;

case LOAD_FE_REPLY_MSG:
pStatusMsg = (generic_status_msg_t *) Msg;
pContext->RepliesReceived++;
if( SCR_E_SUCCESS != pStatusMsg->Status &&
    SCR_E_SUCCESS == pContext->AidesStatus )
{
    /* Note that we've had a failure. */
    pContext->AidesStatus = pStatusMsg->Status;
}
if( pContext->RepliesReceived == pContext->RequestsSent )
{
    /* We've heard back from everyone, so break ourselves out of delay. */
    pContext->MsgTimedOut = FALSE;
    PRTEdelay( 0.0 );
}
break;

default:
sprintf( TmpStr, "Master received unknown user message type: %d",
        pMsg->Type );
SCRlog( TmpStr );
}

int32
Config( master_data_t *pContext )
{
    char                *pTmpStr;
    int32                Status;
    char                TmpStr[256];

    Status = SCR_E_SUCCESS;

    SCRlog( "\n\n\t\t\t\t\t..START OF CONFIG..\n\n" );

    /* Lie about a reducer existing for the aides will initialize. */
    ITOA( 0, TmpStr, pTmpStr );
    PRTEset_network_variable( "REDUCER_ID", TmpStr );

if( SCR_E_SUCCESS == Status )
{
    Status = InitAides( pContext );
}

if( SCR_E_SUCCESS == Status )
{
    Status = ConfigFES( pContext );
}

if( SCR_E_SUCCESS == Status )
{
    Status = StopAides( pContext );
}

SCRlog( "\n\n\n\t\t\t\t\t..END OF CONFIG..\n\n" );

return( Status );
}

/*****
*****/
/*
/* Name: ConfigFES
/*
/* Purpose: This function causes the FEs to be configured.
/*
/* Inputs:
/*
/* Outputs:
/*
/* Function Value:
/*
/* Notes:
/*
*****/
int32
ConfigFES( master_data_t *pContext )
{
    int                Code;
    int32              Index;
    char                NetVarName[50];
    int32              NetVarNum;
    char                *pTmp;
    char                *pValue;
    config_fe_msg_t    ConfigFEMsg;
    int32              Status;

    /* Check if we have any FEs to configure. */
    if( 0 == pContext->NumFES )
    {
        return( SCR_E_SUCCESS );
    }

    /* Initialize stuff. */
    for( Index = 0; Index < pContext->NumConnects; Index++ )
    {
        if( ! pContext->pConnects[Index].ConfConn )
        {
            continue;
        }
        pContext->pConnects[Index].ConfMod = FALSE;
        SCRlog( "\tChecking configuration of %s.",
            pContext->pConnects[Index].FEName );
    }

    /* All the known FE parameters go into the same key, get them by name. */
    strcpy( ConfigFEMsg.Data.Key, TPCC_CLASS );
    strcpy( ConfigFEMsg.Data.Type, "string" );

    for( Code = FFE_C_BASE + 1; Code <= FFE_C_MAX_PARAM; Code++ )
    {
        /* Get the configuration value name in order to get its data */
        pValue = ConfigCodeToStr( Code );
        strcpy( ConfigFEMsg.Data.Value, pValue );

        /* Now collect data and send messages. */

```

```

Status = ConfigFESendMsg( pContext, &ConfigFEMsg, pValue );
if( SCR_E_SUCCESS != Status )
{
    return( Status );
}

/* In order to set a registry entry, you must have the key, value, type */
/* and data. This code assumes that these pieces of info are grouped */
/* in sets of predetermined network variables. So we'll keep setting */
/* entries as long as we keep finding the next set. */
NetVarNum = 1;
sprintf( NetVarName, "%s%d", REG_KEY_STR, NetVarNum );
while( NULL != (pTmp = PRTEget_network_variable( NetVarName )))
{
    /* We got a key back, so the rest of this set should also be there. */
    /* So save the key, and get the rest of the set. */
    strcpy( ConfigFEMsg.Data.Key, pTmp );

    /* Get the value. */
    sprintf( NetVarName, "%s%d", REG_VALUE_STR, NetVarNum );
    if( NULL == (pTmp = PRTEget_network_variable( NetVarName )))
    {
        /* We have an error here. */
        SCRlog( "Getting network variable: %s", ConfigFEMsg.Data.Value );
        return( SCRerr( SCR_E_NO_VALUE ) );
    }
    else
    {
        strcpy( ConfigFEMsg.Data.Value, pTmp );
    }

    /* Get the type. */
    sprintf( NetVarName, "%s%d", REG_TYPE_STR, NetVarNum );
    if( NULL == (pTmp = PRTEget_network_variable( NetVarName )))
    {
        /* We have an error here. */
        SCRlog( "Getting network variable: %s", ConfigFEMsg.Data.Type );
        return( SCRerr( SCR_E_NO_TYPE ) );
    }
    else
    {
        strcpy( ConfigFEMsg.Data.Type, pTmp );
    }

    /* Now collect data and send messages. */
    sprintf( NetVarName, "%s%d", REG_DATA_STR, NetVarNum );
    Status = ConfigFESendMsg( pContext, &ConfigFEMsg, NetVarName );
    if( SCR_E_SUCCESS != Status )
    {
        return( Status );
    }

    /* Move on to the next entry set. */
    NetVarNum++;
    sprintf( NetVarName, "%s%d", REG_KEY_STR, NetVarNum );
} /* while */

/* Check if any of the FEs need to be restarted. */
Status = SCR_E_SUCCESS;
for( Index = 0; Index < pContext->NumConnects; Index++ )
{
    if( ! pContext->pConnects[Index].ConfConn )
    {
        continue;
    }
    if( pContext->pConnects[Index].ConfMod )
    {
        Status = SCR_E_VALUE_MODIFIED;
        SCRlog( "\tSuccessfully modified configuration of %s.",
                pContext->pConnects[Index].FEName );
    }
    else
    {
        SCRlog( "\tSuccessfully checked configuration of %s.",
                pContext->pConnects[Index].FEName );
    }
}

if( SCR_E_VALUE_MODIFIED != Status && SCR_E_SUCCESS != Status )
{
    SCRlog( "\tFailed to configure the FEs. Pausing.\n" );
    PRTEpause();
}

/* Check if FEs should be restarted. */
if( ( FE_RESTART_ALWAYS == pContext->RestartFES ) ||
    ( FE_RESTART_MODIFIED == pContext->RestartFES &&
      SCR_E_VALUE_MODIFIED == Status ) )
{
    if( SCR_E_SUCCESS != ( Status = StopFES( pContext ) ) )
    {
        SCRlog( "\tFailed to stop the FEs. Pausing.\n" );
        PRTEpause();
    }
    if( SCR_E_SUCCESS != ( Status = StartFES( pContext ) ) )
    {
        SCRlog( "\tFailed to start the FEs. Pausing.\n" );
        PRTEpause();
    }
}
else
{
    /* Clear the potential MODIFIED status. */
    Status = SCR_E_SUCCESS;
}

return( Status );
}

int32
ConfigFESendMsg( master_data_t *pContext, config_fe_msg_t *pConfigFEMsg,
                char *pDataVar )
{
    int          Count;
    int32       Index;
    char        *pTmp;
    int32       Status;

    Status = SCR_E_SUCCESS;
    if( NULL == (pTmp = PRTEget_network_variable( pDataVar )) )
    {
        /* We have an error here. */
        SCRlog( "Getting network variable: %s", pDataVar );
        return( SCRerr( SCR_E_NO_DATA ) );
    }

    /* Check for correct number of data values. */
    Count = SCR_count_elements( pTmp );
    if( 1 != Count && pContext->NumFES != Count )
    {
        SCRlog( "Parsing: %s %s", pDataVar, pTmp );
        return( SCRerr( SCR_E_WRONG_DATA_ITEM_COUNT ) );
    }

    /* send reg_msg_t to each aide */
    pContext->RequestsSent = 0;
    pContext->RepliesReceived = 0;
    pContext->AidesStatus = SCR_E_SUCCESS;
    pContext->MsgTimedOut = TRUE;
    pConfigFEMsg->Type = CONFIG_FE_REQUEST_MSG;
    for( Index = 0; Index < pContext->NumConnects; Index++ )
    {
        if( ! pContext->pConnects[Index].ConfConn )
        {
            continue;
        }
        if( 1 == Count )
        {
            /* Always get the first element. Use the element routine to */
            /* eliminate any quoting problems. */
            (void)SCR_next_list_element( pTmp, pConfigFEMsg->Data.Data );
        }
        else
        {
            /* Get the next element. */
            pTmp = SCR_next_list_element( pTmp, pConfigFEMsg->Data.Data );
        }
    }
}

```

```

strcpy( pConfigFEMsg->Data.FEName, pContext->pConnects[Index].FEName );
PRTEmessage_to_user_binary( sizeof( *pConfigFEMsg ), pConfigFEMsg,
                           pContext-
>pConnects[Index].AideID,
                           pContext-
>pConnects[Index].AideID );
pContext->RequestsSent++;
}

PRTEdelay( pContext->MsgTimeout );

if( pContext->MsgTimedOut )
{
    Status = SCRerr( SCR_E_AIDE_TIMEOUT_CONFIG_FE );
    SCRlog( "\tPausing...\n" );
    PRTEpause();
}

if( SCR_E_SUCCESS != pContext->AidesStatus )
{
    Status = SCRerr( pContext->AidesStatus );
    Status = SCRerr( SCR_E_AIDES_FAILED_CONFIG );
}

return( Status );
}

```

```

int32
GetBEInfo( master_data_t *pContext )
{
    char    *List;
    char    *pTmpChar;
    char    ElementString[32];
    int32   BEIndex;

    /* Get the number of FEs we're dealing with, so we can allocate structures.*/
    if( NULL == ( List = PRTEget_network_variable( "BE_NAMES" ) ) )
    {
        return( SCRerr( SCR_E_BE_NAMES ) );
    }

    pContext->NumBE = SCR_count_elements(List);

    /* Now we now how many BEs there are, so we can allocate space.*/
    if( NULL == ( pContext->pBEs =
                 ( be_t * ) malloc( pContext->NumBE * sizeof( be_t ) ) ) )
    {
        return( SCRerr( SCR_E_MALLOC_BE_ARRAY ) );
    }

    SCRlog( "\tThe following BEs will be used." );
    pTmpChar = List;
    BEIndex = 0;
    while( pTmpChar = SCR_next_list_element( pTmpChar, ElementString ) )
    {
        strcpy( pContext->pBEs[BEIndex].Name, ElementString );
        SCRlog( "\t\t%s", pContext->pBEs[BEIndex].Name );
        BEIndex++;
    }

    return( SCR_E_SUCCESS );
}

```

```

void
GetSeed(master_data_t *pContext)
{
    char temp_string[128];
    struct timeval current_time;
    FILE *SeedFile;
    char SeedFileName[256]; /* some max file name size. dj.*/

    /* Get the seed value.*/
    SCR_getnet_long("SEED",SEED_DEFAULT,&pContext->MasterSeed);
    if (0 == pContext->MasterSeed)
    {
        gettimeofday( &current_time, NULL);

```

```

pContext->MasterSeed = pContext->OsPid * current_time.tv_sec;
}

/* Announce seed value to PRTE community.*/
sprintf(temp_string,"%ld",pContext->MasterSeed);
PRTEset_network_variable("SEED",temp_string);

/* Open audit file to record seed.*/
sprintf(SeedFileName, "%sm%sseed.v%d", pContext->RunDir,
        pContext->RunNumStr, pContext->VersionNum);
if (NULL == (SeedFile = fopen(SeedFileName,"w")))
{
    SCRlog( "Master: Failed to open seed file." );
}
else
{
    /* Write seed out to audit file in the run directory.*/
    fprintf(SeedFile, "%s", temp_string);
    fclose(SeedFile);
}

/* Log seed to console and private log file.*/
SCRlog( "\tSeed = %ld\n", pContext->MasterSeed );
}

```

```

*****
* Init()
*
* Inputs: None
*
* Output: None
*
* Written by: Tareef Kawaf (Feb. 1995)
*
* Dependencies: None.
*
* Description:
* Init() will retrieve the value of all
* network variables that would affect the execution of this
* test, as seen by the master.
*
*
*****

```

```

int32
Init( master_data_t *pContext )
{
    int32          CLast;
    double         CkptProximAddOffset;
    double         CkptsPerInterval;
    FILE           *Fd;
    char           FileName[PATH_MAX];
    char           IDString[7];
    int            Index;
    int32          RunId;
    int32          Status;
    struct timeval TimeStamp;
    char           TmpStr[256]; /* arbitrary length */
}

```

```

/* Announce that we're initializing.*/
SCRlog( "Master: Initializing.\n" );

/* Initialize context to zero.*/
memset( pContext, 0, sizeof( *pContext ) );

/* Set the software version for this build. NOTE we should confirm this */
/* is the same version as PRTE!
pContext->pVersion = VERSION; /* Get System Version from compile time.*/
SCRlog( "\tSoftware Version = %s\n", pContext->pVersion );
PRTEset_network_variable("TPCC_SCRIPTS_VERSION", pContext->pVersion);

/* Get the operating system process id.*/
pContext->OsPid = getpid();
SCRlog( "\tOS PID = %d", pContext->OsPid );

```

```

/* Announce the PRTE user id. */
SCRlog( "\tMaster PRTE User ID = %d\n", User_id );

/* Make sure we flush stuff as we write it out. */
Flush_log = TRUE;

/* /Get the test results directory, and create a run directory under it. */
SCR_getnet_string( "TEST_RESULTS_DIR", TEST_RESULTS_DIR_DEFAULT,
                  pContext->OutputDir );

/* Make the run directory, log directory and announce them to the PRTE */
/* community. */
if( -1 == ( RunId = MakeRunDir( pContext->OutputDir, pContext->RunDir )) )
{
    return( SCRerr( SCR_E_MAKING_RUN_DIR ) );
}

sprintf( TmpStr, "%d", RunId );
PRTEset_network_variable( "RUN_ID", TmpStr );

/* We now have enough to build up the log file name and path. This means */
/* master can now play in the asci world. */
strcpy( Log_path, pContext->RunDir );
strcpy( Log_name, "master.log" );

/* Master doesn't connect to any SUTs, so all we only need to enable */
/* PRTEto_log calls. */
Logging_type = ( SCRIPT_SPECIFIC_LOGGING );

SCRlog( "\tLogFile = %s%s\n", Log_path, Log_name );

/* Register binary message handler with PRTE. */
PRTEcatch_message_binary( BinMsgHandler, pContext );

/* Master is now ready to play in the binary message world, so go ahead and */
/* announce his user id to the PRTE community. */
sprintf( IDString, "%d", User_id );
PRTEset_network_variable( "MASTER_ID", IDString );

/* Get the test run number. */
SCR_getnet_string( "RUN_NUMBER", RUN_NUMBER_DEFAULT,
                  pContext->RunNumStr );
SCRlog( "\tRunNumber = %s.", pContext->RunNumStr );

/* Get the test version number. */
SCR_getnet_int( "VERSION_NUMBER", VERSION_NUMBER_DEFAULT,
               &pContext->VersionNum );
SCRlog( "\tVersionNumber = %d\n", pContext->VersionNum );

/* Get timing lengths. */
SCR_getnet_double( "WARMUP_TIME", WARMUP_TIME_DEFAULT,
                  &pContext->WarmUpTime );
if( 0 < pContext->WarmUpTime )
{
    SCRlog( "\tWarmup = %7.2f", pContext->WarmUpTime );
}

SCR_getnet_double( "STEADY_STATE_TIME",
                  STEADY_STATE_TIME_DEFAULT,
                  &pContext->SteadyStateTime );
if( 0 < pContext->SteadyStateTime )
{
    SCRlog( "\tSteady State Time = %7.2f", pContext->SteadyStateTime );
}

