TPC Benchmark™ C
Full Disclosure Report
for
AXIL Computer, Inc. Northbridge NX801
Using
Microsoft SQL Server Enterprise Edition V 6.5
and
Microsoft Windows NT Server Enterprise Edition V 4.0

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

All performance data contained in his report were obtained in a rigorously controlled environment. Results obtained in other operating environments may vary significantly. AXIL Computer, Inc. does not warrant or represent that a user can or will achieve the same performance expressed in transactions per minute (tpmC) or normalized price/performance ($/tpmC).

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Abstract

Overview

This report documents the methodology and results of the TPC Benchmark™ C test conducted on the AXIL Computer, Inc. Northbridge NX801. The tests were run in a client/server configuration using 6 Compaq Presario 4824 Pentium II 233MHz and 2 Dell Dimension Pentium Pro/200 PC's as clients. The operating system used for the benchmark was Microsoft Windows NT Server Enterprise Edition 4.0 for the server and Windows NT Server 4.0 on the clients. The database was the Microsoft SQL Server Enterprise Edition v. 6.5.SP3. All tests were done in compliance with Revision 3.3.2 of the Transaction Processing Council's TPC Benchmark™ C Standard Specification. Two standard TPC Benchmark tm C metrics, transactions per second (tpmC) and price per tpmC ($/tpmC) are reported and referred to in this document. The results from the tests are summarized below.

Hardware	Software	Total System Cost	tpmC	$/tpmC	Availability Date
AXIL Computer, Inc. Northbridge NX801	Microsoft Windows NT Server/E 4.0 Microsoft SQL Server/E 6.5 SP3	$1,138,717.71	**14,501.06**	$78.52	HW: March 30, 1998 SW: January 7, 1998

AUDITOR

The results of the benchmark and test methodology used to produce the results were audited by Francois Raab of Information Paradigm, Inc. and have fully met the TPC-C rev 3.3.2 specifications.

Additional copies of this Full Disclosure Report can be obtained from either the Transaction Processing Performance Council or AXIL Computer, Inc. at the following address:

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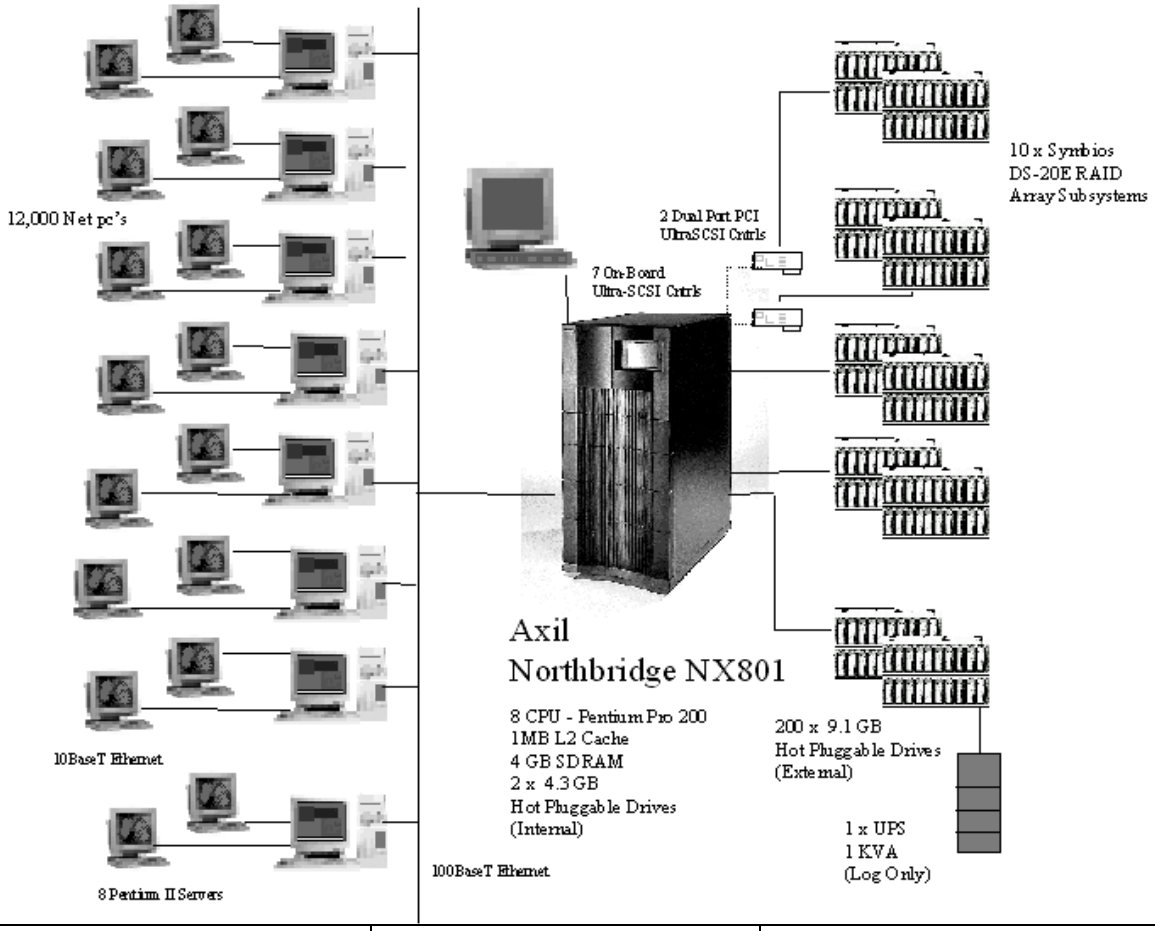
Axil Computer, Inc.	**Northbridge NX801**	TPC-C Rev 3.3.2 Report Date December 2, 1997

Total System Cost	TPC-C Throughput	Price/Performance	Availability Date
$1,138,717.71	**14,501**	**$78.52**	March 30, 1998*

Processors	Database Manager	Operating System	Other Software	Number of Users
8 Pentium Pro @200MHz with 1MB L2 Cache	Microsoft SQL Server Enterprise Ed. 6.5	Microsoft Windows NT 4.0 Server Enterprise	Tuxedo 6.3 Microsoft IIS Microsoft Visual C++	12,000 USERS



System Component	Server		Clients	
Processors	8	Pentium Pro @200MHz	8	Pentium II @ 233 MHz
Cache	8	1MB L2 cache per cpu	8	256k L2 cache per cpu
Memory	1	4.0 GB	8	6 x 256MB & 2 x 128MB
Disk Controllers	11	Ultra SCSI-3	8	SCSI
Disk Drives	200	9.1 GB SCSI	8	4 GB SCSI
Other Disk Drives	2	4.3 GB		
Total Storage	1.8	TB	32	GB
Other	1	CD-ROM	8	CD-ROM

* Microsoft SQL Server Enterprise Edition is available as of January 7, 1998.

Axil Computer	Northbridge NX801	TPC-C REV 3.2 EXECUTIVE SUMMARY PAGE 2 OF 3
Inc.	Client/Server	Report Date: 02-December-1997

Description	Part Number	Third Party		Unit Price	Qty	Extended Price	5 yr. Maint. Price
Server Hardware		**Brand**	**Pricing**				
NX801 Base System	SY1003-E	Axil	1	40,330	$1.00	40,330	19,446
(Includes 2 CPU, 128MB Memory, 2X4GB F/W SCSI-3 disks, 1x10/100 Ethernet PCI, 1x 2D Graphics card, 1x900 watt Power Supply, NT Server/E, NT Media/doc kit, Keyboard, Mouse,cables)							
2 CPU Upgrade	OP-012	Axil	1	21,995	$3.00	65,985	12,741
16x128 MB SDRAM DIMMs (2GB)	OP-025	Axil	1	20,480	$2.00	40,960	5,837
SCSI Extender Option	OP-O16	Axil	1	1,500	$1.00	1,500	214
Raid Storage Array Subsystem (includes 1 controller, 64MB Cache, 20x4GB SCSI drives)	DS/RM20E	Symbios	2	61,153	$9.00	550,377	114,750
Raid Storage Array Subsystem (2 controllers) (includes 2 controllers, 64MB Cache, 20x4GB SCSI drives)	DS20E	Symbios	2	68,441	$1.00	68,441	12,750
Symbios SCSI Controller	SYM22802	Symbios	3	381	$4.00	1,525	warranty+spares
17" EPA SVGA MONITOR	MO-102	Axil	1	695	$1.00	695	540
1 KVA UPS Systeme for log RAID array		APC	4	422	$1.00	640	**
					Subtotal	770,453	166,278
Server Software							
Windows NT Server/E (included with NX801)		Microsoft	5	0	$1.00	0	0*
SQL Server 6.5/E plus unlimited user license		Microsoft	5	28,999	$1.00	28,999	10,475
*** all "5" maint is covered by the maint cost**							
					Subtotal	28,999	10,475
Client Hardware							
Compaq Presario 4824 (includes monitor,256MB Ram., 4GB SCSI drive, keyboard, mouse etc)		Compaq	4	3,405	$8.00	27,236	3,760
** All "4" warranty is provided by maint cost							
					Subtotal	27,236	3,760
Client Software							
Windows NT Server		Microsoft	5	809	$8.00	6,472	0*
Visual C++		Microsoft	5	499	$1.00	499	0*
SQL Workstation		Microsoft	5	499	$1.00	499	0*
BEA Tuxedo/CFS 6.3		BEA	6	3,000	$8.00	24,000	18,000
					Subtotal	31,470	18,000
User Connectivity							
Ethernet Hub, True Fast 100MBPS 8 port (+ 10% spa	NX-H8TX	Netlux	7	299	$4.00	1,196	spared + warranty
Netlux 8 port 10BaseT hub (+10% spares)	NX-H9+	Netlux	7	49	########	80,850	spared + warranty
					Subtotal	82,046	0
					Other Discounts*	0	0
					Total	**$940,204**	**$198,512**

Notes:

1=Axil Computer, 2= Symbios Logic, 3=Anthem Electronics, 4 = COMPUSA, 5 = Microsoft, 6 = BEA Systems, 7=Netlux Inc.

Audited by Francoise Raab, Information Paradigm, Inc.

Five-Year Cost of Ownership:	**$1,138,717**
tpmC Rating:	**14,501**
$ / tpmC:	**78.52**

MQTh, computed Maximum Qualified Throughput **14,501.06** tpmC
% throughput difference, reported & reproducibility runs 0.7 %

Response Times (90th percentile | Average | Maximum) in seconds

- Neworder	1.20	0.87	161.19
- Payment	1.02	0.64	140.06
- Order Status	1.37	0.99	38.05
- Delivery (interactive portion)	0.75	0.50	15.82
- Delivery (deferred portion)	.961	.571	4.00
- Stock-Level	4.11	2.46	32.64
- Menu	0.70	0.34	67.41

Transaction Mix, in percent of total transactions

- New-Order	44.67 %
- Payment	43.10 %
- Order-Status	4.10 %
- Delivery	4.07 %
- Stock-Level	4.06 %

Keying/Think Times (in seconds),	Min		Average		Max	
- New-Order	18.01	0.0	18.01	12.07	18.05	120.51
- Payment	3.00	0.0	3.01	12.01	3.04	120.50
- Order-Status	2.00	0.0	2.01	10.00	2.03	100.50
- Delivery	2.00	0.0	2.01	5.05	2.03	50.50
- Stock-Level	2.00	0.0	2.01	5.08	2.03	50.50

Test Duration

- Ramp-up time	75 minutes
- Measurement interval	30 minutes
- Number of checkpoints	4
- Checkpoint interval	30 minutes
- Number of transactions (all types) completed in measurement interval	973,918

Introduction

Document Structure

The contents of this report are determined by the TPC Benchmark C Standard Specification Revision 3.3.2, written and approved by the Transaction Processing Performance Council (TPC). The format of this report is based on this specification. Most sections of this report begins with the relevant specification requirements printed in italic type, immediately followed by the detail in plain type of how AXIL Computer, Inc. complied with the specification. Where extensive listings are required (such as listing of code), a note is included which references an appendix containing the listing.

Benchmark Overview

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
- Transaction integrity (ACID properties)
- 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.

Although these specifications express implementation in terms of a relational data model with conventional locking scheme, the database may be implemented using any commercially available database management system (DBMS), database server, file system, or other data repository that provides a functionally equivalent implementation.

The terms "table", "row", and "column" are used in this document only as examples of logical data structures.

TPC-C uses terminology and metrics that are similar to other benchmarks, originated by the TPC or others. Such similarity in terminology does not in any way imply that TPC-C results are comparable to other benchmarks. The only benchmark results comparable to TPC-C are other TPC-C results conformant with the same revision.

Despite the fact that this benchmark offers a rich environment that emulates many OLTP applications, this benchmark does not reflect the entire range of OLTP requirements. In addition, the extent to which a customer can achieve the results reported by a vendor is highly dependent on how closely TPC-C approximates the customer application. The relative performance of systems derived from this benchmark does not necessarily hold for other workloads or environments. Extrapolations to any other environment are not recommended.

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

System Overview

Northbridge NX801 Product Specifications and “System Under Test” configuration

Processors	8 Pentium Pro 200 MHz processors, 1MB L2 Cache
Operating System	Windows NT Server Enterprise Edition 4.0, SP3
Cache	32 KB of integrated L1 cache, 1 MB of integrated L2 cache per processor
CPU Board	4 P6 boards (2 processors per board), 2 P6 busses, Adaptive Memory Crossbar [tm] address and data ASICs, 4 PCI buses, 7 UltraSCSI controllers, 1 standard I/O controller, 8 PCI slots.
PCI Chipset	Intel PCI chipset, Model 450GX
Memory	4 GB of high performance SDRAM. (32 x 128 MB SDRAM DIMMS, 2 Memory Modules (up to 32 DIMMS per module), ECC Protected.)
Graphics	2D PCI graphics card, 1280 x 1024, 65 K colors, 72 Hz, 2MB VRAM board (Diamond Stealth)

I/O Subsystem	Total of 4 PCI buses, 2 supporting the 7 UltraSCSI controllers, 2 supporting PCI based SCSI controllers.
Communication Ports	2 serial ports, 2 parallel ports, 1 PS/2 keyboard port, 1 PS/2 mouse port
Networking	Fast Ethernet PCI card with 10/100Base-T support
I2C (Inter-integrated Circuit)	Monitoring and troubleshooting system for cooling, power supplies, memory, battery, security, disks, and CPUs
Control Panel	AxilTouch display panel monitors system statistics, isolates Faults, and provides overall operator control; also allows user to enter password for electronic door locks
Security	2 electronic door locks on front, one for removable media area and one for disk area, one key lock on rear for access to boards, memory, power supplies, fans, connectors, switches, and cables, built-in BIOS password protection, 2-level password, missing memory detection via AxilVision
Storage Bays	One 3.5" for floppy (included), six 5.25" half-height for removable media (empty in SUT except for CD-ROM), centerplane for connection of up to 24 disks (2 included in SUT) optional SCSI extender for connection of external disks (utilized during testing).
Power Supplies	1x900 Watt hot-swappable power supply (system supports 3), DC-controlled, automatic power sensing, 12A maximum input current, 190-250V range
Warranty and Service	Protected by PersonalTouch, 3-year limited warranty includes 3-year on-site service, free parts and labor, and lifetime telephone support. Warranty and service upgrades available; EasySwap components are customer replaceable and upgradable Priced configuration includes 5 years 5x8 onsite support, with 4 hour response time.
Enclosure	

	17"w x 38.5"h x 28.75" d, 432 mm, 965 mm, 680 mm, 60-100 KG; 150-220 lbs.
Power Requirements:	
	System requires a dedicated and properly grounded 220-240 VAC 15 Amp power outlet
External Storage:	10xDS20E Symbios Logic Raid Subsystems. 1 of these subsystems was used as the log device (Raid 1) and was configured with redundant controllers (mirrored cache under battery backup) and protected by a UPS system.

System Architecture

Developing an effective symmetric multiprocessing solution for more than four Pentium Pro processors requires improved techniques for overcoming limitations posed by the P6 System Bus. Axil's innovative Adaptive Memory Crossbar (AMX) architecture presents a dynamic new approach for optimizing memory subsystem performance, coupled with industry standard components, to provide industry-leading SMP performance scalability from 1-to-8 Pentium Pro processors.

The Pentium Pro's most significant limitation at high multiprocessor utilization rates is the amount of data bandwidth on the P6 memory bus. While the P6 bus's 533 Megabyte/second maximum specified limit is designed to support the traffic typically generated by up to 4 processors, it can become a system limitation when 4-8 processors are generating a maximum number of memory hits - for example, in transaction processing, electronic commerce and other data-intensive commercial database applications. Because the P6 bus is unable to support more than 4 processors (for electrical reasons), the major engineering challenge is to bridge 2 P6 buses in an SMP configuration in a way that both maintains cache coherency and minimizes additional overhead to the P6 memory bus.

The AMX architecture presents a dynamic new approach for optimizing the use of the P6 data bus in a 1-8 way multiprocessing environment. By closely coupling two P6 system buses — each with up to 4 processors attached — with an advanced high-performance memory subsystem, each data bus can operate at a full, sustained maximum bandwidth, minimizing memory bottlenecks. Through its high-performance P6 bus bridge and memory subsystem, the AMX architecture increases SMP performance all across the full range of 1-8 processors more effectively than any other proposed SMP scheme for the Pentium Pro. (see figure 1)

As a result, the AMX architecture is able to approach the theoretical limit of Pentium Pro SMP performance with Windows NT across the 1-8 processor range. Statistical

modeling of performance enhancements going from a 4-processor to an 8-processor system yields an estimated 1.7 performance improvement factor for the AMX architecture, as compared to a 1.3-to-1.5 range for other Pentium Pro SMP architectures.

General Items

Test Sponsor

A statement identifying the sponsor of the Benchmark and any other companies who have participated.

AXIL Computer, Inc. was the test sponsor of this TPC Benchmark™ C.

Application Code and Definition Statements

The application program must be disclosed. This includes, but is not limited to, the code implementing the five transactions and the terminal input/output functions.

The application source files that ran on the clients are provided in Appendix A.

The program that implements the TPC Benchmark C translation and collects appropriate transaction statistics is referred to as the Remote Terminal Emulator (RTE) or Driver program. The Driver program is discussed in Section 7.0.

Parameter Settings

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

- *Database options*
- *Recover/commit options*
- *Consistency/locking options*
- *System parameter, application parameters, and configuration parameters.*

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

Appendix C contains all the database and operating system parameters used in this benchmark.

Configuration Diagrams

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

Figure 1 shows the measured full client/server configurations and Figure 2 shows the priced full client/server configuration. The SUT in the measured system was identical to the priced one with the following thrre exceptions: (1) two Dell Dimension XPS Pentium Pro 200 machines were used as clients in the configured run but were substituted by two Compaq Presario 4824 Pentium II 233MHz PC's for pricing, (2) the measured config used 3.75 GB of RAM and 4.0 GB was priced, and (3) the measured configuration used one (one) internal disk drive and the priced uses 2 (two).

FIGURE 1: MEASURED CONFIGURATION

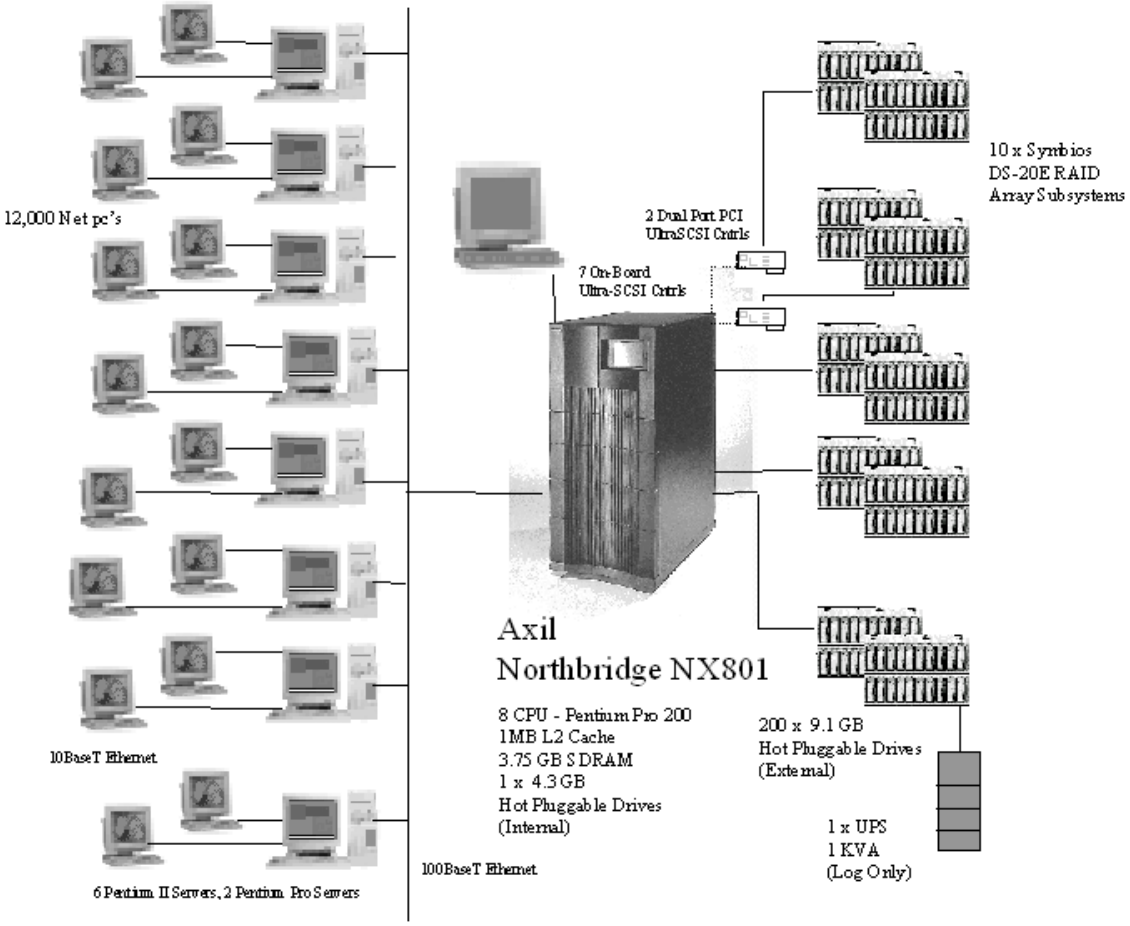
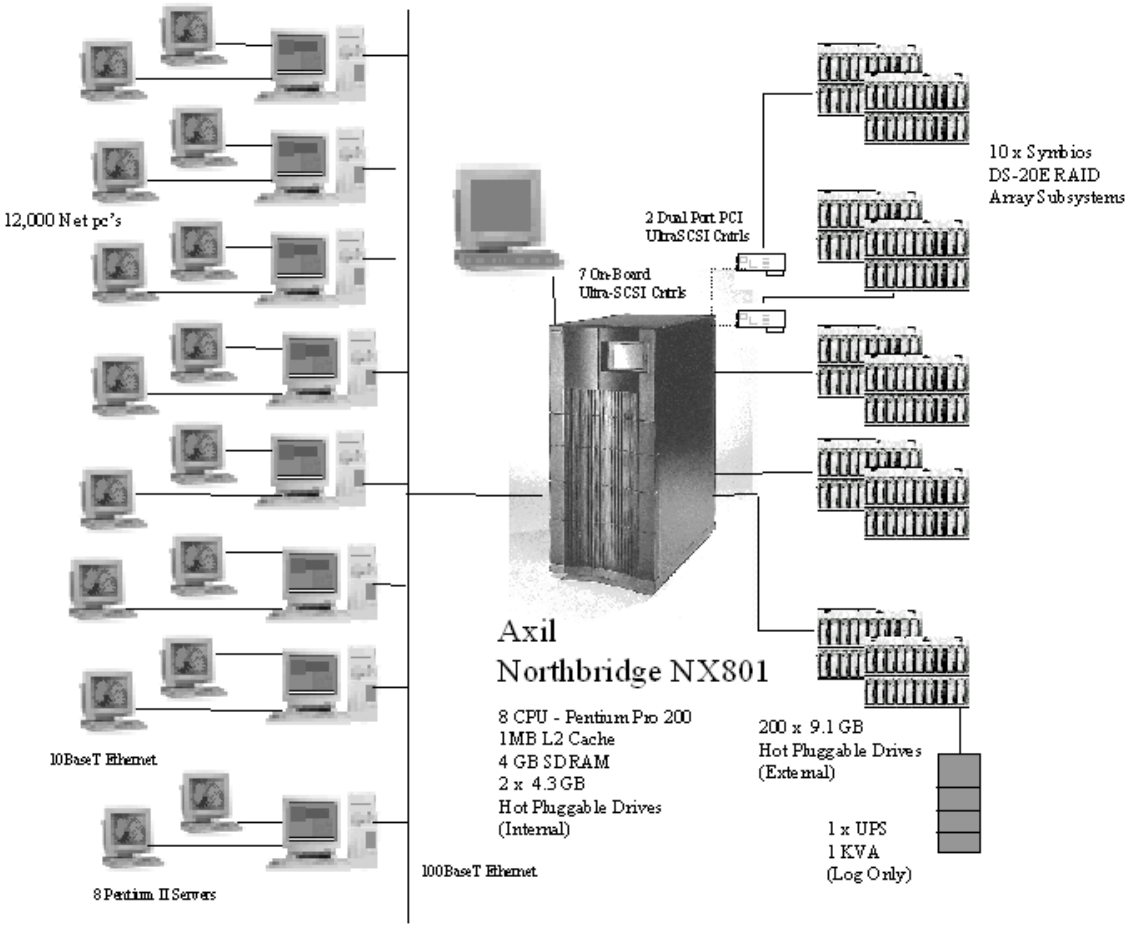


FIGURE 2: PRICED CONFIGURATION



Clause 1 -- Logical Database Design Related Items

Table Definitions

Listings must be provided for all table definition statements and all other statements used to set-up the database. (8.1.2.1)

Appendix B contains the code used to define and load the database tables.

Physical Organization of the Database

The physical organization of tables and indices, within the database, must be disclosed. (8.1.2.2)

The measured configuration used 202 disk drives.

Insert and Delete Operations

It must be ascertained that insert and/or delete operations to any of the tables can occur concurrently with the TPC-C transaction mix. Furthermore, any restriction 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. (8.1.2.3)

Insert and delete functionality was fully operational during the benchmark.

Horizontal and Vertical Partitioning

While there are a few restrictions placed upon horizontal or vertical partitioning of tables and rows in the TPC-C benchmark (see Clause 1.6), any such partitioning must be disclosed. (8.1.2.4)

Partitioning was not used in this benchmark.

Replication

Replication of tables, if used, must be disclosed (see Clause 1.4.6). (8.1.2.5)

Replication was not used in this benchmark.

Table Attributes

Additional and/or duplicated attributes in any table must be disclosed along with a statement on the impact on performance (see Clause 1.4.7). (8.1.2.6)

No additional attributes were used in this benchmark.

Clause 2 -- Transaction and Terminal Profiles Related Items

Random Number Generation

The method of verification for the random number generation must be described. (8.1.3.1)

Screen Layout

The actual layouts of the terminal input/output screens must be disclosed. (8.1.3.2)

The screen layouts are based on those in Clauses 2.4.3, 2.5.3, 2.6.3, 2.7.3, and 2.8.3 of the TPC-C Standard Specification. There are some differences based on the fact that this is a WEB client implementation.

Terminal Verification

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

The terminal features were verified by allowing the auditor to manually execute each of the five transaction types, using Microsoft Internet Explorer version 3.0.

Intelligent Terminals

Any usage of presentation managers or intelligent terminals must be explained. (8.1.3.4)
Comment 1*: The intent of this clause is to describe any special manipulations performed by a local terminal or workstation to off-load work from the SUT. This includes, but is not limited to: screen presentations, message bundling, and local storage of TPC-C rows.*
Comment 2*: This disclosure also requires that all data manipulation functions performed by the local terminal to provide navigational aids for transaction(s) must also be described. Within this disclosure, the purpose of such additional function(s) must be explained.*

Application code involved in the manipulation of data was run on the client. Screen manipulation commands were downloaded to the WEB browser which handled input and output presentation graphics. A listing of this code is included in Appendix A. Microsoft Internet Information Service assisted in the processing and presentation of this data.