SCR_getnet_double( "MEASUREMENT_INTERVAL",
                  MEASUREMENT_INTERVAL_DEFAULT,
                  &pContext->MeasurementInterval );
if( 0 < pContext->MeasurementInterval )
{
    SCRlog( "\tMeasurement Interval= %7.2f", pContext->MeasurementInterval );
}

SCR_getnet_double( "COOLDOWN_TIME", COOLDOWN_TIME_DEFAULT,
                  &pContext->CoolDownTime );
if( 0 < pContext->CoolDownTime )
{
    SCRlog( "\tCooldown = %7.2f\n", pContext->CoolDownTime );
}

}

/* Get the message timeout value. */
SCR_getnet_double( "MSG_TIMEOUT", MSG_TIMEOUT_DEFAULT,
                  &( pContext->MsgTimeout ) );
SCRlog( "\tMessage Timeout = %5.2f\n", pContext->MsgTimeout );

/* Set the seed. Requires RunDir, RunNumStr, RunVer. */
GetSeed( pContext );

/* Check out the value for C_LAST. Users are the ones who need this, */
/* but we don't want all of them printing it's value out, so master */
/* does it. Also, master logs it to a file in the run directory. */
SCR_getnet_int( "C_LAST", C_LAST_DEFAULT, &CLast );
SCRlog( "\tC_LAST = %d\n", CLast );
sprintf( FileName, "%srte%sclast.v%d", pContext->RunDir,
        pContext->RunNumStr, pContext->VersionNum );
if( NULL == ( Fd = fopen( FileName, "w" )) )
{
    ( void ) SCRerr( SCR_E_OPEN_C_LAST_FILE );
}
else
{
    gettimeofday( &TimeStamp, NULL );
    fprintf( Fd, "Date: %s\n\n", ctime( &TimeStamp.tv_sec ) );
    fprintf( Fd, "C_LAST constant = %d.\n", CLast );
    fclose( Fd );
}

/* Get RTE info */
Status = GetConnectInfo( pContext->RunMode, &pContext->TpccUsers,
                        &pContext->NumFES, &pContext-
>AdminUsers,
                        &pContext->NumConnects, &pContext-
>pConnects );
if( SCR_E_SUCCESS != Status )
{
    SCRlog( "Error ( %d ) getting CONNECT information.", Status );
    return( Status );
}

/* Get the run mode. */
SCR_getnet_int( "RUN_MODE", RUN_MODE_DEFAULT,
               &pContext->RunMode );
switch( pContext->RunMode )
{
case END_TO_END_MODE:
    SCRlog( "\tRunning in end-to-end mode.\n" );
    break;
case BACKEND_MODE:
    SCRlog( "\tRunning in rte based backend run (C) mode.\n" );
    break;
case CONFIG_MODE:
    SCRlog( "\tRunning in config mode.\n" );
    break;
default:
    SCRlog( "RunMode = %d", pContext->RunMode );
    return( SCRerr( SCR_E_INVALID_RUN_MODE ) );
    break;
}

SCRlog( "\tConnects." );
#define CONNECT_TABLE_HEADER_FORMAT "\t % -12s % -12s % -5s % -5s %5s\n"
#define CONNECT_TABLE_ENTRY_FORMAT "\t % -12s % -12s % -5s % -5s %5d\n"
SCRlog( CONNECT_TABLE_HEADER_FORMAT,
        "RTE", "FE", "Conf.", "Admin", "Users", "Script" );
for( Index = 0; Index < pContext->NumConnects; Index++ )
{
    SCRlog( CONNECT_TABLE_ENTRY_FORMAT,
        (pContext->pConnects)[Index].RTENAME,
        (pContext->pConnects)[Index].FENAME,
        (pContext->pConnects)[Index].ConfConn ? " T" : " F",
        (pContext->pConnects)[Index].AdminConn ? " T" : " F",
        (pContext->pConnects)[Index].Ucnt,
        (pContext->pConnects)[Index].Script );
}
SCRlog( "\tTotal TPC-C Users = %d\n", pContext->TpccUsers );
SCRlog( "\tTotal FE Count = %d\n", pContext->NumFES );

```

```

SCRlog( "\tTotal Admin Users = %d\n", pContext->AdminUsers );

/* How to handle FEs after reconfig. */
SCR_getnet_bool( "FE_RESTART_VIA_REBOOT",
FE_RESTART_VIA_REBOOT_DEFAULT,
    &pContext->FERestartViaReboot );
SCR_getnet_int( "FE_RESTART_MODE", FE_RESTART_MODE_DEFAULT,
    &pContext->RestartFEs );

/* Get support user info. */
SCR_getnet_string( "ADMIN_SCRIPT_NAME",
ADMIN_SCRIPT_NAME_DEFAULT,
    pContext->AideScriptName );
SCRlog( "\tAide Script Name = %s.", pContext->AideScriptName );

SCR_getnet_string( "REDUCER_SCRIPT_NAME",
REDUCER_SCRIPT_NAME_DEFAULT,
    pContext->ReducerScriptName );
SCRlog( "\tReducer Script Name = %s.", pContext->ReducerScriptName );
SCR_getnet_string( "REDUCER_SCRIPT_NODE",
REDUCER_SCRIPT_NODE_DEFAULT,
    pContext->ReducerScriptNode );
SCRlog( "\tReducer Script Node = %s.", pContext->ReducerScriptNode );

/* Get the user dll name. We don't print out the name of the dll here */
/* because the reducer will print out all the dll info. */
SCR_getnet_string( "CGI_SCRIPT_NAME", CGI_SCRIPT_NAME_DEFAULT,
    pContext->CgiScriptName );

if( 0 < pContext->AdminUsers )
{
    /* Get the checkpoint settings. */
    SCR_getnet_int( "CHECKPOINT_INTERVAL",
CHECKPOINT_INTERVAL_DEFAULT,
        &pContext->CheckpointInterval );

    SCRlog( "\tCheckpoint Interval = %d", pContext->CheckpointInterval );

    if( 0 < pContext->CheckpointInterval )
    {
        SCR_getnet_double( "CKPT_PROXIMITY_ADDITIONAL_OFFSET",
CKPT_PROXIMITY_ADDITIONAL_OFFSET_DEFAULT,
            &CkptProximAddOffset );

        /* Verify that the checkpoints will be legal with regard to the */
        /* benchmark specification (v3.3.2 Sec. 5.5.2.2). */

        /* Checkpoint interval must be less than or equal to 1800 seconds. */
        if( pContext->CheckpointInterval > 1800 )
        {
            return( SCRerr( SCR_E_CKPT_INT_TOO_LONG ); )
        }

        /* Checkpoint interval must be less than or equal to measurement int. */
        if( pContext->CheckpointInterval > pContext->MeasurementInterval )
        {
            return( SCRerr(
SCR_E_CKPT_INT_GREATER_THAN_MEASUREMENT_INT ); )
        }

        /* If checkpoint is less than measurement interval, measurement */
        /* interval must be integral multiple of checkpoint interval. */
        if( ( pContext->CheckpointInterval < pContext->MeasurementInterval ) &&
            ( (int32) pContext->MeasurementInterval %
                pContext->CheckpointInterval != 0 ) )
        {
            return( SCRerr(
SCR_E_MEASUREMENT_NOT_INTEGRAL_MULTIPLE ); )
        }

        /* If there are fewer than 4 checkpoints in the measurement interval */
        /* then guard zones must be observed. */
        CkptsPerInterval = ceil( pContext->MeasurementInterval /
            pContext->CheckpointInterval );

        if( 4 > CkptsPerInterval )
        {
            pContext->Proximity = ( pContext->MeasurementInterval *
                ( 2 / ( CkptsPerInterval + 3 ) ) ) / 2;

```

```

}

/* Now that we know the requested values are legal by the spec. make */
/* sure the values are legal for this implementation. Specifically, */
/* make sure the warm up period is long enough to support the */
/* requested checkpoint interval. */
if( 0 >= ( pContext->CkptStartOffset = pContext->WarmUpTime +
    pContext->Proximity + CkptProximAddOffset -
    pContext->CheckpointInterval ) )
{
    return( SCRerr( SCR_E_WARMUP_TOO_SHORT ); )
}

/* Since we've made it through all our checks, we can do checkpoints. */
pContext->DoCheckpoints = TRUE;
if( ( 0 < pContext->Proximity ) && ( 0 < CkptProximAddOffset ) )
{
    SCRlog( "\tProximity = %7.2f",
        pContext->Proximity );
    SCRlog( "\tAdditional Proximity Offset = %7.2f",
        CkptProximAddOffset );
    SCRlog( "\tTotal Checkpoint Offset = %7.2f\n",
        pContext->Proximity + CkptProximAddOffset );
}
else if( 0 < pContext->Proximity )
{
    SCRlog( "\tProximity = %7.2f\n",
        pContext->Proximity );
}
else if( 0 < CkptProximAddOffset )
{
    SCRlog( "\tCheckpoint Offset = %7.2f\n",
        CkptProximAddOffset );
}
else
{
    SCRlog( "Master: Checkpoints will not be done." );
}
}

/* If we're not going all the way to a real database, then there is */
/* no point in doing any of this. */
if( 0 < pContext->AdminUsers )
{
    SCRlog( "\tAudit utilities will be run." );

    /* Get all the BE info we're going to need. */
    if( SCR_E_SUCCESS != ( Status = GetBeInfo( pContext ) ) )
    {
        ( void ) SCRerr( SCR_E_GET_BE_INFO );
        return( Status );
    }

    Status = UTILGetAuditFunctionNetworkVariables( &pContext->BeTasksData );
    if( SCR_E_SUCCESS != Status )
    {
        SCRlog( "Error getting audit function net vars." );
        return( Status );
    }
    else
    {
        SCRlog( "\tDatabase type is %s", pContext->BeTasksData.DbTypeStr );
    }
}

return( SCR_E_SUCCESS );
} /* End of Init */

int32
InitAides( master_data_t *pContext )
{
    int32 AideID;
    int32 Index;
    int32 Status;

    Status = SCR_E_SUCCESS;

```

```

if( 0 < pContext->NumFES || 0 < pContext->AdminUsers )
{
    SCRlog( "\tAides being created and initialized.\n\n" );

    pContext->RequestsSent = 0;
    pContext->RepliesReceived = 0;
    pContext->AidesStatus = SCR_E_SUCCESS;
    pContext->MsgTimedOut = FALSE;

    for( Index = 0; Index < pContext->NumConnects; Index++ )
    {
        if( ! pContext->pConnects[Index].ConfConn &&
            ! pContext->pConnects[Index].AdminConn )
        {
            pContext->pConnects[Index].AideID = 0;
            continue;
        }
        AideID = PRTEexecute_script( pContext->AideScriptName,
                                   pContext-
>pConnects[Index].RTEName,
                                   I, pContext-
>pConnects[Index].FEName, 0.0 );
        if( -1 == AideID )
        {
            Status = SCRerr( SCR_E_AIDE_CREATE_FAILED );
            SCRlog( "\tPausing.\n" );
            PRTEpause();
            return( Status );
        }

        PRTEstart_users( AideID, AideID );

        /* Keep track of the aide's ID */
        pContext->pConnects[Index].AideID = AideID;
        pContext->RequestsSent++;
    }

    pContext->MsgTimedOut = TRUE;
    PRTEdelay( pContext->MsgTimeout );
    SCRlog( "Master: Resuming.\n" );

    if( pContext->MsgTimedOut )
    {
        /* We timed out waiting to hear from the aides. */
        Status = SCRerr( SCR_E_AIDE_INIT_TIMEOUT );
        SCRlog( "\tPausing indefinitely....\n\n" );
        PRTEpause();
    }

    if( SCR_E_SUCCESS != pContext->AidesStatus )
    {
        Status = SCRerr( pContext->AidesStatus );
        SCRlog( "\tNot all aides initialized correctly. Pausing.\n" );
        PRTEpause();
    }
    else
    {
        SCRlog( "\tAides successfully initialized.\n" );
    }
}

return( Status );
}

/*****
*****/
/*
/* Name: InitFES
/*
/* Purpose: This function causes the application code to be loaded in the FE. */
/*
/* Inputs:
/*
/* Outputs:
/*
/* Function Value:
/*
/* Notes:

```

```

*/
/*****
*****/
int32
InitFES( master_data_t *pContext )
{
    int32
    load_fe_msg_t
    int32
    Index;
    LoadFEMsg;
    Status;

    /* Check if we have any FEs to start. */
    if( 0 == pContext->NumFES )
    {
        return( SCR_E_SUCCESS );
    }

    /* Get the timeout value to use when loading the user dll. */
    SCR_getnet_int( "LOAD_FE_TIMEOUT", LOAD_FE_TIMEOUT_DEFAULT,
                  &LoadFEMsg.Data.Timeout );
    SCRlog( "\tFE(s) being loaded. FE Load Timeout = %d\n",
            LoadFEMsg.Data.Timeout );

    LoadFEMsg.Type = LOAD_FE_REQUEST_MSG;

    pContext->RequestsSent = 0;
    pContext->RepliesReceived = 0;
    pContext->AidesStatus = SCR_E_SUCCESS;
    pContext->MsgTimedOut = TRUE;

    for( Index = 0; Index < pContext->NumConnects; Index++ )
    {
        if( ! pContext->pConnects[Index].ConfConn )
        {
            continue;
        }

        strcpy( LoadFEMsg.Data.FEName, pContext->pConnects[Index].FEName );
        #pragma message ("FIXME: the cgi script (dll) name is possibly different. This code
should parse a comma separated list? Not here, but where the CgiScriptName is
originally loaded.")
        strcpy( LoadFEMsg.Data.CgiScriptName, pContext->CgiScriptName );

        PRTEmessage_to_user_binary( sizeof( LoadFEMsg ), &LoadFEMsg,
                                   pContext-
>pConnects[Index].AideID,
                                   pContext-
>pConnects[Index].AideID );
        pContext->RequestsSent++;
    }

    PRTEdelay( LoadFEMsg.Data.Timeout );

    Status = SCR_E_SUCCESS;
    if( pContext->MsgTimedOut )
    {
        /* We timed out waiting to hear from the aide(s). */
        Status = SCRerr( SCR_E_LOAD_FE_TIMEOUT );
    }
    else if( SCR_E_SUCCESS != pContext->AidesStatus )
    {
        Status = SCRerr( pContext->AidesStatus );
        Status = SCRerr( SCR_E_LOAD_FE_FAILURE );
    }
    else
    {
        SCRlog( "\tFE(s) successfully loaded.\n" );
    }

    if( SCR_E_SUCCESS != Status )
    {
        SCRlog( "\tFailed to load FEs' application code. Pausing.\n" );
        PRTEpause();
    }

    return( Status );
}

int32
InitReducer( master_data_t *pContext )

```

```

{
int32                Status;

Status = SCR_E_SUCCESS;

/* Tell reducer to initialize. We'll resume ourselves from in the*/
/* binary message handler once we hear back from reducer.          */
SCRlog( "\tReducer being created.\n\n" );

pContext->ReducerStatus = SCR_E_SUCCESS;
pContext->MsgTimedOut = FALSE;

pContext->ReducerID = PRTEexecute_script( pContext->ReducerScriptName,
>ReducerScriptNode,
1, "", 0.0 );

if( -1 == pContext->ReducerID )
{
Status = SCRerr( SCR_E_REDUCE_CREATE_FAILED );
SCRlog( "\tPausing.\n" );
PRTEpause();
}
else
{
SCRlog( "\tReducer being told to initialize.\n\n" );
PRTEstart_users( pContext->ReducerID, pContext->ReducerID );

pContext->MsgTimedOut = TRUE;
PRTEdelay( pContext->MsgTimeout );
SCRlog( "Master: Resuming.\n" );
}

if( pContext->MsgTimedOut )
{
/* We timed out waiting to hear from the reducer. */
Status = SCRerr( SCR_E_REDUCE_INIT_TIMEOUT );
SCRlog( "\tPausing.\n" );
PRTEpause();
}

if( SCR_E_SUCCESS != pContext->ReducerStatus )
{
SCRlog( "\tReducer failed to initialize correctly. Pausing.\n" );
PRTEpause();
}
else
{
SCRlog( "\tReducer successfully initialized.\n" );
}

return( Status );
}

```

```

/*****
*****/
/*
/* Name: MakeRunDir
/*
/* Purpose: This function creates the run results directory.
/*
/* Inputs:
/* DirName: Pointer to the parent directory where there run directory
/* should be created.
/*
/* Outputs: Returns the run-dir number, or -1, there was an error
/*
/*
/* Function Value: a char * to a memory location where the name of the newly
/* created directory is (i.e. a null terminated string).
/*
/* Notes:
/*
*****/

```