Transaction Profiles

The percentage of home and remote order-lines in the New-Order transactions must be disclosed. (8.1.3.5)
The percentage of New-Order transactions that were rolled back as a result of an unused item number must be disclosed. (8.1.3.6)
The number of items per orders entered by New-Order transactions must be disclosed.

(8.1.3.7)
The percentage of home and remote Payment transactions must be disclosed. (8.1.3.8)
The percentage of Payment and Order-Status transactions that used non-primary key (C_LAST) access to the database must be disclosed. (8.1.3.9)
The percentage of Delivery transactions that were skipped as a result of an insufficient number of rows in the NEW-ORDER table must be disclosed. 8.1.3.10)

Table 1: Transaction Statistics

Transaction	Function	Value
New Order	Home Warehouse Items	99.00%
	Remote Warehouse Items	1.00%
	Rolled Back Transactions	1.00%
	Average Lines Per Order	10.00
Payment	Home Warehouse	85.03%
	Remote Warehouse	14.97%
	Non-Primary Key Access	60.13%
Order Status	Non-Primary Key Access	60.23%
Delivery	Skipped Transactions	0

Transaction Mix

The mix (i.e., percentages) of transaction types seen by the SUT must be disclosed. (8.1.3.11)

Table 2: Transaction Mix

Transaction	Percentage
New Order	44.67
Payment	43.10
Order Status	4.10
Delivery	4.07
Stock Level	4.06

Deferred Delivery Mechanism

The queuing mechanism used to defer the execution of the Delivery transaction must be disclosed. (8.1.3.12)

The client application processes submitted delivery transactions to BEA Tuxedo /T queueing mechanism software running on the client machines. There were multiple delivery servers with single execution threads running on each client machine. These delivery servers were responsible for processing deliveries queued to Tuxedo and submitting them to the database server.

The source code is listed in Appendix A.

Clause 3 -- Transaction and System Properties Related Items

ACID Tests

The results of the ACID tests must be disclosed along with a description of how the ACID requirements were met. This includes disclosing which case was followed for the execution of Isolation Test 7. (8.1.4.1)

All ACID property tests were successful. The executions are described below.

Atomicity

The system under test must guarantee that the 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.

Completed Transactions

A row was selected in a script from the warehouse, district and customer tables, and the balances noted. A payment transaction was started with the same warehouse, district and customer identifiers and a known amount. The payment transaction was committed and the rows were verified to contain correctly updated balances.

Aborted Transactions

A row was selected in a script from the warehouse, district and customer tables, and the balances noted. A payment transaction was started with the same warehouse, district and customer identifiers and a known amount. The payment transaction was rolled back and the rows were verified to contain the original balances.

Consistency

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

Consistency conditions one through four were tested using a shell script to issue queries to the database. The results of the queries verified that the database was consistent for all four tests. A run was executed under full load lasting over ten (10) minutes and included a checkpoint. The shell script was executed again. The result of the same queries verified that the database remained consistent after the run.

Isolation

Sufficient conditions must be enabled at either the system or application level to ensure the required isolation defined above (clause 3.4.1) is obtained.

Isolation tests one through seven were executed using shell scripts to issue queries to the database. Each script included timestamps to demonstrate the concurrency of operations.

The results of the queries were captured to files. The captured files were verified by the auditor to demonstrate the required isolation had been met.

In addition, the phantom tests and the stock level tests were executed and verified.

For Isolation test seven, case A was followed.

Durability

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

Durable Media Failure

Durability from media failure was demonstrated on a 10 warehouse database for log and data loss, and on the fully scaled database for system and memory loss. The standard driving mechanism was used to generate the transaction load of 100 users for the Loss of Log and Data. The fully scaled database under full load would also have passed the following tests.

Loss of Log and Loss of Data

The loss of log and loss of data tests were performed on a 10 warehouse system. To demonstrate recovery from a permanent failure of durable medium containing TPC-C logs and tables, the following steps were executed:

1. A 10 warehouse database was built in a manner similar to the full size database.
2. A backup was taken of the database using Microsoft SQL Server facilities.
3. A sum of d_next_o_id was taken and noted.
4. 100 users were logged into the database and proceeded to run transactions.
5. One disk drive was removed from a disk array containing the transaction log.
6. NT reported that part of a mirrored pair was not responding.
7. SQL Server reported no errors and continued running normally.
8. One disk drive was removed from a disk array containing database files.
9. SQL Server reported errors and transactions failed.
10. SQL Server was restarted and a dump of the transaction log was taken.
11. The tpcc database was dropped.
12. The system was shut down and the faulty disk drive was replaced and the partition reformatted.
13. The 10 warehouse database was recreated.
14. The 10 warehouse database was restored from backup.

15. The saved transaction log was loaded and transactions rolled forward.
16. A sum of d_next_o_id was taken and noted.
17. The number of transactions reported in the database and in the RTE log was compared.

Instantaneous Interruption and Loss of Memory

Because loss of power erases the contents of memory, the instantaneous interruption and the loss of memory tests were combined into a single test. This test was executed on a fully scaled database of 1200 warehouses under a full load of 12,000 users. The following steps were executed:

1. A sum of d_next_o_id was taken and noted.
2. 12,000 users were logged into the database and proceeded to run transactions.
3. System power was terminated.
4. System power was reapplied and NT restarted.
5. SQL Server was started and recovery occured automatically.
6. A sum of d_next_o_id was taken and noted.
7. The number of transactions reported in the database and in the RTE log were compared.

Clause 4 -- Scaling and Database Population Related Items

Table Cardinality

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. (8.1.5.1)

Table 3: Table Cardinality

Table	Cardinality as Benchmarked
Warehouse	1,200
District	12,000
Customer	36,000,000
History	36,000,000
Orders	36,000,000
New Order	10,800,000
Order Line	360,002,793
Stock	120,000,000
Item	100,000
Deleted Warehouses	0

Constant Values

The following values were used as constant value inputs to the NURand function for this benchmark.

Table 4: Constant Values

Function	Constant C Value
C_LAST (Build)	123
C_LAST (Run)	233

Data Distribution

The distribution *of tables and logs across all media must be explicitly depicted for the tested and priced systems. (8.1.5.2)*

Logical Disk and Size	Partition and Size	Database Device on Partition
Disk 0 – 64000 MB	G:	Stock_dev1
	N: 4000 MB	Cust_dev1
Disk 1 – 64000 MB	Y: 64000 MB	Backup device
Disk 2 – 64000 MB	H: 5700 MB	Stock_dev2
	O: 4000 MB	Cust_dev2
Disk 3 – 64000 MB	I: 5700 MB	Stock_dev3
	P: 4000 MB	Cust_dev3
Disk 4 – 64000 MB	J: 5700 MB	Stock_dev4
	Q: 4000 MB	Cust_dev4
Disk 5 – 64000 MB	E: 64000 MB	Orderline_dev1
Disk 6 – 64000 MB	W: 64000 MB	Backup device
Disk 7 – 64000 MB	K: 5700 MB	Stock_dev5
	R: 4000 MB	Cust_dev5
Disk 8 – 64000 MB	Z: 64000 MB	Backup device
Disk 9 – 64000 MB	L: 5700 MB	Stock_dev6
	S: 4000 MB	Cust_dev6
Disk 10 - 64000 MB	F: 64000 MB	Misc_dev1
Disk 11 - 64000 MB	X: 64000 MB	Backup device
Disk 12 – 64000 MB	V: 64000 MB	Log_dev1
Disk 13 – 64000 MB	M: 5700 MB	Stock_dev7
	T: 4000 MB	Cust_dev7
Disk 14 – 4094 MB	C: 4094 MB	OS

Microsoft SQL Server v6.50.258 is a relational DBMS.

The interface used was Microsoft SQL Server stored procedures accessed with Remote Procedure Calls embedded in C code.

Partition Mapping

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

The database was not replicated nor partitioned.

180 Day Space Calculation

Details of the 180 day space computations along with proof that the database is configured to sustain 8 hours of growth for the dynamic tables (Order, Order-Line, and History) must be disclosed (see Clause 4.2.3). (8.1.5.5)

1. To calculate the space required to sustain the database log for 8 hours of growth at steady state, the following steps were followed:
2. The free space on the log file was queried using *DBCC checktable(syslogs)*.
3. Transactions were run against the database with a full load of users.
4. The free space was again queried using *DBCC checktable(syslogs)*.
5. The space used was calculated as the difference between the first and second query.
6. The number of NEW-ORDERS was verified from an RTE report covering the entire run.
7. The space used was divided by the number of NEW-ORDERS giving a spaceused per NEW-ORDER transaction.
8. The space used per transaction was multiplied by the measured tpmC rate times 480 minutes.

The results of the above steps yielded a requirement of 38.80GB (not including mirror) to sustain the log for 8 hours. Space available on the transaction log volume was 64GB (not including mirror), indicating that enough storage was configured to sustain 8 hours of growth. The log drives were mirrored using hardware RAID. 64GB was mirrored to 64GB on the same raid subsystem.

The same methodology was used to compute growth requirements for dynamic tables Order, Order-Line and History.

The details of the 180-day space requirement is shown in Appendix D.

Clause 5 -- Performance Metrics and Response Time Related Items

Measured TpmC

Measured tpmC must be reported. (8.1.6.1)

Measured TpmC	**14,501.06 tpmC**
Price per TpmC	**$78.52**

Response Times

Ninetieth percentile, maximum and average response times must be reported for all transaction types as well as for the Menu response time. (8.1.6.2)

Table 5: Transaction Response Times

Transaction	Average	Maximum	90%
New Order	0.87	161.19	1.20
Payment	0.64	140.06	1.02
Order Status	0.99	38.05	1.37
Interactive Delivery	0.50	15.82	0.75
Deferred Delivery	.57	4.00	.96
Stock Level	2.46	32.64	4.11
Menu	0.34	67.41	0.70

Think Times & Key Times

The minimum, the average, and the maximum keying and think times must be reported for each transaction type. (8.1.6.3)

Table 6: Transaction Key Times

Transaction	Average	Max	Min
New Order	18.01	18.05	18.01
Payment	3.01	3.04	3.00
Order Status	2.01	2.03	2.00
Delivery	2.01	2.03	2.00
Stock Level	2.01	2.03	2.00

Table 7: Transaction Think Times

Transaction	Average	Max	Min
New Order	12.07	120.51	0.00
Payment	12.01	120.50	0.00
Order Status	10.00	100.50	0.00
Delivery	5.05	50.50	0.00
Stock Level	5.08	50.50	0.00

Response Time Distribution Curves

Response Time frequency distribution curves (see Clause 5.6.1) must be reported for each transaction type. (8.1.6.4)

Figure 1: New Order Response Time Distribution

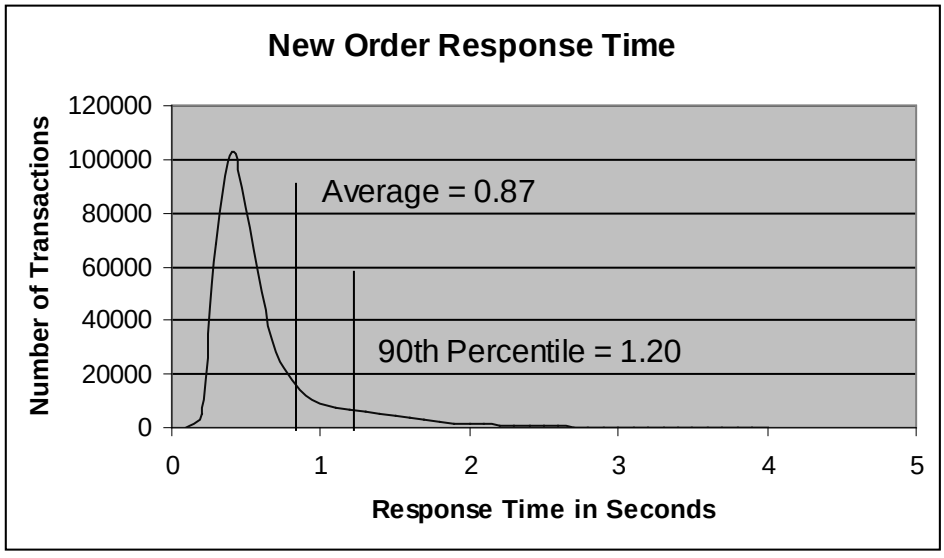


Figure 2: Payment Response Time Distribution

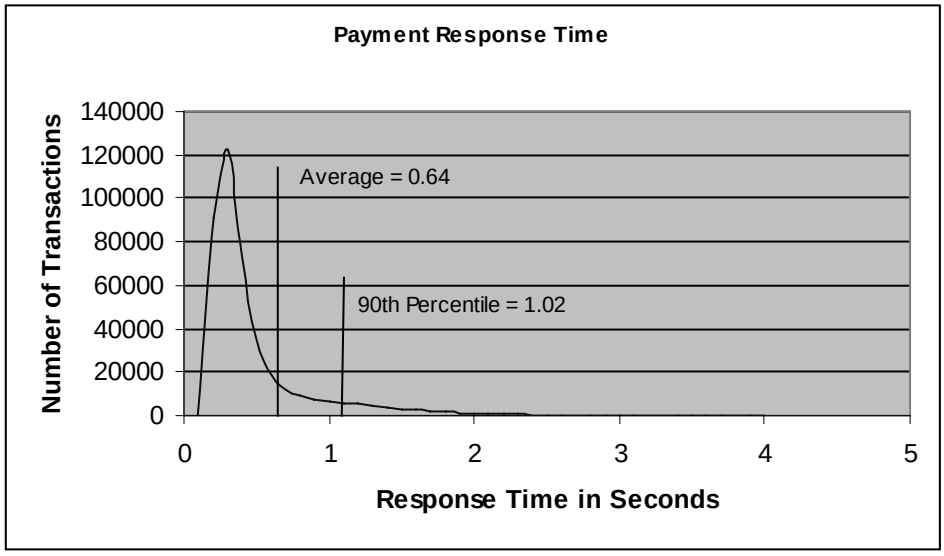


Figure 3: Order Status Response Time Distribution

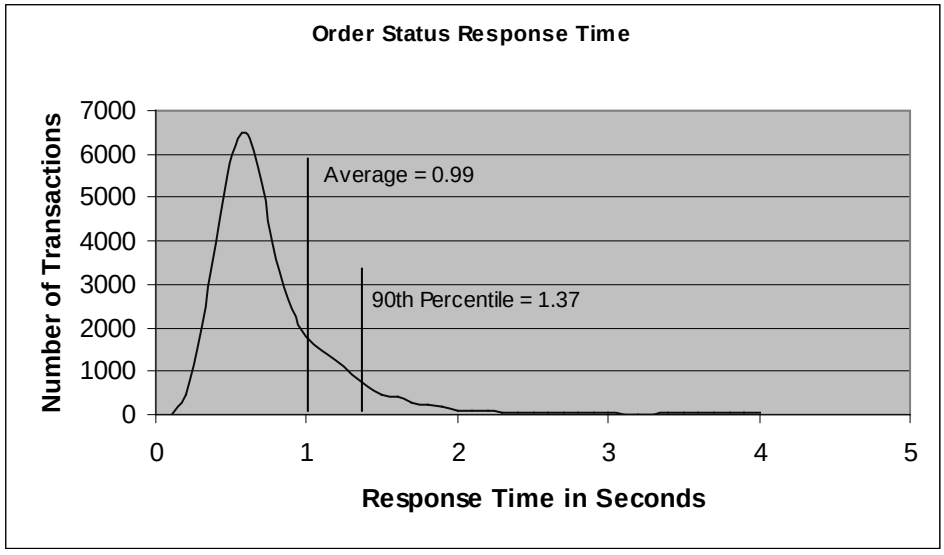


Figure 4: Delivery Response Time Distribution

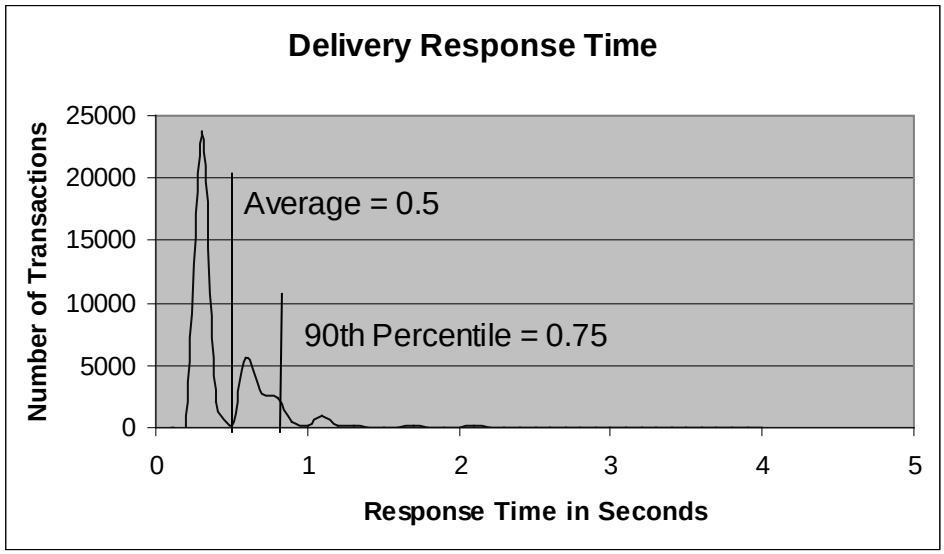
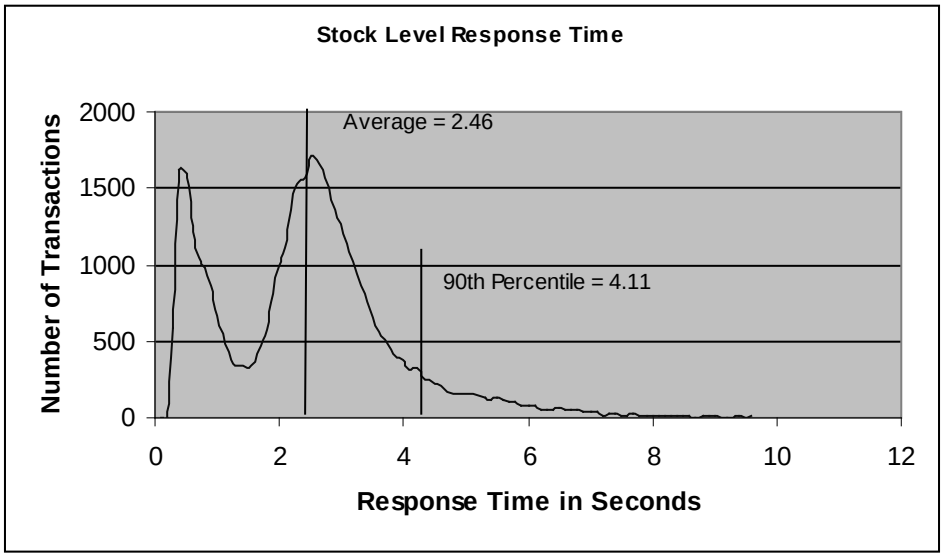


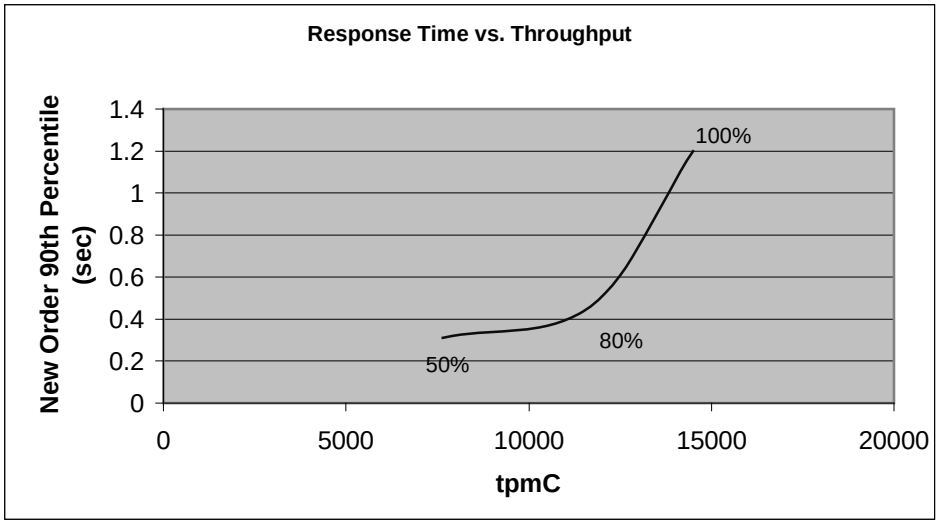
Figure 5: Stock Level Response Time Distribution



New-Order Response Time vs. Throughput Graph

The performance curve for response times versus throughput (see Clause 5.6.2) must be reported for the New-Order transaction. (8.1.6.5)

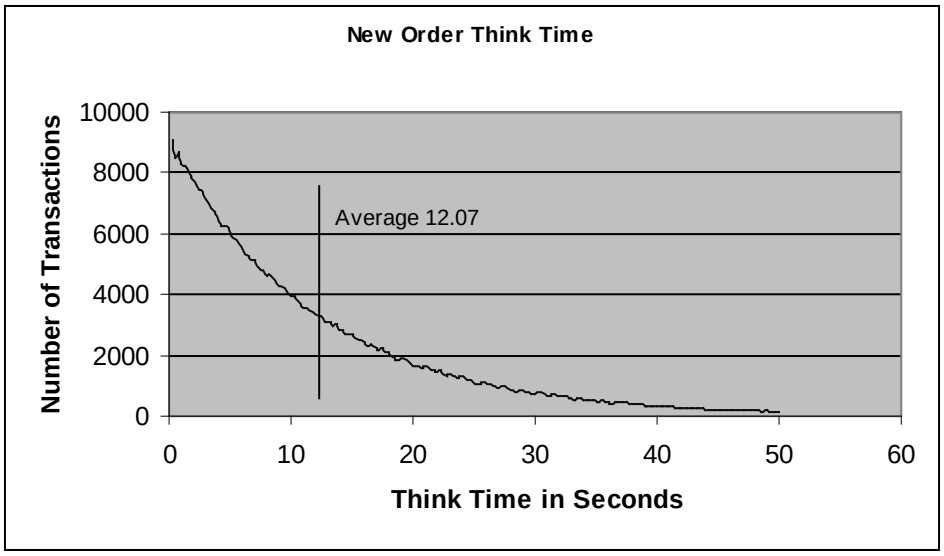
Figure 6: New Order Response Time vs. Throughput



New-Order Think Time Distribution Graph

Think Time frequency distribution curves (see Clause 5.6.3) must be reported for the New-Order transaction (8.1.6.6)

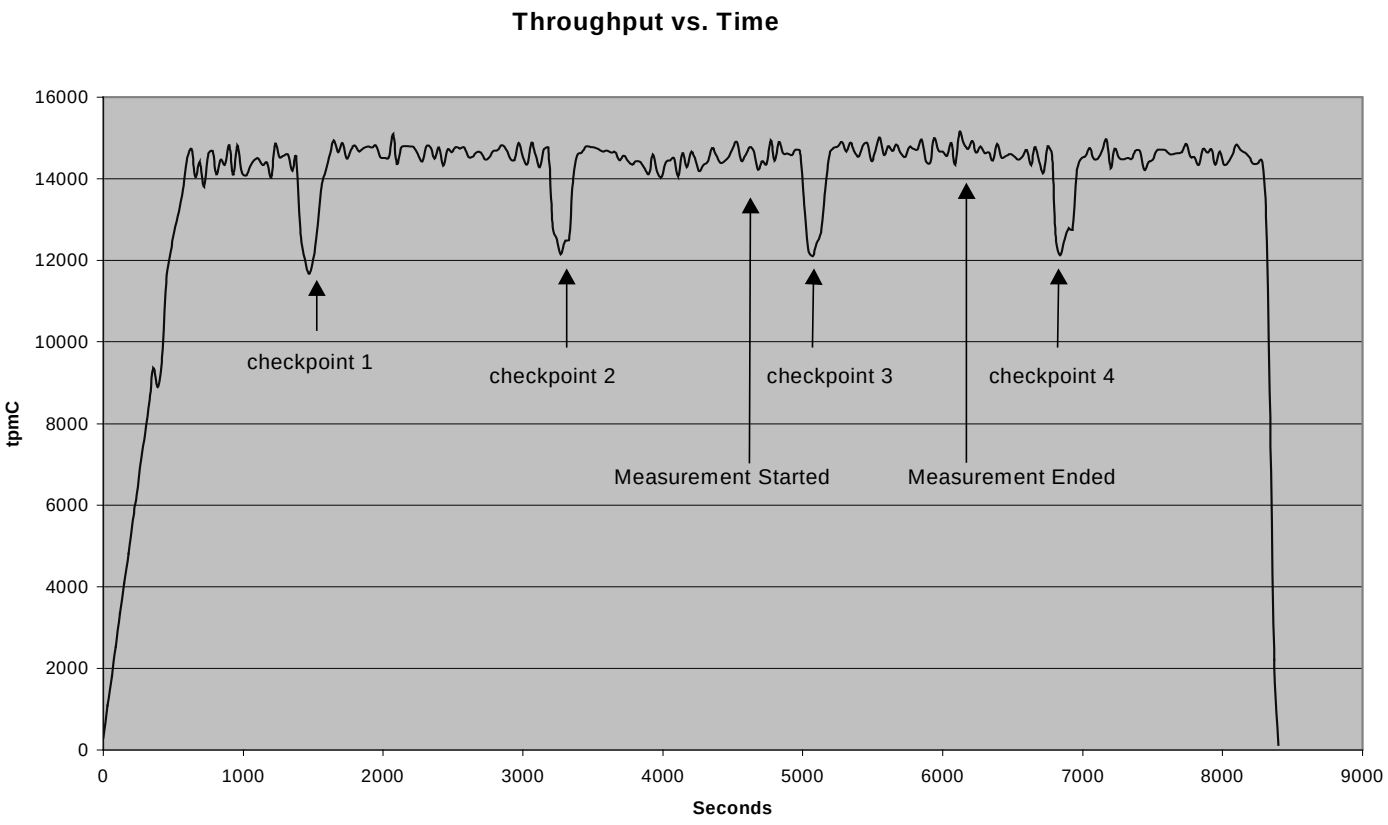
Figure 7: New Order Think Time Distribution



Steady-State Graph

A graph of throughput versus elapsed time (see Clause 5.6.5) must be reported for the New-Order transaction. (8.1.6.8)

Figure 8: New Order Throughput vs. Time



Steady-State Methodology

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. (8.1.6.9)

Steady state was determined using real time monitor utilities from both the operating system and the RTE. Steady state was further confirmed by the throughput data collected during the run and graphed in Figure 8.

Work Performed During Steady State

A description of how the work normally performed during a sustained test (for example

checkpointing, writing redo/undo log records, etc.), actually occurred during the measurement interval must be reported. (8.1.6.10)

The RTE generated the required input data to choose a transaction from the menu. This data was timestamped. The response for the requested transaction was verified and timestamped in the RTE log files.

The RTE generated the required input data for the chosen transaction. It waited to complete the minimum required key time before transmitting the input screen. The transmission was timestamped. The return of the screen with the required response data was timestamped. The difference between these two timestamps was the response time for that transaction and was logged in the RTE log.

The RTE then waited the required think time interval before repeating the process starting at selecting another transaction from the menu.

The RTE transmissions were sent to application processes running on the client machines through Ethernet LANs. These client application processes handled all screen I/O as well as all requests to the database on the server. The applications communicated with the database server over another Ethernet LAN using Microsoft SQL Server DBLIB library and RPC calls.

To perform checkpoints at specific intervals, we set SQL Server *recovery interval* to the maximum allowable value and wrote a script to schedule multiple checkpoints at specific intervals. By setting the TRACE FLAG #3502, SQL Server logged the checkpoint beginning and ending time in the ERRORLOG file. The script included a wait time between each checkpoint equal to the measurement interval which was 30 minutes. The checkpoint script was started manually after the RTE had all users logged in and sending transactions.

At each checkpoint, Microsoft SQL Server wrote to disk all memory pages that had been updated but not yet physically written to disk. Upon completion of the checkpoint, Microsoft SQL Server wrote a special record to the recovery log to indicate that all disk operations had been satisfied to this point. The positioning of the checkpoint was verified to be clear of the guard zones and is depicted on the graph in Figure 8.

Reproducibility Methodology

A description of the method used to determine the reproducibility of the measurement results must be reported. (8.1.6.11)

We allowed the database to warm up and to reach a steady state for approximately 15 minutes. The steady state was sustained for a 30-minute (measurement) interval, and was followed by a ramp-down. The repeatable interval result was within 0.7 % of the reported interval result.

Measurement Interval

A statement of the duration of the measurement interval for the reported Maximum Qualified Throughput (tpmC) must be included. (8.1.6.12)

The measurement interval was 30 minutes.

Transaction Mix

8.1.6.13 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. (8.1.6.13)

The RTE was given a weighted random distribution which was not be adjusted during the run.

The percentage of the total mix for each transaction type must be disclosed. (8.1.6.14)

Table 8: Transaction Mix

Transaction	Percentage
New Order	44.67
Payment	43.10
Order Status	4.10
Delivery	4.07
Stock Level	4.06

Other Metrics

The percentage of New-Order transactions rolled back as a result of invalid item number must be disclosed. (8.1.6.15)
The average number of order-lines entered per New-Order transaction must be disclosed. (8.1.6.16)
The percentage of remote order-lines entered per New-Order transaction must be disclosed. (8.1.6.17)
The percentage of remote Payment transactions must be disclosed. (8.1.6.18)
The percentage of customer selections by customer last name in the Payment and Order-Status transactions must be disclosed. (8.1.6.19)
The percentage of Delivery transactions skipped due to there being fewer than necessary orders in the New-Order table must be disclosed. (8.1.6.20)

Table 9: Transaction Statistics

Transaction	Function	Value
New Order	Home Warehouse Items	99.00%
	Remote Warehouse Items	1.00%
	Rolled Back Transactions	1.00%
	Average Lines Per Order	10.00
Payment	Home Warehouse	85.03%
	Remote Warehouse	14.97%
	Non-Primary Key Access	60.13%
Order Status	Non-Primary Key Access	60.23%
Delivery	Skipped Transactions	0

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. (8.1.6.21)

The initial checkpoint was started 23 minutes after the start of the ramp-up. The succeeding checkpoints were started in 30 minute intervals. The checkpoint in the measurement interval lasted 3 minutes 13 seconds. The measurement interval contains the third checkpoint, and is clear of the guard zones.

Clause 6 -- SUT, Driver, and Communication Definition Related Items

RTE Parameters

The RTE input parameters, code fragments, functions, etc. used to generate each transaction input field must be disclosed. (8.1.7.1)
Comment: *The intent is to demonstrate the RTE was configured to generate transaction input data as specified in Clause 2.*

The RTE used was the Microsoft BenchCraft RTE System.

Emulated Components

It must be demonstrated that the functionality and performance of the components being emulated in the Driver System are equivalent to that of the priced system. The results of the test described in Clause 6.6.3.4 must be disclosed. (8.1.7.2)

No components were emulated.

Benchmarked and Targeted System Configuration Diagrams

A complete functional diagram of both the benchmark configuration and the configuration of the proposed (target) system must be disclosed. A detailed list of all software and hardware functionality being performed on the Driver System, and its interface to the SUT must be disclosed (see Clause 6.6.3.6). (8.1.7.3)

The driver system performed the data generation and input functions of the priced display device. It also captured the input and output data and timestamps for post-processing of the reported metrics. No other functionality was included on the driver system.
Figures 1 and 2 of this report contain detailed diagrams of both the benchmark configuration and the priced configuration. One substitution of clients was made.

Two (2) Dell XPS Pro200n clients with 128 MB of (non-EDO) RAM and 3.2 GB IDE Hard disk Drives in the measured configuration are being substituted by two (2) Compaq Presario 4824 computers with 256 MB (EDO) RAM and a 4 GB SCSI Drive in the priced configuration..

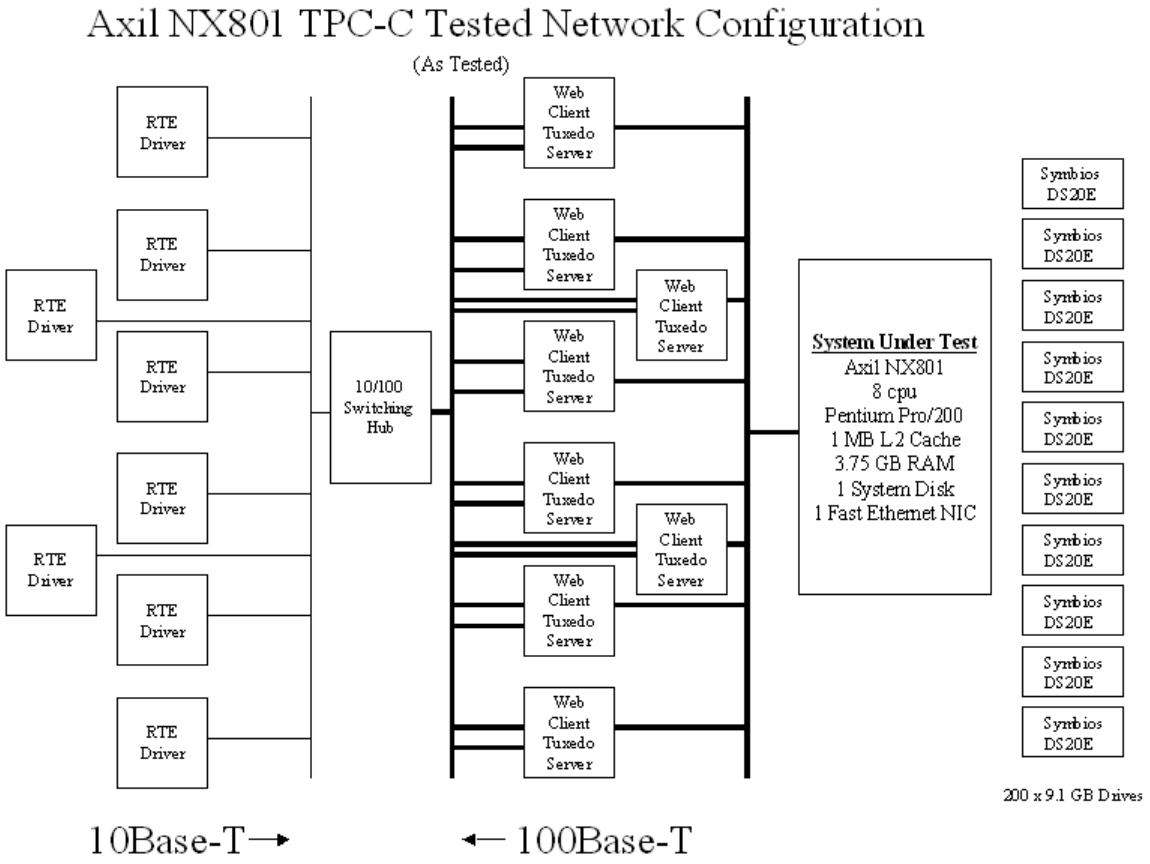
Tests were run in accordance with TAB ID 229 which confirm the suitability of the substition.

	New Orders	Users	Avg. Orders/User
All Priced	1,557,492	9600	162.238
Non-Priced #1	187,390	1200	156.158
Non-Priced #2	190,845	1200	159.038
All Non-Priced	378,235	2400	157.597

Network Configuration

The network configurations of both the tested services and the proposed (target) services which are being represented and a thorough explanation of exactly which parts of the proposed configuration are being replaced with the Driver System must be disclosed (see Clause 6.6.4). (8.1.7.4)

The following diagram shows the network setup for the performance run.



Network Bandwidth

The bandwidth of the network(s) used in the tested/priced configuration must be disclosed. (8.1.7.5)

The driver machine network was using 10Mbps connection to the 10/100 switching hub and the client machines were using 100Mbps to the switching hub. The client to server network was using 100Mbps. See above diagram of network.

Operator Intervention

If the configuration requires operator intervention (see Clause 6.6.6), the mechanism and the frequency of this intervention must be disclosed. (8.1.7.6)

This configuration does not require any operator intervention to sustain eight hours of the reported throughput.

Clause 7 -- Pricing Related Items

Hardware and Software List

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

Pricing source(s) and effective date(s) of price(s) must also be reported. (8.1.8.1)

The total 5-year price of the entire configuration must be reported, including: hardware, software, and maintenance charges. Separate component pricing is recommended. The basis of all discounts used must be disclosed. (8.1.8.2)

The details of the hardware and software are reported in the front of this report as part of the executive summary. All third party quotations are included at the end of this report as Appendix E.

Availability Date

The committed delivery date for general availability (availability date) of products used in the price calculations must be reported. When the priced system includes products with different availability dates, the reported availability date for the priced system must be the date at which all components are committed to be available. (8.1.8.3)

Submitted for Review Date: December 1, 1997
Hardware Availability Date: March 30, 1998
Software Availability Date: Novemer 30, 1997

Measured TpmC

A statement of the measured tpmC, as well as the respective calculations for 5-year pricing, price/performance (price/tpmC), and the availability date must be included. (8.1.8.4)

Maximum Qualified Throughput: **14,501** tpmC
Price Performance Metric: **$78.52** per tpmC

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. (8.1.8.5)

This system is priced for the United States of America.

Usage Pricing

For any usage pricing, the sponsor must disclose (8.1.8.6):

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

***Comment**: Usage pricing may include, but is not limited to, the operating system and database management software.*

The component pricing based on usage is shown below:

- Eight Microsoft Windows NT Server 4.0 licenses (includes 5 client acess licenses)
- One Microsoft Windows NT 4.0 Server Enterprise license (includes 25 client licenses)
- One (1) Microsoft SQL Server Enterprise v.6.50 (Includes unlimited User Licenses).
- One (1) Microsoft SQL Server Programmers Toolkit
- One (1) Microsoft Visual C++ version 4.2

System Pricing

System pricing should include subtotals for the following components: Server Hardware, Server Software, Client Hardware, Client Software, and Network Components used for terminal connection (see Clause 7.2.2.3). Clause 6.1 describes the Server and Client components. An example of the standard pricing sheet is shown in Appendix B. (8.1.8.7) System pricing must include line item indication where non-sponsoring companies' brands are used. System pricing must also include line item indication of third party pricing. See example in Appendix B. (8.1.8.8)

***Comment:** By standardizing the pricing spreadsheet and adding subtotals the value of the FDR and executive summary will be enhanced. This will allow the reader to more easily compare results and determine pricing.*

The details of the hardware and software are reported in the front of this report as part of the executive summary. All third party quotations are included at the end of this report as Appendix E.

Clause 9 -- Audit Related Items

Auditor

The auditor's name, address, phone number, and a copy of the auditor's attestation letter indicating compliance must be included in the Full Disclosure Report. (8.1.9.1)
A review of the pricing model is required to ensure that all components required are priced (see Clause 9.2.8). The auditor is not required to review the final Full Disclosure Report or the final pricing prior to issuing the attestations letter. (8.1.9.2)

This TPC-C benchmark has been audited by Francios Raab of Information Paradigm.

The letter of attestation is included on the following pages:

Information Paradigm

TPC TRANSACTION PROCESSING PERFORMANCE COUNCIL

Certified Auditor

Sponsor: Greg Roody
Axil Computer, Inc
130 C Baker Ave Extention
Concord, Ma 01742

Nov 19, 1997

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

Platform: Northbridge NX801
Operating system: Microsoft Windows NT Server Enterprise Edition 4.0
Database Manager: Microsoft SQL Server Enterprise Edition 6.50
Transaction Manager: Bea Tuxedo 6.3

The results were:

CPU's Speed	Memory	Disks	NewOrder 90% Response Time	tpmC
Server: Northbridge NX801				
8 x Pentium Pro (200 MHz)	3.75 GB (1 MB L2 cache per cpu)	200 x 9.1 GB 1 x 4.3 GB	1.2 Seconds	14,501
Eight Clients: (6) Compaq 42824 & (2) Dell XPS Pro200n (Spec for Compaq)				
1 x Pentium Pro (233 MHz)	256 MB	1 x 4 GB	n/a	n/a

In my opinion, these performance results were produced in compliance with the TPC requirements for Revision 3.3.2 of the benchmark. The following verification items were given special attention:

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

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- The ACID properties were met
- 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.
- At least 90% of all delivery transactions met the 80 Second completion time limit
- All 90% response times were under the specified maximums
- The measurement interval was representative of steady state conditions
- The reported measurement interval was 30 minutes (1800 seconds).
- One checkpoint was taken during the measurement interval
- Measurement repeatability was verified
- The 180 day storage requirement was correctly computed
- The system pricing was verified for major components and maintenance

Additional Audit Notes:

The measured configuration used (6) Compaq Presario 42824 clients and (2) Dell Dimension XPS Pro200 clients. For availability reasons (8) Compaq 42824's were priced. Based on the data collected it is my opinion that this substitution would have no material negative impact on the reported performance.

Respectfully Yours,

François Raab
President

Northbridge NX801

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Availability of the Full Disclosure Report

The Full Disclosure Report must be readily available to the public at a reasonable charge, similar to the charges for similar documents by the test sponsor. The report must be made available when results are made public. In order to use the phrase "TPC Benchmark™ C", the Full Disclosure Report must have been submitted to the TPC Administrator as well as written permission obtained to distribute same.

Requests for this TPC Benchmark C Full Disclosure Report should be sent to:

Transaction Processing Performance Council
c/o Shanley Public Relations
777 North First Street, Suite 6000
San Jose, CA 95112-6311

or:

AXIL Computer, Inc.
130C Baker Ave Extention
Concord, MA 01742

WEB Client Application Code

Makefile

```
!IF "$(CFG)" == ""
CFG=Release
!MESSAGE No configuration specified.  Defaulting to
Debug
!ENDIF


!IF "$(SQL_LOC)" == ""
SQL_LOC=D:\mssql\dblib
!MESSAGE No SQL_LOC specified.  Defaulting to
D:\MSSQL\DBLIB
!ENDIF

!IF "$(TUXDIR)" == ""
TUXDIR    = E:\TUXEDO
!MESSAGE No TUXDIR specified.  Defaulting to E:\TUXEDO
!ENDIF

!IF "$(CFG)" != "Release" && "$(CFG)" != "Debug"
!MESSAGE Invalid configuration "$(CFG)" specified.
!MESSAGE You can specify a configuration when running
NMAKE on this makefile
!MESSAGE by defining the macro CFG on the command line.
For example:
!MESSAGE
!MESSAGE NMAKE CFG="Debug"
!MESSAGE
!MESSAGE Possible choices for configuration are:
!MESSAGE
!MESSAGE "Release"
!MESSAGE "Debug"
!MESSAGE
!ERROR An invalid configuration is specified.
!ENDIF

OUTDIR          = .
SRCDIR          = .\Src
OBJDIR          = .\Objs
OUTDIR          = .\Bin
DBLIB           = $(SQL_LOC)
DBLIBINC        = $(DBLIB)\include
DBLIBDIR        = $(DBLIB)\lib

!IF "$(CFG)" != "Debug"
LDEBUG       =
CDEBUG       =
LDEBUG_RG    =
CDEBUG_RG    =
DEBUG        =
FLAGS        = /D "WIN32" /D "_WINDOWS" /D
"_TMSTHREADS"
#FLAGS        = /D "WIN32" /D "_WINDOWS" /D
"_TMSTHREADS" /D "LOCAL_ALLOC"
CFLAGS       = /D "WIN32" /D "_WINDOWS" /D
"_TMSTHREADS"
OPT          = /Ot
!ELSE
LDEBUG       = /debug /pdb:$(OBJDIR)\tpcc.pdb
CDEBUG       = /Zi /Yd /Fd$(OBJDIR)\tpcc.pdb
LDEBUG_RG    = /debug /pdb:$(OBJDIR)\install.pdb
CDEBUG_RG    = /Zi /Yd /Fd$(OBJDIR)\install.pdb
FLAGS        = /D "WIN32" /D "_WINDOWS" /D
"_TMSTHREADS"
#FLAGS        = /D "WIN32" /D "_WINDOWS" /D
"_TMSTHREADS" /D "LOCAL_ALLOC"
CFLAGS       = /D "WIN32" /D "_WINDOWS" /D
"_TMSTHREADS"
OPT          = /Od
!ENDIF


LINK32_LIBS     = user32.lib msacm32.lib advapi32.lib
$(DBLIBDIR)\ntwdblib.lib
TUX_LIBS  = $(TUXDIR)\lib\libtux.lib
$(TUXDIR)\lib\libbuft.lib $(TUXDIR)\lib\libtux2.lib  \
$(TUXDIR)\lib\libfml.lib $(TUXDIR)\lib\libfml32.lib
$(TUXDIR)\lib\libgp.lib
OTHER_LIBS          = wsock32.lib kernel32.lib
gdi32.lib comdlg32.lib winspool.lib
LINK32_OBJS     = "$(OBJDIR)\tpcc.obj"
"$(OBJDIR)\tpcc.res"
LINK32_DEF      = "$(SRCDIR)\tpcc.def"

LINK32_FLAGS    = /nologo /subsystem:windows /dll
/incremental:no $(LDEBUG) /def:"$(LINK32_DEF)"
/out:"$(OUTDIR)\tpcc.dll"

LINK32_LIBS_RG  = user32.lib gdi32.lib advapi32.lib
version.lib comctl32.lib
LINK32_OBJS_RG  = "$(OBJDIR)\install.obj"
"$(OBJDIR)\install.res"
LINK32_FLAGS_RG = /nologo /subsystem:windows
/incremental:no $(LDEBUG_RG) /out:$(OUTDIR)\install.exe

ALL:    $(OBJDIR)\. $(OUTDIR)\. $(OUTDIR)\tpcc.dll
$(OUTDIR)\Neworder.exe $(OUTDIR)\Payment.exe \
        $(OUTDIR)\Stocklevel.exe
$(OUTDIR)\Orderstatus.exe $(OUTDIR)\Delivery.exe
$(OUTDIR)\Delirpt.exe

$(OBJDIR)\.:
        if not exist $(OBJDIR) md $(OBJDIR)

$(OUTDIR)\.:
        if not exist $(OUTDIR) md $(OUTDIR)

"$(OBJDIR)\tpcc.obj":   "$(SRCDIR)\tpcc.c"
"$(SRCDIR)\tpcc.h"
        cl.exe /nologo /MT /W3 $(CDEBUG) $(OPT) /I
$(DBLIBINC) /I $(TUXDIR)\include $(FLAGS)
/Fo$(OBJDIR)\tpcc.obj /c "$(SRCDIR)\tpcc.c"

$(OBJDIR)\tpcc.res:     $(SRCDIR)\tpcc.rc
        rc.exe /l 0x409 /fo $(OBJDIR)\tpcc.res
$(FLAGS) $(SRCDIR)\tpcc.rc

$(OUTDIR)\tpcc.dll:     $(LINK32_OBJS) $(LINK32_DEF)
        link.exe   $(LINK32_FLAGS) $(LINK32_OBJS)
$(LINK32_LIBS) $(TUX_LIBS) $(OTHER_LIBS)

$(OUTDIR)\Neworder.exe: $(SRCDIR)\neworder.c
        $(TUXDIR)\bin\buildserver /f
$(SRCDIR)\neworder.c /o $(OUTDIR)\Neworder.exe \
/s NEWORDER /l "$(LINK32_LIBS) /I $(DBLIBINC)"
        del neworder.obj

$(OUTDIR)\Payment.exe: $(SRCDIR)\payment.c
        $(TUXDIR)\bin\buildserver /f
$(SRCDIR)\payment.c /o $(OUTDIR)\Payment.exe \
/s PAYMENT /l "$(LINK32_LIBS) /I $(DBLIBINC)"
        del payment.obj

$(OUTDIR)\Orderstatus.exe: $(SRCDIR)\orderstatus.c
        $(TUXDIR)\bin\buildserver /f
$(SRCDIR)\orderstatus.c /o $(OUTDIR)\Orderstatus.exe \
/s ORDERSTATUS /l "$(LINK32_LIBS) /I  $(DBLIBINC)"
        del orderstatus.obj

$(OUTDIR)\Stocklevel.exe: $(SRCDIR)\stocklevel.c
        $(TUXDIR)\bin\buildserver /f
$(SRCDIR)\stocklevel.c /o $(OUTDIR)\Stocklevel.exe \
/s STOCKLEVEL /l "$(LINK32_LIBS) /I $(DBLIBINC)"
        del stocklevel.obj

$(OUTDIR)\Delivery.exe: $(SRCDIR)\delivery.c
        $(TUXDIR)\bin\buildserver /f
$(SRCDIR)\delivery.c /o $(OUTDIR)\Delivery.exe \
/s DELIVERY /l "$(LINK32_LIBS) /I  $(DBLIBINC)"
        del delivery.obj

$(OUTDIR)\Delirpt.exe: $(SRCDIR)\delirpt.c
        cl.exe $(SRCDIR)\delirpt.c /o
"$(OUTDIR)\Delirpt.exe"
        del delirpt.obj
```