```
int32
```

```

MakeRunDir(char *DirName, char *RunDir)
{
#ifdef _WIN32
HANDLE find_handle = INVALID_HANDLE_VALUE;
WIN32_FIND_DATA find_data;
#else
DIR *pDir;
struct dirent *Entry;
#endif
char *c;
char FormatStr[MAX_RUN_DIR_NAME_LEN + 3]; /* + 3 is
for %0 d/. */
int MaxDir=0;
int NewDir=0;
int Len;
mode_t Mode = 0770;

/* Make sure we got something for input. */
if( NULL == DirName )
return -1;

/* Now open the directory, read all entries, and find the current max. */
/* In the WIN32 version, things are based on a group of files, in the */
/* Unix version, things are based on a directory. */
#ifdef _WIN32
strcpy(RunDir, DirName);
strcat(RunDir, "\\");
find_handle = FindFirstFile(( LPTSTR )RunDir, &find_data );
if( INVALID_HANDLE_VALUE == find_handle )
return -1;

do
{
c = find_data.cFileName;
while( (*c != '\0') && (0' <= *c) && (*c <= '9') )
{
c++;
}

if ( '\0' == *c )
{
MaxDir = maximum(MaxDir, atoi(find_data.cFileName));
}
} while( FindNextFile( find_handle, &find_data ));

(void)FindClose( find_handle );
#else
if( NULL == (pDir = opendir(DirName)))
{
return -1;
}

/* Check each entry in the directory. */
for (Entry = readdir(pDir); Entry != NULL; Entry = readdir(pDir))
{
/* Make sure the name is all numbers. */
c = Entry->d_name;
while( (c != '\0') && (0' <= *c) && (*c <= '9') )
{
c++;
}

if ( '\0' == *c )
{
MaxDir = maximum(MaxDir, atoi(Entry->d_name));
}
}

closedir(pDir);
#endif

/* The next dir will be "1 more" than the max found. */
NewDir = MaxDir + 1;

/* Move the parent directory name into the run directory. */
strcpy(RunDir,DirName);

/* Make sure we end with a directory separator. */
Len = strlen(RunDir);
if ( '/' != RunDir[Len])

```



```

{
  RunDir[Len++] = '/';
}

/* NOTE: The value of 3 is hardcoded below. This allows up to 999 run */
/* directories which should be reasonable enough for anyone. Also note */
/* that we need to bump the value of Len, so that it continues to */
/* point to the end of the full name. */
sprintf(FormatStr,"%0%dd", MAX_RUN_DIR_NAME_LEN);
sprintf(&RunDir[Len], FormatStr, NewDir);
Len += 4; /* Size of field above plus "/" */

/* Now actually make the run directory. */
if ( -1 == MKDIR(RunDir, Mode) )
{
  return -1;
}
SCRlog("\tRun Dir = %s", RunDir);
PRTEset_network_variable("RUN_DIR", RunDir);

/* Now temporarily add the log dir to the run dir, make the log dir, and */
/* then remove the log portion of the path so we're just left with run */
/* dir again. */
strcat(RunDir, LOG_DIR);
if ( -1 == MKDIR(RunDir, Mode) )
{
  return -1;
}
PRTEset_network_variable("LOG_DIR", RunDir);
RunDir[Len] = '\0';

return NewDir;
}

/*****
*****/
/*
/* Name: StartFES
/* Purpose: This function causes the FEs to be started.
/* Inputs:
/* Outputs:
/* Function Value:
/* Notes:
*****/
int32
StartFES( master_data_t *pContext )
{
  int32 Index;
  start_fe_msg_t StartFEMsg;
  start_fe_msg_t *pStartFEMsg = &StartFEMsg;
  double StartTimeout;
  int32 Status;

  Status = SCR_E_SUCCESS;
  if( 0 == pContext->NumFES )
  {
    return( SCR_E_SUCCESS );
  }

#pragma message ("FIXME: Should there be a separate start timeout as network
variable?")
  StartTimeout = pContext->MsgTimeout;

  pContext->RequestsSent = 0;
  pContext->RepliesReceived = 0;
  pContext->AidesStatus = SCR_E_SUCCESS;
  pContext->MsgTimedOut = TRUE;
  pStartFEMsg->Type = START_FE_REQUEST_MSG;
  pStartFEMsg->Data.Timeout = StartTimeout;
  for( Index = 0; Index < pContext->NumConnects; Index++ )
  {
    if( ! pContext->pConnects[Index].ConfConn )

```

```

{
  continue;
}
else if( FE_RESTART_ALWAYS != pContext->RestartFES &&
! pContext->pConnects[Index].ConfMod )
{
  continue;
}
strcpy( pStartFEMsg->Data.FEName, pContext->pConnects[Index].FEName );
PRTEmessage_to_user_binary( sizeof( *pStartFEMsg ), pStartFEMsg,
pContext-
pConnects[Index].AideID,
pContext-
pConnects[Index].AideID );
pContext->RequestsSent++;
SCRlog( "\tStarting %s.", pContext->pConnects[Index].FEName );
}

/* Now wait for replies. */
if( 0 == pContext->RequestsSent )
{
  return( SCR_E_SUCCESS );
}

/* Wait as long as the Aides do to start FEs plus the msg timeout. */
PRTEdelay( StartTimeout + pContext->MsgTimeout );

if( pContext->MsgTimedOut )
{
  Status = SCRerr( SCR_E_AIDE_TIMEOUT_START_FE );
  SCRlog( "Pausing...\n" );
  PRTEpause();
}

if( SCR_E_SUCCESS != pContext->AidesStatus )
{
  Status = SCRerr( pContext->AidesStatus );
  Status = SCRerr( SCR_E_AIDES_FAILED_START );
}
else
{
  for( Index = 0; Index < pContext->NumConnects; Index++ )
  {
    if( ! pContext->pConnects[Index].ConfConn )
    {
      continue;
    }
    else if( FE_RESTART_ALWAYS != pContext->RestartFES &&
! pContext->pConnects[Index].ConfMod )
    {
      continue;
    }
    SCRlog( "\tSuccessfully started %s.",
pContext->pConnects[Index].FEName );
  }
}

return( Status );
}

int32
StopAides( master_data_t *pContext )
{
  generic_msg_t GenericMsg;
  int32 Index;
  int32 Status;

  Status = SCR_E_SUCCESS;

  if( 0 < pContext->NumFES || 0 < pContext->AdminUsers )
  {
    SCRlog( "\tAides being told to exit." );
    pContext->RequestsSent = 0;
    GenericMsg.Type = AIDE_EXIT_REQUEST_MSG;
    pContext->RepliesReceived = 0;
    pContext->AidesStatus = SCR_E_SUCCESS;
    pContext->MsgTimedOut = TRUE;

```

```

for( Index = 0; Index < pContext->NumConnects; Index++)
{
    if( ! pContext->pConnects[Index].ConfConn )
    {
        continue;
    }
    PRTEmessage_to_user_binary( sizeof( GenericMsg ), &GenericMsg,
                               pContext-
>pConnects[Index].AideID,
                               pContext-
>pConnects[Index].AideID );
    pContext->RequestsSent++;
}

PRTEdelay( pContext->MsgTimeout );

if( pContext->MsgTimedOut )
{
    Status = SCRerr( SCR_E_AIDE_EXIT_TIMEOUT );
}

if( SCR_E_SUCCESS != pContext->AidesStatus )
{
    Status = SCRerr( pContext->AidesStatus );
    SCRlog( "Not all aides exited successfully." );
}
else
{
    SCRlog( "\t%d Aides exited successfully.\n", pContext->ReplysReceived );
}

return( Status );
}

/*****
*****/
/* Name: StopFES */
/* Purpose: This function causes the FEs to be stopped. */
/* Inputs: */
/* Outputs: */
/* Function Value: */
/* Notes: */
*****/
int32
StopFES( master_data_t *pContext )
{
    int32 Index;
    stop_fe_msg_t StopFEMsg;
    stop_fe_msg_t *pStopFEMsg = &StopFEMsg;
    double StopTimeout;
    int32 Status;

    Status = SCR_E_SUCCESS;
    if( 0 == pContext->NumFES )
    {
        return( SCR_E_SUCCESS );
    }

#pragma message ("FIXME: Should there be a separate stop timeout as network
variable?")
    StopTimeout = pContext->MsgTimeout;

    pContext->RequestsSent = 0;
    pContext->ReplysReceived = 0;
    pContext->AidesStatus = SCR_E_SUCCESS;
    pContext->MsgTimedOut = TRUE;
    pStopFEMsg->Type = STOP_FE_REQUEST_MSG;
    pStopFEMsg->Data.Timeout = StopTimeout;
    pStopFEMsg->Data.Reboot = pContext->FERestartViaReboot;
    for( Index = 0; Index < pContext->NumConnects; Index++)

```

```

{
    if( ! pContext->pConnects[Index].ConfConn )
    {
        continue;
    }
    else if( FE_RESTART_ALWAYS != pContext->RestartFES &&
            ! pContext->pConnects[Index].ConfMod )
    {
        continue;
    }
    strcpy( pStopFEMsg->Data.FEName, pContext->pConnects[Index].FEName );
    PRTEmessage_to_user_binary( sizeof( *pStopFEMsg ), pStopFEMsg,
                               pContext-
>pConnects[Index].AideID,
                               pContext-
>pConnects[Index].AideID );
    pContext->RequestsSent++;
    SCRlog( "\tStopping %s.", pContext->pConnects[Index].FEName );
}

/* Now wait for replies. */
if( 0 == pContext->RequestsSent )
{
    return( SCR_E_SUCCESS );
}

/* Wait as long as the Aides do to stop FEs plus the msg timeout. */
PRTEdelay( StopTimeout + pContext->MsgTimeout );

if( pContext->MsgTimedOut )
{
    Status = SCRerr( SCR_E_AIDE_TIMEOUT_STOP_FE );
    SCRlog( "Pausing...\n" );
    PRTEpause();
}

if( SCR_E_SUCCESS != pContext->AidesStatus )
{
    Status = SCRerr( pContext->AidesStatus );
    Status = SCRerr( SCR_E_AIDES_FAILED_STOP );
}
else
{
    for( Index = 0; Index < pContext->NumConnects; Index++)
    {
        if( ! pContext->pConnects[Index].ConfConn )
        {
            continue;
        }
        else if( FE_RESTART_ALWAYS != pContext->RestartFES &&
                ! pContext->pConnects[Index].ConfMod )
        {
            continue;
        }
        SCRlog( "\tSuccessfully stopped %s.",
                pContext->pConnects[Index].FEName );
    }
}

return( Status );
}

int32
StopReducer( master_data_t *pContext )
{
    /* Nothing to be done here. */
    return( SCR_E_SUCCESS );
}

void
TellAidesTo( master_data_t *pContext, int32 Task, int32 State )
{
    int32 BeIndex;
    int32 Index;
    generic_dotask_msg_t SendMsg;

```



```

pContext->RepliesReceived = 0;
pContext->AidesStatus = SCR_E_SUCCESS;
pContext->MsgTimedOut = TRUE;

for( Index = 0; Index < pContext->NumConnects; Index++ )
{
    if( ! pContext->pConnects[Index].AdminConn )
    {
        continue;
    }
    PRTEmessage_to_user_binary( sizeof( GenericMsg ), &GenericMsg,
    pContext-
>pConnects[Index].AideID,
    pContext-
>pConnects[Index].AideID );
    pContext->RequestsSent++;
}

PRTEdelay( pContext->MsgTimeout );

if( pContext->MsgTimedOut )
{
    ( void ) SCRerr( SCR_E_AIDE_CKPT_STOP_TIMEOUT );
    SCRlog( "Pausing indefinitely...\n\n" );
    PRTEpause();
}

if( SCR_E_SUCCESS != pContext->AidesStatus )
{
    Status = SCRerr( pContext->AidesStatus );
    SCRlog( "Not all aides successfully ran checkpoint loop." );
    SCRlog( "Pausing...\n\n" );
    PRTEpause();
}

SCRlog( "\t%d Aides successfully ran checkpoint loop.\n",
    pContext->RepliesReceived );
}

/* Break reducer out of his "infinite process data" loop. */
PRTEstop_users( pContext->ReducerID, pContext->ReducerID );
PRTEpause();

/* Tell the reducer to stop users. */
SCRlog("\tPausing while users stop doing transactions.\n\n");
pContext->ReducerStatus = SCR_E_SUCCESS;
PRTEresume_users( pContext->ReducerID, pContext->ReducerID );
PRTEpause();

SCRlog("Master: Resuming.\n");

if( SCR_E_SUCCESS != pContext->ReducerStatus )
{
    SCRlog( "\tUsers failed to stop successfully. Pausing.\n" );
    PRTEpause();
}
else
{
    SCRlog( "\tAll users successfully stopped doing transactions.\n" );
}

/* If we're doing checkpoints, have the aides disconnect checkpoint stuff. */
if( pContext->DoCheckpoints )
{
    SCRlog( "\t%d Aides disconnecting checkpoint sub-systems.",
    pContext->AdminUsers );
    CheckpointDisconnect.Type = CHECKPOINT_DISCONNECT_REQUEST_MSG;
    strcpy( CheckpointDisconnect.Data.Dll, pContext->CgiScriptName );
    pContext->RequestsSent = 0;
    pContext->RepliesReceived = 0;
    pContext->AidesStatus = SCR_E_SUCCESS;
    pContext->MsgTimedOut = TRUE;

    for( Index = 0; Index < pContext->NumConnects; Index++ )
    {
        if( ! pContext->pConnects[Index].AdminConn )
        {
            continue;
        }
        strcpy( CheckpointDisconnect.Data.FENName,
            pContext->pConnects[Index].FENName );
        PRTEmessage_to_user_binary( sizeof( CheckpointDisconnect ),
            &CheckpointDisconnect,
            pContext-
>pConnects[Index].AideID,
            pContext-
>pConnects[Index].AideID );
        pContext->RequestsSent++;
    }

    PRTEdelay( pContext->MsgTimeout );

    if( pContext->MsgTimedOut )
    {
        ( void ) SCRerr( SCR_E_AIDE_CKPT_DISCONNECT_TIMEOUT );
        SCRlog( "Pausing indefinitely...\n\n" );
        PRTEpause();
    }

    if( SCR_E_SUCCESS != pContext->AidesStatus )
    {
        Status = SCRerr( pContext->AidesStatus );
        SCRlog( "Not all aides did checkpoint disconnect successfully." );
        SCRlog( "Pausing...\n\n" );
        PRTEpause();
    }

    SCRlog( "\t%d Aides successfully disconnected checkpoint sub-systems.\n",
        pContext->RepliesReceived );
}

/* Tell the reducer to post process data. */
SCRlog("\tPost process binary logfile.\n\n");

pContext->ReducerStatus = SCR_E_SUCCESS;
PRTEresume_users( pContext->ReducerID, pContext->ReducerID );
PRTEpause();

SCRlog("Master: Resuming.\n");