Delirpt.c

```
/*        FILE:               DELIRPT.C

 *                                        Microsoft TPC-C
Kit Ver. 3.00.000

 *

 *                                        Copyright
Microsoft, 1996
 *
 *        PURPOSE:  Delivery report processing
application
 *        Author:             Philip Durr
 *
          philipdu@Microsoft.com
 */

#include <windows.h>
#include <stdio.h>
#include <stdlib.h>
```

```
#define LOGFILE_READ_EOF      0

          //check log file flag return current state
#define LOGFILE_CLEAR_EOF     1

          //clear end of log file flag
#define LOGFILE_SET_EOF                2

                    //set flag end of log file reached

#define INTERVAL                       .01

                    //90th percentile calculation
bucket interval

#define ERR_SUCCESS
                    1000
          //success no error
#define ERR_READING_LOGFILE
          1001                                      //io
errors occured reading delivery log file
#define ERR_INSUFFICIENT_MEMORY
          1002
          //insuficient memory to process 90th
percentile report
#define ERR_CANNOT_OPEN_RESULTS_FILE    1005
                              //Cannot open delivery
results file delilog.

typedef struct _RPTLINE
{
          SYSTEMTIME          start;

                              //delilog report line
start time
          SYSTEMTIME          end;

                              //delilog report line end
time
          int                           response;

                              //delilog report line
time delivery took in milliseconds
          int                           w_id;

                              //delilog
report line warehouse id for delivery
          int                           o_carrier_id;

                              //delilog report line
carier id for delivery
          int                           items[10];

                              //delilog
report line delivery line items
} RPTLINE, *PRPTLINE;

//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;

int                                   versionMS = 3;

          //delirpt version
int                                   versionMM = 0;
int                                   versionLS = 2;
int                                   iReport;

          //delirpt report to process
int                                   iStartTime;

                    //begin times to accept for report
int                                   iEndTime;

          //end times to accept for report
FILE                          *fpLog;

          //log file stream

//Local function prototypes
void                main(int argc, char *argv[]);
static int          Init(void);
static void         Restore(void);
static int          DoReport(void);
int                           AverageResponse(void);
int                           SkippedDelivery(void);
int                           Percentile90th(void);
BOOL                CheckTimes(PRPTLINE pRptLine);
static int          OpenLogFile(void);
static void         CloseLogFile(void);
static void         ResetLogFile(void);
static BOOL         LogEOF(int iOperation);
static BOOL         ReadReportLine(char *szBuffer,
PRPTLINE pRptLine);
static BOOL         ParseReportLine(char *szLine,
PRPTLINE pRptLine);
static BOOL         ParseDate(char *szDate,
LPSYSTEMTIME pTime);
static BOOL         ParseTime(char *szTime,
LPSYSTEMTIME pTime);
static void         ErrorMessage(int iError);
static BOOL         GetParameters(int argc, char
*argv[]);
static void         PrintParameters(void);
static void         PrintHeader(void);
static void         cls(void);
static BOOL         IsNumeric(char *ptr);


/* FUNCTION: int main(int argc, char *argv[])
 *
 * PURPOSE:         This function is the beginning
execution point for the delivery executable.
 *
 * ARGUMENTS:       int                 argc
          number of command line arguments passed to
delivery
 *                                      char
          *argv[]   array of command line argument
pointers
 *
 * RETURNS:                   None
 *
 * COMMENTS:        None
 *
 */

void main(int argc, char *argv[])
{
          int       iError;

          PrintHeader();

          if ( GetParameters(argc, argv) )
          {
                    PrintParameters();
                    return;
          }

          if ( (iError=Init()) != ERR_SUCCESS )
          {
                    ErrorMessage(iError);
                    Restore();
                    return;
          }

          if ( (iError = DoReport()) != ERR_SUCCESS )
                    ErrorMessage(iError);

          Restore();

          return;
}

/* FUNCTION: static int Init(void)
 *
 * PURPOSE:         This function initializes the
delirtp application.
 *
 * ARGUMENTS:       None
 *
 * RETURNS:                   None
 *
 * COMMENTS:        None
 *
 */

static int Init(void)
{
          int iError;

          if ( (iError = OpenLogFile()) )
                    return iError;
          return TRUE;
}

/* FUNCTION: static void Restore(void)
 *
 * PURPOSE:         This function cleans up the delirpt
application before termination.
 *
 * ARGUMENTS:       None
 *
 * RETURNS:                   None
 *
 * COMMENTS:        None
 *
 */

static void Restore(void)
{
```

```
        CloseLogFile();
        return;
}

/* FUNCTION: static int DoReport(void)
 *
 * PURPOSE:                 This function dispatches
the requested report.
 *
 * ARGUMENTS:       None
 *
 * RETURNS:                 ERR_SUCCESS if
successfull or error code if an error occurs.
 *
 * COMMENTS:        None
 *
 */

static int DoReport(void)
{
        int iRc;

        switch(iReport)
        {
                case 1:
                        iRc = AverageResponse();
                        break;
                case 2:
                        iRc = Percentile90th();
                        break;
                case 3:
                        iRc = SkippedDelivery();
                        break;
                case 4:
                        if ( (iRc =
AverageResponse()) != ERR_SUCCESS )
                                break;
                        if ( (iRc =
Percentile90th()) != ERR_SUCCESS )
                                break;
                        if ( (iRc =
SkippedDelivery()) != ERR_SUCCESS )
                                break;
                        break;
        }
        return iRc;
}

/* FUNCTION: int AverageResponse(void)
 *
 * PURPOSE:                 This function processes
the AverageResponse report.
 *
 * ARGUMENTS:       None
 *
 * RETURNS:                 ERR_SUCCESS if
successfull or error code if an error occurs.
 *
 * COMMENTS:        None
 *
 */

int AverageResponse(void)
{
        RPTLINE reportLine;
        int             iTotalResponse;
        int             iLines;
        double  fAverage;
        char    szDelivery[128];

        ResetLogFile();

        iTotalResponse = 0;
        iLines = 0;
        printf("\n\n******** Average Response Time
Report *******\n");
        while ( !LogEOF(LOGFILE_READ_EOF) )
        {
                if ( ReadReportLine(szDelivery,
&reportLine) )
                        return
ERR_READING_LOGFILE;
                if ( szDelivery[0] == '*' )
                        continue;
                if ( !LogEOF(LOGFILE_READ_EOF) )
                {
                        if (
CheckTimes(&reportLine) )
                                continue;
                        iLines++;
                        iTotalResponse +=
reportLine.response;

                        if ( iLines % 10 == 0 )
                                printf("Reading
Report Line:\t%d\r", iLines);
                }
        }
        printf("
\r");
        if ( iLines == 0 )
        {
                printf("No deliveries found.\n");
        }
        else
        {
                fAverage = ((double)iTotalResponse
/ (double)iLines)/(double)1000;
                printf("Total Deliveries:
%10.0f\n", (float)iLines);
                printf("Total Response Times:
%10.3f\n", ((float)iTotalResponse/(float)1000));
                printf("Average Response Time:
%10.3f\n", fAverage);
        }

        return ERR_SUCCESS;
}

/* FUNCTION: int Percentile90th(void)
 *
 * PURPOSE:                 This function processes
the 90th percentile report.
 *
 * ARGUMENTS:       None
 *
 * RETURNS:                 ERR_SUCCESS if
successfull or error code if an error occurs.
 *
 * COMMENTS:        This function requires enough space
to allocate needed
 *                                  buckets which
will be 2 * max response time in
 *                                  deci-seconds.
 *
 */

int Percentile90th(void)
{
        RPTLINE reportLine;
        int             iBucketSize;
        int             i;
        int             iResponseSeconds;
        int             iMaxSeconds;
        int             iTotalBuckets;
        double  iTotal;
        double  i90thPercent;
        short   *psBuckets;
        char    szDelivery[128];

        printf("\n\n******** 90th Percentile
*******\n");
        printf("Calculating Max Response
Seconds...\n");

        ResetLogFile();

        iMaxSeconds = -1;
        while ( !LogEOF(LOGFILE_READ_EOF) )
        {
                if ( ReadReportLine(szDelivery,
&reportLine) )
                        return
ERR_READING_LOGFILE;
                if ( szDelivery[0] == '*' )
                        continue;
                if ( !LogEOF(LOGFILE_READ_EOF) )
                {
                        if ( iMaxSeconds <
reportLine.response )
                                iMaxSeconds =
reportLine.response;
                }
        }

        iTotalBuckets = iMaxSeconds + 1;

        printf("Allocating Buckets...\n");

        iBucketSize = iTotalBuckets * sizeof(short);

        if ( !(psBuckets = (short
*)malloc(iBucketSize)) )
                return ERR_INSUFFICIENT_MEMORY;

        ZeroMemory(psBuckets, iBucketSize);

        iTotal = 0;

        ResetLogFile();
        printf("Calculating Distribution...\n");

        while ( !LogEOF(LOGFILE_READ_EOF) )
        {
                if ( ReadReportLine(szDelivery,
&reportLine) )
```

```
                                return
ERR_READING_LOGFILE;
                    if ( szDelivery[0] == '*' )
                                continue;
                    if ( !LogEOF(LOGFILE_READ_EOF) )
                    {
                                if (
CheckTimes(&reportLine) )
                                        continue;

          psBuckets[reportLine.response]++;
                                iTotal++;
                    }
          }

          i90thPercent = iTotal * .9;

          for(i=0, iTotal = 0.0; iTotal < i90thPercent;
iTotal += (double)psBuckets[i] )
                    i++;

          printf("90th Percentile = %d.%d\n", i/1000,
(i % 1000));

          free(psBuckets);

          return ERR_SUCCESS;
}

/* FUNCTION: int SkippedDelivery(void)
 *
 * PURPOSE:                   This function processes
the Skipped Deliveries report.
 *
 * ARGUMENTS:       None
 *
 * RETURNS:                   ERR_SUCCESS if
successfull or error code if an error occurs.
 *
 * COMMENTS:        None
 *
 */

int SkippedDelivery(void)
{
          RPTLINE reportLine;
          char      szDelivery[128];
          int                 i;
          int                 items[10];

          ResetLogFile();

          printf("\n\n******** Skipped Delivery Report
*******\n");
          memset(items, 0, sizeof(items));
          printf("Reading Delivery Log File...");

          while ( !LogEOF(LOGFILE_READ_EOF) )
          {
                    if ( ReadReportLine(szDelivery,
&reportLine) )
                                return
ERR_READING_LOGFILE;
                    if ( szDelivery[0] == '*' )
                                continue;
                    if ( !LogEOF(LOGFILE_READ_EOF) )
                    {
                                if (
CheckTimes(&reportLine) )
                                        continue;
                                for(i=0; i<10; i++)
                                {
                                        if (
!reportLine.items[i] )

          items[i]++;
                                }
                    }
          }
          printf("\n");
          printf("Skipped delivery table.\n");
          printf("  1    2    3    4    5    6    7
8    9   10 \n");
          printf("---- ---- ---- ---- ---- ---- ---- --
-- ---- ----\n");
          for(i=0; i<10; i++)
                    printf("%4.4d ", items[i]);
          printf("\n");

          return ERR_SUCCESS;
}

/* FUNCTION: BOOL CheckTimes(PRPTLINE pRptLine)
 *
 * PURPOSE:         This function checks to see of the
delilog record falls withing the
 *                            begin and end time from
the command line.
 *
 * ARGUMENTS:       PRPTLINE  pRptLine  delilog
processed report line.
 *
 * RETURNS:                   BOOL      FALSE     if
report line is not within the
 *
                                requested start and end
times.
 *
          TRUE      if the report line is within the
 *
                                requested start and end
times.
 *
 * COMMENTS:        If startTime and endTime are both 0
then the user requested
 *                                      the default
behavior which is all records in delilog are
 *                                      valid.
 */

BOOL CheckTimes(PRPTLINE pRptLine)
{
          int       iRptEndTime;
          int       iRptStartTime;

          iRptStartTime = (pRptLine->start.wHour *
3600000) + (pRptLine->start.wMinute * 60000) +
(pRptLine->start.wSecond * 1000) + pRptLine-
>start.wMilliseconds;
          iRptEndTime = (pRptLine->end.wHour * 3600000)
+ (pRptLine->end.wMinute * 60000) + (pRptLine-
>end.wSecond * 1000) + pRptLine->end.wMilliseconds;

          if ( iStartTime == 0 && iEndTime == 0 )
                    return FALSE;

          if ( iStartTime <= iRptStartTime && iEndTime
>= iRptEndTime )
                    return FALSE;

          return TRUE;
}

/* FUNCTION: int OpenLogFile(void)
 *
 * PURPOSE:          This function opens the delivery
log file for use.
 *
 * ARGUMENTS:       None
 *
 * RETURNS:                   int
          ERR_CANNOT_OPEN_RESULTS_FILE  Cannot create
results log file.
 *
          ERR_SUCCESS
                                Log file successfully
opened
 *
 *
 * COMMENTS:        None
 *
 */

static int OpenLogFile(void)
{
          fpLog = fopen("delilog.", "rb");

          if ( !fpLog )
                    return
ERR_CANNOT_OPEN_RESULTS_FILE;

          return ERR_SUCCESS;
}

/* FUNCTION: int CloseLogFile(void)
 *
 * PURPOSE:          This function closes the delivery
log file.
 *
 * ARGUMENTS:       None
 *
 * RETURNS:                   None
 *
 * COMMENTS:        None
 *
 */

static void CloseLogFile(void)
{
          if ( fpLog )
                    fclose(fpLog);

          return;
}


/* FUNCTION: static void ResetLogFile(void)
 *
```

```
 * PURPOSE:          This function prepares the delilog.
file for reading
 *
 * ARGUMENTS:        None
 *
 * RETURNS:                    None
 *
 * COMMENTS:         None
 *
 */

static void ResetLogFile(void)
{
          fseek(fpLog, 0L, SEEK_SET);
          LogEOF(LOGFILE_CLEAR_EOF);

          return;
}

/* FUNCTION: static BOOL LogEOF(int iOperation)
 *
 * PURPOSE:          This function tracks and reports
the end of file condition
 *                            on the delilog file.
 *
 * ARGUMENTS:        int iOperation      requested
operation this can be:
 *
          LOGFILE_READ_EOF    check log file flag
return current state
 *
          LOGFILE_CLEAR_EOF   clear end of log file
flag
 *                                        LOGFILE_SET_EOF
                    set flag end of log file reached
 *
 *
 * RETURNS:                    None
 *
 * COMMENTS:         None
 *
 */

static BOOL LogEOF(int iOperation)
{
          static BOOL bEOF;

          switch(iOperation)
          {
                    case LOGFILE_READ_EOF:
                              return bEOF;
                              break;
                    case LOGFILE_CLEAR_EOF:
                              bEOF = FALSE;
                              break;
                    case LOGFILE_SET_EOF:
                              bEOF = TRUE;
                              break;
          }
          return FALSE;
}

/* FUNCTION: static BOOL ReadReportLine(char *szBuffer,
PRPTLINE pRptLine)
 *
 * PURPOSE:          This function reads a text line
from the delilog file.
 *                            on the delilog file.
 *
 * ARGUMENTS:        char                *szBuffer
          buffer to placed read delilog file line into.
 *                                      PRPTLINE
          pRptLine  returned structure containing
parsed delilog
 *
          report line.
 *
 * RETURNS:                    FALSE     if successfull
or TRUE if an error occurs.
 *
 * COMMENTS:         None
 *
 */

static BOOL ReadReportLine(char *szBuffer, PRPTLINE
pRptLine)
{
          int i = 0;
          int ch;
          int iEof;

          while( i < 128 )
          {
                    ch = fgetc(fpLog);
                    if ( iEof = feof(fpLog) )
                              break;
                    if ( ch == '\r' )
                    {
                              if ( i )
                                        break;
                              continue;
                    }
                    if ( ch == '\n' )
                              continue;
                    szBuffer[i++] = ch;

          }

          //delivery item format is to long cannot be a
valid delivery item
          if ( i >= 128 )
                    return TRUE;

          szBuffer[i] = 0;
          if ( iEof )
          {
                    LogEOF(LOGFILE_SET_EOF);
                    if ( i == 0 )
                              return FALSE;
          }
          if ( szBuffer[0] == '*' )
          {
                    //error line ignore
                    return FALSE;
          }
          return ParseReportLine(szBuffer, pRptLine);
}

/* FUNCTION: static BOOL ParseReportLine(char *szLine,
PRPTLINE pRptLine)
 *
 * PURPOSE:          This function reads a text line
from the delilog file.
 *                            on the delilog file.
 *
 * ARGUMENTS:        char                *szLine
          buffer containing the delilog file line to be
parsed.
 *                                      PRPTLINE
          pRptLine  returned structure containing
parsed delilog
 *
          report line values.
 *
 * RETURNS:                    FALSE     if successfull
or TRUE if an error occurs.
 *
 * COMMENTS:         None
 *
 */

static BOOL ParseReportLine(char *szLine, PRPTLINE
pRptLine)
{
          int i;

          if ( ParseDate(szLine, &pRptLine->start) )
                    return TRUE;

          pRptLine->end.wYear = pRptLine->start.wYear;
          pRptLine->end.wMonth = pRptLine-
>start.wMonth;
          pRptLine->end.wDay = pRptLine->start.wDay;

          if ( !(szLine = strchr(szLine, ',')) )
                    return TRUE;
          szLine++;

          if ( ParseTime(szLine, &pRptLine->start) )
                    return TRUE;

          if ( !(szLine = strchr(szLine, ',')) )
                    return TRUE;
          szLine++;

          if ( ParseTime(szLine, &pRptLine->end) )
                    return TRUE;

          if ( !(szLine = strchr(szLine, ',')) )
                    return TRUE;
          szLine++;

          if ( !IsNumeric(szLine) )
                    return TRUE;
          pRptLine->response = atoi(szLine);

          if ( !(szLine = strchr(szLine, ',')) )
                    return TRUE;
          szLine++;

          if ( !IsNumeric(szLine) )
                    return TRUE;
          pRptLine->w_id = atoi(szLine);
```

```
          if ( !(szLine = strchr(szLine, ',')) )
                    return TRUE;
          szLine++;

          if ( !IsNumeric(szLine) )
                    return TRUE;
          pRptLine->o_carrier_id = atoi(szLine);

          if ( !(szLine = strchr(szLine, ',')) )
                    return TRUE;
          szLine++;

          for(i=0; i<10; i++)
          {
                    if ( !IsNumeric(szLine) )
                              return TRUE;
                    pRptLine->items[i] = atoi(szLine);

                    if ( i<9 && !(szLine =
strchr(szLine, ',')) )
                              return TRUE;
                    szLine++;
          }

          return FALSE;
}

/* FUNCTION: static BOOL ParseDate(char *szDate,
LPSYSTEMTIME pTime)
 *
 * PURPOSE:         This function validates and
extracts a date string in the format
 *                            yy/mm/dd into an
SYSTEMTIME structure.
 *
 * ARGUMENTS:       char
          *szDate             buffer containing the
date to be parsed.
 *                                        LPSYSTEMTIME
          pTime               system time structure
where date will be placed.
 *
 * RETURNS:                   FALSE if successfull or
TRUE if an error occurs.
 *
 * COMMENTS:        None
 *
 */

static BOOL ParseDate(char *szDate, LPSYSTEMTIME pTime)
{
          if ( !isdigit(*szDate) ||
!isdigit(*(szDate+1)) || *(szDate+2) != '/' ||
                     !isdigit(*(szDate+3)) ||
!isdigit(*(szDate+4)) || *(szDate+5) != '/' ||
                      !isdigit(*(szDate+6)) ||
!isdigit(*(szDate+7)) )
                       return TRUE;

          pTime->wYear = atoi(szDate);

          pTime->wMonth = atoi(szDate+3);

          pTime->wDay = atoi(szDate+6);

          if ( pTime->wMonth > 12 || pTime->wMonth < 0
|| pTime->wDay > 31 || pTime->wDay < 0 )
                    return TRUE;

          return FALSE;
}

/* FUNCTION: static BOOL ParseTime(char *szTime,
LPSYSTEMTIME pTime)
 *
 * PURPOSE:         This function validates and
extracts a time string in the format
 *                            hh:mm:ss:mmm into an
SYSTEMTIME structure.
 *
 * ARGUMENTS:       char
          *szTime             buffer containing the
time to be parsed.
 *                                        LPSYSTEMTIME
          pTime               system time structure
where date will be placed.
 *
 * RETURNS:                   FALSE if successfull or
TRUE if an error occurs.
 *
 * COMMENTS:        None
 *
 */

static BOOL ParseTime(char *szTime, LPSYSTEMTIME pTime)
{
          if ( !isdigit(*szTime) ||
!isdigit(*(szTime+1)) || *(szTime+2) != ':' ||
                     !isdigit(*(szTime+3)) ||
!isdigit(*(szTime+4)) || *(szTime+5) != ':' ||
                      !isdigit(*(szTime+6)) ||
!isdigit(*(szTime+7)) || *(szTime+8) != ':' ||
                      !isdigit(*(szTime+9)) ||
!isdigit(*(szTime+10)) || !isdigit(*(szTime+11)) )
                      return TRUE;

          pTime->wHour = atoi(szTime);
          pTime->wMinute = atoi(szTime+3);
          pTime->wSecond = atoi(szTime+6);
          pTime->wMilliseconds  = atoi(szTime+9);

          if ( pTime->wHour > 23 || pTime->wHour < 0 ||
                    pTime->wMinute > 59 || pTime-
>wMinute < 0 ||
                    pTime->wSecond > 59 || pTime-
>wSecond < 0 ||
                    pTime->wMilliseconds < 0 )
                    return TRUE;

          if ( pTime->wMilliseconds > 999 )
          {
                    pTime->wSecond += (pTime-
>wMilliseconds/1000);
                    pTime->wMilliseconds = pTime-
>wMilliseconds  % 1000;
          }

          return FALSE;
}

/* FUNCTION: void ErrorMessage(int iError)
 *
 * PURPOSE:         This function displays an error
message in the delivery executable's console window.
 *
 * ARGUMENTS:       int                 iError    error
id to be displayed
 *
 * RETURNS:                   None
 *
 * COMMENTS:        None
 *
 */

static void ErrorMessage(int iError)
{
          int i;

          static SERRORMSG errorMsgs[] =
          {
                    {         ERR_SUCCESS,

          "Success, no error."

                                        },
                    {
          ERR_CANNOT_OPEN_RESULTS_FILE,
          "Cannot open delivery results file delilog."
                                                  },
                    {         ERR_READING_LOGFILE,

          "Reading delivery log file, Delivery item
format incorrect."  },
                    {         ERR_INSUFFICIENT_MEMORY,
                                        "insufficient
memory to process 90th percentile report."
          },
                    {         0,

                                        ""


                                        }
          };

          for(i=0; errorMsgs[i].szMsg[0]; i++)
          {
                    if ( iError == errorMsgs[i].iError
)
                    {
                                        printf("\nError(%d): %s",
iError, errorMsgs[i].szMsg);
                                        return;
                    }
          }
          printf("Error(%d): %s", errorMsgs[0].szMsg);
          return;
}

/* FUNCTION: BOOL GetParameters(int argc, char *argv[])
 *
 * PURPOSE:         This function parses the command
line passed in to the delivery executable, initializing
 *                            and filling in global
variable parameters.
 *
```

```
 * ARGUMENTS:       int                 argc
          number of command line arguments passed to
delivery
 *                                     char
          *argv[]   array of command line argument
pointers
 *
 * RETURNS:                  BOOL      FALSE
          parameter read successfull
 *
          TRUE      user has requested parameter
information screen be displayed.
 *
 * COMMENTS:        None
 *
 */

static BOOL GetParameters(int argc, char *argv[])
{
          int                           i;
          SYSTEMTIME          startTime;
          SYSTEMTIME          endTime;

          iStartTime = 0;
          iEndTime = 0;
          iReport = 4;

          for(i=0; i<argc; i++)
          {
                    if ( argv[i][0] == '-' ||
argv[i][0] == '/' )
                    {
                              switch(argv[i][1])
                              {
                                        case 'S':
                                        case 's':
                                                  if (
ParseTime(argv[i]+2, &startTime) )

          return TRUE;

          iStartTime = (startTime.wHour * 3600000) +
(startTime.wMinute * 60000) + (startTime.wSecond *
1000) + startTime.wMilliseconds;

          break;
                                        case 'E':
                                        case 'e':
                                                  if (
ParseTime(argv[i]+2, &endTime) )

          return TRUE;

          iEndTime = (endTime.wHour * 3600000) +
(endTime.wMinute * 60000) + (endTime.wSecond * 1000) +
endTime.wMilliseconds;

          break;
                                        case 'R':
                                        case 'r':

          iReport = atoi(argv[i]+2);
                                                  if (
iReport > 4 || iReport < 1 )

          iReport = 4;

          break;
                                        case '?':

          return TRUE;
                              }
                    }
          }
          return FALSE;
}

/* FUNCTION: void PrintParameters(void)
 *
 * PURPOSE:         This function displays the
supported command line flags.
 *
 * ARGUMENTS:       None
 *
 * RETURNS:                  None
 *
 * COMMENTS:        None
 *
 */

static void PrintParameters(void)
{
          PrintHeader();
          printf("DELIRPT:\n\n");
          printf("Parameter
Default\n");
          printf("-------------------------------------
----------------------------------\n");
          printf("-S Start Time HH:MM:SS:MMM
All    \n");
          printf("-E End Time HH:MM:SS:MMM
All    \n");
          printf("-R 1)Average Response, 2)90th 3)
Skipped 4) All                    All    \n");
          printf("-? This help screen\n\n");
          printf("Note:  Command line switches are NOT
case sensitive.\n");

          return;
}

/* FUNCTION: void PrintHeader(void)
 *
 * PURPOSE:         This function displays the delivery
report applications banner information.
 *
 * ARGUMENTS:       None
 *
 * RETURNS:                  None
 *
 * COMMENTS:        None
 *
 */

static void PrintHeader(void)
{
          cls();

          printf("**************************************
***********\n");
          printf("*
*\n");
          printf("*  Microsoft SQL Server 6.5
*\n");
          printf("*
*\n");
          printf("*  HTML TPC-C BENCHMARK KIT: Delivery
Report    *\n");
          printf("*  Version %d.%2.2d.%3.3d
*\n", versionMS, versionMM, versionLS);
          printf("*
*\n");
          printf("**************************************
***********\n\n");

          return;
}

/* FUNCTION: void cls(void)
 *
 * PURPOSE:         This function clears the console
window
 *
 * ARGUMENTS:       None
 *
 * RETURNS:                  None
 *
 * COMMENTS:        None
 *
 */

static void cls(void)
{
          HANDLE    hConsole;
          COORD     coordScreen = { 0, 0 };
                    //here's where we'll home the
cursor
          DWORD     cCharsWritten;
          CONSOLE_SCREEN_BUFFER_INFO    csbi;
          //to get buffer info
          DWORD
                    dwConSize;          //number of
character cells in the current buffer

          hConsole = GetStdHandle(STD_OUTPUT_HANDLE);

          //get the number of character cells in the
current buffer

          GetConsoleScreenBufferInfo( hConsole, &csbi
);
          dwConSize = csbi.dwSize.X * csbi.dwSize.Y;

          //fill the entire screen with blanks
          FillConsoleOutputCharacter( hConsole, (TCHAR)
' ', dwConSize, coordScreen, &cCharsWritten );
          GetConsoleScreenBufferInfo( hConsole, &csbi
);

          //now set the buffer's attributes accordingly
          FillConsoleOutputAttribute( hConsole,
csbi.wAttributes,dwConSize, coordScreen, &cCharsWritten
);

          //put the cursor at (0, 0)
          SetConsoleCursorPosition( hConsole,
coordScreen );
```

```
        return;
}

/* FUNCTION: BOOL IsNumeric(char *ptr)
 *
 * PURPOSE:         This function determines if a
string is numeric. It fails if any characters other
 *                          than numeric and null
terminator are present.
 *
 * ARGUMENTS:       char                            *ptr
        pointer to string to check.
 *
 * RETURNS:                 BOOL      FALSE     if
string is not all numeric
 *
        TRUE      if string contains only numeric
characters i.e. '0' - '9'
 *
 * COMMENTS:        A comma is counted as a valid
delimiter.
 *
 */

static BOOL IsNumeric(char *ptr)
{
        if ( *ptr == 0 )
                return FALSE;

        while( *ptr && isdigit(*ptr) )
                ptr++;
        if ( !*ptr || *ptr == ',' )
                return TRUE;
        else
                return FALSE;
}
```