/* Do post-test back-end functions */

/* If Checkpoints requested then do Back-end Checkpoint stuff */
if( pContext->DoCheckpoints )
{
    TellAidesTo( pContext, BE_CKPTDATA_REQUEST_MSG, AFTER );
}

/* For Oracle, do switch logfile. If stats requested, do stats end
script, too */

/* If GetAllAuditFiles specified -- get the log size info */
if( pContext->BeTasksData.GetAllAuditFiles )
{
    TellAidesTo( pContext, GET_LOGSIZE_REQUEST_MSG, AFTER );
}

if( pContext->BeTasksData.DbType == DB_TYPE_ORACLE )
{
    if( pContext->BeTasksData.OraStatScriptPath[0] )
        TellAidesTo( pContext, ORA_DOSTATS_REQUEST_MSG, AFTER );

    TellAidesTo( pContext, ORA_SWITCHLOG_REQUEST_MSG, AFTER );
}

/* If custom script specified -- go do it */
if( pContext->BeTasksData.CustomAfterTestScript[0] )
    TellAidesTo( pContext, DO_CUSTOM_SCRIPT_REQUEST_MSG, AFTER );

/* Tell the reducer to post process data. */
SCRlog("\tPost process aide logfiles.\n\n");

pContext->ReducerStatus = SCR_E_SUCCESS;
PRTEresume_users( pContext->ReducerID, pContext->ReducerID );

```

```

PRTEpause();

SCRlog("Master: Resuming.\n");

/* Tell any aides to exit. */
Status = StopAides( pContext );

Status = StopReducer( pContext );

free( pContext->pConnects );

SCRlog( "\n\n\n\t\t\t\t\t.END OF TEST.\n\n\n" );

#pragma message ("FIXME: This routine needs to keep a running track of the status of
all operations.")
return( Status );
}

```

tpcc_user.c

```

/*_+*****
*****
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*
*
*
*****_*/

/* This script is the main script for each tpcc user. It
handles communications with other scripts, control
of the transaction mix and initialization and shutdown of
of each user. It calls routines in tpcc_gen.c to
get the actual data for each transaction.
*/

#include <stdio.h>
#include <stdlib.h>
#include <string.h>
#include <sys/types.h>
#include <sys/stat.h>
#include <errno.h>
#ifdef _WIN32
#include <nt_lib.h>
#include <time.h>
#endif

#include <stdtypes.h>

```

```

#include <prte.h>
#include <common.h>

#include <tpccstruct.h>
#include <tpccapi.h>
#include <tpccerr.h>
#include <transpool.h>
#include <config.h>

#include <scr_util.h>

#include <msg.h>
#include <netvar.h>
#include <tx_api.h>

/* Maximum values set for strings and such */
#define MAXSTRINGSIZE 4096

typedef struct _user_context_t {
    long                myseed;
    char                *Version;
    txn_context_t       TxnContext;
} user_context_t;

/* Prototypes */
void BinMsgHandler(void *Context, int SendersID, int Len, void *Msg);
void DisconnectExit(user_context_t *pContext, int status, int Disconnect);
int Init(user_context_t *pContext);

/* globals variables */

void
main(int argc, char *argv[])
{
    generic_status_msg_t StatusMsg;
    user_login_reply_msg_t LoginMsg;
    user_context_t       Context;
    user_context_t       *pContext = &Context;

    /* Init PRTE */
    PRTEinit(argc,argv);

    /* Register binary message handler with PRTE. */
    /* This must be done before the user pauses so he can wake himself in */
    /* response to a transaction message. */
    PRTEcatch_message_binary(BinMsgHandler, pContext);

    /* Initialize transaction timing records. */
    pContext->TxnContext.TxnTiming.Data.MenuStart = 0.0;
    pContext->TxnContext.TxnTiming.Data.MenuResponse = 0.0;
    pContext->TxnContext.TxnTiming.Data.TxnStart = 0.0;
    pContext->TxnContext.TxnTiming.Data.TxnResponse = 0.0;

    /* Let the reducer know we are initialized. */
    pContext->TxnContext.ReducerID =
        atoi( PRTEwait_for_network_variable( "REDUCER_ID" ) );
    StatusMsg.Status = SCR_E_SUCCESS;
    StatusMsg.Type = USER_INIT_REPLY_MSG;
    PRTEmessage_to_user_binary( sizeof( StatusMsg ), &StatusMsg,
                               pContext->TxnContext.ReducerID,
                               pContext->TxnContext.ReducerID );

    /* Wait to be told to continue */
    PRTEpause();

    LoginMsg.Type = USER_LOGIN_REPLY_MSG;

    /* Get variables to figure out what to do */
    if( SCR_E_SUCCESS != ( LoginMsg.Status = Init( pContext ) ) )
    {
        /* Exit, but don't need to disconnect since we haven't connected yet. */
        PRTEmessage_to_user_binary( sizeof( LoginMsg ), &LoginMsg,
                                   pContext->TxnContext.ReducerID,
                                   pContext->TxnContext.ReducerID
        );
        DisconnectExit ( pContext, LoginMsg.Status, FALSE );
    }

    if( SCR_E_SUCCESS != ( LoginMsg.Status = StartupTxn( &pContext->TxnContext
    ) ) )

```

```

{
/* Disconnect application and exit. */
PRTEmessage_to_user_binary( sizeof( LoginMsg ), &LoginMsg,
                             pContext->TxnContext.ReducerID,
                             pContext->TxnContext.ReducerID
);
DisconnectExit( pContext, LoginMsg.Status, FALSE );
}

/* Connect to the SUT and database*/
LoginMsg.Status = ConnectTxn( &pContext->TxnContext, CONNECT_TRANS,
                              &LoginMsg.Data );
if( SCR_E_SUCCESS != LoginMsg.Status )
{
/* Disconnect application and exit. */
PRTEmessage_to_user_binary( sizeof( LoginMsg ), &LoginMsg,
                             pContext->TxnContext.ReducerID,
                             pContext->TxnContext.ReducerID
);
DisconnectExit( pContext, LoginMsg.Status, FALSE );
}

LoginMsg.Status = SCR_E_SUCCESS;
PRTEmessage_to_user_binary( sizeof(LoginMsg), &LoginMsg,
                             pContext->TxnContext.ReducerID,
                             pContext->TxnContext.ReducerID );

/* Now execute the transaction loop. */
StatusMsg.Status = DequeueExecLoopTxn( &pContext->TxnContext );

/* We're done doing transactions either because the test is over, or */
/* because we encountered an error. In either event, disconnect the */
/* application and exit. */
DisconnectExit( pContext, StatusMsg.Status, TRUE );
}

```

```

/*****
*****/
/*
/* Name: BinMsgHandler
/*
/* Purpose: This is the message handler that gets registered with PRTE for
/* processing binary messages sent to the User.
/*
/* Inputs:
/* Context: Pointer to the context structure. This structure is set
/* up elsewhere, and registered with PRTE to be passed in.
/* SendersID: User ID number of the user that sent us the binary
/* message.
/* Len: Length of the binary message in bytes.
/* Msg: Pointer to the actual data being sent.
/*
/* Outputs: This routine records the data sent into the user and uses it to
/* define the next transaction.
/*
/* Function Value: void
/*
/* Notes: This funtion is called on our behalf by PRTE. In order for this
/* to happen, we must be inside a call to some PRTE function. If we
/* are running code outside a PRTE function, PRTE will not interrupt
/* us (i.e. no signal is sent). It is only when we are inside a PRTE
/* function call (e.g. PRTEdelay, etc.) that PRTE will check to see if
/* we have a message that needs processing.
*****/
void
BinMsgHandler( void *Context, int SendersID, int Len, void *Msg )
{
user_context_t *pContext;

/* NOTE: These structures are prone to possible bugs if the user sending
/* the message is on one platform with one type of structure padding
/* rule, and the receiver is on another platform with a different padding

```

```

/* rule.
generic_msg_t *pMsg;
start_msg_t *pStartMsg;
txn_msg_t *pTxnMsg;

/* Effectively convert void * parameters to correct types. */
pMsg = Msg;
pContext = Context;

/* Process message based on its type. */
switch( pMsg->Type ) {
case USER_LOGIN_REQUEST_MSG:
PRTEresume( );
break;

case USER_START_REQUEST_MSG:
pStartMsg = Msg;
EnqueueTxn( &pContext->TxnContext, TXN_CACHE_SIZE, &pStartMsg-
>Data[0] );
break;

case TXN_MSG:
pTxnMsg = Msg;
EnqueueTxn( &pContext->TxnContext, 1, &pTxnMsg->Data );
break;

case USER_STOP_REQUEST_MSG:
PRTEstop( );
PRTEdelay( 0.0 );
break;

default:
SCRlog( "User: Received unknown message type: %d", *pMsg );
}

void
DisconnectExit(user_context_t *pContext, int Status, int Disconnect)
{
user_exit_msg_t ExitMsg;
char tmp_buf[128];
int LocStatus;

/* Disconnect from any application if told to. */
if ( TRUE == Disconnect )
{
LocStatus = DisconnectTxn( &pContext->TxnContext, DISCONNECT_TRANS );
if( SCR_E_SUCCESS != LocStatus )
{
SCRerr( LocStatus );
SCRlog( "User %d: Failed to disconnect from application.", User_id );
}
}

LocStatus = ShutdownTxn( &pContext->TxnContext );
if( SCR_E_SUCCESS != LocStatus )
{
SCRerr( LocStatus );
SCRlog( "User %d: Failed to shutdown application.", User_id );
}

/* Make sure we get our log file flushed out by turning on flushing,
/* and sending a final message.
Flush_log = TRUE;
if (Status == SCR_E_SUCCESS)
{
sprintf(tmp_buf, "User %d: Exited gracefully as a swan.", User_id);
PRTEto_log(110, tmp_buf);
}
else
{
SCRlog( "User %d: Exited with fatal error (%d).", User_id, Status );
SCRerr( Status );
}

/* Log our exit status with the reducer.
ExitMsg.Type = USER_EXIT_MSG;
ExitMsg.Data.Status = Status;
ExitMsg.Data.ExitTime = PRTEtimer_begin ( "x" );

```

```

PRTEtimer_cancel();
PRTEmessage_to_user_binary( sizeof(ExitMsg), &ExitMsg,
                           pContext->TxnContext.ReducerID,
                           pContext->TxnContext.ReducerID
);

PRTEexit();
}

```

```

int
Init( user_context_t *pContext )
{
    char temp_string[128];
    char *pNetVarStr;
    char *master_seed;
    int temp_int;

    /* Get the log file and logging type set up. It is important to do this */
    /* first because we need these in place for PRTEto_log calls to work. */

    /* LOG_DIR is a network variable set by master. */
    SCR_getnet_string("LOG_DIR", LOG_DIR_DEFAULT, temp_string);
    if ( \0' == temp_string[0] )
    {
        return( SCRerr( SCR_E_LOG_DIR_NOT_SET ));
    }
    else
    {
        strcpy( Log_path, temp_string);
        strcpy( Err_path, temp_string);
    }

    /* The error log name is built based on the user id. */
    sprintf(temp_string, "user_%d.err", User_id);
    strcpy( Err_name, temp_string);

    /* The log name is built based on the user id. */
    sprintf(temp_string, "user_%d.log", User_id);
    strcpy( Log_name, temp_string);

    /* Get/set the logging type. Logging_type is a bit mask. */
    /* Its values are defined in prte.h. */
    SCR_getnet_int("TPCC_USER_LOG_TYPE",
                  TPCC_USER_LOG_TYPE_DEFAULT,
                  &Logging_type);
    Logging_type |= (USER_SUT_DATA_LOGGING);

    /* Set our version based on compile command line defined constant. */
    pContext->Version = VERSION;

    /* Verify our version with the master's. */
    pNetVarStr = PRTEget_network_variable("TPCC_SCRIPTS_VERSION");
    if( NULL == pNetVarStr )
    {
        /* The required network variable was not set. */
        return( SCRerr( SCR_E_CODE_VERSION_NOT_SET ));
    }
    else if( STRING_MATCH != strcmp( pContext->Version, pNetVarStr ))
    {
        SCRlog( "User code version = %s, Master code version = %s.",
              pContext->Version, pNetVarStr );
        return( SCRerr( SCR_E_CODE_VERSION_MISMATCH ));
    }

    /* Get/set the flush log type. */
    SCR_getnet_int("TPCC_USER_FLUSH_LOG",
                  TPCC_USER_FLUSH_LOG_DEFAULT,
                  &Flush_log);

    /* Find out if we're running in RTE run mode. */
    SCR_getnet_int( "RUN_MODE", RUN_MODE_DEFAULT,
                  &pContext->TxnContext.RunMode );

    /* Get the cgi script name. */
    SCR_getnet_string( "CGI_SCRIPT_NAME", CGI_SCRIPT_NAME_DEFAULT,
                     pContext->TxnContext.CgiScriptName );
    if( \0' == *pContext->TxnContext.CgiScriptName )

```

```

{
    return( SCRerr( SCR_E_CGI_SCRIPT_NAME_NOT_SET ));
}

/* Get the seed from the master (or input file) and make it unique for each */
/* user - then initialize the random functions. Force the seed to be odd. */
master_seed = PRTEwait_for_network_variable("SEED");
pContext->myseed = ( atol( master_seed ) * User_id * 2000 ) + 1;

PRTErandomize(((unsigned) pContext->myseed % 100)); /* seed PRTE random */
srand48(pContext->myseed); /* seeds the rand48 random
function */

/* Find out if we're running a durability test. */
SCR_getnet_bool( "DURABILITY_LOGGING",
DURABILITY_LOGGING_DEFAULT,
                &pContext->TxnContext.DurabilityLogging );

/* Calculate the w_id and d_id for this User */
pNetVarStr = PRTEget_network_variable( "FIRST_USER_ID" );
if( NULL == pNetVarStr )
{
    return( SCRerr( SCR_E_FIRST_USER_ID_NOT_SET ));
}

temp_int = User_id - atoi( pNetVarStr );
pContext->TxnContext.w_id = ( temp_int / 10 ) + 1;
pContext->TxnContext.d_id = ( temp_int % 10 ) + 1;

/* Get the value we should use for C_LAST. */
SCR_getnet_int( "C_LAST", C_LAST_DEFAULT, &( pContext-
>TxnContext.CLast ));

return( SCR_E_SUCCESS );
}

```


Appendix D

WFTPCC1

```

ident            "WFTPCC1"

options          UERF
options          OSF
options          _LMF_
options          BIN_COMPAT
options          COMPAT_43
options          MACH
options          MACH_IPC_TCACHE
options          MACH_IPC_WWA
options          MACH_IPC_XXXHACK
options          BUFCACHE_STATS
options          INOCACHE_STATS
options          STAT_TIME
options          VAGUE_STATS
options          UFS
options          NFS
options          AUTOFS
options          NFS_SERVER
options          MSFS
options          STRKINFO
options          STREAMS
options          LDTTY
options          RPTY
options          INET
options          UIPC
options          SYSV_COFF
options          QUOTA
options          LABELS

options          SL
options          SNMPINFO

options          DLI
options          BSD_TTY

options          BPARM

options          FFM_FS
options          DLB

options          PROCFS

#
# Standard options.
#
options          UNIX_LOCKS
options          SER_COMPAT
options          RT_PREEMPT
options          RT_SCHED
options          RT_SCHED_RQ
options          RT_PML
options          RT_TIMER
options          RT_SEM
options          RT_CSEM
options          RT_IPC
#
makeoptionsCDEBUGOPTS="-g3"
makeoptionsCCOMPRESS="-compress"
makeoptionsPROFOPTS="-DPROFILING -DPROFTYPE=4"
makeoptionsLOADADDR="ffffff0000830000"
#
# Special options (see configuring the kernel chapter
# in the Guide to System Administration)
#
cpu              "ALPHAWILDFIRE"
makeoptionsLOADADDR="ffffff00000000 -Nu"
machine          alpha

config           vmunix      swap generic

bus             isa0      at *
callout after_c "../bin/mkdata isa"

```

```

#
# Static Driver Definitions
#
config_driver mchan
config_driver tu
config_driver alt
config_driver ata
config_driver fdi
config_driver lp
config_driver ace
config_driver gpc
config_driver emx
config_driver scsi
config_driver isp
config_driver pci
callout after_c "../bin/mkdata pci"
config_driver wfiop
config_driver wfqbb

#
# Pseudodevice Definitions (see configuring the
# kernel chapter in the Guide to System Administration)
#
pseudo-device    lsm          1
pseudo-device    lsm_vmted  0
pseudo-device    sysv_hab
pseudo-device    svid_three_hab
pseudo-device    svr_four_hab
pseudo-device    soe_two_hab
pseudo-device    rt_hab
pseudo-device    ether
pseudo-device    loop
pseudo-device    ws

```

m1proxim.v1

```

*****
alert_TPCC7.log
*****

Mon Apr 16 10:49:31 2001
Beginning log switch checkpoint up to RBA [0x3.2.10], SCN: 0x0000.4ce95b8e
Thread 7 advanced to log sequence 3
  Current log# 13 seq# 3 mem# 0: /ora817/dbs/tpcc_disks/log6_1
Mon Apr 16 11:16:43 2001
Completed checkpoint up to RBA [0x3.2.10], SCN: 0x0000.4ce95b8e
Mon Apr 16 11:19:43 2001
Beginning log switch checkpoint up to RBA [0x4.2.10], SCN: 0x0000.4d514b33
Thread 7 advanced to log sequence 4
  Current log# 14 seq# 4 mem# 0: /ora817/dbs/tpcc_disks/log6_2
Mon Apr 16 11:46:26 2001
Completed checkpoint up to RBA [0x4.2.10], SCN: 0x0000.4d514b33
Mon Apr 16 11:49:25 2001
Beginning log switch checkpoint up to RBA [0x5.2.10], SCN: 0x0000.4db88b5e
Thread 7 advanced to log sequence 5
  Current log# 13 seq# 5 mem# 0: /ora817/dbs/tpcc_disks/log6_1
Mon Apr 16 12:16:21 2001
Completed checkpoint up to RBA [0x5.2.10], SCN: 0x0000.4db88b5e
Mon Apr 16 12:19:21 2001
Beginning log switch checkpoint up to RBA [0x6.2.10], SCN: 0x0000.4e1f7a72
Thread 7 advanced to log sequence 6
  Current log# 14 seq# 6 mem# 0: /ora817/dbs/tpcc_disks/log6_2
Mon Apr 16 12:46:07 2001
Completed checkpoint up to RBA [0x6.2.10], SCN: 0x0000.4e1f7a72
Mon Apr 16 12:49:07 2001
Beginning log switch checkpoint up to RBA [0x7.2.10], SCN: 0x0000.4e8664d7
Thread 7 advanced to log sequence 7
  Current log# 13 seq# 7 mem# 0: /ora817/dbs/tpcc_disks/log6_1
Mon Apr 16 13:15:52 2001
Completed checkpoint up to RBA [0x7.2.10], SCN: 0x0000.4e8664d7

```

p_run_1.ora

```
#-----  
# p_run for node1 of 8 node tpcc  
#-----  
ifile=$ORACLE_HOME/dbs/p_run_common.ora  
_ipc_net = lo0  
instance_number = 1  
thread = 1  
rollback_segments =  
(t_0_1,t_0_2,t_0_3,t_0_4,t_0_5,t_0_6,t_0_7,t_0_8,t_0_9,t_0_10,t_0_11,t_0_12,t_0_13  
.t_0_14,t_0_15,t_0_16,t_0_17,t_0_18,t_0_19,t_0_20,t_0_21,t_0_22,t_0_23,t_0_24,t_0  
_25,t_0_26,t_0_27,t_0_28,t_0_29,  
t_0_30,t_0_31,t_0_32,t_0_33,t_0_34,t_0_35,t_0_36,t_0_37,t_0_38,t_0_39,t_0_40,  
t_0_41,t_0_42,t_0_43,t_0_44,t_0_45,t_0_46,t_0_47,t_0_48,t_0_49,t_0_50,t_0_51,t_0  
_52,t_0_53,t_0_54,t_0_55,t_0_56,t_0_57,t_0_58,t_0_59,t_0_60,t_0_61,t_0_62,  
t_0_63,t_0_64,t_0_65,t_0_66,t_0_67,t_0_68,t_0_69,t_0_70,t_0_71,t_0_72,t_0_73,t_0  
_74,t_0_75,t_0_76,t_0_77,t_0_78,t_0_79,t_0_80,t_0_81,t_0_82,t_0_83,t_0_84,t_0_85  
.t_0_86,t_0_87,t_0_88,t_0_89,t_0_90,t_0_91,t_0_92,t_0_93,t_0_94,t_0_95,t_0_96,t_0  
_97,t_0_98,t_0_99,t_0_100)
```

p_run_2.ora

```
#-----  
# p_run for node2 of 8 node tpcc  
#-----  
ifile=$ORACLE_HOME/dbs/p_run_common.ora  
_ipc_net = lo0  
instance_number = 2  
thread = 2  
rollback_segments =  
(t_1_1,t_1_2,t_1_3,t_1_4,t_1_5,t_1_6,t_1_7,t_1_8,t_1_9,t_1_10,t_1_11,t_1_12,t_1_13  
.t_1_14,t_1_15,t_1_16,t_1_17,t_1_18,t_1_19,t_1_20,t_1_21,t_1_22,t_1_23,t_1_24,t_1  
_25,t_1_26,t_1_27,t_1_28,t_1_29,  
t_1_30,t_1_31,t_1_32,t_1_33,t_1_34,t_1_35,t_1_36,t_1_37,t_1_38,t_1_39,t_1_40,  
t_1_41,t_1_42,t_1_43,t_1_44,t_1_45,t_1_46,t_1_47,t_1_48,t_1_49,t_1_50,t_1_51,t_1  
_52,t_1_53,t_1_54,t_1_55,t_1_56,t_1_57,t_1_58,t_1_59,t_1_60,t_1_61,t_1_62,  
t_1_63,t_1_64,t_1_65,t_1_66,t_1_67,t_1_68,t_1_69,t_1_70,t_1_71,t_1_72,t_1_73,t_1  
_74,t_1_75,t_1_76,t_1_77,t_1_78,t_1_79,t_1_80,t_1_81,t_1_82,t_1_83,t_1_84,t_1_85  
.t_1_86,t_1_87,t_1_88,t_1_89,t_1_90,t_1_91,t_1_92,t_1_93,t_1_94,t_1_95,t_1_96,t_1  
_97,t_1_98,t_1_99,t_1_100)
```

p_run_3.ora

```
#-----  
# p_run for node3 of 8 node tpcc  
#-----  
ifile=$ORACLE_HOME/dbs/p_run_common.ora  
_ipc_net = lo0  
instance_number = 3  
thread = 3  
rollback_segments =  
(t_2_1,t_2_2,t_2_3,t_2_4,t_2_5,t_2_6,t_2_7,t_2_8,t_2_9,t_2_10,t_2_11,t_2_12,t_2_13  
.t_2_14,t_2_15,t_2_16,t_2_17,t_2_18,t_2_19,t_2_20,t_2_21,t_2_22,t_2_23,t_2_24,t_2  
_25,t_2_26,t_2_27,t_2_28,t_2_29,  
t_2_30,t_2_31,t_2_32,t_2_33,t_2_34,t_2_35,t_2_36,t_2_37,t_2_38,t_2_39,t_2_40,  
t_2_41,t_2_42,t_2_43,t_2_44,t_2_45,t_2_46,t_2_47,t_2_48,t_2_49,t_2_50,t_2_51,t_2  
_52,t_2_53,t_2_54,t_2_55,t_2_56,t_2_57,t_2_58,t_2_59,t_2_60,t_2_61,t_2_62,  
t_2_63,t_2_64,t_2_65,t_2_66,t_2_67,t_2_68,t_2_69,t_2_70,t_2_71,t_2_72,t_2_73,t_2  
_74,t_2_75,t_2_76,t_2_77,t_2_78,t_2_79,t_2_80,t_2_81,t_2_82,t_2_83,t_2_84,t_2_85  
.t_2_86,t_2_87,t_2_88,t_2_89,t_2_90,t_2_91,t_2_92,t_2_93,t_2_94,t_2_95,t_2_96,t_2  
_97,t_2_98,t_2_99,t_2_100)
```

p_run_4.ora

```
#-----  
# p_run for node4 of 8 node tpcc  
#-----  
ifile=$ORACLE_HOME/dbs/p_run_common.ora  
_ipc_net = lo0  
instance_number = 4  
thread = 4  
rollback_segments =  
(t_3_1,t_3_2,t_3_3,t_3_4,t_3_5,t_3_6,t_3_7,t_3_8,t_3_9,t_3_10,t_3_11,t_3_12,t_3_13  
.t_3_14,t_3_15,t_3_16,t_3_17,t_3_18,t_3_19,t_3_20,t_3_21,t_3_22,t_3_23,t_3_24,t_3  
_25,t_3_26,t_3_27,t_3_28,t_3_29,  
t_3_30,t_3_31,t_3_32,t_3_33,t_3_34,t_3_35,t_3_36,t_3_37,t_3_38,t_3_39,t_3_40,  
t_3_41,t_3_42,t_3_43,t_3_44,t_3_45,t_3_46,t_3_47,t_3_48,t_3_49,t_3_50,t_3_51,t_3  
_52,t_3_53,t_3_54,t_3_55,t_3_56,t_3_57,t_3_58,t_3_59,t_3_60,t_3_61,t_3_62,  
t_3_63,t_3_64,t_3_65,t_3_66,t_3_67,t_3_68,t_3_69,t_3_70,t_3_71,t_3_72,t_3_73,t_3  
_74,t_3_75,t_3_76,t_3_77,t_3_78,t_3_79,t_3_80,t_3_81,t_3_82,t_3_83,t_3_84,t_3_85  
.t_3_86,t_3_87,t_3_88,t_3_89,t_3_90,t_3_91,t_3_92,t_3_93,t_3_94,t_3_95,t_3_96,t_3  
_97,t_3_98,t_3_99,t_3_100)
```

p_run_5.ora

```
#-----  
# p_run for node6 of 8 node tpcc  
#-----  
ifile=$ORACLE_HOME/dbs/p_run_common.ora  
_ipc_net = lo0  
instance_number = 5  
thread = 5  
rollback_segments =  
(t_4_1,t_4_2,t_4_3,t_4_4,t_4_5,t_4_6,t_4_7,t_4_8,t_4_9,t_4_10,t_4_11,t_4_12,t_4_13  
.t_4_14,t_4_15,t_4_16,t_4_17,t_4_18,t_4_19,t_4_20,t_4_21,t_4_22,t_4_23,t_4_24,t_4  
_25,t_4_26,t_4_27,t_4_28,t_4_29,  
t_4_30,t_4_31,t_4_32,t_4_33,t_4_34,t_4_35,t_4_36,t_4_37,t_4_38,t_4_39,t_4_40,  
t_4_41,t_4_42,t_4_43,t_4_44,t_4_45,t_4_46,t_4_47,t_4_48,t_4_49,t_4_50,t_4_51,t_4  
_52,t_4_53,t_4_54,t_4_55,t_4_56,t_4_57,t_4_58,t_4_59,t_4_60,t_4_61,t_4_62,  
t_4_63,t_4_64,t_4_65,t_4_66,t_4_67,t_4_68,t_4_69,t_4_70,t_4_71,t_4_72,t_4_73,t_4  
_74,t_4_75,t_4_76,t_4_77,t_4_78,t_4_79,t_4_80,t_4_81,t_4_82,t_4_83,t_4_84,t_4_85  
.t_4_86,t_4_87,t_4_88,t_4_89,t_4_90,t_4_91,t_4_92,t_4_93,t_4_94,t_4_95,t_4_96,t_4  
_97,t_4_98,t_4_99,t_4_100)
```

p_run_6.ora

```
#-----  
# p_run for node6 of 8 node tpcc  
#-----  
ifile=$ORACLE_HOME/dbs/p_run_common.ora  
_ipc_net = lo0  
instance_number = 6  
thread = 6  
rollback_segments =  
(t_5_1,t_5_2,t_5_3,t_5_4,t_5_5,t_5_6,t_5_7,t_5_8,t_5_9,t_5_10,t_5_11,t_5_12,t_5_13  
.t_5_14,t_5_15,t_5_16,t_5_17,t_5_18,t_5_19,t_5_20,t_5_21,t_5_22,t_5_23,t_5_24,t_5  
_25,t_5_26,t_5_27,t_5_28,t_5_29,  
t_5_30,t_5_31,t_5_32,t_5_33,t_5_34,t_5_35,t_5_36,t_5_37,t_5_38,t_5_39,t_5_40,  
t_5_41,t_5_42,t_5_43,t_5_44,t_5_45,t_5_46,t_5_47,t_5_48,t_5_49,t_5_50,t_5_51,t_5  
_52,t_5_53,t_5_54,t_5_55,t_5_56,t_5_57,t_5_58,t_5_59,t_5_60,t_5_61,t_5_62,  
t_5_63,t_5_64,t_5_65,t_5_66,t_5_67,t_5_68,t_5_69,t_5_70,t_5_71,t_5_72,t_5_73,t_5  
_74,t_5_75,t_5_76,t_5_77,t_5_78,t_5_79,t_5_80,t_5_81,t_5_82,t_5_83,t_5_84,t_5_85  
.t_5_86,t_5_87,t_5_88,t_5_89,t_5_90,t_5_91,t_5_92,t_5_93,t_5_94,t_5_95,t_5_96,t_5  
_97,t_5_98,t_5_99,t_5_100)
```

p_run_7.ora

```
#-----  
# p_run for node7 of 8 node tpcc  
#-----  
ifile=$ORACLE_HOME/dbs/p_run_common.ora  
_ipc_net = lo0  
instance_number = 7  
thread = 7
```

```

rollback_segments =
(t_6_1,t_6_2,t_6_3,t_6_4,t_6_5,t_6_6,t_6_7,t_6_8,t_6_9,t_6_10,t_6_11,t_6_12,t_6_13
,t_6_14,t_6_15,t_6_16,t_6_17,t_6_18,t_6_19,t_6_20,t_6_21,t_6_22,t_6_23,t_6_24,t_6
_25,t_6_26,t_6_27,t_6_28,t_6_29,
t_6_30,t_6_31,t_6_32,t_6_33,t_6_34,t_6_35,t_6_36,t_6_37,t_6_38,t_6_39,t_6_40,
t_6_41,t_6_42,t_6_43,t_6_44,t_6_45,t_6_46,t_6_47,t_6_48,t_6_49,t_6_50,t_6_51,t_6
_52,t_6_53,t_6_54,t_6_55,t_6_56,t_6_57,t_6_58,t_6_59,t_6_60,t_6_61,t_6_62,
t_6_63,t_6_64,t_6_65,t_6_66,t_6_67,t_6_68,t_6_69,t_6_70,t_6_71,t_6_72,t_6_73,t_6
_74,t_6_75,t_6_76,t_6_77,t_6_78,t_6_79,t_6_80,t_6_81,t_6_82,t_6_83,t_6_84,t_6_85
,t_6_86,t_6_87,t_6_88,t_6_89,t_6_90,t_6_91,t_6_92,t_6_93,t_6_94,t_6_95,t_6_96,t_6
_97,t_6_98,t_6_99,t_6_100)

```

p_run_8.ora