Delivery.c

```
/*      FILE:               DELIVERY.C
*
*
 *      Based on: Microsoft TPC-C Kit Ver. 3.00.000
 *
 *                                      Copyright
Microsoft, 1996
 *                                      Copyright
Performance Tuning Corporation, 1997
 *
 *      PURPOSE:  New Order Tuxedo Server.
 *      Author:             Philip Durr
 *
        philipdu@Microsoft.com
 *
 *  MODIFIED        Changed for modularity and to allow
for the Tuxedo TM
 *
 *  Author:                 Edward Whalen
 *                                      Performance
Tuning Corporation
 *
        ewhalen@perftuning.com
 */

#include <windows.h>
#include <process.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 DBNTWIN32
#include <sqlfront.h>
#include <sqldb.h>

#include "trans.h"
                //tpckit transaction header
contains definations of structures specific to TPC-C
#include "httpext.h"
                //ISAPI DLL information header

#include "tpcc.h"
                //this dlls specific structure,
value e.t. header.

#include <tmenv.h>
#include <xa.h>
#include <atmi.h>

BOOL      bLog                          = FALSE;
BOOL      bFlush;
                                //Flush delivery log info
when written.
BOOL      verbose                       = FALSE;
BOOL      bError                        = FALSE;

int               iThreads              = 5;
int               iMaxWareHouses        = 500;
int               iDelayMs              = 100;
short     iMaxConnections = (short)1;
short     iDeadlockRetry      = (short)3;

DBPROCESS *pdbproc;

char
        szServer[32];
        //SQL server name
char
        szDatabase[32];
        //tpcc database name
char
        szUser[32];
                //user name
char
        szPassword[32];
        //user password
int spId;

#ifdef LOCAL_ALLOC
DELIVERY_DATA DeliveryData;
#else
TUX_DATA TuxData;
#endif
TERM Term;

static char         szTpccLogPath[256]; //path to html
log file if logging turned on in registry.
static char szErrorLogPath[256];        //path to error
log file.

static    CRITICAL_SECTION
        CriticalSection;
static    CRITICAL_SECTION
        ErrorLogCriticalSection;
static    EXTENSION_CONTROL_BLOCK       *gpECB = NULL;
static    int
                bTpccExit;          //exit delivery
disconnect loop as dll exiting.

extern void TMLog();
extern BOOL SQLInit();
extern void UtilStrCpy();
extern void UtilStrCpy();
extern BOOL SQLOpenConnection();
extern BOOL SQLCloseConnection();

//BOOL
        bDone;
                                //delivery executable
termination request flag
BOOL
        bFlush;
                                //Flush delivery log info
when written.

#define ERR_CANNOT_CREATE_THREAD                  1000
        //Cannot create thread.
#define ERR_DBGETDATA_FAILED                      1001
        //Get data failed.
#define   ERR_REGISTRY_NOT_SETUP
        1002      //Registry not setup for tpcc.
#define   ERR_CANNOT_ACCESS_DELIVERY_FN 1003
        //Cannot access ReadDelivery cache.
#define   ERR_CANNOT_ACCESS_REGISTRY              1004
        //Cannot access registry key TPCC.
#define   ERR_CANNOT_CREATE_RESULTS_FILE          1005
        //Cannot create results file.

FILE      *fpLog;

/* FUNCTION: tpsvrinit ( int argc, char *argv[])
 *
 * PURPOSE:         Initialize the Server to Database
connection.
 *
 * RETURNS:                 int       0
        Success
 *                                                  -1
        Failure
 *
 *
 * COMMENTS:        None
 *
 */

int tpsvrinit ( int argc, char *argv[] )
{
        if ( GetParameters(argc, argv) )
```

```
        {
                PrintParameters();
                return -1;
        }

        if ( verbose )
                TMLog("TPSVRINIT: Delivery: Server
%s, Database %s, User %s, Password %s, Flush %d.",
                        szServer, szDatabase,
szUser, szPassword, bFlush);

        if ( ! SQLInit() )
        {
                TMLog( "DELIVERY: SQLInit Failed"
);
                return -1;
        }

        if ( SQLOpenConnection ( NULL, 0, 0,
&pdbproc, szServer, szDatabase, szUser, szPassword,
szDatabase, &spId))
        {
                TMLog ( "DELIVERY:
SQLOpenConnection Failed" );
                dbexit();
                return -1;
        }

        OpenLogFile();

        return 0;
}

/* FUNCTION: tpsvrdone ( void )
 *
 * PURPOSE:         Initialize the Server to Database
connection.
 *
 * RETURNS:                 int       0
        Success
 *                                              -1
        Failure
 *
 *
 * COMMENTS:        None
 *
 */

void tpsvrdone ( void )
{
        SQLCloseConnection( NULL, pdbproc);
        dbexit();
}

/* FUNCTION: DELIVERY ( TPSVCINFO *rqst )
 *
 * PURPOSE:         Process a New Order request.
 *
 * RETURNS:                 int       0
        Success
 *                                              -1
        Failure
 *
 *
 * COMMENTS:        None
 *
 */

void DELIVERY ( TPSVCINFO *rqst )
{
        PECBINFO pECBInfo = dbgetuserdata(pdbproc);
        int size = rqst->len;

        if (verbose)
                TMLog(" DELIVERY: Begin
transaction");

#ifdef LOCAL_ALLOC
        memcpy(&DeliveryData, rqst->data, size);

        if (verbose )
        {
                TMLog(" DELIVERY: w_id %d ",
DeliveryData.w_id);
                TMLog(" DELIVERY: d_id %d ",
DeliveryData.o_carrier_id);
        }

        bError = FALSE;

        DeliveryData.retval = SQLDelivery( pdbproc,
&DeliveryData, iDeadlockRetry);

        if (bError == TRUE)
                DeliveryData.retval = -1;

        memcpy( rqst->data, &DeliveryData, size);
#else
        memcpy(&TuxData, rqst->data, size);

        if (verbose )
        {
                TMLog(" DELIVERY: w_id %d ",
TuxData.DeliveryData.w_id);
                TMLog(" DELIVERY: d_id %d ",
TuxData.DeliveryData.o_carrier_id);
        }

        bError = FALSE;

        TuxData.DeliveryData.retval = SQLDelivery(
pdbproc, &TuxData.DeliveryData, iDeadlockRetry);

        if (bError == TRUE)
                TuxData.DeliveryData.retval = -1;

        memcpy( rqst->data, &TuxData, size);
#endif
        tpreturn( TPSUCCESS, 0, rqst->data, size, 0);
}


/* FUNCTION: void CalculateElapsedTime(int *pElapsed,
LPSYSTEMTIME lpBegin, LPSYSTEMTIME lpEnd)
 *
 * PURPOSE:         This function calculates the
elapsed time a delivery transaction took.
 *
 * ARGUMENTS:       int
        *pElapsed pointer to int variable to receive
calculated elapsed
 *
        time in milliseconds.
 *                                      LPSYSTEMTIME
        lpBegin             Pointer to system time
structure containing
 *
        transaction beginning time.
 *                                      LPSYSTEMTIME
        lpEnd               Pointer to system time
structure containing
 *
        transaction ending time.
 * RETURNS:                 None
 *
 * COMMENTS:        None
 *
 */

static void CalculateElapsedTime(int *pElapsed,
LPSYSTEMTIME lpBegin, LPSYSTEMTIME lpEnd)
{
        int                         beginSeconds;
        int                         endSeconds;


        beginSeconds = (lpBegin->wHour * 3600000) +
(lpBegin->wMinute * 60000) + (lpBegin->wSecond * 1000)
+ lpBegin->wMilliseconds;
        endSeconds = (lpEnd->wHour * 3600000) +
(lpEnd->wMinute * 60000) + (lpEnd->wSecond * 1000) +
lpEnd->wMilliseconds;
        *pElapsed = endSeconds - beginSeconds;

        //check for day boundry, this will function
for 24 hour period however it will not work over 48
hours.
        if ( *pElapsed < 0 )
                *pElapsed = *pElapsed + (24 * 60 *
60 * 1000);

        return;
}

/* FUNCTION: int SQLDelivery(DBPROCESS *dbproc,
DELIVERY *pDelivery, short deadlock_retry )
 *
 * PURPOSE:         This function processes the
delivery transaction.
 *
 * ARGUMENTS:       DELIVERY            *pDelivery
                    Pointer to delivery transaction
structure
 *
 * RETURNS:                 int
        ERR_DBGETDATA_FAILED
        Delivery get data operation failed.
 *
        ERR_SUCCESS
                Delivery successfull, no error
 *
 *
 * COMMENTS:        None
 *
 */
```

```
static int SQLDelivery(DBPROCESS *dbproc, DELIVERY_DATA
*pDelivery, short deadlock_retry)
{
          RETCODE   rc;
          int                 i;
          int                 deadlock_count;
          BYTE      *pData;
          SYSTEMTIME          trans_end;
          //delivery transaction finished time
          int       elapsed;
          //delivery transaction time

          deadlock_count = 0;


          // Start new delivery
          while ( TRUE )
          {
                    if (dbrpcinit(dbproc,
"tpcc_delivery", 0) == SUCCEED)
                    {
                              dbrpcparam(dbproc, NULL,
0, SQLINT2, -1, -1, (BYTE *)&pDelivery->w_id);
                              dbrpcparam(dbproc, NULL,
0, SQLINT1, -1, -1, (BYTE *)&pDelivery->o_carrier_id);

                              if (dbrpcexec(dbproc) ==
SUCCEED)
                              {
                                        while (((rc =
dbresults(dbproc)) != NO_MORE_RESULTS) && (rc != FAIL))
                                        {
                                                  while
(((rc = dbnextrow(dbproc)) != NO_MORE_ROWS) && (rc !=
FAIL))
                                                  {

          for (i=0;i<10;i++)

          {

                    if(pData=dbdata(dbproc, i+1))

                              pDelivery->o_id[i] =
*((DBINT *)pData);

                    else

                              pDelivery->o_id[i] = 0;

          }
                                                  }
                                        }
                              }
                    }
                    if ( !SQLDetectDeadlock(dbproc) )
                              break;
                    deadlock_count++;
                    Sleep(10 * deadlock_count);
          }
          GetLocalTime(&trans_end);

          CalculateElapsedTime(&elapsed, &pDelivery-
>queue_time, &trans_end);

          fprintf(fpLog,
"%2.2d/%2.2d/%2.2d,%2.2d:%2.2d:%2.2d:%3.3d,%2.2d:%2.2d:
%2.2d:%3.3d,%d,%d,%d,%d,%d,%d,%d,%d,%d,%d,%d,%d\r\n"
,
                    trans_end.wYear - 1900,
trans_end.wMonth, trans_end.wDay,
                    pDelivery->queue_time.wHour,
pDelivery->queue_time.wMinute,
                    pDelivery->queue_time.wSecond,
pDelivery->queue_time.wMilliseconds,
                    trans_end.wHour, trans_end.wMinute,
trans_end.wSecond, trans_end.wMilliseconds,
                    elapsed,
                    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 ( bFlush )
                    fflush(fpLog);


          return ERR_SUCCESS;
}

/* FUNCTION: BOOL SQLDetectDeadlock(DBPROCESS *dbproc)
 *
 * PURPOSE:          This function is used to check for
deadlock conditions.
 *
 * ARGUMENTS:        DBPROCESS           *dbproc
          DBPROCESS to check
 *
 * RETURNS:                    BOOL      FALSE
                              No lock condition present
 *
          TRUE                                  Lock
condition detected
 *
 * COMMENTS:         None
 *
 */

static BOOL SQLDetectDeadlock(DBPROCESS *dbproc)
{
          if (*((BOOL *) dbgetuserdata(dbproc)) ==
TRUE)
    {
                    *((BOOL *) dbgetuserdata(dbproc)) =
FALSE;
                    return TRUE;
          }
          return FALSE;
}

/* FUNCTION: int OpenLogFile(void)
 *
 * PURPOSE:          This function opens the delivery
log file for use.
 *
 * ARGUMENTS:        None
 *
 * RETURNS:                    int
          ERR_REGISTRY_NOT_SETUP
          Registry not setup.
 *
          ERR_CANNOT_CREATE_RESULTS_FILE
          Cannot create results log file.
 *
          ERR_SUCCESS
                              Log file successfully
opened
 *
 *
 * COMMENTS:         None
 *
 */

static int OpenLogFile(void)
{
          HKEY      hKey;
          BOOL      bRc;
          BYTE      szTmp[256];
          char      szKey[256];
          char      szLogPath[256];
          DWORD     size;
          DWORD     sv;
          int                 len;
          char      *ptr;

          szLogPath[0] =  0;
          bRc = TRUE;
          if ( RegOpenKeyEx(HKEY_LOCAL_MACHINE,
"SYSTEM\\CurrentControlSet\\Services\\W3SVC\\Parameters
\\Virtual Roots", 0, KEY_ALL_ACCESS, &hKey) ==
ERROR_SUCCESS )
          {
                    sv = sizeof(szKey);
                    size = sizeof(szTmp);

                    if ( RegEnumValue(hKey, 0, szKey,
&sv, NULL, NULL, szTmp, &size) == ERROR_SUCCESS )
                    {
                              strcpy(szLogPath, szTmp);
                              bRc = FALSE;
                    }
                    RegCloseKey(hKey);
          }

          if ( bRc )
                    return ERR_REGISTRY_NOT_SETUP;

          if ( (ptr = strchr(szLogPath, ',')) )
                    *ptr = 0;

          len = strlen(szLogPath);
          if ( szLogPath[len-1] != '\\' )
          {
                    szLogPath[len] = '\\';
                    szLogPath[len+1] = 0;
          }
          strcat(szLogPath, "delilog.");

          fpLog = fopen(szLogPath, "ab");

          if ( !fpLog )
                    return
ERR_CANNOT_CREATE_RESULTS_FILE;
```

```
        return ERR_SUCCESS;
}

/*
 *      Common Code for all Servers
 */

 /* FUNCTION: BOOL SQLInit()
 *
 * PURPOSE:         This function initializes SQL
Server for later use.
 *
 *
 * RETURNS:                  BOOL      FALSE     if
successfull
 *
        TRUE      if an error occurs and connection
cannot be established.
 *
 * COMMENTS:        None
 *
 */
BOOL SQLInit ()
{
        dbinit();

        if ( dbgetmaxprocs() < iMaxConnections )
        {
                if ( dbsetmaxprocs(iMaxConnections)
== FAIL )
                {
                        //set for fail error
message when HttpExtensionProc() is called because
                        //at this point we don't
have a pECB so no way to show error message.
                        iMaxConnections = -1;
                }
        }

        // install error and message handlers
        dbmsghandle((DBMSGHANDLE_PROC)msg_handler);
        dberrhandle((DBERRHANDLE_PROC)err_handler);

        return TRUE;
}


/* FUNCTION: BOOL
SQLOpenConnection(EXTENSION_CONTROL_BLOCK
        *pECB, int iTermId, int iSyncId, DBPROCESS
**dbproc, char *server, char *database, char *user,
char *password, char *app, int *spid, long *pack_size)
 *
 * PURPOSE:         This function opens the sql
connection for use.
 *
 * ARGUMENTS:       EXTENSION_CONTROL_BLOCK       *pECB
        passed in structure pointer from inetsrv.
 *                               int
                        iTermId
        terminal id of browser
 *                               int
                        iSyncId             sync
id of browser
 *                               DBPROCESS
        **dbproc  pointer to returned DBPROCESS
 *                               char
                *server             SQL server name
 *                               char
                *database SQL server database
 *                               char
                *user               user name
 *                               char
                *password user password
 *                               char
                *app                pointer to
returned application array
 *                               int
                        *spid
        pointer to returned spid
 *                               long
                *pack_size          pointer to
returned default pack size
 *
 * RETURNS:                  BOOL      FALSE     if
successfull
 *
        TRUE      if an error occurs
 *
 * COMMENTS:        None
 *
 */


#ifdef USE_ODBC
        static BOOL
SQLOpenConnection(EXTENSION_CONTROL_BLOCK *pECB, int
iTermId, int iSyncId, DBPROCESS **dbproc, char *server,
char *database, char *user, char *password, char *app,
int *spid, long *pack_size)
        {

                RETCODE   rc;
                char      buffer[30];

                *dbproc = (DBPROCESS
*)malloc(sizeof(DBPROCESS));
                if ( !*dbproc )
                        return TRUE;

                //set pECB data into dbproc
                (*dbproc)->bDeadlock = FALSE;
                (*dbproc)->bFailed = FALSE;
                (*dbproc)->pECB = pECB;
                (*dbproc)->iTermId = iTermId;
                (*dbproc)->iSyncId = iSyncId;


                if ( SQLAllocConnect(henv,
&(*dbproc)->hdbc) == SQL_ERROR )
                        return TRUE;

                if ( SQLSetConnectOption((*dbproc)-
>hdbc, SQL_PACKET_SIZE, pack_size) == SQL_ERROR )
                        return TRUE;

                rc = SQLConnect((*dbproc)->hdbc,
server, SQL_NTS, user, SQL_NTS, password, SQL_NTS);
                if (rc != SQL_SUCCESS && rc !=
SQL_SUCCESS_WITH_INFO)
                        return TRUE;
                rc = SQLAllocStmt((*dbproc)->hdbc,
&(*dbproc)->hstmt);
                if (rc == SQL_ERROR)
                        return TRUE;

                sprintf(buffer,"use %s", Client-
>database);

                rc = SQLExecDirect((*dbproc)-
>hstmt, buffer, SQL_NTS);
                if (rc != SQL_SUCCESS && rc !=
SQL_SUCCESS_WITH_INFO)
                        return TRUE;

                SQLFreeStmt((*dbproc)->hstmt,
SQL_CLOSE);
                sprintf(buffer,"set nocount on");
                rc = SQLExecDirect((*dbproc)-
>hstmt, buffer, SQL_NTS);
                if (rc != SQL_SUCCESS && rc !=
SQL_SUCCESS_WITH_INFO)
                        return TRUE;
                SQLFreeStmt((*dbproc)->hstmt,
SQL_CLOSE);

                sprintf(buffer,"select @@spid");

                rc = SQLExecDirect((*dbproc)-
>hstmt, buffer, SQL_NTS);
                if (rc != SQL_SUCCESS && rc !=
SQL_SUCCESS_WITH_INFO)
                        return TRUE;

                if ( SQLBindCol((*dbproc)->hstmt,
1, SQL_C_SSHORT, &(*dbproc)->spid, 0, NULL) ==
SQL_ERROR )
                        return TRUE;


                if ( SQLFetch((*dbproc)->hstmt) ==
SQL_ERROR )
                        return TRUE;

                SQLFreeStmt((*dbproc)->hstmt,
SQL_CLOSE);

                return FALSE;
        }

#else

        static BOOL
SQLOpenConnection(EXTENSION_CONTROL_BLOCK *pECB, int
iTermId, int iSyncId, DBPROCESS **dbproc, char *server,
char *database, char *user, char *password, char *app,
int *spid)
        {
                LOGINREC  *login;
                PECBINFO  pEcbInfo;

                //set local msg proc for login
record
                //attach pECB record
```

```
                    //this is necessary as dblib
provides no way to pass user data in a login structure.
So until
                    //there is an allocated dbproc we
need to use a static which means that the login attempt
must
                    //be serialized.

                    gpECB = pECB;

                    login = dblogin();
                    if ( !*user )
                              DBSETLUSER(login, "sa");
                    else
                              DBSETLUSER(login, user);

                    DBSETLPWD(login,  password);
                    DBSETLHOST(login, app);

//                  Do not set the packet size.  Use
the size set up in SQL Server.
//                  DBSETLPACKET(login, (unsigned
short)DEFCLPACKSIZE);

//                  This can potentially cut down on
data conversion
                    DBSETLVERSION(login, DBVER60);

                    if ((*dbproc = dbopen(login, server
)) == NULL)
                              return TRUE;

                    //set pECB data into dbproc
                    pEcbInfo =
(PECBINFO)malloc(sizeof(ECBINFO));
                    pEcbInfo->bDeadlock = FALSE;
                    pEcbInfo->pECB = pECB;
                    pEcbInfo->iTermId = iTermId;
                    pEcbInfo->iSyncId = iSyncId;
                    dbsetuserdata(*dbproc, pEcbInfo);

                    // Use the the right database
                    dbuse(*dbproc, database);

                    dbcmd(*dbproc, "select @@spid");

                    dbsqlexec(*dbproc);
                    while (dbresults(*dbproc) !=
NO_MORE_RESULTS)
                    {
                              dbbind(*dbproc, 1,
SMALLBIND, (DBINT) 0, (BYTE *) spid);
                              while (dbnextrow(*dbproc)
!= NO_MORE_ROWS)
                              ;
                    }
                    dbcmd(*dbproc, "set nocount on");

                    dbsqlexec(*dbproc);
                    while (dbresults(*dbproc) !=
NO_MORE_RESULTS)
                    {
                              while (dbnextrow(*dbproc)
!= NO_MORE_ROWS)
                              ;
                    }

                    //rollback transaction on abort
                    dbcmd(*dbproc, "set XACT_ABORT
ON");

                    dbsqlexec(*dbproc);
                    while (dbresults(*dbproc) !=
NO_MORE_RESULTS)
                    {
                              while (dbnextrow(*dbproc)
!= NO_MORE_ROWS)
                              ;
                    }

                    return FALSE;
          }

#endif

/* FUNCTION: BOOL
SQLCloseConnection(EXTENSION_CONTROL_BLOCK *pECB,
DBPROCESS *dbproc)
 *
 * PURPOSE:         This function closes the sql
connection.
 *
 * ARGUMENTS:       EXTENSION_CONTROL_BLOCK       *pECB
          passed in structure pointer from inetsrv.
 *                                  DBPROCESS
          *dbproc   pointer to DBPROCESS
 *
 * RETURNS:                   BOOL      FALSE     if
successfull
 *
          TRUE      if an error occurs
 *
 * COMMENTS:        None
 *
 */

#ifdef USE_ODBC
          static BOOL
SQLCloseConnection(EXTENSION_CONTROL_BLOCK *pECB,
DBPROCESS *dbproc)
          {
                    if ( dbproc )
                    {
                              SQLFreeStmt(dbproc-
>hstmt, SQL_DROP);
                              SQLDisconnect(dbproc-
>hdbc);
                              SQLFreeConnect(dbproc-
>hdbc);
                              free(dbproc);
                              dbproc = NULL;
                    }
                    return FALSE;
          }
#else
          static BOOL
SQLCloseConnection(EXTENSION_CONTROL_BLOCK *pECB,
DBPROCESS *dbproc)
          {
                    if (dbclose(dbproc) == FAIL)
                              return TRUE;
                    return FALSE;
          }
#endif

// Lifted from HP FDR since they did such a nice job
void TMLog( char *format, ... )
{
          va_list args;
          char buf[4096];
          int len;
          va_start( args, format );
          _strtime( buf );
          strcat( buf," ");
          len = strlen( buf );
          (void)_vsnprintf( buf+ len, sizeof( buf) -
len - 1, format, args);
          buf[sizeof( buf )- 1]= '\0';
          va_end( args );
          userlog( buf );
}

/* FUNCTION: void UtilStrCpy(char *pDest, char *pSrc,
int n)
 *
 * PURPOSE:         This function copies n characters
from string pSrc to pDst and places a
 *                              null character at the end
of the destination string.
 *
 * ARGUMENTS:       char
          *pDest    destination string pointer
 *                                        char
                    *pSrc     source string pointer
 *                                        int
                              n
          number of characters to copy
 *
 * RETURNS:                   None
 *
 * COMMENTS:        Unlike strncpy this function
ensures that the result string is
 *                                        always null
terminated.
 *
 */

static void UtilStrCpy(char *pDest, char *pSrc, int n)
{
    strncpy(pDest, pSrc, n);
    pDest[n] = '\0';

          return;
}

/* FUNCTION: int err_handler(DBPROCESS *dbproc, int
severity, int dberr, int oserr, char *dberrstr, char
*oserrstr)
 *
 * PURPOSE:         This function handles DB-Library
errors
 *
 * ARGUMENTS:       DBPROCESS           *dbproc
                    DBPROCESS id pointer
 *                                        int
                              severity
          severity of error
```

```
 *                                    int
                              dberr
          error id
 *                                    int
                              oserr
          operating system specific error code
 *                                    char
                    *dberrstr         printable error
description of dberr
 *                                    char
                    *oserrstr         printable error
description of oserr
 *
 * RETURNS:                 int
                    INT_CONTINUE      continue if
error is SQLETIME else INT_CANCEL action
 *
 * COMMENTS:        None
 *
 */


int err_handler(DBPROCESS *dbproc, int severity, int
dberr, int oserr, char *dberrstr, char *oserrstr)
{
          PECBINFO
          pEcbInfo;
          EXTENSION_CONTROL_BLOCK       *pECB;
          FILE
          *fp;
          SYSTEMTIME
          systemTime;
          char
          szTmp[256];
          int
                    iTermId;
          int
                    iSyncId;

          pEcbInfo = NULL;

          if ((dbproc == NULL) || (DBDEAD(dbproc)))
          {
                    TMLog("DBPROC is invalid");
                    return INT_CANCEL;
          }

          if ( !(pEcbInfo =
(PECBINFO)dbgetuserdata(dbproc)) )
          {
                    pECB = gpECB;
                    iTermId = 0;
                    iSyncId = 0;
          }
          else
          {
                    pECB = pEcbInfo->pECB;
                    iTermId = pEcbInfo->iTermId;
                    iSyncId = pEcbInfo->iSyncId;
          }

          if ( pEcbInfo && pEcbInfo->bFailed )
          {
                    bError == FALSE;
                    return INT_CANCEL;
          }

          if ( oserr != DBNOERR )
          {
                    TMLog("DBLIB Error %s", oserrstr);
                    if ( pEcbInfo )
                    {
                              pEcbInfo->bFailed = TRUE;
                              bError = TRUE;
                    }

                    GetLocalTime(&systemTime);
                    fp = fopen(szErrorLogPath, "ab");

                    sprintf(szTmp, "ErrorHandler:
DBLIB(%d): %s", oserr, oserrstr);

                    TMLog("%2.2d/%2.2d/%2.2d
%2.2d:%2.2d:%2.2d\r\n\r\n%s\r\n\r\n",
                              systemTime.wYear,
systemTime.wMonth, systemTime.wDay,
                              systemTime.wHour,
systemTime.wMinute, systemTime.wSecond,
                              szTmp);

                    fclose(fp);
          }

          return INT_CANCEL;
}


/* FUNCTION: int msg_handler(DBPROCESS *dbproc, DBINT
msgno, int msgstate, int severity, char *msgtext)
 *
 * PURPOSE:         This function handles DB-Library
SQL Server error messages
 *
 * ARGUMENTS:       DBPROCESS           *dbproc
                    DBPROCESS id pointer
 *                                      DBINT
                    msgno
          message number
 *                                      int
                              msgstate
          message state
 *                                      int
                              severity
          message severity
 *                                      char
                    *msgtext            printable
message description
 *
 * RETURNS:                 int
                    INT_CONTINUE        continue if
error is SQLETIME else INT_CANCEL action
 *                                      INT_CANCEL
          cancel operation
 *
 * COMMENTS:        This function also sets the dead
lock dbproc variable if necessary.
 *
 */

int msg_handler(DBPROCESS *dbproc, DBINT msgno, int
msgstate, int severity, char *msgtext)
{
          PECBINFO
          pEcbInfo;
          EXTENSION_CONTROL_BLOCK       *pECB;
          FILE
          *fp;
          SYSTEMTIME
          systemTime;
          char
          szTmp[256];
          int
                    iTermId;
          int
                    iSyncId;

          if ( !(pEcbInfo =
(PECBINFO)dbgetuserdata(dbproc)) )
          {
                    pECB = gpECB;
                    iTermId = 0;
                    iSyncId = 0;
          }
          else
          {
                    pECB = pEcbInfo->pECB;
                    iTermId = pEcbInfo->iTermId;
                    iSyncId = pEcbInfo->iSyncId;
          }


          if ( (msgno == 5701) || (msgno == 2528) ||
(msgno == 5703) || (msgno == 6006) )
                    return INT_CONTINUE;

          // deadlock message
          if (msgno == 1205)
          {
                    // set the deadlock indicator
                    if ( pEcbInfo )
                              pEcbInfo->bDeadlock =
TRUE;
                    else
                              TMLog("Error,
dbgetuserdata returned NULL.");
                    return INT_CONTINUE;
          }
          if ( pEcbInfo && pEcbInfo->bFailed )
          {
                    TMLog("SQL Error ");
                    return INT_CANCEL;
          }

          if (msgno == 0)
                    return INT_CONTINUE;
          else
          {
                    TMLog("MsgHandler: SQL Error %s",
msgtext);

                    if ( pEcbInfo )
                              pEcbInfo->bFailed = TRUE;

                    bError = TRUE;

                    sprintf(szTmp, "Error: SQLSVR(%d):
%s", msgno, msgtext);
```

```
                    TMLog("%2.2d/%2.2d/%2.2d
%2.2d:%2.2d:%2.2d\r\n\r\n%s\r\n\r\n",
                              systemTime.wYear,
systemTime.wMonth, systemTime.wDay,
                              systemTime.wHour,
systemTime.wMinute, systemTime.wSecond,
                              szTmp);
          }
          return INT_CANCEL;
}


/* FUNCTION: BOOL GetParameters(int argc, char *argv[])
 *
 * PURPOSE:         This function parses the command
line passed in to the delivery executable, initializing
 *                          and filling in global
variable parameters.
 *
 * ARGUMENTS:       int                 argc
          number of command line arguments passed to
delivery
 *                                      char
          *argv[]   array of command line argument
pointers
 *
 * RETURNS:                 BOOL      FALSE
          parameter read successfull
 *
          TRUE      user has requested parameter
information screen be displayed.
 *
 * COMMENTS:        None
 *
 */

static BOOL GetParameters(int argc, char *argv[])
{
          int i;

          szServer[0]                       = 0;
          szPassword[0]       = 0;
          bFlush                            = FALSE;
          strcpy(szDatabase, "tpcc");
          strcpy(szUser, "sa");

          for(i=0; i<argc; i++)
          {
                    if ( argv[i][0] == '-' ||
argv[i][0] == '/' )
                    {
                              switch(argv[i][1])
                              {
                                        case 'S':
                                        case 's':

          strcpy(szServer, argv[i]+2);

          break;
                                        case 'V':
                                        case 'v':

          verbose = TRUE;

          break;
                                        case 'F':
                                        case 'f':

          bFlush = TRUE;      //turn on delilog flush
when written.

          break;
                                        case '?':

          return TRUE;
                              }
                    }
          }
          return FALSE;
}

/* FUNCTION: void PrintParameters(void)
 *
 * PURPOSE:         This function displays the
supported command line flags.
 *
 * ARGUMENTS:       None
 *
 * RETURNS:                 None
 *
 * COMMENTS:        None
 *
 */

static void PrintParameters(void)
{
          TMLog("Performance Tuning Corporation Tuxedo
Kit");
          TMLog("   www.perftuning.com   (281) 251-3495
");
          TMLog("Delivery: -S Server [-v (verbose)] [-F
(Flush delilog)]" );
          TMLog("Delivery: Server %s Flush %d.",
szServer, bFlush);

}
```