```

#-----
# p_run for node8 of 8 node tpcc
#-----
ifile=$ORACLE_HOME/dbs/p_run_common.ora
_ipc_net = lo0
instance_number          = 8
thread                   = 8
rollback_segments =
(t_7_1,t_7_2,t_7_3,t_7_4,t_7_5,t_7_6,t_7_7,t_7_8,t_7_9,t_7_10,t_7_11,t_7_12,t_7_13
,t_7_14,t_7_15,t_7_16,t_7_17,t_7_18,t_7_19,t_7_20,t_7_21,t_7_22,t_7_23,t_7_24,t_7
_25,t_7_26,t_7_27,t_7_28,t_7_29,
t_7_30,t_7_31,t_7_32,t_7_33,t_7_34,t_7_35,t_7_36,t_7_37,t_7_38,t_7_39,t_7_40,
t_7_41,t_7_42,t_7_43,t_7_44,t_7_45,t_7_46,t_7_47,t_7_48,t_7_49,t_7_50,t_7_51,t_7
_52,t_7_53,t_7_54,t_7_55,t_7_56,t_7_57,t_7_58,t_7_59,t_7_60,t_7_61,t_7_62,
t_7_63,t_7_64,t_7_65,t_7_66,t_7_67,t_7_68,t_7_69,t_7_70,t_7_71,t_7_72,t_7_73,t_7
_74,t_7_75,t_7_76,t_7_77,t_7_78,t_7_79,t_7_80,t_7_81,t_7_82,t_7_83,t_7_84,t_7_85
,t_7_86,t_7_87,t_7_88,t_7_89,t_7_90,t_7_91,t_7_92,t_7_93,t_7_94,t_7_95,t_7_96,t_7
_97,t_7_98,t_7_99,t_7_100)

```

p_run_common.ora

```

#=====
# FILENAME
# p_run_common.ora
# DESCRIPTION
# Oracle parameter file for running TPC-C in OPS mode.
#=====
control_files          = (?/dbs/tpcc_disks/control_001)
compatible             = 8.1.7
db_block_lru_latches  = 18
db_block_size         = 4096
db_name               = tpcc
db_files              = 900
timed_statistics      = FALSE
cpu_count             = 4
parallel_server       = TRUE
parallel_server_instances = 8
db_block_buffers      = 6515744 # 29 gig
buffer_pool_recycle   = (buffers:15640,lru_latches:5)
buffer_pool_keep      = (buffers:4561024,lru_latches:8)
log_buffer            = 16777216
enqueue_resources     = 900
_db_writer_max_writes = 128
_db_writer_chunk_writes = 64
db_block_max_dirty_target = 0
fast_start_io_target  = 0
shared_pool_size      = 206870912
shared_pool_reserved_size = 2700000
cursor_space_for_time = TRUE
max_dump_file_size    = 900000
db_block_checking     = FALSE
replication_dependency_tracking = FALSE
transaction_auditing  = FALSE
recovery_parallelism  = 0
parallel_max_servers  = 0
dml_locks             = 0 # 60
hash_join_enabled     = FALSE

```

```

log_archive_start     = FALSE
log_checkpoint_timeout = 0
log_checkpoint_interval = 0
log_checkpoints_to_alert = TRUE
sort_area_size       = 1048576
hash_area_size       = 1048576
hash_multiblock_io_count = 1
open_cursors         = 240
processes            = 140
transactions         = 400
db_file_multiblock_read_count = 1
_db_file_noncontig_mblock_read_count=1
distributed_transactions = 0
max_rollback_segments = 130
transactions_per_rollback_segment = 1
lm_ress              = (760566,760566)
lm_locks             = (2151304,2151304)
#lm_locks            = (2651304,2651304)
gc_releasable_locks = 0
gc_rollback_locks   = "0-1637=30EACH"
gc_files_to_locks   = "1=4000EACH:" # system
# stock 6000 25per
gc_files_to_locks   = "23-47=6000EACH:"
gc_files_to_locks   = "48-72=6000EACH:"
gc_files_to_locks   = "73-97=6000EACH:"
gc_files_to_locks   = "98-122=6000EACH:"
gc_files_to_locks   = "123-147=6000EACH:"
gc_files_to_locks   = "148-171,376=6000EACH:"
gc_files_to_locks   = "172-190,313-317=6000EACH:"
gc_files_to_locks   = "318-343=6000EACH:344=6000EACH:"
# cust 2000 21per
gc_files_to_locks   = "375,377-394=2000EACH:"
gc_files_to_locks   = "395-417=2000EACH:"
gc_files_to_locks   = "418-438=2000EACH:"
gc_files_to_locks   = "439-459=2000EACH:"
gc_files_to_locks   = "460-480=2000EACH:"
gc_files_to_locks   = "481-501=2000EACH:"
gc_files_to_locks   = "502-522=2000EACH:"
gc_files_to_locks   = "523-544=2000EACH:"
# ordl 50 16per
gc_files_to_locks   = "191-206=20EACH:"
gc_files_to_locks   = "207-222=20EACH:"
gc_files_to_locks   = "223-238=20EACH:"
gc_files_to_locks   = "239-254=20EACH:"
gc_files_to_locks   = "255-270=20EACH:"
gc_files_to_locks   = "271-286=20EACH:"
gc_files_to_locks   = "287-302=20EACH:"
gc_files_to_locks   = "303-312=20EACH:"
# dist and ware
gc_files_to_locks   = "658-673=10EACH:"
# idist and iware
gc_files_to_locks   = "570-585=10EACH:"
# all others *****
gc_files_to_locks   = "20-22,345-374,553-569,586-634=50EACH"
gc_files_to_locks   = "545-552,650-657=2EACH" # istok,temp
#
java_pool_size      = 4K
mts_max_servers     = 0
_db_aging_stay_count = 1
_spin_count         = 4000
_interconnect_checksum = FALSE
_wait_for_sync      = FALSE

```

sysconfigtab

```

#
# *****
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# HISTORY
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#
#
# OSF/1 1.2
#
#
# The supported method of changing the information in this
# file (sysconfigtab) is by using the sysconfigdb command.
#
# If you insist upon changing this file by direct editing,
# then it would be advisable to add new information at the end
# rather than the beginning or middle of the file, in order
# to reduce confusion during installation and reconciliation
# of user changes and update changes.
#
# See the appropriate documentation such as the release notes
# for the new version being installed as well as the appropriate
# reference pages.
#
#
# Contiguous Memory Allocation for loadable driver subsystems
#
cma_dd:

#
# EISA_Option = Board_Id Function_Name Driver_Name Type
#
eisa:
#
# %%%EISA
#
EISA_Option = Board_Id - ADP0001, Function_Name - AHA1740, Driver_Name -
aha, Int_Aft_Attach - 1
EISA_Option = Board_Id - ADP0002, Function_Name - AHA1740, Driver_Name -
aha, Int_Aft_Attach - 1
EISA_Option = Board_Id - DEC2500, Driver_Name - envram
EISA_Option = Board_Id - ISA1010, Function_Name - 'COM,1' Driver_Name - ace
EISA_Option = Board_Id - ISA1010, Function_Name - 'COM,2', Driver_Name - ace
EISA_Option = Board_Id - ISA1010, Function_Name - PAR, Driver_Name - lp
EISA_Option = Board_Id - DEC2A01, Function_Name - SYSMEM, Int_Aft_Attach
- 1
EISA_Option = Board_Id - DEC2A01, Function_Name - 'ACECOM,1',
Driver_Name - ace
EISA_Option = Board_Id - DEC2A01, Function_Name - 'ACECOM,2',
Driver_Name - ace
EISA_Option = Board_Id - DEC2A01, Function_Name - PAR, Driver_Name - lp
EISA_Option = Board_Id - MLX0070, Driver_Name - xcr, Int_Aft_Attach - 1
EISA_Option = Board_Id - MLX0075, Driver_Name - xcr, Int_Aft_Attach - 1
EISA_Option = Board_Id - MLX0077, Driver_Name - xcr, Int_Aft_Attach - 1
EISA_Option = Board_Id - DEC5000, Function_Name - SYSMEM, Int_Aft_Attach
- 1
EISA_Option = Board_Id - DEC5000, Function_Name - 'ACECOM,1',
Driver_Name - ace
EISA_Option = Board_Id - DEC5000, Function_Name - 'ACECOM,2',
Driver_Name - ace
EISA_Option = Board_Id - DEC5000, Function_Name - PAR, Driver_Name - lp
EISA_Option = Board_Id - DEC5000, Function_Name - 'KBD,MOUSE',
Driver_Name - gpc
EISA_Option = Board_Id - DEC5100, Function_Name - SYSMEM, Int_Aft_Attach
- 1
EISA_Option = Board_Id - DEC5100, Function_Name - 'ACECOM,1',
Driver_Name - ace

```

```

EISA_Option = Board_Id - DEC5100, Function_Name - 'ACECOM,2',
Driver_Name - ace
EISA_Option = Board_Id - DEC5100, Function_Name - PAR, Driver_Name - lp
EISA_Option = Board_Id - DEC5100, Function_Name - 'KBD,MOUSE',
Driver_Name - gpc
EISA_Option = Board_Id - DEC5301, Function_Name - SYSMEM, Int_Aft_Attach
- 1
EISA_Option = Board_Id - DEC5301, Function_Name - 'ACECOM,1',
Driver_Name - ace
EISA_Option = Board_Id - DEC5301, Function_Name - 'ACECOM,2',
Driver_Name - ace
EISA_Option = Board_Id - DEC5301, Function_Name - PAR, Driver_Name - lp
EISA_Option = Board_Id - DEC5301, Function_Name - 'KBD,MOUSE',
Driver_Name - gpc
EISA_Option = Board_Id - DEC6000, Function_Name - 'SYSMEM', Int_Aft_Attach
- 1
EISA_Option = Board_Id - DEC6000, Function_Name - 'KBD,MOUSE',
Driver_Name - gpc
EISA_Option = Board_Id - DEC6400, Function_Name - SYSMEM, Driver_Name -
Null
EISA_Option = Board_Id - DEC6400, Function_Name - 'ACECOM,1',
Driver_Name - ace
EISA_Option = Board_Id - DEC6400, Function_Name - 'ACECOM,2',
Driver_Name - ace
EISA_Option = Board_Id - DEC6400, Function_Name - PAR, Driver_Name - lp
EISA_Option = Board_Id - DEC6400, Function_Name - 'KBD,MOUSE',
Driver_Name - gpc
#
# ISA_Option = Board_Id Function_Name Driver_Name Type
#
isa:
#
# %%%ISA
#
ISA_Option = Function_Name - 'KBD,MOUSE', Driver_Name - gpc
ISA_Option = Function_Name - COM, Driver_Name - ace
ISA_Option = Function_Name - LPT, Driver_Name - lp
ISA_Option = Function_Name - 'ISA--SCC', Driver_Name - iscc

```

```

#
# Pciw_Version Vendor_Id Ddevice_Id Rev Base Sub Pif Sub_Vid Sub_Did
Vid_Mo_Flag Did_Mo_Flag
# Rev_Mo_Flag Base_Mo_Flag Sub_Mo_Flag Pif_Mo_Flag Sub_Vid_Mo_Flag
Driver_Name Type
#
pci:
#
# %%%PCI
#
#
# PCI to something bridge adapters
#
# At present these are not used in system configuration, but are present in
# this file for informational purposes. In some cases, the "driver" may
# not exist, and in other cases the driver may exist but be unprepared to
# parse these entries, so they are all commented out at this time.
#
# PCI_Option = PCI_SE_Rev - 0x210, Vendor_Id - 0x1013, Device_Id - 0x1100,
Driver_Name - pcmcia, Type - A, Adpt_Config - N
# PCI_Option = PCI_SE_Rev - 0x210, Vendor_Id - 0x1011, Device_Id - 0x1, Base -
6, Sub - 4, Driver_Name - pci, Type - A, Adpt_Config - N
# PCI_Option = PCI_SE_Rev - 0x210, Vendor_Id - 0x1011, Base - 6, Sub - 4,
Driver_Name - pci, Type - A, Adpt_Config - N
# PCI_Option = PCI_SE_Rev - 0x210, Base - 6, Sub - 4, Driver_Name - pci, Type -
A, Adpt_Config - N
# PCI_Option = PCI_SE_Rev - 0x210, Vendor_Id - 0x8086, Device_Id - 0x482,
Driver_Name - eisa, Type - A, Adpt_Config - N
# PCI_Option = PCI_SE_Rev - 0x210, Vendor_Id - 0x8086, Device_Id - 0x484,
Driver_Name - isa, Type - A, Adpt_Config - N
# PCI_Option = PCI_SE_Rev - 0x210, Vendor_Id - 0x1011, Device_Id - 0x10,
Driver_Name - vba, Type - A, Adpt_Config - N
# PCI_Option = PCI_SE_Rev - 0x210, Vendor_Id - 0x10E3, Device_Id - 0x00,
Driver_Name - vba, Type - A, Adpt_Config - N

```

```
#
```

```

# TC_Option = Modname Driver_Name
#
tc:
#
# %%%TC
#
TC_Option = Modname - 'PMTNV-AA', Driver_Name - nvtc, Int_Aft_Attach - 1,
Type - C, Adpt_Config - N
TC_Option = Modname - 'PMAP-AA ', Driver_Name - nvtc, Int_Aft_Attach - 1,
Type - C, Adpt_Config - N
TC_Option = Modname - 'PMAZ-AA ', Driver_Name - asc, Int_Aft_Attach - 1,
Type - A, Adpt_Config - N
TC_Option = Modname - 'PMAZ-DS ', Driver_Name - tcds, Int_Aft_Attach - 1,
Type - A, Adpt_Config - N
TC_Option = Modname - 'PMAZ-FS ', Driver_Name - tcds, Int_Aft_Attach - 1,
Type - A, Adpt_Config - N
TC_Option = Modname - 'PMAZB-AA', Driver_Name - tcds, Int_Aft_Attach - 1,
Type - A, Adpt_Config - N
TC_Option = Modname - 'PMAZB-AB', Driver_Name - tcds, Int_Aft_Attach - 1,
Type - A, Adpt_Config - N
TC_Option = Modname - 'PMAZC-AA', Driver_Name - tcds, Int_Aft_Attach - 1,
Type - A, Adpt_Config - N
TC_Option = Modname - 'KZTSA-AA', Driver_Name - tza, Int_Aft_Attach - 1,
Type - A, Adpt_Config - N
TC_Option = Modname - 'PMAGB-BA', Driver_Name - fb, Int_Aft_Attach - 1,
Type - C, Adpt_Config - N
TC_Option = Modname - 'PMAG-RO ', Driver_Name - fb, Type - C, Adpt_Config -
N
TC_Option = Modname - 'PMAG-JA ', Driver_Name - fb, Type - C, Adpt_Config -
N
TC_Option = Modname - 'PMADC ', Driver_Name - pv, Int_Aft_Attach - 1, Type
- C, Adpt_Config - N
TC_Option = Modname - 'PMAGC-AA', Driver_Name - pv, Int_Aft_Attach - 1,
Type - C, Adpt_Config - N
TC_Option = Modname - 'PMAGC-BA', Driver_Name - pv, Int_Aft_Attach - 1,
Type - C, Adpt_Config - N
TC_Option = Modname - 'PMAGC-DA', Driver_Name - pvl, Int_Aft_Attach - 1,
Type - C, Adpt_Config - N
TC_Option = Modname - 'PMAGC-EA', Driver_Name - pvl, Int_Aft_Attach - 1,
Type - C, Adpt_Config - N
TC_Option = Modname - 'PMAGD ', Driver_Name - fb, Int_Aft_Attach - 1, Type
- C, Adpt_Config - N
TC_Option = Modname - 'PMAGD-AA', Driver_Name - fb, Int_Aft_Attach - 1,
Type - C, Adpt_Config - N
TC_Option = Modname - 'PMAGD-BA', Driver_Name - fb, Int_Aft_Attach - 1,
Type - C, Adpt_Config - N
# Disabled due to lack of X support in Platinum, device driver is being pulled from the
release
# TC_Option = Modname - "KWS_TD", Confname - kws_td, Int_Aft_Attach- 1,
Type - C, Adpt_Config - N