Install.c

```
/*        FILE:               INSTALL.C
 *                                      Microsoft TPC-C
Kit Ver. 3.00.000
 *                                      Audited
08/23/96, By Francois Raab
 *
 *                                      Copyright
Microsoft, 1996
 *
 *        PURPOSE:  Automated installation application
for TPC-C Web Kit
 *        Author:             Philip Durr
 *
          philipdu@Microsoft.com
 */

#include <windows.h>
#include <direct.h>
#include  <io.h>
#include <stdlib.h>
#include <stdio.h>
#include <commctrl.h>
#include "install.h"

HICON               hIcon;
HINSTANCE hInst;

DWORD                           versionExeMS;
DWORD                           versionExeLS;
DWORD                           versionDllMS;
DWORD                           versionDllLS;

static    BOOL      bLog;
static    int                   iThreads;
static    int                   iMaxWareHouse;
static    int                   iDelayMs;
static    int                   iDeadlockRetry;
static    int                   iMaxConnections;
static    int                   iPoolThreadsLimit;
static    int                   iThreadTimeout;
static    int                   iListenBackLog;
static    int                   iAcceptExOutstanding;
static    int                   iQSlotts;

static    int                   iMaxPhysicalMemory;
          //max physical memory in MB

BOOL      CALLBACK  UpdatedDlgProc(HWND hwnd, UINT
uMsg, WPARAM wParam, LPARAM lParam);
BOOL      CALLBACK  MainDlgProc(HWND hwnd, UINT uMsg,
WPARAM wParam, LPARAM lParam);
BOOL      CALLBACK  CopyDlgProc(HWND hwnd, UINT uMsg,
WPARAM wParam, LPARAM lParam);
static    void
          ReadRegistrySettings(void);
static    void
          WriteRegistrySettings(char *szDllPath);
static    int                             CopyFiles(HWND
hDlg, char *szDllPath);
static    BOOL                GetInstallPath(char
*szDllPath);
static    void                GetVersionInfo(char
*szDLLPath, char *szExePath);
static    BOOL                StartWWWebService(void);
static    BOOL                StopWWWebService(void);
static    void                UpdateDialog(HWND hDlg);

int WINAPI WinMain( HINSTANCE hInstance, HINSTANCE
hPrevInstance, LPSTR lpCmdLine, int nCmdShow )
{
          int iRc;

          hInst = hInstance;

          InitCommonControls();

          hIcon = LoadIcon(hInstance,
MAKEINTRESOURCE(IDI_ICON1));

          iRc = DialogBox(hInstance,
MAKEINTRESOURCE(IDD_DIALOG1), GetDesktopWindow(),
MainDlgProc);
          if ( iRc )
```

```
                              DialogBoxParam(hInstance,
MAKEINTRESOURCE(IDD_DIALOG2), GetDesktopWindow(),
UpdatedDlgProc, (LPARAM)iRc);
          DestroyIcon(hIcon);

          return 0;
}

BOOL CALLBACK UpdatedDlgProc(HWND hwnd, UINT uMsg,
WPARAM wParam, LPARAM lParam)
{
          switch(uMsg)
          {
                    case WM_INITDIALOG:
                              if ( lParam == 1 )

          SetDlgItemText(hwnd, IDC_RESULTS, "HTML TPCC
Installation Successfull");
                              else

          SetDlgItemText(hwnd, IDC_RESULTS, "HTML TPCC
Registry Updated");
                              return TRUE;
                    case WM_COMMAND:
                              if ( wParam == IDOK )
                                        EndDialog(hwnd,
TRUE);
                              break;
                    default:
                              break;
          }
          return FALSE;
}

BOOL CALLBACK MainDlgProc(HWND hwnd, UINT uMsg, WPARAM
wParam, LPARAM lParam)
{
          PAINTSTRUCT                 ps;
          MEMORYSTATUS        memoryStatus;
          int                                   d;
          int                                   rc;
          HWND                        hDlg;
          char                        szTmp[256];
          static char                 szDllPath[256];
          static char                 szExePath[256];

          switch(uMsg)
          {
                    case WM_INITDIALOG:

          GlobalMemoryStatus(&memoryStatus);
                              iMaxPhysicalMemory  =
(memoryStatus.dwTotalPhys/ 1048576);

                              if (
GetInstallPath(szDllPath) )
                              {

          MessageBox(hwnd, "Error internet service
inetsrv is not installed.", NULL, MB_ICONSTOP | MB_OK);
                                        EndDialog(hwnd,
FALSE);
                                        return TRUE;
                              }

                              bLog
                              = FALSE;
                              iThreads
                    = 4;
                              iMaxWareHouse
                    = 500;
                              iDelayMs
                    = 500;
                              iDeadlockRetry
                    = 3;
                              iMaxConnections
                    = 25;
                              iPoolThreadsLimit
          = iMaxPhysicalMemory * 2;
                              iThreadTimeout
                    = 86400;
                              iListenBackLog
                    = 15;
                              iAcceptExOutstanding
          = 40;

                              ReadRegistrySettings();

                              GetModuleFileName(hInst,
szExePath, sizeof(szExePath));
                              GetVersionInfo(szDllPath,
szExePath);
                              if ( bLog )

          CheckDlgButton(hwnd, BN_LOG, 1);

                              wsprintf(szTmp, "Version
%d.00.%3.3d", versionExeMS, versionExeLS);
                              SetDlgItemText(hwnd,
IDC_VERSION, szTmp);

                              SetDlgItemText(hwnd,
IDC_PATH, szDllPath);
                              SetDlgItemInt(hwnd,
ED_MAXWARE, iMaxWareHouse, FALSE);
                              SetDlgItemInt(hwnd,
ED_THREADS, iThreads, FALSE);
                              SetDlgItemInt(hwnd,
ED_MAXCONNECTION, iMaxConnections, FALSE);
                              SetDlgItemInt(hwnd,
ED_IIS_MAX_THEAD_POOL_LIMIT, iPoolThreadsLimit, FALSE);
                              SetDlgItemInt(hwnd,
ED_IIS_THREAD_TIMEOUT, iThreadTimeout, FALSE);
                              SetDlgItemInt(hwnd,
ED_IIS_LISTEN_BACKLOG, iListenBackLog, FALSE);
                              SetDlgItemInt(hwnd,
ED_WEB_SERVICE_BACKLOG_QUEUE_SIZE,
iAcceptExOutstanding, FALSE);

                              return TRUE;
                    case WM_PAINT:
                              if ( IsIconic(hwnd) )
                              {
          BeginPaint(hwnd, &ps);

          DrawIcon(ps.hdc, 0, 0, hIcon);
                                        EndPaint(hwnd,
&ps);
                                        return TRUE;
                              }
                              break;
                    case WM_COMMAND:
                              if ( wParam == IDOK )
                              {
                                        if (
IsDlgButtonChecked(hwnd, BN_LOG) )
                                                  bLog
= TRUE;
                                        else
                                                  bLog
= FALSE;
                                        iThreads  =
GetDlgItemInt(hwnd, ED_THREADS, &d, FALSE);
                                        iMaxWareHouse =
GetDlgItemInt(hwnd, ED_MAXWARE, &d, FALSE);
                                        iMaxConnections
= GetDlgItemInt(hwnd, ED_MAXCONNECTION, &d, FALSE);



          iPoolThreadsLimit = GetDlgItemInt(hwnd,
ED_IIS_MAX_THEAD_POOL_LIMIT, &d, FALSE);
                                        iThreadTimeout
= GetDlgItemInt(hwnd, ED_IIS_THREAD_TIMEOUT,      &d,
FALSE);
                                        iListenBackLog
= GetDlgItemInt(hwnd, ED_IIS_LISTEN_BACKLOG, &d,
FALSE);

          iAcceptExOutstanding = GetDlgItemInt(hwnd,
ED_WEB_SERVICE_BACKLOG_QUEUE_SIZE, &d, FALSE);


          ShowWindow(hwnd, SW_HIDE);
                                        hDlg =
CreateDialog(hInst, MAKEINTRESOURCE(IDD_DIALOG3), hwnd,
CopyDlgProc);

          ShowWindow(hDlg, SW_SHOWNA);

          UpdateDialog(hDlg);
                                        rc =
CopyFiles(hDlg, szDllPath);
                                        if ( !rc )
                                        {

          ShowWindow(hwnd, SW_SHOWNA);

          DestroyWindow(hDlg);

          MessageBox(hwnd, "Error(s) occured when
creating tpcc.dll", NULL, MB_ICONSTOP | MB_OK);

          EndDialog(hwnd, 0);

          return TRUE;
                                        }

          SetDlgItemText(hDlg, IDC_STATUS, "Updating
Registry.");

          SendDlgItemMessage(hDlg, IDC_PROGRESS1,
PBM_STEPIT, 0, 0);

          UpdateDialog(hDlg);
```

```
          WriteRegistrySettings(szDllPath);

                                        Sleep(100);


          ShowWindow(hwnd, SW_SHOWNA);

          DestroyWindow(hDlg);

                                        EndDialog(hwnd,
rc);
                                        return TRUE;
                              }
                              if ( wParam == IDCANCEL )
                              {
                                        EndDialog(hwnd,
FALSE);
                                        return TRUE;
                              }
                              break;
                    default:
                              break;
          }
          return FALSE;
}

static void ReadRegistrySettings(void)
{
          HKEY      hKey;
          DWORD     size;
          DWORD     type;
          char      szTmp[256];

          if ( RegOpenKeyEx(HKEY_LOCAL_MACHINE,
"SOFTWARE\\Microsoft\\TPCC", 0, KEY_READ, &hKey) ==
ERROR_SUCCESS )
          {
                    size = sizeof(szTmp);

                    bLog = FALSE;
                    if ( RegQueryValueEx(hKey, "LOG",
0, &type, szTmp, &size) == ERROR_SUCCESS )
                              if ( !stricmp(szTmp,
"ON") )
                                        bLog = TRUE;
                    iThreads = 4;
                    size = sizeof(szTmp);
                    if ( RegQueryValueEx(hKey,
"NumberOfDeliveryThreads", 0, &type, szTmp, &size) ==
ERROR_SUCCESS )
                              iThreads = atoi(szTmp);
                    if ( iThreads == 0 )
                              iThreads = 4;

                    iMaxWareHouse = 500;
                    size = sizeof(szTmp);
                    if ( RegQueryValueEx(hKey,
"MaximumWarehouses", 0, &type, szTmp, &size) ==
ERROR_SUCCESS )
                              iMaxWareHouse =
atoi(szTmp);
                    if ( iMaxWareHouse == 0 )
                              iMaxWareHouse = 500;

                    iDelayMs = 500;
                    size = sizeof(szTmp);
                    if ( RegQueryValueEx(hKey,
"BackoffDelay", 0, &type, szTmp, &size) ==
ERROR_SUCCESS )
                              iDelayMs = atoi(szTmp);
                    if ( iDelayMs == 0 )
                              iDelayMs = 500;

                    iDeadlockRetry = 3;
                    size = sizeof(szTmp);
                    if ( RegQueryValueEx(hKey,
"DeadlockRetry", 0, &type, szTmp, &size) ==
ERROR_SUCCESS )
                              iDeadlockRetry =
atoi(szTmp);
                              if ( !iDeadlockRetry )
                                        iDeadlockRetry
= 3;

                    iMaxConnections = 25;
                    size = sizeof(szTmp);
                    if ( RegQueryValueEx(hKey,
"MaxConnections", 0, &type, szTmp, &size) ==
ERROR_SUCCESS )
                              iMaxConnections =
atoi(szTmp);
                              if ( !iMaxConnections )
                                        iMaxConnections
= 25;

                    iQSlotts = 3000;
                    size = sizeof(szTmp);
                    if ( RegQueryValueEx(hKey,
"QueueSlotts", 0, &type, szTmp, &size) == ERROR_SUCCESS
)
                              iQSlotts = atoi(szTmp);
                    if ( iQSlotts == 0 )
                              iQSlotts = 3000;

                    RegCloseKey(hKey);

                    if (
RegOpenKeyEx(HKEY_LOCAL_MACHINE,
"SYSTEM\\CurrentControlSet\\Services\\Inetinfo\\Paramet
ers", 0, KEY_READ, &hKey) == ERROR_SUCCESS )
                    {
                              iPoolThreadsLimit =
iMaxPhysicalMemory * 2;
                              size =
sizeof(iPoolThreadsLimit);
                              if (
RegQueryValueEx(hKey, "PoolThreadsLimit", 0, &type,
(char *)&iPoolThreadsLimit, &size) == ERROR_SUCCESS )
                              if ( !iPoolThreadsLimit )

          iPoolThreadsLimit =  iMaxPhysicalMemory * 2;

                              iThreadTimeout = 86400;
                              size =
sizeof(iThreadTimeout);
                              if (
RegQueryValueEx(hKey, "ThreadTimeout", 0, &type, (char
*)&iThreadTimeout, &size) == ERROR_SUCCESS )
                                        if (
!iThreadTimeout )

          iThreadTimeout = 86400;

                              iListenBackLog = 15;
                              size =
sizeof(iListenBackLog);
                              if (
RegQueryValueEx(hKey, "ListenBackLog", 0, &type, (char
*)&iListenBackLog, &size) == ERROR_SUCCESS )
                                        if (
!iListenBackLog )

          iListenBackLog = 15;
                    }

                    RegCloseKey(hKey);

                    if (
RegOpenKeyEx(HKEY_LOCAL_MACHINE,
"SYSTEM\\CurrentControlSet\\Services\\W3SVC\\Parameters
", 0, KEY_READ, &hKey) == ERROR_SUCCESS )
                    {
                              iAcceptExOutstanding =
40;
                              size =
sizeof(iAcceptExOutstanding);
                              if (
RegQueryValueEx(hKey, "AcceptExOutstanding", 0, &type,
(char *)&iAcceptExOutstanding, &size) == ERROR_SUCCESS
)
                                        if (
!iAcceptExOutstanding )

          iAcceptExOutstanding = 40;
                    }

                    RegCloseKey(hKey);
          }

          return;
}

static void WriteRegistrySettings(char *szDllPath)
{
          HKEY      hKey;
          DWORD     dwDisposition;
          char      szTmp[256];
          char      *ptr;
          int                 iRc;

          if ( RegCreateKeyEx(HKEY_LOCAL_MACHINE,
"SOFTWARE\\Microsoft\\TPCC", 0, NULL,
REG_OPTION_NON_VOLATILE, KEY_ALL_ACCESS, NULL, &hKey,
&dwDisposition) == ERROR_SUCCESS )
          {
                    strcpy(szTmp, szDllPath);
                    ptr = strstr(szTmp, "tpcc");
                    if ( ptr )
                              *ptr = 0;

                    RegSetValueEx(hKey, "PATH", 0,
REG_SZ, szTmp, strlen(szTmp));

                    if ( bLog )
                              RegSetValueEx(hKey,
"LOG", 0, REG_SZ, "ON", 2);
```

```
                    else
                              RegSetValueEx(hKey,
"LOG", 0, REG_SZ, "OFF", 3);

                    itoa(iThreads, szTmp, 10);
                    RegSetValueEx(hKey,
"NumberOfDeliveryThreads", 0, REG_SZ, szTmp,
strlen(szTmp));

                    itoa(iMaxWareHouse, szTmp, 10);
                    RegSetValueEx(hKey,
"MaximumWarehouses", 0, REG_SZ, szTmp, strlen(szTmp));

                    itoa(iDelayMs, szTmp, 10);
                    RegSetValueEx(hKey, "BackoffDelay",
0, REG_SZ, szTmp, strlen(szTmp));

                    itoa(iDeadlockRetry, szTmp, 10);
                    RegSetValueEx(hKey,
"DeadlockRetry", 0, REG_SZ, szTmp, strlen(szTmp));

                    itoa(iMaxConnections, szTmp, 10);
                    RegSetValueEx(hKey,
"MaxConnections", 0, REG_SZ, szTmp, strlen(szTmp));

                    itoa(iQSlotts, szTmp, 10);
                    RegSetValueEx(hKey, "QueueSlotts",
0, REG_SZ, szTmp, strlen(szTmp));

                    RegFlushKey(hKey);

                    RegCloseKey(hKey);
          }

          if ( (iRc=RegCreateKeyEx(HKEY_LOCAL_MACHINE,
"SYSTEM\\CurrentControlSet\\Services\\Inetinfo\\Paramet
ers", 0, NULL, REG_OPTION_NON_VOLATILE, KEY_ALL_ACCESS,
NULL, &hKey, &dwDisposition)) == ERROR_SUCCESS )
          {
                    RegSetValueEx(hKey,
"PoolThreadsLimit", 0, REG_DWORD, (char
*)&iPoolThreadsLimit, sizeof(iPoolThreadsLimit));
                    RegSetValueEx(hKey,
"ThreadTimeout", 0, REG_DWORD, (char *)&iThreadTimeout,
sizeof(iThreadTimeout));
                    RegSetValueEx(hKey,
"ListenBackLog", 0, REG_DWORD, (char *)&iListenBackLog,
sizeof(iListenBackLog));

                    RegFlushKey(hKey);
                    RegCloseKey(hKey);
          }

          if ( (iRc=RegCreateKeyEx(HKEY_LOCAL_MACHINE,
"SYSTEM\\CurrentControlSet\\Services\\W3SVC\\Parameters
", 0, NULL, REG_OPTION_NON_VOLATILE, KEY_ALL_ACCESS,
NULL, &hKey, &dwDisposition)) == ERROR_SUCCESS )
          {
                    RegSetValueEx(hKey,
"AcceptExOutstanding", 0, REG_DWORD, (char
*)&iAcceptExOutstanding, sizeof(iAcceptExOutstanding));

                    RegFlushKey(hKey);
                    RegCloseKey(hKey);
          }

          return;
}

BOOL CALLBACK CopyDlgProc(HWND hwnd, UINT uMsg, WPARAM
wParam, LPARAM lParam)
{
          if ( uMsg == WM_INITDIALOG )
          {
                    SendDlgItemMessage(hwnd,
IDC_PROGRESS1, PBM_SETRANGE, 0, MAKELPARAM(0, 8));
                    SendDlgItemMessage(hwnd,
IDC_PROGRESS1, PBM_SETSTEP, (WPARAM)1, 0);
                    return TRUE;
          }
          return FALSE;
}

static int CopyFiles(HWND hDlg, char *szDllPath)
{
          HGLOBAL                         hDLL;
          HGLOBAL                         hExe;
          HRSRC                           hResInfo;
          BYTE                            *pSrc;
          HANDLE                          hFile;
          DWORD                           dwSize;
          DWORD                           d;
          char                            szTmp[256];
          char                            *ptr;
          BOOL                            bSvcRunning;

          SetDlgItemText(hDlg, IDC_STATUS, "Stopping
Web Service.");
          SendDlgItemMessage(hDlg, IDC_PROGRESS1,
PBM_STEPIT, 0, 0);
          UpdateDialog(hDlg);

          bSvcRunning = !StopWWWebService();
          SendDlgItemMessage(hDlg, IDC_PROGRESS1,
PBM_STEPIT, 0, 0);
          UpdateDialog(hDlg);

          hResInfo = FindResource(hInst,
MAKEINTRESOURCE(IDR_TPCCDLL1), "TPCCDLL");
          SetDlgItemText(hDlg, IDC_STATUS, "Copying
Files...");
          SendDlgItemMessage(hDlg, IDC_PROGRESS1,
PBM_STEPIT, 0, 0);
          UpdateDialog(hDlg);

          dwSize = SizeofResource(hInst, hResInfo);
          hDLL = LoadResource(hInst, hResInfo );
          pSrc = (BYTE *)LockResource(hDLL);
          remove(szDllPath);

          if ( !(hFile = CreateFile(szDllPath,
GENERIC_WRITE, 0, NULL, CREATE_ALWAYS,
FILE_ATTRIBUTE_NORMAL, NULL)) )
                    return 0;

          if ( !WriteFile(hFile, pSrc, dwSize, &d,
NULL) )
                    return 0;

          CloseHandle(hFile);

          UnlockResource(hDLL);
          FreeResource(hDLL);

          SendDlgItemMessage(hDlg, IDC_PROGRESS1,
PBM_STEPIT, 0, 0);
          UpdateDialog(hDlg);

          hResInfo = FindResource(hInst,
MAKEINTRESOURCE(IDR_DELIVERY1), "DELIVERY");

          dwSize = SizeofResource(hInst, hResInfo);
          hExe = LoadResource(hInst, hResInfo );
          pSrc = (BYTE *)LockResource(hExe);

          strcpy(szTmp, szDllPath);
          ptr = strstr(szTmp, "tpcc");
          if ( ptr )
                    *ptr = 0;
          strcat(szTmp, "delisrv.exe");

          remove(szTmp);

          if ( !(hFile = CreateFile(szTmp,
GENERIC_WRITE, 0, NULL, CREATE_ALWAYS,
FILE_ATTRIBUTE_NORMAL, NULL)) )
                    return 0;

          if ( !WriteFile(hFile, pSrc, dwSize, &d,
NULL) )
                    return 0;

          CloseHandle(hFile);

          UnlockResource(hExe);
          FreeResource(hExe);

          SendDlgItemMessage(hDlg, IDC_PROGRESS1,
PBM_STEPIT, 0, 0);
          UpdateDialog(hDlg);

          //if we stopped service restart it.
          if ( !bSvcRunning )
          {
                    SetDlgItemText(hDlg, IDC_STATUS,
"Starting Web Service.");
                    SendDlgItemMessage(hDlg,
IDC_PROGRESS1, PBM_STEPIT, 0, 0);
                    UpdateDialog(hDlg);
                    StartWWWebService();
          }

          SendDlgItemMessage(hDlg, IDC_PROGRESS1,
PBM_STEPIT, 0, 0);
          UpdateDialog(hDlg);

          return 1;
}

static BOOL GetInstallPath(char *szDllPath)
{
    HKEY  hKey;
          BYTE      szTmp[256];
          char      szKey[256];
          DWORD     size;
          DWORD     sv;
          BOOL      bRc;
```

```
        int                 len;
        char      *ptr;

        szDllPath[0] =  0;
        bRc = TRUE;
        if ( RegOpenKeyEx(HKEY_LOCAL_MACHINE,
"SYSTEM\\CurrentControlSet\\Services\\W3SVC\\Parameters
\\Virtual Roots", 0, KEY_ALL_ACCESS, &hKey) ==
ERROR_SUCCESS )
        {
                sv = sizeof(szKey);
                size = sizeof(szTmp);

                if ( RegEnumValue(hKey, 0, szKey,
&sv, NULL, NULL, szTmp, &size) == ERROR_SUCCESS )
                {
                        strcpy(szDllPath, szTmp);
                        bRc = FALSE;
                }
                RegCloseKey(hKey);
        }
        if ( (ptr = strchr(szDllPath, ',')) )
                *ptr = 0;

        len = strlen(szDllPath);
        if ( szDllPath[len-1] != '\\' )
        {
                szDllPath[len] = '\\';
                szDllPath[len+1] = 0;
        }
        strcat(szDllPath, "tpcc.dll");

        return bRc;
}

static void GetVersionInfo(char *szDLLPath, char
*szExePath)
{
        DWORD                                   d;
        DWORD
        dwSize;
        DWORD
        dwBytes;
        char                                    *ptr;
        VS_FIXEDFILEINFO    *vs;

        versionDllMS = 0;
        versionDllLS = 0;
        if ( _access(szDLLPath, 00) == 0 )
        {
                dwSize =
GetFileVersionInfoSize(szDLLPath, &d);
                if ( dwSize )
                {
                        ptr = (char
*)malloc(dwSize);

        GetFileVersionInfo(szDLLPath, 0, dwSize,
ptr);
                        VerQueryValue(ptr,
"\\",&vs, &dwBytes);
                        versionDllMS = vs-
>dwProductVersionMS;
                        versionDllLS = vs-
>dwProductVersionLS;
                        free(ptr);
                }
        }

        versionExeMS = 0x7FFF;
        versionExeLS = 0x7FFF;
        dwSize = GetFileVersionInfoSize(szExePath,
&d);
        if ( dwSize )
        {
                ptr = (char *)malloc(dwSize);
                GetFileVersionInfo(szExePath, 0,
dwSize, ptr);
                VerQueryValue(ptr, "\\",&vs,
&dwBytes);

                versionExeMS = vs-
>dwProductVersionMS;
                versionExeLS = vs-
>dwProductVersionLS;
                free(ptr);
        }
        return;
}

static BOOL StartWWWebService(void)
{
        SC_HANDLE           schSCManager;
        SC_HANDLE           schService;
        SERVICE_STATUS      ssStatus;
        DWORD
        dwOldCheckPoint;

        schSCManager = OpenSCManager(NULL, NULL,
SC_MANAGER_ALL_ACCESS);
        schService = OpenService(schSCManager,
TEXT("W3SVC"), SERVICE_ALL_ACCESS);
        if (schService == NULL)
                return FALSE;

        if (! StartService(schService, 0, NULL) )
                goto StartWWWebErr;
        //start Service pending, Check the status
until the service is running.
        if (! QueryServiceStatus(schService,
&ssStatus) )
                goto StartWWWebErr;
        while( ssStatus.dwCurrentState !=
SERVICE_RUNNING)
        {

                dwOldCheckPoint =
ssStatus.dwCheckPoint;
        //Save the current checkpoint.
                Sleep(ssStatus.dwWaitHint);

        //Wait for the specified interval.
                if (
!QueryServiceStatus(schService, &ssStatus) )
        //Check the status again.
                        break;
                if (dwOldCheckPoint >=
ssStatus.dwCheckPoint)                  //Break if the
checkpoint has not been incremented.
                        break;
        }

        if (ssStatus.dwCurrentState ==
SERVICE_RUNNING)
                goto StartWWWebErr;

        CloseServiceHandle(schService);
        return TRUE;

StartWWWebErr:
        CloseServiceHandle(schService);
        return FALSE;
}

static BOOL StopWWWebService(void)
{
        SC_HANDLE           schSCManager;
        SC_HANDLE           schService;
        SERVICE_STATUS      ssStatus;
        DWORD
        dwOldCheckPoint;

        schSCManager = OpenSCManager(NULL, NULL,
SC_MANAGER_ALL_ACCESS);
        schService = OpenService(schSCManager,
TEXT("W3SVC"), SERVICE_ALL_ACCESS);
        if (schService == NULL)
                return FALSE;

        if (! QueryServiceStatus(schService,
&ssStatus) )
                goto StopWWWebErr;

        if ( !ControlService(schService,
SERVICE_CONTROL_STOP, &ssStatus) )
                goto StopWWWebErr;
        //start Service pending, Check the status
until the service is running.
        if (! QueryServiceStatus(schService,
&ssStatus) )
                goto StopWWWebErr;
        while( ssStatus.dwCurrentState ==
SERVICE_RUNNING)
        {

                dwOldCheckPoint =
ssStatus.dwCheckPoint;
        //Save the current checkpoint.
                Sleep(ssStatus.dwWaitHint);

        //Wait for the specified interval.
                if (
!QueryServiceStatus(schService, &ssStatus) )
        //Check the status again.
                        break;
                if (dwOldCheckPoint >=
ssStatus.dwCheckPoint)                  //Break if the
checkpoint has not been incremented.
                        break;
        }

        if (ssStatus.dwCurrentState ==
SERVICE_RUNNING)
                goto StopWWWebErr;

        CloseServiceHandle(schService);
        return TRUE;
```

```
StopWWWebErr:
          CloseServiceHandle(schService);
          return FALSE;
}

static void UpdateDialog(HWND hDlg)
{
          MSG msg;

          UpdateWindow(hDlg);
          while( PeekMessage(&msg, hDlg, 0, 0,
PM_REMOVE) )
          {
                    TranslateMessage(&msg);
                    DispatchMessage(&msg);
          }
          Sleep(250);
          return;
}
```

Install.h

```
//{{NO_DEPENDENCIES}}
// Microsoft Developer Studio generated include file.
// Used by install.rc
//
#define IDD_DIALOG1                                 101
#define IDI_ICON1                                   102
#define IDR_TPCCDLL1                                103
#define IDD_DIALOG2                                 104
#define IDI_ICON2                                   105
#define IDR_DELIVERY1                               109
#define IDD_DIALOG3                                 110
#define BN_LOG                                      1001
#define ED_KEEP                                     1002
#define ED_THREADS                                  1003
#define ED_THREADS2                                 1004
#define ED_MAXWARE                                  1006
#define IDC_PATH                                    1007
#define IDC_VERSION                                 1009
#define IDC_RESULTS                                 1010
#define IDC_PROGRESS1                               1011
#define IDC_STATUS                                  1012
#define IDC_BUTTON1                                 1013
#define ED_MAXCONNECTION                            1014
#define ED_IIS_MAX_THEAD_POOL_LIMIT                 1015
#define ED_WEB_SERVICE_BACKLOG_QUEUE_SIZE           1017
#define ED_IIS_THREAD_TIMEOUT                       1018
#define ED_IIS_LISTEN_BACKLOG                       1019

// Next default values for new objects
//
#ifdef APSTUDIO_INVOKED
#ifndef APSTUDIO_READONLY_SYMBOLS
#define _APS_NEXT_RESOURCE_VALUE                    111
#define _APS_NEXT_COMMAND_VALUE                     40001
#define _APS_NEXT_CONTROL_VALUE                     1015
#define _APS_NEXT_SYMED_VALUE                       101
#endif
#endif
```