#
# fdi: FLOPPY
#
fdi:
ISA_Option = Function_Name - FLOPPY, Driver_Name - fdi
EISA_Option = Board_Id - ADP0002, Function_Name - 'MSD,FPYCTL',
Driver_Name - fdi
EISA_Option = Board_Id - DEC2400, Function_Name - 'MSD,FPYCTL',
Driver_Name - fdi
EISA_Option = Board_Id - DEC2A01, Function_Name - 'MSD,FPYCTL',
Driver_Name - fdi
EISA_Option = Board_Id - DEC5000, Function_Name - 'MSD,FPYCTL',
Driver_Name - fdi
EISA_Option = Board_Id - DEC5100, Function_Name - 'MSD,FPYCTL',
Driver_Name - fdi
EISA_Option = Board_Id - DEC5301, Function_Name - 'MSD,FPYCTL',
Driver_Name - fdi
EISA_Option = Board_Id - DEC6000, Function_Name - 'MSD,FPYCTL',
Driver_Name - fdi

#
# In: LANCE Ethernet
#
In:
TC_Option = Modname - 'PMAD-AA ', Driver_Name - In, Type - C, Adpt_Config -
N
TC_Option = Modname - 'PMAD-BA ', Driver_Name - In, Type - C, Adpt_Config -
N

EISA_Option = Board_Id - DEC4220, Function_Name - 'NET,ETH', Driver_Name -
In
CMA_Option = Size - 0x10000, Alignment - 0x10000, Addrlimit - 0, Type - 0x1f,
Flag - 0

#
# le: LeMAC Ethernet
#
le:
ISA_Option = Function_Name - 'DE200-LE', Driver_Name - le

#
# el: 3Com EtherLink III Ethernet
#
el:
PCMCIA_Option = Manufact_Name - '3Com Corporation', Product_Name -
'3C589', Manufact_Id - 0x101, Card_Rev - 0, Func_Code - 6, Driver_Name - el,
Loadable_Flag - 0, Unload_Flag - 0, Intr_Handler_Flag - 0, Type - C, Adpt_Config -
N, Man_Name_Mo_Flag - 1, Prd_Name_Mo_Flag - 1, Mid_Mo_Flag - 0,
Card_Rev_Mo_Flag - 0, Multi_Func_Flag - 0, Func_Num - 0

PCMCIA_Option = Manufact_Name - '3Com Corporation', Product_Name -
'3C589D', Manufact_Id - 0x101, Card_Rev - 0, Func_Code - 6, Driver_Name - el,
Loadable_Flag - 0, Unload_Flag - 0, Intr_Handler_Flag - 0, Type - C, Adpt_Config -
N, Man_Name_Mo_Flag - 1, Prd_Name_Mo_Flag - 1, Mid_Mo_Flag - 0,
Card_Rev_Mo_Flag - 0, Multi_Func_Flag - 0, Func_Num - 0

ISA_Option = Function_Name - 3C509, Driver_Name - el, Type - C

PCMCIA_Option = Manufact_Name - '3Com Corporation', Product_Name -
'3C562B/3C563B', Manufact_Id - 0x101, Card_Rev - 0, Func_Code - 6, Driver_Name
- el, Loadable_Flag - 0, Unload_Flag - 0, Intr_Handler_Flag - 0, Type - C,
Adpt_Config - N, Man_Name_Mo_Flag - 1, Prd_Name_Mo_Flag - 1, Mid_Mo_Flag -
0, Card_Rev_Mo_Flag - 0, Multi_Func_Flag - 1, Func_Num - 0

#
# ee: i82558/9 PCI 10/100 Ethernet
#
ee:
# PCI_Option = PCI_SE_Rev - 0x210, Vendor_Id - 0x8086, Device_Id - 0x1229,
Driver_Name - ee

#
# tu: TULIP Ethernet/Fast Ethernet
#
tu:
EISA_Option = Board_Id - DEC4250, Function_Name - Null, Driver_Name - tu,
Type - C, Adpt_Config - N
# PCI_Option = PCI_SE_Rev - 0x210, Vendor_Id - 0x1011, Device_Id - 2,
Driver_Name - tu
# PCI_Option = PCI_SE_Rev - 0x210, Vendor_Id - 0x1011, Device_Id - 0x14,
Driver_Name - tu
# PCI_Option = PCI_SE_Rev - 0x210, Vendor_Id - 0x1011, Device_Id - 0x9,
Driver_Name - tu
# PCI_Option = PCI_SE_Rev - 0x210, Vendor_Id - 0x1011, Device_Id - 0x19,
Driver_Name - tu

#
# alt: DEGPA Gigabit Ethernet
#
alt:
# PCI_Option = PCI_SE_Rev - 0x210, Vendor_Id - 0x12AE, Device_Id - 0x1,
Driver_Name - alt

#
# fza: DEFZA FDDI
#
fza:
TC_Option = Modname - 'PMAF-AA ', Driver_Name - fza, Type - C, Adpt_Config
- N

#
# fta: PDQ FDDI
#
fta:
TC_Option = Modname - 'PMAF-FA ', Driver_Name - fta, Type - C, Adpt_Config -
N
TC_Option = Modname - 'PMAF-FS ', Driver_Name - fta, Type - C, Adpt_Config -
N

```

```

TC_Option = Modname - PMAF-FD ', Driver_Name - fta, Type - C, Adpt_Config -
N
TC_Option = Modname - PMAF-FU ', Driver_Name - fta, Type - C, Adpt_Config -
N
EISA_Option = Board_Id - DEC3001, Driver_Name - fta
EISA_Option = Board_Id - DEC3002, Driver_Name - fta
# PCI_Option = PCI_SE_Rev - 0x210, Vendor_Id - 0x1011, Device_Id - 0xF,
Driver_Name - fta

#
# tra: Token-Ring
#
tra:
TC_Option = Modname - PMAT-AA ', Driver_Name - tra, Type - C, Adpt_Config
-N
ISA_Option = Function_Name - DW110, Driver_Name - tra
ISA_Option = Function_Name - TKRNG, Driver_Name - tra
EISA_Option = Board_Id - PRO6000, Driver_Name - tra
EISA_Option = Board_Id - PRO6001, Driver_Name - tra
EISA_Option = Board_Id - PRO6002, Driver_Name - tra
# PCI_Option = PCI_SE_Rev - 0x210, Vendor_Id - 0x104C, Device_Id - 0x0508,
Driver_Name - tra
# PCI_Option = PCI_SE_Rev - 0x210, Vendor_Id - 0x10DA, Device_Id - 0x0508,
Driver_Name - tra
# PCI_Option = PCI_SE_Rev - 0x210, Vendor_Id - 0x10EF, Device_Id - 0x8154,
Driver_Name - tra

#
# lta: ATM
#
# NOTE: There must be one CMA_Option line for each dynamically
# loaded Turbo Channel lta device (DGLTA-FA)
#
lta:
TC_Option = Modname - DGLTA-FA', Driver_Name - lta, Type - C, Adpt_Config -
N
# PCI_Option = PCI_SE_Rev - 0x210, Vendor_Id - 0x1011, Device_Id - 0x16,
Driver_Name - lta
# CMA_Option = Size - 0x23D00, Alignment - 0x10000, Addrlimit - 0, Type - 0x1d,
Flag - 2

#
# lfa: ForeRunner HE Series ATM Adapter
#
lfa:
# PCI_Option = PCI_SE_Rev - 0x210, Vendor_Id - 0x1127, Device_Id - 0x400, Rev
- 0, Base - 0, Sub - 0, Pif - 0, Sub_Vid - 0, Sub_Did - 0, Vid_Mo_Flag - 1,
Did_Mo_Flag - 1, Rev_Mo_Flag - 0, Base_Mo_Flag - 0, Sub_Mo_Flag - 0,
Pif_Mo_Flag - 0, Sub_Vid_Mo_Flag - 0, Sub_Did_Mo_Flag - 0, Driver_Name - lfa,
Type - C, Adpt_Config - N

#
# PCMCIA_Option = Manufact_Name Product_Name Manufact_Id Card_Rev
Func_Code
# Driver_Name Loadable_Flag Unload_Flag Intr_Handler_Flag Type
# Adpt_Config Man_Name_Mo_Flag Prd_Name_Mo_Flag
Mid_Mo_Flag Card_Rev_Mo_Flag
# Multi_Func_Flag Func_Num

#
# pcmcia:
#
# %%%PCMCIA
#
PCMCIA_Option = Manufact_Name - 'AT&T Paradyne', Product_Name -
'KeepInTouch Card', Manufact_Id - 0, Card_Rev - 0, Func_Code - 2, Driver_Name -
ace, Loadable_Flag - 0, Unload_Flag - 0, Intr_Handler_Flag - 1, Type - C,
Adpt_Config - N, Man_Name_Mo_Flag - 1, Prd_Name_Mo_Flag - 1, Mid_Mo_Flag -
0, Card_Rev_Mo_Flag - 0, Multi_Func_Flag - 0, Func_Num - 0
PCMCIA_Option = Manufact_Name - 'Digital', Product_Name - 'PCMCIA V.32bis
14,400 Fax', Manufact_Id - 0, Card_Rev - 0, Func_Code - 2, Driver_Name - ace,
Loadable_Flag - 0, Unload_Flag - 0, Intr_Handler_Flag - 1, Type - C, Adpt_Config -
N, Man_Name_Mo_Flag - 1, Prd_Name_Mo_Flag - 1, Mid_Mo_Flag - 0,
Card_Rev_Mo_Flag - 0, Multi_Func_Flag - 0, Func_Num - 0
PCMCIA_Option = Manufact_Name - 'MEGAHERTZ', Product_Name - 'XJ2288',
Manufact_Id - 0, Card_Rev - 0, Func_Code - 2, Driver_Name - ace, Loadable_Flag -
0, Unload_Flag - 0, Intr_Handler_Flag - 1, Type - C, Adpt_Config - N,
Man_Name_Mo_Flag - 1, Prd_Name_Mo_Flag - 1, Mid_Mo_Flag - 0,
Card_Rev_Mo_Flag - 0, Multi_Func_Flag - 0, Func_Num - 0
PCMCIA_Option = Manufact_Name - '3Com Corporation', Product_Name -
'3C562B/3C563B', Manufact_Id - 0x101, Card_Rev - 0, Func_Code - 2, Driver_Name

```

```

- ace, Loadable_Flag - 0, Unload_Flag - 0, Intr_Handler_Flag - 1, Type - C,
Adpt_Config - N, Man_Name_Mo_Flag - 1, Prd_Name_Mo_Flag - 1, Mid_Mo_Flag -
0, Card_Rev_Mo_Flag - 0, Multi_Func_Flag - 1, Func_Num - 1
PCMCIA_Option = Manufact_Name - 'AD PC-CARD', Product_Name -
'RC288ACL', Manufact_Id - 0, Card_Rev - 0, Func_Code - 2, Driver_Name - ace,
Loadable_Flag - 0, Unload_Flag - 0, Intr_Handler_Flag - 1, Type - C, Adpt_Config -
N, Man_Name_Mo_Flag - 1, Prd_Name_Mo_Flag - 1, Mid_Mo_Flag - 0,
Card_Rev_Mo_Flag - 0, Multi_Func_Flag - 0, Func_Num - 0
PCMCIA_Option = Manufact_Name - 'AD2880WRLD', Product_Name -
'International V.34 PC-Card Modem', Manufact_Id - 0, Card_Rev - 0, Func_Code -
2, Driver_Name - ace, Loadable_Flag - 0, Unload_Flag - 0, Intr_Handler_Flag - 1,
Type - C, Adpt_Config - N, Man_Name_Mo_Flag - 1, Prd_Name_Mo_Flag - 1,
Mid_Mo_Flag - 0, Card_Rev_Mo_Flag - 0, Multi_Func_Flag - 0, Func_Num - 0
#
# The following are the ONLY ATA cards that have been tested. Others are known
# to violate various parts of the spec and therefore fail. Some devices also
# require ddr.dbase entries due to broken firmware which causes them to self-
# destruct (the Maxtor DDR entry is an example). Beware if you attempt using
# such devices.
#
PCMCIA_Option = Manufact_Name - 'INTEGRAL PERIPHERALS',
Product_Name - 'ATA CARD', Manufact_Id - 0, Card_Rev - 0, Func_Code - 4,
Driver_Name - ata, Loadable_Flag - 0, Unload_Flag - 0, Intr_Handler_Flag - 0, Type -
A, Adpt_Config - N, Man_Name_Mo_Flag - 1, Prd_Name_Mo_Flag - 1,
Mid_Mo_Flag - 0, Card_Rev_Mo_Flag - 0, Multi_Func_Flag - 0, Func_Num - 0
PCMCIA_Option = Manufact_Name - 'IBM', Product_Name - ' ', Manufact_Id - 0,
Card_Rev - 0, Func_Code - 4, Driver_Name - ata, Loadable_Flag - 0, Unload_Flag - 0,
Intr_Handler_Flag - 0, Type - A, Adpt_Config - N, Man_Name_Mo_Flag - 1,
Prd_Name_Mo_Flag - 0, Mid_Mo_Flag - 0, Card_Rev_Mo_Flag - 0,
Multi_Func_Flag - 0, Func_Num - 0
PCMCIA_Option = Manufact_Name - 'Maxtor', Product_Name - ' ', Manufact_Id - 0,
Card_Rev - 0, Func_Code - 4, Driver_Name - ata, Loadable_Flag - 0, Unload_Flag - 0,
Intr_Handler_Flag - 0, Type - A, Adpt_Config - N, Man_Name_Mo_Flag - 1,
Prd_Name_Mo_Flag - 0, Mid_Mo_Flag - 0, Card_Rev_Mo_Flag - 0,
Multi_Func_Flag - 0, Func_Num - 0

#
# qvision: CMPQ Qvision SVGA
#
qvision:
EISA_Option = Board_Id - CPQ3011, Driver_Name - qvision
EISA_Option = Board_Id - CPQ3111, Driver_Name - qvision
EISA_Option = Board_Id - CPQ3112, Driver_Name - qvision
# PCI_Option = PCI_SE_Rev - 0x210, Vendor_Id - 0x0e11, Device_Id - 0x3032,
Driver_Name - qvision

#
# cirrus: Cirrus SVGA
#
cirrus:
EISA_Option = Board_Id - DEC5000, Function_Name - VID, Driver_Name - cirrus

#
# ati64: ATI Mach64 SVGA
#
ati64:
EISA_Option = Board_Id - ISA6400, Driver_Name - ati
ISA_Option = Function_Name - 'MACH64', Driver_Name - ati
# PCI_Option = PCI_SE_Rev - 0x210, Vendor_Id - 0x1002, Device_Id - 0x4358,
Driver_Name - ati
# PCI_Option = PCI_SE_Rev - 0x210, Vendor_Id - 0x1002, Device_Id - 0x4758,
Driver_Name - ati
# PCI_Option = PCI_SE_Rev - 0x210, Vendor_Id - 0x1002, Device_Id - 0x4354,
Driver_Name - ati

#
# s3trio: S3 Trio 32/64 SVGA
#
s3trio:
# PCI_Option = PCI_SE_Rev - 0x210, Vendor_Id - 0x5333, Device_Id - 0x8811,
Driver_Name - trio
# PCI_Option = PCI_SE_Rev - 0x210, Vendor_Id - 0x5333, Device_Id - 0x8810,
Driver_Name - trio