Neworder.c

```
/*        FILE:               NEWORDER.C
 *
 *        Based on: Microsoft TPC-C Kit Ver. 3.00.000
 *
 *                                  Copyright
Microsoft, 1996
 *                                  Copyright
Performance Tuning Corporation, 1997
 *
 *        PURPOSE:  New Order Tuxedo Server.
 *        Author:             Philip Durr
 *
          philipdu@Microsoft.com
 *
 *  MODIFIED        Changed for modularity and to allow
for the Tuxedo TM
 *
 *  Author:                   Edward Whalen
 *                                  Performance
Tuning Corporation
 *
          ewhalen@perftuning.com
 */

#include <windows.h>
#include <process.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 DBNTWIN32
#include <sqlfront.h>
#include <sqldb.h>

#include "trans.h"
                    //tpckit transaction header
contains definations of structures specific to TPC-C
#include "httpext.h"
                    //ISAPI DLL information header

#include "tpcc.h"
                    //this dlls specific structure,
value e.t. header.

#include <tmenv.h>
#include <xa.h>
#include <atmi.h>

BOOL      bLog                          = FALSE;
BOOL      bFlush;
                              //Flush delivery log info
when written.
BOOL      verbose                       = FALSE;
BOOL      bError                        = FALSE;

int                 iThreads            = 5;
int                 iMaxWareHouses      = 500;
int                 iDelayMs            = 100;
short     iMaxConnections = (short)1;
short     iDeadlockRetry      = (short)3;

DBPROCESS *pdbproc;

static char
          szServer[32];
          //SQL server name
static char
          szDatabase[32];
          //tpcc database name
static char
          szUser[32];
                    //user name
static char
          szPassword[32];
          //user password
int spId;

#ifdef LOCAL_ALLOC
NEW_ORDER_DATA      NewOrderData;
#else
TUX_DATA TuxData;
#endif
TERM Term;

static char         szTpccLogPath[256]; //path to html
log file if logging turned on in registry.
static char szErrorLogPath[256];        //path to error
log file.

static    CRITICAL_SECTION
          CriticalSection;
static    CRITICAL_SECTION
          ErrorLogCriticalSection;
static    EXTENSION_CONTROL_BLOCK       *gpECB = NULL;
static    int
                    bTpccExit;          //exit delivery
disconnect loop as dll exiting.

extern void TMLog();
extern BOOL SQLInit();
extern void UtilStrCpy();
extern void UtilStrCpy();
extern BOOL SQLOpenConnection();
extern BOOL SQLCloseConnection();
extern BOOL SQLDetectDeadlock();

/* FUNCTION: tpsvrinit ( int argc, char *argv[])
 *
 * PURPOSE:          Initialize the Server to Database
connection.
 *
 * RETURNS:                    int       0
          Success
 *                                                    -1
          Failure
 *
 *
 * COMMENTS:         None
 *
 */

int tpsvrinit ( int argc, char *argv[] )
{
```

```
        if ( GetParameters(argc, argv) )
        {
                PrintParameters();
                return -1;
        }

        if ( verbose )
                TMLog("TPSVRINIT: NewOrder: Server
%s, Database %s, User %s, Password %s, Flush %d.",
                        szServer, szDatabase,
szUser, szPassword, bFlush);


        if ( ! SQLInit() )
        {
                TMLog( "NEWORDER: SQLInit Failed"
);
                return -1;
        }

        if ( SQLOpenConnection ( NULL, 0, 0,
&pdbproc, szServer, szDatabase, szUser, szPassword,
szDatabase, &spId))
        {
                TMLog ( "NEWORDER:
SQLOpenConnection Failed" );
                dbexit();
                return -1;
        }
        return 0;
}

/* FUNCTION: tpsvrdone ( void )
 *
 * PURPOSE:         Initialize the Server to Database
connection.
 *
 * RETURNS:                 int       0
        Success
 *                                              -1
        Failure
 *
 *
 * COMMENTS:        None
 *
 */

void tpsvrdone ( void )
{
        SQLCloseConnection( NULL, pdbproc);
        dbexit();
}

/* FUNCTION: NEWORDER ( TPSVCINFO *rqst )
 *
 * PURPOSE:         Process a New Order request.
 *
 * RETURNS:                 int       0
        Success
 *                                              -1
        Failure
 *
 *
 * COMMENTS:        None
 *
 */

void NEWORDER ( TPSVCINFO *rqst )
{
        PECBINFO pECBInfo = dbgetuserdata(pdbproc);
        int size = rqst->len;

#ifdef LOCAL_ALLOC
        memcpy(&NewOrderData, rqst->data, size);

        if (verbose )
        {
                TMLog(" NEWORDER: w_id %d ",
NewOrderData.w_id);
                TMLog(" NEWORDER: d_id %d ",
NewOrderData.d_id);
                TMLog(" NEWORDER: c_id %d ",
NewOrderData.c_id);
        }

        bError = FALSE;

        NewOrderData.retval = SQLNewOrder( NULL, 0,
0, pdbproc, &NewOrderData, iDeadlockRetry);

        if (bError == TRUE)
                NewOrderData.retval = -1;

        if (verbose )
                TMLog(" NEWORDER: Return Value %d",
NewOrderData.retval);

        memcpy( rqst->data, &NewOrderData, size);
#else
        memcpy(&TuxData, rqst->data, size);

        if (verbose )
        {
                TMLog(" NEWORDER: w_id %d ",
TuxData.NewOrderData.w_id);
                TMLog(" NEWORDER: d_id %d ",
TuxData.NewOrderData.d_id);
                TMLog(" NEWORDER: c_id %d ",
TuxData.NewOrderData.c_id);
        }

        bError = FALSE;

        TuxData.NewOrderData.retval = SQLNewOrder(
NULL, 0, 0, pdbproc, &TuxData.NewOrderData,
iDeadlockRetry);

        if (bError == TRUE)
                TuxData.NewOrderData.retval = -1;

        if (verbose )
                TMLog(" NEWORDER: Return Value %d",
TuxData.NewOrderData.retval);

        memcpy( rqst->data, &TuxData.NewOrderData,
size);
#endif
        tpreturn( TPSUCCESS, 0, rqst->data, size, 0);
}

/* FUNCTION: int SQLNewOrder(EXTENSION_CONTROL_BLOCK
*pECB, int iTermId, int iSyncId, int iTermId, int
iSyncId, DBPROCESS *dbproc, NEW_ORDER_DATA  *pNewOrder,
short deadlock_retry)
 *
 * PURPOSE:         This function handles the new order
transaction.
 *
 * ARGUMENTS:       EXTENSION_CONTROL_BLOCK       *pECB
                        passed in structure
pointer from inetsrv.
 *                                      int

        iTermId                         terminal id of
browser
 *                                      int

        iSyncId                         sync id of
browser
 *                                      DBPROCESS
                        *dbproc
        connection db process id
 *                                      NEW_ORDER_DATA
                        *pNewOrder
        pointer to new order structure for
input/output data
 *                                      short
                                        deadlock_retry
        retry count if deadlocked
 *
 * RETURNS:                 int       TRUE
        transaction committed
 *                                                FALSE
        item number not valid
 *                                              -1
                deadlock max retry reached
 *
 *
 * COMMENTS:        None
 *
 */

static int SQLNewOrder(EXTENSION_CONTROL_BLOCK
        *pECB, int iTermId, int iSyncId, DBPROCESS
*dbproc, NEW_ORDER_DATA  *pNewOrder, short
deadlock_retry)
{
        RETCODE                         rc;
        int                                     i;
        DBINT                           commit_flag;
        int
        tryit;
        char                            printbuf[25];
        char                            tmpbuf[30];
        DBDATETIME                      datetime;
        BYTE                            *pData;
        PECBINFO            pEcbInfo;

        if ( (pEcbInfo =
(PECBINFO)dbgetuserdata(dbproc)) )
        {
                pEcbInfo->pECB = pECB;
                pEcbInfo->bFailed = FALSE;
                pEcbInfo->iTermId = iTermId;
                pEcbInfo->iSyncId = iSyncId;
        }
```

```
          pNewOrder->num_deadlocks = 0;

          strcpy(tmpbuf, "tpcc_neworder");

          for (tryit=0; tryit < deadlock_retry;
tryit++)
          {
                    if (dbrpcinit(dbproc, tmpbuf, 0) ==
SUCCEED)
                    {
                              dbrpcparam(dbproc, NULL,
0, SQLINT2, -1, -1, (BYTE *) &pNewOrder->w_id);
                              dbrpcparam(dbproc, NULL,
0, SQLINT1, -1, -1, (BYTE *) &pNewOrder->d_id);
                              dbrpcparam(dbproc, NULL,
0, SQLINT4, -1, -1, (BYTE *) &pNewOrder->c_id);
                              dbrpcparam(dbproc, NULL,
0, SQLINT1, -1, -1, (BYTE *) &pNewOrder->o_ol_cnt);
//                            dbrpcparam(dbproc, NULL,
0, SQLINT1, -1, -1, (BYTE *) &pNewOrder->o_all_local);

                              pNewOrder->o_all_local =
1;
                              for (i = 0; i <
pNewOrder->o_ol_cnt; i++)
                              {
                                        if ( pNewOrder-
>o_all_local && pNewOrder->Ol[i].ol_supply_w_id !=
pNewOrder->w_id )

          pNewOrder->o_all_local = 0;
                              }
                              dbrpcparam(dbproc, NULL,
0, SQLINT1, -1, -1, (BYTE *) &pNewOrder->o_all_local);

                              for (i = 0; i <
pNewOrder->o_ol_cnt; i++)
                              {

          dbrpcparam(dbproc, NULL, 0, SQLINT4, -1, -1,
(BYTE *) &pNewOrder->Ol[i].ol_i_id);

          dbrpcparam(dbproc, NULL, 0, SQLINT2, -1, -1,
(BYTE *) &pNewOrder->Ol[i].ol_supply_w_id);

          dbrpcparam(dbproc, NULL, 0, SQLINT2, -1, -1,
(BYTE *) &pNewOrder->Ol[i].ol_quantity);
                              }

                              if (dbrpcexec(dbproc) ==
SUCCEED)
                              {
                                        pNewOrder-
>total_amount=0;

                                        // Get resutls
from order line
                                        for (i = 0;
i<pNewOrder->o_ol_cnt; i++)
                                        {
                                                  if
(((rc = dbresults(dbproc)) != NO_MORE_RESULTS) && (rc
!= FAIL))
                                                  {

          if (DBROWS(dbproc) && (dbnumcols(dbproc) ==
5))
          {

                    while (dbnextrow(dbproc) !=
NO_MORE_ROWS)
                    {

                              if(pData=dbdata(dbproc,
1))

          UtilStrCpy(pNewOrder->Ol[i].ol_i_name, pData,
dbdatlen(dbproc, 1));

                              if(pData=dbdata(dbproc,
2))

                                        pNewOrder-
>Ol[i].ol_stock = (*(DBSMALLINT *) pData);

                              if(pData=dbdata(dbproc,
3))

          UtilStrCpy(pNewOrder->Ol[i].ol_brand_generic,
pData, dbdatlen(dbproc, 3));

                              if(pData=dbdata(dbproc,
4))

                                        pNewOrder-
>Ol[i].ol_i_price = (*(DBFLT8 *) pData);

                              if(pData=dbdata(dbproc,
5))

                                        pNewOrder-
>Ol[i].ol_amount = (*(DBFLT8 *) pData);

                              pNewOrder->total_amount =
pNewOrder->total_amount + pNewOrder->Ol[i].ol_amount;
                    }

          }
                                                  }
                                        }
                                        while (((rc =
dbresults(dbproc)) != NO_MORE_RESULTS) && (rc != FAIL))
                                        {
                                                  if
(DBROWS(dbproc) && (dbnumcols(dbproc) == 8))
                                                  {

          while (((rc = dbnextrow(dbproc)) !=
NO_MORE_ROWS) && (rc != FAIL))

          {
                    if(pData=dbdata(dbproc, 1))

                              pNewOrder->w_tax =
(*(DBFLT8 *) pData);

                    if(pData=dbdata(dbproc, 2))

                              pNewOrder->d_tax =
(*(DBFLT8 *) pData);

                    if(pData=dbdata(dbproc, 3))

                              pNewOrder->o_id =
(*(DBINT *) pData);

                    if(pData=dbdata(dbproc, 4))

                              UtilStrCpy(pNewOrder-
>c_last, pData, dbdatlen(dbproc, 4));

                    if(pData=dbdata(dbproc, 5))

                              pNewOrder->c_discount =
(*(DBFLT8 *) pData);

                    if(pData=dbdata(dbproc, 6))

                              UtilStrCpy(pNewOrder-
>c_credit, pData, dbdatlen(dbproc, 6));

                    if(pData=dbdata(dbproc, 7))

                    {
```

```
                                datetime = *((DBDATETIME
*) pData);

                                dbdatecrack(dbproc,
&pNewOrder->o_entry_d, &datetime);

                        }

                        if(pData=dbdata(dbproc,
8))commit_flag = (*(DBTINYINT *) pData);

                }
                                                        }
                                }
                                }
                        }
                        if (SQLDetectDeadlock(dbproc))
                        {
                                pNewOrder-
>num_deadlocks++;

                sprintf(printbuf,"deadlock: retry:
%d",pNewOrder->num_deadlocks);

                Sleep(DEADLOCKWAIT*tryit);
                        }
                        else
                        {
                                if (commit_flag == 1)
                                {
                                        pNewOrder-
>total_amount = pNewOrder->total_amount * ((1 +
pNewOrder->w_tax + pNewOrder->d_tax) * (1 - pNewOrder-
>c_discount));

                strcpy(pNewOrder-
>execution_status,"Transaction commited.");
                                        return TRUE;
                                }
                                else
                                {

                strcpy(pNewOrder->execution_status,"Item
number is not valid.");
                                        pNewOrder-
>error=ERR_BAD_ITEM_ID;
                                        return FALSE;
                                }
                        }
                }

                // If we reached here, it means we quit after
MAX_RETRY deadlocks
                strcpy(pNewOrder->execution_status,"Hit
deadlock max.  ");
                pNewOrder->error=ERR_TYPE_DEADLOCK;
                if ( verbose )
                        TMLog(" NEWORDER: SQLNewOrder Max
Deadlocks %d", tryit);

                return -1;              //        "deadlock max
retry reached!"
}

/*
 *        Common Code for all Servers
 */

 /* FUNCTION: BOOL SQLInit()
 *
 * PURPOSE:         This function initializes SQL
Server for later use.
 *
 *
 * RETURNS:                     BOOL      FALSE     if
successfull
 *
                TRUE      if an error occurs and connection
cannot be established.
 *
 * COMMENTS:        None
 *
 */
BOOL SQLInit ()
{

                dbinit();

                if ( dbgetmaxprocs() < iMaxConnections )
                {
                        if ( dbsetmaxprocs(iMaxConnections)
== FAIL )
                        {
                                //set for fail error
message when HttpExtensionProc() is called because
                                //at this point we don't
have a pECB so no way to show error message.
                                iMaxConnections = -1;
                        }
                }

                // install error and message handlers
                dbmsghandle((DBMSGHANDLE_PROC)msg_handler);
                dberrhandle((DBERRHANDLE_PROC)err_handler);

                return TRUE;
}


/* FUNCTION: BOOL
SQLOpenConnection(EXTENSION_CONTROL_BLOCK
                *pECB, int iTermId, int iSyncId, DBPROCESS
**dbproc, char *server, char *database, char *user,
char *password, char *app, int *spid, long *pack_size)
 *
 * PURPOSE:         This function opens the sql
connection for use.
 *
 * ARGUMENTS:       EXTENSION_CONTROL_BLOCK       *pECB
                passed in structure pointer from inetsrv.
 *                                      int
                        iTermId
                terminal id of browser
 *                                      int
                        iSyncId             sync
id of browser
 *                                      DBPROCESS
                **dbproc  pointer to returned DBPROCESS
 *                                      char
                        *server             SQL server name
 *                                      char
                        *database SQL server database
 *                                      char
                        *user               user name
 *                                      char
                        *password user password
 *                                      char
                        *app                pointer to
returned application array
 *                                      int
                        *spid
                pointer to returned spid
 *                                      long
                        *pack_size          pointer to
returned default pack size
 *
 * RETURNS:                     BOOL      FALSE     if
successfull
 *
                TRUE      if an error occurs
 *
 * COMMENTS:        None
 *
 */


#ifdef USE_ODBC
                static BOOL
SQLOpenConnection(EXTENSION_CONTROL_BLOCK *pECB, int
iTermId, int iSyncId, DBPROCESS **dbproc, char *server,
char *database, char *user, char *password, char *app,
int *spid, long *pack_size)
                {

                        RETCODE   rc;
                        char      buffer[30];

                        *dbproc = (DBPROCESS
*)malloc(sizeof(DBPROCESS));
                        if ( !*dbproc )
                                return TRUE;

                        //set pECB data into dbproc
                        (*dbproc)->bDeadlock = FALSE;
                        (*dbproc)->bFailed = FALSE;
                        (*dbproc)->pECB = pECB;
                        (*dbproc)->iTermId = iTermId;
                        (*dbproc)->iSyncId = iSyncId;


                        if ( SQLAllocConnect(henv,
&(*dbproc)->hdbc) == SQL_ERROR )
                                return TRUE;

                        if ( SQLSetConnectOption((*dbproc)-
>hdbc, SQL_PACKET_SIZE, pack_size) == SQL_ERROR )
                                return TRUE;

                        rc = SQLConnect((*dbproc)->hdbc,
server, SQL_NTS, user, SQL_NTS, password, SQL_NTS);
                        if (rc != SQL_SUCCESS && rc !=
SQL_SUCCESS_WITH_INFO)
                                return TRUE;
                        rc = SQLAllocStmt((*dbproc)->hdbc,
&(*dbproc)->hstmt);
                        if (rc == SQL_ERROR)
                                return TRUE;
```

```
                    sprintf(buffer,"use %s", Client-
>database);

                    rc = SQLExecDirect((*dbproc)-
>hstmt, buffer, SQL_NTS);
                    if (rc != SQL_SUCCESS && rc !=
SQL_SUCCESS_WITH_INFO)
                              return TRUE;

                    SQLFreeStmt((*dbproc)->hstmt,
SQL_CLOSE);
                    sprintf(buffer,"set nocount on");
                    rc = SQLExecDirect((*dbproc)-
>hstmt, buffer, SQL_NTS);
                    if (rc != SQL_SUCCESS && rc !=
SQL_SUCCESS_WITH_INFO)
                              return TRUE;
                    SQLFreeStmt((*dbproc)->hstmt,
SQL_CLOSE);

                    sprintf(buffer,"select @@spid");

                    rc = SQLExecDirect((*dbproc)-
>hstmt, buffer, SQL_NTS);
                    if (rc != SQL_SUCCESS && rc !=
SQL_SUCCESS_WITH_INFO)
                              return TRUE;

                    if ( SQLBindCol((*dbproc)->hstmt,
1, SQL_C_SSHORT, &(*dbproc)->spid, 0, NULL) ==
SQL_ERROR )
                              return TRUE;


                    if ( SQLFetch((*dbproc)->hstmt) ==
SQL_ERROR )
                              return TRUE;

                    SQLFreeStmt((*dbproc)->hstmt,
SQL_CLOSE);

                    return FALSE;
          }

#else

          static BOOL
SQLOpenConnection(EXTENSION_CONTROL_BLOCK *pECB, int
iTermId, int iSyncId, DBPROCESS **dbproc, char *server,
char *database, char *user, char *password, char *app,
int *spid)
          {
                    LOGINREC  *login;
                    PECBINFO  pEcbInfo;

                    //set local msg proc for login
record
                    //attach pECB record

                    //this is necessary as dblib
provides no way to pass user data in a login structure.
So until
                    //there is an allocated dbproc we
need to use a static which means that the login attempt
must
                    //be serialized.

                    gpECB = pECB;

                    login = dblogin();
                    if ( !*user )
                              DBSETLUSER(login, "sa");
                    else
                              DBSETLUSER(login, user);

                    DBSETLPWD(login,  password);
                    DBSETLHOST(login, app);

//                  Do not set the packet size.  Use
the size set up in SQL Server.
//                  DBSETLPACKET(login, (unsigned
short)DEFCLPACKSIZE);

//                  This can potentially cut down on
data conversion
                    DBSETLVERSION(login, DBVER60);

                    if ((*dbproc = dbopen(login, server
)) == NULL)
                              return TRUE;

                    //set pECB data into dbproc
                    pEcbInfo =
(PECBINFO)malloc(sizeof(ECBINFO));
                    pEcbInfo->bDeadlock = FALSE;
                    pEcbInfo->pECB = pECB;
                    pEcbInfo->iTermId = iTermId;
                    pEcbInfo->iSyncId = iSyncId;
                    dbsetuserdata(*dbproc, pEcbInfo);

                    // Use the the right database
                    dbuse(*dbproc, database);

                    dbcmd(*dbproc, "select @@spid");

                    dbsqlexec(*dbproc);
                    while (dbresults(*dbproc) !=
NO_MORE_RESULTS)
                    {
                              dbbind(*dbproc, 1,
SMALLBIND, (DBINT) 0, (BYTE *) spid);
                              while (dbnextrow(*dbproc)
!= NO_MORE_ROWS)
                              ;
                    }
                    dbcmd(*dbproc, "set nocount on");

                    dbsqlexec(*dbproc);
                    while (dbresults(*dbproc) !=
NO_MORE_RESULTS)
                    {
                              while (dbnextrow(*dbproc)
!= NO_MORE_ROWS)
                              ;
                    }

                    //rollback transaction on abort
                    dbcmd(*dbproc, "set XACT_ABORT
ON");

                    dbsqlexec(*dbproc);
                    while (dbresults(*dbproc) !=
NO_MORE_RESULTS)
                    {
                              while (dbnextrow(*dbproc)
!= NO_MORE_ROWS)
                              ;
                    }

                    return FALSE;
          }

#endif

/* FUNCTION: BOOL
SQLCloseConnection(EXTENSION_CONTROL_BLOCK *pECB,
DBPROCESS *dbproc)
 *
 * PURPOSE:          This function closes the sql
connection.
 *
 * ARGUMENTS:        EXTENSION_CONTROL_BLOCK       *pECB
          passed in structure pointer from inetsrv.
 *                                  DBPROCESS
          *dbproc   pointer to DBPROCESS
 *
 * RETURNS:                   BOOL      FALSE     if
successfull
 *
          TRUE      if an error occurs
 *
 * COMMENTS:         None
 *
 */

#ifdef USE_ODBC
          static BOOL
SQLCloseConnection(EXTENSION_CONTROL_BLOCK *pECB,
DBPROCESS *dbproc)
          {
                    if ( dbproc )
                    {
                              SQLFreeStmt(dbproc-
>hstmt, SQL_DROP);
                              SQLDisconnect(dbproc-
>hdbc);
                              SQLFreeConnect(dbproc-
>hdbc);
                              free(dbproc);
                              dbproc = NULL;
                    }
                    return FALSE;
          }
#else
          static BOOL
SQLCloseConnection(EXTENSION_CONTROL_BLOCK *pECB,
DBPROCESS *dbproc)
          {
                    if (dbclose(dbproc) == FAIL)
                              return TRUE;
                    return FALSE;
          }
#endif

/* FUNCTION: BOOL SQLDetectDeadlock(DBPROCESS *dbproc)
 *
```

```
 * PURPOSE:         This function checks to see if a
sql server deadlock condition exists.
 *
 * ARGUMENTS:       DBPROCESS
          *dbproc                       connection db
process id to check
 *
 * RETURNS:                  BOOL      FALSE
          no deadlock detected
 *
          TRUE              deadlock condition exists
 *
 * COMMENTS:        None
 *
 */

BOOL SQLDetectDeadlock(DBPROCESS *dbproc)
{
          PECBINFO  pEcbInfo;

          if ( (pEcbInfo =
(PECBINFO)dbgetuserdata(dbproc)) )
          {
                    if ( pEcbInfo->bDeadlock )
                    {
                              pEcbInfo->bDeadlock =
FALSE;
                              return TRUE;
                    }
          }
          return FALSE;
}

// Lifted from HP FDR since they did such a nice job
void TMLog( char *format, ... )
{
          va_list args;
          char buf[4096];
          int len;
          va_start( args, format );
          _strtime( buf );
          strcat( buf," ");
          len = strlen( buf );
          (void)_vsnprintf( buf+ len, sizeof( buf) -
len - 1, format, args);
          buf[sizeof( buf )- 1]= '\0';
          va_end( args );
          userlog( buf );
}

/* FUNCTION: void UtilStrCpy(char *pDest, char *pSrc,
int n)
 *
 * PURPOSE:         This function copies n characters
from string pSrc to pDst and places a
 *                                 null character at the end
of the destination string.
 *
 * ARGUMENTS:       char
          *pDest    destination string pointer
 *                                 char
                    *pSrc     source string pointer
 *                                 int
                              n
          number of characters to copy
 *
 * RETURNS:                  None
 *
 * COMMENTS:        Unlike strncpy this function
ensures that the result string is
 *                                 always null
terminated.
 *
 */

static void UtilStrCpy(char *pDest, char *pSrc, int n)
{
    strncpy(pDest, pSrc, n);
    pDest[n] = '\0';

          return;
}

/* FUNCTION: int err_handler(DBPROCESS *dbproc, int
severity, int dberr, int oserr, char *dberrstr, char
*oserrstr)
 *
 * PURPOSE:         This function handles DB-Library
errors
 *
 * ARGUMENTS:       DBPROCESS           *dbproc
                    DBPROCESS id pointer
 *                                 int
                              severity
          severity of error
 *                                 int
                              dberr
          error id
 *                                 int
                         oserr
          operating system specific error code
 *                                 char
                    *dberrstr           printable error
description of dberr
 *                                 char
                    *oserrstr           printable error
description of oserr
 *
 * RETURNS:                  int
                    INT_CONTINUE        continue if
error is SQLETIME else INT_CANCEL action
 *
 * COMMENTS:        None
 *
 */


int err_handler(DBPROCESS *dbproc, int severity, int
dberr, int oserr, char *dberrstr, char *oserrstr)
{
          PECBINFO
          pEcbInfo;
          EXTENSION_CONTROL_BLOCK       *pECB;
          FILE
          *fp;
          SYSTEMTIME
          systemTime;
          char
          szTmp[256];
          int
                    iTermId;
          int
                    iSyncId;

          pEcbInfo = NULL;

          if ((dbproc == NULL) || (DBDEAD(dbproc)))
          {
                    TMLog("DBPROC is invalid");
                    return INT_CANCEL;
          }

          if ( !(pEcbInfo =
(PECBINFO)dbgetuserdata(dbproc)) )
          {
                    pECB = gpECB;
                    iTermId = 0;
                    iSyncId = 0;
          }
          else
          {
                    pECB = pEcbInfo->pECB;
                    iTermId = pEcbInfo->iTermId;
                    iSyncId = pEcbInfo->iSyncId;
          }

          if ( pEcbInfo && pEcbInfo->bFailed )
          {
                    bError == FALSE;
                    return INT_CANCEL;
          }

          if ( oserr != DBNOERR )
          {
                    TMLog("DBLIB Error %s", oserrstr);
                    if ( pEcbInfo )
                    {
                              pEcbInfo->bFailed = TRUE;
                              bError = TRUE;
                    }

                    GetLocalTime(&systemTime);
                    fp = fopen(szErrorLogPath, "ab");

                    sprintf(szTmp, "ErrorHandler:
DBLIB(%d): %s", oserr, oserrstr);

                    TMLog("%2.2d/%2.2d/%2.2d
%2.2d:%2.2d:%2.2d\r\n\r\n%s\r\n\r\n",
                              systemTime.wYear,
systemTime.wMonth, systemTime.wDay,
                              systemTime.wHour,
systemTime.wMinute, systemTime.wSecond,
                              szTmp);

                    fclose(fp);
          }

          return INT_CANCEL;
}


/* FUNCTION: int msg_handler(DBPROCESS *dbproc, DBINT
msgno, int msgstate, int severity, char *msgtext)
 *
 * PURPOSE:         This function handles DB-Library
SQL Server error messages
```

```
 *
 * ARGUMENTS:       DBPROCESS           *dbproc
                    DBPROCESS id pointer
 *                                      DBINT
                    msgno
          message number
 *                                      int
                              msgstate
          message state
 *                                      int
                              severity
          message severity
 *                                      char
                    *msgtext            printable
message description
 *
 * RETURNS:                   int
                    INT_CONTINUE        continue if
error is SQLETIME else INT_CANCEL action
 *
                              INT_CANCEL
          cancel operation
 *
 * COMMENTS:        This function also sets the dead
lock dbproc variable if necessary.
 *
 */

int msg_handler(DBPROCESS *dbproc, DBINT msgno, int
msgstate, int severity, char *msgtext)
{
          PECBINFO
          pEcbInfo;
          EXTENSION_CONTROL_BLOCK       *pECB;
          FILE
          *fp;
          SYSTEMTIME
          systemTime;
          char
          szTmp[256];
          int
                    iTermId;
          int
                    iSyncId;

          if ( !(pEcbInfo =
(PECBINFO)dbgetuserdata(dbproc)) )
          {
                    pECB = gpECB;
                    iTermId = 0;
                    iSyncId = 0;
          }
          else
          {
                    pECB = pEcbInfo->pECB;
                    iTermId = pEcbInfo->iTermId;
                    iSyncId = pEcbInfo->iSyncId;
          }


          if ( (msgno == 5701) || (msgno == 2528) ||
(msgno == 5703) || (msgno == 6006) )
                    return INT_CONTINUE;

          // deadlock message
          if (msgno == 1205)
          {
                    // set the deadlock indicator
                    if ( pEcbInfo )
                              pEcbInfo->bDeadlock =
TRUE;
                    else
                              TMLog("Error,
dbgetuserdata returned NULL.");
                    return INT_CONTINUE;
          }
          if ( pEcbInfo && pEcbInfo->bFailed )
          {
                    TMLog("SQL Error ");
                    return INT_CANCEL;
          }

          if (msgno == 0)
                    return INT_CONTINUE;
          else
          {
                    TMLog("MsgHandler: SQL Error %s",
msgtext);

                    if ( pEcbInfo )
                              pEcbInfo->bFailed = TRUE;

                    bError = TRUE;

                    sprintf(szTmp, "Error: SQLSVR(%d):
%s", msgno, msgtext);

                    TMLog("%2.2d/%2.2d/%2.2d
%2.2d:%2.2d:%2.2d\r\n\r\n%s\r\n\r\n",
                              systemTime.wYear,
systemTime.wMonth, systemTime.wDay,
                              systemTime.wHour,
systemTime.wMinute, systemTime.wSecond,
                              szTmp);
          }
          return INT_CANCEL;
}


/* FUNCTION: BOOL GetParameters(int argc, char *argv[])
 *
 * PURPOSE:         This function parses the command
line passed in to the delivery executable, initializing
 *                  and filling in global
variable parameters.
 *
 * ARGUMENTS:       int                 argc
          number of command line arguments passed to
delivery
 *                                      char
          *argv[]   array of command line argument
pointers
 *
 * RETURNS:                   BOOL      FALSE
          parameter read successfull
 *
          TRUE      user has requested parameter
information screen be displayed.
 *
 * COMMENTS:        None
 *
 */

static BOOL GetParameters(int argc, char *argv[])
{
          int i;

          szServer[0]                   = 0;
          szPassword[0]       = 0;
          bFlush                        = FALSE;
          strcpy(szDatabase, "tpcc");
          strcpy(szUser, "sa");

          for(i=0; i<argc; i++)
          {
                    if ( argv[i][0] == '-' ||
argv[i][0] == '/' )
                    {
                              switch(argv[i][1])
                              {
                                        case 'S':
                                        case 's':

          strcpy(szServer, argv[i]+2);

          break;
                                        case 'V':
                                        case 'v':

          verbose = TRUE;

          break;
                                        case '?':

          return TRUE;
                              }
                    }
          }
          return FALSE;
}

/* FUNCTION: void PrintParameters(void)
 *
 * PURPOSE:         This function displays the
supported command line flags.
 *
 * ARGUMENTS:       None
 *
 * RETURNS:                   None
 *
 * COMMENTS:        None
 *
 */

static void PrintParameters(void)
{
          TMLog("Performance Tuning Corporation Tuxedo
Kit");
          TMLog("   www.perftuning.com   (281) 251-3495
");
          TMLog("NewOrder: -S Server [-v (verbose)]" );
          TMLog("NewOrder: Server %s", szServer);

}
```