#
# wd: Western Digital WD90C24 SVGA
#
ISA_Option = Function_Name - 'WD90', Driver_Name - wd

```

```

#
# vga: Standard 640x480 VGA
#
vga:
  EISA_Option = Board_Id - PHI8041, Driver_Name - vga
  ISA_Option = Function_Name - 'ISA--VGA', Driver_Name - vga
# PCI_Option = PCI_SE_Rev - 0x210, Base - 3, Sub - 0, Driver_Name - vga
# PCI_Option = PCI_SE_Rev - 0x210, Base - 0, Sub - 1, Driver_Name - vga

#
# other SVGAs
#
#s3v864:
## PCI_Option = PCI_SE_Rev - 0x210, Vendor_Id - 0x5333, Device_Id - 0x88c0,
Driver_Name - svision
#
#ati32:
# PCI_Option = PCI_SE_Rev - 0x210, Vendor_Id - 0x1002, Device_Id - 0x4158,
Driver_Name - ati_vga, Type - C, Adpt_Config - N

#
# VBA_Option = Manufact_Name Product_Name Bus_Instance Driver_Name
# Driver_Instance Csr1 Csr2 Vector Bus_Priority
# Type Adpt_Config
#
vb:
#
# %%%VB
#
  VBA_Option = Manufact_Name - 'Digital', Product_Name - 'VME Backplane
Network Driver', Bus_Instance - 0, Driver_Name - vb, Driver_Instance - 0, Csr1 - 0,
Csr2 - 0, Vector - 0x1150, Bus_Priority - 7, Type - C, Adpt_Config - N
#
# pfm: Pseudo driver needed for performace measurements ... kprofile() and/or
uprofile()
#
pfm:
  Module_Config_Name = pfm
  Device_Dir = /dev
  Device_Char_Major = Any
  Device_Char_Minor = 0
  Device_Char_Files = pfcntr
  Device_User = root
  Device_Group = 0
  Device_Mode = 444
  Device_Major_Req = Same

#
# USB drivers. Supported options are: Driver_Name, Vendor_Id, Product_Id,
# Release_Num, Device_Class, Device_Sub_Class, Device_Protocol,
# Configuration_Valu, Interface_Number, Interface_Sub_Class,
# Interface_Protocol, Interface_Class
DEC_USBhub:
  USB_Class_Driver = Driver_Name - usb_hub, Release_Num - 0x1000,
Device_Class - 0x09, Device_Sub_Class - 0x1, Config_Device - 0x1
  USB_Class_Driver = Driver_Name - usb_hub, Release_Num - 0x1000,
Device_Class - 0x09, Device_Sub_Class - 0x0, Config_Device - 0x1
DEC_USBmouse:
  USB_Class_Driver = Driver_Name - usb_mouse, Release_Num - 0x1000,
Device_Class - 0xff, Interface_Class - 0x03, Interface_Sub_Class - 0x01,
Interface_Protocol - 0x02, Config_Interface - 0x1
DEC_USBkeyboard:
  USB_Class_Driver = Driver_Name - usb_keyboard, Release_Num -
0x1000, Device_Class - 0xff, Interface_Class - 0x03, Interface_Sub_Class - 0x01,
Interface_Protocol - 0x01, Config_Interface - 0x1
DEC_USBhid:
  USB_Class_Driver = Driver_Name - usb_hid, Release_Num - 0x1000,
Device_Class - 0xff, Interface_Class - 0x03, Interface_Sub_Class - 0x01,
Config_Interface - 0x1

generic:
  memberid=1
  msgbuf_size=16384
  new_vers_high=1445655480385976064
  new_vers_low=51480
  act_vers_high=1445655480385976064
  act_vers_low=51480
  rolls_ver_lookup=0

```

```

locktype=0
emx:
# work around panic_on_no_context = 0
# work around2 panic_on_stale_IOCB = 0
panic_on_no_context = 1
Enable_Polled_Operation=1

ipc:
  shm_allocate_striped=0
  msg_max = 32768
  msg_mnb = 16384
  msg_mni = 256
  msg_tql = 40
  sem_aem = 32768
  sem_mni = 16384
  sem_msl = 2000
  sem_opm = 2000
  sem_ume = 2000
  sem_vmx = 320000
  shm_max = 2139095040
  shm_mni = 1024
  shm_seg = 8196
  ssm_threshold = 0

rt:
# aio_max_num = 16384
aio_task_max_num = 16384

io:
  basic_dma_window_size = 2048

proc:
  max_proc_per_user = 0
  max_threads_per_user = 0
  max_per_proc_stack_size=33554432
# max_per_proc_stack_size = 1073741824
  max_per_proc_address_space = 274877906944
  max_per_proc_data_size = 274877906944
  per_proc_address_space = 274877906944
  per_proc_data_size = 274877906944
  give_boost = 0
# sched_min_idle=10000

rm:
  rm_no_inheritance = 1

net:
  netisrthreads = 8

inet:
  udp_recvspace=32768
  udp_sendspace=32768
  ipqmaxlen=2048
  ipqs=8
  tcbhashnum=8
  tcbhashsize=8192

vm:
  swapdevice=/dev/disk/dsk3b/dev/disk/dsk6c
  vm_page_free_reserved=20
  vm_page_free_min=30
  replicate_user_text = 1
  rad_gh_regions[0]=30720
  rad_gh_regions[1]=30720
  rad_gh_regions[2]=30720
  rad_gh_regions[3]=30720
  rad_gh_regions[4]=30720
  rad_gh_regions[5]=30720
  rad_gh_regions[6]=30720
  rad_gh_regions[7]=30720
  gh-fail-if-no-mem = 1
  new_wire_method = 1
  vm-swap-eager=0
  dump_user_pte_pages=1
  vm_ubcdirtypercent = 50
  ubc_maxdirtywrites = 20

lsm:
  lsm_rootdev_is_volume=0
# Enable_LSM_Stats=0

pcount:
  Subsystem_Description = pcount device driver

```

Module_Config_Name = pcount
Module_Type = Dynamic
Device_Char_Major = ANY
Device_Char_Minor = 0
Device_Char_Files = pcount0

clubase:

cluster_expected_votes=1
cluster_name=tpcc
cluster_node_name=wftpc1
cluster_node_inter_name=mc0
cluster_node_votes=1
tnc_node_info=10.0.0.1
tnc_node_mask=255.255.255.0
tnc_interface=mc0
cluster_seqdisk_major=19
cluster_seqdisk_minor=79
cluster_qdisk_major=0
cluster_qdisk_minor=0
cluster_qdisk_votes=0

sec:

acl_mode = disable

rdg:

max_objs=8096
max_async_req=2048
msg_size = 4096
max_sessions = 2048
rdg_max_auto_msg_wires = 4000

cfs:

cfslog_max_size=163840

drd:

drd_enable_drd=0

dln:

dln_scn_switch=1

Appendix E

Auditor Attestation

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

May 2, 2001

I verified the performance of the following configuration:

Platform: **Compaq AlphaServer GS320 c/s**
 Operating system: **Compaq Tru64 UNIX V5.1**
 Database Manager: **Oracle9i, 9.0.1 Enterprise Edition**
 Transaction Manager: **Compaq DB Web Connector V1.1**

The performance was measured according to the requirements of the TPC-C Benchmark. The results were:

CPU's Speed	Memory	Disks	NewOrder 90% Response Time	tpmC
Server: AlphaServer GS320 Model 68/1001				
32 x Alphachip 21264A (1 GHz)	256 GB (8 MB cache per cpu)	1172 x 9 GB 431 x 18 GB 116 x 36 GB	1.337 Seconds	230,533
Sixteen Clients: Compaq ProLiant ML350 (Specification for each)				
2 x Pentium III (1 GHz)	640 MB	1 x 18 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 2 hours (7200 seconds)
- The reported measurement interval was representative of steady state conditions
- Four checkpoints were taken during the reported measurement interval
- The 60-day storage requirement was correctly computed
- The system pricing was verified for major components and maintenance

Additional Audit Notes:

None.

Respectfully Yours,

A handwritten signature in black ink, appearing to read "François Raab", with a long horizontal flourish extending to the right.

François Raab
President

Appendix F

Price Quotations



Quotation

Date	6/12/01	Sales Rep	Allison R Strome
Quote #	1-L1KB3	Rev #	1
Valid From:	06/15/2001	To	07/16/2001
Type	Hardware/Software/Service	Contract	SAP
PO#		OSR	BDURKEE

To Maria Lopez
(603) 884-0030 Fax () -
Compaq Computer Corporation
110 Spitbrook Road
Nashua, NH 03062

Line	Product Description	Qty.	Customer List	Net Price	Extended Price
1	VH-8G 8 port Gigabit 1000Base-SX Std alone fixed SC connectors	1	\$6,995.00	\$5,246.25	\$5,246.25
2	9342125-10M (1) SC Duplex to (1) SC Duplex M.M. Fiber, PVC	1	\$44.18	\$39.76	\$39.76

Total - Products	\$5,286.01
Total - Maintenance	\$0.00
Total - Services	\$0.00
Grand Total	\$5,286.01

ALL SALES ARE SUBJECT TO ENTERASYS'S STANDARD TERMS AND CONDITIONS FOR PURCHASE AND SUPPORT SERVICE. A COPY OF THE STANDARD TERMS IS AVAILABLE UPON REQUEST.

In order to process your order as quickly as possible please include the following on all purchase orders: Quote number, Requested delivery date, Freight carrier and Billing & Shipping addresses with contact name and phone number.

1-L1KB3

Compaq Computer Corp
 Atten: Maria Lopez

SERVER HARDWARE:

	Part Num.	Qty.		
Compaq AlphaServer GS320 6/1001 Model 32	DA-320EE-AA	1	\$466,200	\$466,200
GS160/320 Add-on 1GHz CPU	3X-KN8AB-AE	31	\$16,100	\$499,100
GS80/160/320 4GB Memory Module	3X-MS8AA-DB	32	\$23,400	\$748,800
GS80/160/320 4GB Memory Dimm Upgrade	3X-MS8AA-DU	32	\$19,800	\$633,600
RH ULTRASCSI SHELF CAB SPLITB	BA36R-RD	1	\$1,078	\$1,078
3M VHDCI to 68HD Cable Assy	BN38C-03	1	\$88	\$88
64 Bit Fibre HBA	DS-KGPSA-CA	56	\$2,800	\$156,800
PCI to UltraSCSI Adapter	KZPBA-CA	1	\$322	\$322
1600 Watt Bulk Power Converter	H7506-AA	4	\$7,000	\$28,000
GS160/320 PCI Expansion Box	3X-DWWPA-SA	11	\$10,500	\$115,500
System I/O module	3X-KFWHA-AA	15	\$2,100	\$31,500
GS80/160/320 Expansion Cab	H9A20-AA	3	\$3,500	\$10,500
15M Fibre Op Cable 50/125	234457-B23	56	\$159	\$8,904
PCI to GbE SX Adapter	DEGPA-SA	8	\$1,364	\$10,912
3YR 7X24 4/HR GS320 25-32 CPU	FM-W6724-36	1	\$296,168	\$296,168
SC-SC Dual FO Cbl, MM, PP, 4.5M	BN34B-4E	8	\$67	\$536
VT510,WHITE,NORTH AMER,NO KEY	VT510-AA	1	\$427	\$427
US& Canada/English KB	PCXLA-NA	1	\$18	\$18
SUBTOTAL SERVER HARDWARE:				\$3,008,453

STORAGE:

EMA 12000 Storage Array	DS-SWXEB-AA	18	\$49,976	\$899,568
HSG80 FC Controller, W/O ECB Cable Kit, 256MB Cache W/OPDS	DS-HSG80-BK	108	\$11,547	\$1,247,076
16 Port Fibre Switch	DS-DSGGB-AB	18	\$25,000	\$450,000
Model 2200 ECB	DS-SE2CS-CB	108	\$207	\$22,356
3YR 7X24/4HR 24 Slot Enc/No Drives	FM-CG724-36	36	\$1,378	\$49,608
3YR 7X24/4hr; HS*80 w/Cache	FM-CA724-36	72	\$1,704	\$122,688
3YR 7X24/4HR 41U/42U CAB	FM-CB724-36	18	\$1,128	\$20,304
Short Wave Optical GBIC	380561-B21	256	\$345	\$88,320
15M Fibre Op Cable 50/125	234457-B23	216	\$159	\$34,344
18.2GB 7200rpm UWSCSI Disk**	DS-RZ1EA-VW	8	\$837	\$6,696
9.1GB 10Krpm UWSCSI3 Disk **	3R-A0584-AA	1290	\$403	\$519,870
18.1 GB 10K RPM UWSCSI3 Disk**	3R-A0585-AA	468	\$578	\$270,504
36.4GB 10K RPM UWSCSI3 Disk**	3R-A0919-AA	128	\$972	\$124,416
12/24GB 4mm DAT Tape	TLZ10-LB	1	\$637	\$637
3YR 7X24/4HR DAT TAPE	FM-4M724-36	1	\$862	\$862
SUBTOTAL STORAGE:				\$3,857,249

SERVER SOFTWARE:

3YR TRU64UNIX BRZ7X24	FM-W16US-36	1	\$19,055	\$19,055
3YR GS160/320 TRU64 UNIX SMP	FM-W16SM-36	31	\$1,286	\$39,866
3YR Tru64Unix O/S & LP	FM-CDDST-36	1	\$6,765	\$6,765
HSG80 ACSsf ALL LIC/PCRM PKG	QB-6BUAA-SA	108	\$4,900	\$529,200
3YR 7X24 HS*80 SW Dual Controller	FM-DUAL6-36	54	\$10,209	\$551,286
3YR 7X24 HS*80 Platform SW	FM-PLAT2-36	54	\$844	\$45,576
Digital UNIX Alpha CDRM	QA-MT4AA-H8	1	\$277	\$277
SERVER SOFTWARE SUBTOTAL:				\$1,192,025

CLIENT HARDWARE:

Compaq ProLiant ML350 1.0Ghz	160247-001	16	\$2,093	\$33,488
3YR 7X24 4HR WorkGroup Svr	FM-LO724-36	16	\$1,160	\$18,560
Pentium II P1000-256k Processor	207068-B21	16	\$1,597	\$25,552
512MB SDRAMM DIMM Memory	128279-B21	16	\$1,168	\$18,688
ProLiant ML350 Hot Plug Drive Cage	161275-B21	16	\$441	\$7,056
18.2GB Wide Ultra 3 Drive	142673-B22	16	\$601	\$9,616
SC-SC Dual FO Cbl, MM, PP, 4.5M	BN34B-4E	16	\$42	\$672
Compaq NC3134 Fast Ethernet NIC 64 PCI Dual Port 10/100	138603-B21	64	\$277	\$17,728
for NC3134	138604-B21	48	\$221	\$10,608
NC3134	338456-B23	16	\$551	\$8,816
S510 15" Monitor NH US	168636-001	16	\$193	\$3,088

CLIENT HARDWARE SUBTOTAL:**\$153,872****CLIENT SOFTWARE:**

Application Optimizer WNT Server Edition	QB-641AA-SA	16	\$315	\$5,040
Application Optimizer WNT Server Service	QT-641AA-XA	5	\$58	\$4,640

CLIENT SOFTWARE SUBTOTAL:**\$9,680****CONFIGURATION TOTAL:****\$8,221,279**

The Compaq AlphaServer GS320 carries a three (3) year, 7x24/4HR response warranty. The storage have a three (3) year on-site, 4-hour, 7-day per week response with a three (3) year return to manufacture warranty. All other products carry a standard warranty of three (3) years on-site; 4-hour x 7-days per week.

Traditional Compaq Intel Based Client Hardware Priced at US1plus%

Valid: This quote is valid for 60days from date

Terms: TBD

Delivery: 15 Days ARO

Shipping: FOB Origin

Warranty: Manufactures New Equipment

Installation: Included

Sincerely,

Philip K. Nolan

Vice President

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