Orderstatus.c

```
/*        FILE:               ORDERSTATUS.C
 *
 *        Based on: Microsoft TPC-C Kit Ver. 3.00.000
 *
 *                                  Copyright
Microsoft, 1996
 *                                  Copyright
Performance Tuning Corporation, 1997
 *
 *        PURPOSE:  New Order Tuxedo Server.
 *        Author:             Philip Durr
 *
          philipdu@Microsoft.com
 *
 *  MODIFIED        Changed for modularity and to allow
for the Tuxedo TM
 *
 *  Author:                   Edward Whalen
 *                                  Performance
Tuning Corporation
 *
          ewhalen@perftuning.com
 */

#include <windows.h>
#include <process.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 DBNTWIN32
#include <sqlfront.h>
#include <sqldb.h>

#include "trans.h"
                  //tpckit transaction header
contains definations of structures specific to TPC-C
#include "httpext.h"
                  //ISAPI DLL information header

#include "tpcc.h"
                  //this dlls specific structure,
value e.t. header.

#include <tmenv.h>
#include <xa.h>
#include <atmi.h>

BOOL      bLog                          = FALSE;
BOOL      bFlush;
                            //Flush delivery log info
when written.
BOOL      verbose                       = FALSE;
BOOL      bError                        = FALSE;

int                 iThreads            = 5;
int                 iMaxWareHouses      = 500;
int                 iDelayMs            = 100;
short     iMaxConnections = (short)1;
short     iDeadlockRetry      = (short)3;

DBPROCESS *pdbproc;

char
          szServer[32];
          //SQL server name
char
          szDatabase[32];
          //tpcc database name
char
          szUser[32];
                  //user name
char
          szPassword[32];
          //user password
int spId;

#ifdef LOCAL_ALLOC
ORDER_STATUS_DATA OrderStatusData;
#else
TUX_DATA TuxData;
#endif
TERM Term;

static char         szTpccLogPath[256]; //path to html
log file if logging turned on in registry.
static char szErrorLogPath[256];        //path to error
log file.

static    CRITICAL_SECTION
          CriticalSection;

static    CRITICAL_SECTION
          ErrorLogCriticalSection;
static    EXTENSION_CONTROL_BLOCK       *gpECB = NULL;
static    int
                  bTpccExit;          //exit delivery
disconnect loop as dll exiting.

extern void TMLog();
extern BOOL SQLInit();
extern void UtilStrCpy();
extern void UtilStrCpy();
extern BOOL SQLOpenConnection();
extern BOOL SQLCloseConnection();
extern BOOL SQLDetectDeadlock();

/* FUNCTION: tpsvrinit ( int argc, char *argv[])
 *
 * PURPOSE:          Initialize the Server to Database
connection.
 *
 * RETURNS:                    int       0
          Success
 *                                                    -1
          Failure
 *
 *
 * COMMENTS:         None
 *
 */

int tpsvrinit ( int argc, char *argv[] )
{

          if ( GetParameters(argc, argv) )
          {
                    PrintParameters();
                    return -1;
          }

          if ( verbose )
                    TMLog("TPSVRINIT: OrderStatus:
Server %s, Database %s, User %s, Password %s, Flush
%d.",
                              szServer, szDatabase,
szUser, szPassword, bFlush);


          if ( ! SQLInit() )
          {
                    TMLog( "ORDERSTATUS: SQLInit
Failed" );
                    return -1;
          }
          if ( SQLOpenConnection ( NULL, 0, 0,
&pdbproc, szServer, szDatabase, szUser, szPassword,
szDatabase, &spId))
          {
                    TMLog ( "ORDERSTATUS:
SQLOpenConnection Failed" );
                    dbexit();
                    return -1;
          }
          return 0;
}

/* FUNCTION: tpsvrdone ( void )
 *
 * PURPOSE:          Initialize the Server to Database
connection.
 *
 * RETURNS:                    int       0
          Success
 *                                                    -1
          Failure
 *
 *
 * COMMENTS:         None
 *
 */

void tpsvrdone ( void )
{
          SQLCloseConnection( NULL, pdbproc);
          dbexit();
}

/* FUNCTION: ORDERSTATUS ( TPSVCINFO *rqst )
 *
 * PURPOSE:          Process an Order Status request.
 *
 * RETURNS:                    int       0
          Success
 *                                                    -1
          Failure
 *
 *
 * COMMENTS:         None
 *
 */
```

```
void ORDERSTATUS ( TPSVCINFO *rqst )
{
          PECBINFO pECBInfo = dbgetuserdata(pdbproc);
          int size = rqst->len;

#ifdef LOCAL_ALLOC
          memcpy(&OrderStatusData, rqst->data, size);

          if (verbose )
          {
                    TMLog(" ORDERSTATUS: w_id %d ",
OrderStatusData.w_id);
                    TMLog(" ORDERSTATUS: d_id %d ",
OrderStatusData.d_id);
                    TMLog(" ORDERSTATUS: c_id %d ",
OrderStatusData.c_id);
          }

          bError = FALSE;

          OrderStatusData.retval = SQLOrderStatus(
NULL, 0, 0, pdbproc, &OrderStatusData, iDeadlockRetry);

          if (bError == TRUE)
                    OrderStatusData.retval = -1;

          if ( verbose )
                    TMLog(" ORDERSTATUS: Return Value
%d", OrderStatusData.retval);

          memcpy( rqst->data, &OrderStatusData, size);
#else
          memcpy(&TuxData, rqst->data, size);

          if (verbose )
          {
                    TMLog(" ORDERSTATUS: w_id %d ",
TuxData.OrderStatusData.w_id);
                    TMLog(" ORDERSTATUS: d_id %d ",
TuxData.OrderStatusData.d_id);
                    TMLog(" ORDERSTATUS: c_id %d ",
TuxData.OrderStatusData.c_id);
          }

          bError = FALSE;

          TuxData.OrderStatusData.retval =
SQLOrderStatus( NULL, 0, 0, pdbproc,
&TuxData.OrderStatusData, iDeadlockRetry);

          if (bError == TRUE)
                    TuxData.OrderStatusData.retval = -
1;

          if ( verbose )
                    TMLog(" ORDERSTATUS: Return Value
%d  error = %d",

          TuxData.OrderStatusData.retval,
TuxData.OrderStatusData.error);

          memcpy( rqst->data, &TuxData, size);
#endif
          tpreturn( TPSUCCESS, 0, rqst->data, size, 0);
}

/* FUNCTION: int SQLOrderStatus(EXTENSION_CONTROL_BLOCK
*pECB, int iTermId, int iSyncId, DBPROCESS *dbproc,
ORDER_STATUS_DATA *pOrderStatus, short deadlock_retry)
 *
 * PURPOSE:         This function processes the Order
Status transaction.
 *
 * ARGUMENTS:       EXTENSION_CONTROL_BLOCK       *pECB
                              passed in structure
pointer from inetsrv.
 *                                        int

          iTermId                         terminal id of
browser
 *                                        int

          iSyncId                         sync id of
browser
 *                                        DBPROCESS
                              *dbproc
          connection db process id
 *
          ORDER_STATUS_DATA               *pOrderStatus
          pointer to Order Status data input/output
structure
 *                                        short
                                          deadlock_retry
          deadlock retry count
 *
 * RETURNS:                  int         -1
          max deadlock reached
 *                                                  0
                    No orders found for customer
 *                                                  1
                    Transaction successfull
 *
 * COMMENTS:        None
 *
 */

static int SQLOrderStatus(EXTENSION_CONTROL_BLOCK
*pECB, int iTermId, int iSyncId, DBPROCESS *dbproc,
ORDER_STATUS_DATA *pOrderStatus, short deadlock_retry)
{
          RETCODE             rc;
          int                           tryit;
          int                           i;
          char                printbuf[25];
//        BOOL                by_name;
          DBDATETIME          datetime;
          BYTE                *pData;
          PECBINFO  pEcbInfo;

          if ( (pEcbInfo =
(PECBINFO)dbgetuserdata(dbproc)) )
          {
                    pEcbInfo->pECB = pECB;
                    pEcbInfo->bFailed = FALSE;
                    pEcbInfo->iTermId = iTermId;
                    pEcbInfo->iSyncId = iSyncId;
          }

          pOrderStatus->num_deadlocks = 0;
//        if (pOrderStatus->c_id == 0)
//                  by_name = TRUE;
//        else
//                  by_name = FALSE;

          for (tryit=0; tryit < deadlock_retry;
tryit++)
          {
                    if (dbrpcinit(dbproc,
"tpcc_orderstatus", 0) == SUCCEED)
                    {
                              dbrpcparam(dbproc, NULL,
0, SQLINT2, -1, -1, (BYTE *) &pOrderStatus->w_id);
                              dbrpcparam(dbproc, NULL,
0, SQLINT1, -1, -1, (BYTE *) &pOrderStatus->d_id);
                              dbrpcparam(dbproc, NULL,
0, SQLINT4, -1, -1, (BYTE *) &pOrderStatus->c_id);
                              if (pOrderStatus->c_id ==
0)
                              {


          dbrpcparam(dbproc, NULL, 0, SQLCHAR, -1,
strlen(pOrderStatus->c_last), pOrderStatus->c_last);
                              }
                    }
                    if (dbrpcexec(dbproc) == SUCCEED)
                    {
                              while (((rc =
dbresults(dbproc)) != NO_MORE_RESULTS) && (rc != FAIL))

                              {
                                                  if
(DBROWS(dbproc) && (dbnumcols(dbproc) == 5))
                                                  {
                                                            i=0;
                                                            while
(((rc = dbnextrow(dbproc)) != NO_MORE_ROWS) && (rc !=
FAIL))
                                                            {

          if(pData=dbdata(dbproc, 1))

                    pOrderStatus-
>OlOrderStatusData[i].ol_supply_w_id = (*(DBSMALLINT *)
pData);

          if(pData=dbdata(dbproc, 2))

                    pOrderStatus-
>OlOrderStatusData[i].ol_i_id = (*(DBINT *) pData);

          if(pData=dbdata(dbproc, 3))

                    pOrderStatus-
>OlOrderStatusData[i].ol_quantity = (*(DBSMALLINT *)
pData);

          if(pData=dbdata(dbproc, 4))

                    pOrderStatus-
>OlOrderStatusData[i].ol_amount = (*(DBFLT8 *) pData);

          if(pData=dbdata(dbproc, 5))

          {
```

```
                    datetime = *((DBDATETIME *) pData);

                    dbdatecrack(dbproc, &pOrderStatus-
>OlOrderStatusData[i].ol_delivery_d, &datetime);

          }

          i++;
                                                }

          pOrderStatus->o_ol_cnt = i;
                                      }

                                      else if
(DBROWS(dbproc) && (dbnumcols(dbproc) == 8))

                                      {
                                                while
(((rc = dbnextrow(dbproc)) != NO_MORE_ROWS) && (rc !=
FAIL))
                                                {

          if(pData=dbdata(dbproc, 1))

                    pOrderStatus->c_id = (*(DBINT *)
pData);

          if(pData=dbdata(dbproc, 2))

                    UtilStrCpy(pOrderStatus->c_last,
pData, dbdatlen(dbproc,2));

          if(pData=dbdata(dbproc, 3))

                    UtilStrCpy(pOrderStatus->c_first,
pData, dbdatlen(dbproc,3));

          if(pData=dbdata(dbproc, 4))

                    UtilStrCpy(pOrderStatus->c_middle,
pData, dbdatlen(dbproc, 4));

          if(pData=dbdata(dbproc, 5))

          {

                    datetime = *((DBDATETIME *) pData);

                    dbdatecrack(dbproc, &pOrderStatus-
>o_entry_d, &datetime);

          }

          if(pData=dbdata(dbproc, 6))

                    pOrderStatus->o_carrier_id =
(*(DBSMALLINT *) pData);

          if(pData=dbdata(dbproc, 7))

                    pOrderStatus->c_balance = (*(DBFLT8
*) pData);

          if(pData=dbdata(dbproc, 8))

                    pOrderStatus->o_id = (*(DBINT *)
pData);
                                                }
                                      }
                                      if (i==0)

          return 0; //"No orders found for customer"
                                }
                    }
                    if (SQLDetectDeadlock(dbproc))
                    {
                              pOrderStatus-
>num_deadlocks++;

          sprintf(printbuf,"deadlock: retry:
%d",pOrderStatus->num_deadlocks);

          Sleep(DEADLOCKWAIT*tryit);
                    }
                    else
                    {
                              if (pOrderStatus->c_id ==
0 && pOrderStatus->c_last[0] == 0)
                              {

          strcpy(pOrderStatus-
>execution_status,"Invalid Customer id,name.");
                                        pOrderStatus-
>error=ERR_NOSUCH_CUSTOMER;
                                        TMLog("
ORDERSTATUS: No such customer ");
                              }
                              else

          strcpy(pOrderStatus-
>execution_status,"Transaction commited.");
                                        return 1;
                              }
                    }
                    // If we reached here, it means we quit after
MAX_RETRY deadlocks
                    strcpy(pOrderStatus->execution_status,"Hit
deadlock max.  ");
                    pOrderStatus->error=ERR_TYPE_DEADLOCK;
                    return -1; //"deadlock max retry reached!"
}

/*
 *        Common Code for all Servers
 */

 /* FUNCTION: BOOL SQLInit()
 *
 * PURPOSE:          This function initializes SQL
Server for later use.
 *
 *
 * RETURNS:                    BOOL      FALSE     if
successfull
 *
          TRUE      if an error occurs and connection
cannot be established.
 *
 * COMMENTS:         None
 *
 */
BOOL SQLInit ()
{

          dbinit();

          if ( dbgetmaxprocs() < iMaxConnections )
          {
                    if ( dbsetmaxprocs(iMaxConnections)
== FAIL )
                    {
                              //set for fail error
message when HttpExtensionProc() is called because
                              //at this point we don't
have a pECB so no way to show error message.
                              iMaxConnections = -1;
                    }
          }

          // install error and message handlers
          dbmsghandle((DBMSGHANDLE_PROC)msg_handler);
          dberrhandle((DBERRHANDLE_PROC)err_handler);

          return TRUE;
}


/* FUNCTION: BOOL
SQLOpenConnection(EXTENSION_CONTROL_BLOCK
          *pECB, int iTermId, int iSyncId, DBPROCESS
**dbproc, char *server, char *database, char *user,
char *password, char *app, int *spid, long *pack_size)
 *
 * PURPOSE:          This function opens the sql
connection for use.
 *
 * ARGUMENTS:        EXTENSION_CONTROL_BLOCK       *pECB
          passed in structure pointer from inetsrv.
 *                                  int
                              iTermId
          terminal id of browser
 *                                  int
                              iSyncId             sync
id of browser
 *                                  DBPROCESS
          **dbproc  pointer to returned DBPROCESS
 *                                  char
                    *server             SQL server name
 *                                  char
                    *database SQL server database
 *                                  char
                    *user               user name
 *                                  char
                    *password user password
 *                                  char
                    *app                pointer to
returned application array
 *                                  int
                              *spid
          pointer to returned spid
 *                                  long
                    *pack_size          pointer to
returned default pack size
 *
 * RETURNS:                    BOOL      FALSE     if
successfull
```

```
 *
         TRUE      if an error occurs
 *
 * COMMENTS:       None
 *
 */


#ifdef USE_ODBC
         static BOOL
SQLOpenConnection(EXTENSION_CONTROL_BLOCK *pECB, int
iTermId, int iSyncId, DBPROCESS **dbproc, char *server,
char *database, char *user, char *password, char *app,
int *spid, long *pack_size)
         {

                   RETCODE   rc;
                   char      buffer[30];

                   *dbproc = (DBPROCESS
*)malloc(sizeof(DBPROCESS));
                   if ( !*dbproc )
                             return TRUE;

                   //set pECB data into dbproc
                   (*dbproc)->bDeadlock = FALSE;
                   (*dbproc)->bFailed = FALSE;
                   (*dbproc)->pECB = pECB;
                   (*dbproc)->iTermId = iTermId;
                   (*dbproc)->iSyncId = iSyncId;


                   if ( SQLAllocConnect(henv,
&(*dbproc)->hdbc) == SQL_ERROR )
                             return TRUE;

                   if ( SQLSetConnectOption((*dbproc)-
>hdbc, SQL_PACKET_SIZE, pack_size) == SQL_ERROR )
                             return TRUE;

                   rc = SQLConnect((*dbproc)->hdbc,
server, SQL_NTS, user, SQL_NTS, password, SQL_NTS);
                   if (rc != SQL_SUCCESS && rc !=
SQL_SUCCESS_WITH_INFO)
                             return TRUE;
                   rc = SQLAllocStmt((*dbproc)->hdbc,
&(*dbproc)->hstmt);
                   if (rc == SQL_ERROR)
                             return TRUE;

                   sprintf(buffer,"use %s", Client-
>database);

                   rc = SQLExecDirect((*dbproc)-
>hstmt, buffer, SQL_NTS);
                   if (rc != SQL_SUCCESS && rc !=
SQL_SUCCESS_WITH_INFO)
                             return TRUE;

                   SQLFreeStmt((*dbproc)->hstmt,
SQL_CLOSE);
                   sprintf(buffer,"set nocount on");
                   rc = SQLExecDirect((*dbproc)-
>hstmt, buffer, SQL_NTS);
                   if (rc != SQL_SUCCESS && rc !=
SQL_SUCCESS_WITH_INFO)
                             return TRUE;
                   SQLFreeStmt((*dbproc)->hstmt,
SQL_CLOSE);

                   sprintf(buffer,"select @@spid");

                   rc = SQLExecDirect((*dbproc)-
>hstmt, buffer, SQL_NTS);
                   if (rc != SQL_SUCCESS && rc !=
SQL_SUCCESS_WITH_INFO)
                             return TRUE;

                   if ( SQLBindCol((*dbproc)->hstmt,
1, SQL_C_SSHORT, &(*dbproc)->spid, 0, NULL) ==
SQL_ERROR )
                             return TRUE;


                   if ( SQLFetch((*dbproc)->hstmt) ==
SQL_ERROR )
                             return TRUE;

                   SQLFreeStmt((*dbproc)->hstmt,
SQL_CLOSE);

                   return FALSE;
         }

#else

         static BOOL
SQLOpenConnection(EXTENSION_CONTROL_BLOCK *pECB, int
iTermId, int iSyncId, DBPROCESS **dbproc, char *server,
char *database, char *user, char *password, char *app,
int *spid)
         {
                   LOGINREC  *login;
                   PECBINFO  pEcbInfo;

                   //set local msg proc for login
record
                   //attach pECB record

                   //this is necessary as dblib
provides no way to pass user data in a login structure.
So until
                   //there is an allocated dbproc we
need to use a static which means that the login attempt
must
                   //be serialized.

                   gpECB = pECB;

                   login = dblogin();
                   if ( !*user )
                             DBSETLUSER(login, "sa");
                   else
                             DBSETLUSER(login, user);

                   DBSETLPWD(login,  password);
                   DBSETLHOST(login, app);

//                 Do not set the packet size.  Use
the size set up in SQL Server.
//                 DBSETLPACKET(login, (unsigned
short)DEFCLPACKSIZE);

//                 This can potentially cut down on
data conversion
                   DBSETLVERSION(login, DBVER60);

                   if ((*dbproc = dbopen(login, server
)) == NULL)
                             return TRUE;

                   //set pECB data into dbproc
                   pEcbInfo =
(PECBINFO)malloc(sizeof(ECBINFO));
                   pEcbInfo->bDeadlock = FALSE;
                   pEcbInfo->pECB = pECB;
                   pEcbInfo->iTermId = iTermId;
                   pEcbInfo->iSyncId = iSyncId;
                   dbsetuserdata(*dbproc, pEcbInfo);

                   // Use the the right database
                   dbuse(*dbproc, database);

                   dbcmd(*dbproc, "select @@spid");

                   dbsqlexec(*dbproc);
                   while (dbresults(*dbproc) !=
NO_MORE_RESULTS)
                   {
                             dbbind(*dbproc, 1,
SMALLBIND, (DBINT) 0, (BYTE *) spid);
                             while (dbnextrow(*dbproc)
!= NO_MORE_ROWS)
                             ;
                   }
                   dbcmd(*dbproc, "set nocount on");
                   dbsqlexec(*dbproc);
                   while (dbresults(*dbproc) !=
NO_MORE_RESULTS)
                   {
                             while (dbnextrow(*dbproc)
!= NO_MORE_ROWS)
                             ;
                   }

                   //rollback transaction on abort
                   dbcmd(*dbproc, "set XACT_ABORT
ON");

                   dbsqlexec(*dbproc);
                   while (dbresults(*dbproc) !=
NO_MORE_RESULTS)
                   {
                             while (dbnextrow(*dbproc)
!= NO_MORE_ROWS)
                             ;
                   }

                   return FALSE;
         }

#endif

/* FUNCTION: BOOL
SQLCloseConnection(EXTENSION_CONTROL_BLOCK *pECB,
DBPROCESS *dbproc)
 *
```

```
 * PURPOSE:         This function closes the sql
connection.
 *
 * ARGUMENTS:       EXTENSION_CONTROL_BLOCK       *pECB
         passed in structure pointer from inetsrv.
 *                                  DBPROCESS
         *dbproc   pointer to DBPROCESS
 *
 * RETURNS:                  BOOL      FALSE     if
successfull
 *
         TRUE      if an error occurs
 *
 * COMMENTS:        None
 *
 */

#ifdef USE_ODBC
         static BOOL
SQLCloseConnection(EXTENSION_CONTROL_BLOCK *pECB,
DBPROCESS *dbproc)
         {
                  if ( dbproc )
                  {
                           SQLFreeStmt(dbproc-
>hstmt, SQL_DROP);
                           SQLDisconnect(dbproc-
>hdbc);
                           SQLFreeConnect(dbproc-
>hdbc);
                           free(dbproc);
                           dbproc = NULL;
                  }
                  return FALSE;
         }
#else
         static BOOL
SQLCloseConnection(EXTENSION_CONTROL_BLOCK *pECB,
DBPROCESS *dbproc)
         {
                  if (dbclose(dbproc) == FAIL)
                           return TRUE;
                  return FALSE;
         }
#endif

/* FUNCTION: BOOL SQLDetectDeadlock(DBPROCESS *dbproc)
 *
 * PURPOSE:         This function checks to see if a
sql server deadlock condition exists.
 *
 * ARGUMENTS:       DBPROCESS
         *dbproc                   connection db
process id to check
 *
 * RETURNS:                  BOOL      FALSE
         no deadlock detected
 *
         TRUE              deadlock condition exists
 *
 * COMMENTS:        None
 *
 */

BOOL SQLDetectDeadlock(DBPROCESS *dbproc)
{
         PECBINFO  pEcbInfo;

         if ( (pEcbInfo =
(PECBINFO)dbgetuserdata(dbproc)) )
         {
                  if ( pEcbInfo->bDeadlock )
                  {
                           pEcbInfo->bDeadlock =
FALSE;
                           return TRUE;
                  }
         }
         return FALSE;
}

// Lifted from HP FDR since they did such a nice job
void TMLog( char *format, ... )
{
         va_list args;
         char buf[4096];
         int len;
         va_start( args, format );
         _strtime( buf );
         strcat( buf," ");
         len = strlen( buf );
         (void)_vsnprintf( buf+ len, sizeof( buf) -
len - 1, format, args);
         buf[sizeof( buf )- 1]= '\0';
         va_end( args );
         userlog( buf );
}
```

```
/* FUNCTION: void UtilStrCpy(char *pDest, char *pSrc,
int n)
 *
 * PURPOSE:         This function copies n characters
from string pSrc to pDst and places a
 *                           null character at the end
of the destination string.
 *
 * ARGUMENTS:       char
         *pDest    destination string pointer
 *                                  char
                  *pSrc     source string pointer
 *                                  int
                           n
         number of characters to copy
 *
 * RETURNS:                  None
 *
 * COMMENTS:        Unlike strncpy this function
ensures that the result string is
 *                                  always null
terminated.
 *
 */

static void UtilStrCpy(char *pDest, char *pSrc, int n)
{
    strncpy(pDest, pSrc, n);
    pDest[n] = '\0';

         return;
}

/* FUNCTION: int err_handler(DBPROCESS *dbproc, int
severity, int dberr, int oserr, char *dberrstr, char
*oserrstr)
 *
 * PURPOSE:         This function handles DB-Library
errors
 *
 * ARGUMENTS:       DBPROCESS           *dbproc
                  DBPROCESS id pointer
 *                                  int
                           severity
         severity of error
 *                                  int
                           dberr
         error id
 *                                  int
                           oserr
         operating system specific error code
 *                                  char
                  *dberrstr           printable error
description of dberr
 *                                  char
                  *oserrstr           printable error
description of oserr
 *
 * RETURNS:                  int
                  INT_CONTINUE        continue if
error is SQLETIME else INT_CANCEL action
 *
 * COMMENTS:        None
 *
 */


int err_handler(DBPROCESS *dbproc, int severity, int
dberr, int oserr, char *dberrstr, char *oserrstr)
{
         PECBINFO
         pEcbInfo;
         EXTENSION_CONTROL_BLOCK       *pECB;
         FILE
         *fp;
         SYSTEMTIME
         systemTime;
         char
         szTmp[256];
         int
                  iTermId;
         int
                  iSyncId;

         pEcbInfo = NULL;

         if ((dbproc == NULL) || (DBDEAD(dbproc)))
         {
                  TMLog("DBPROC is invalid");
                  return INT_CANCEL;
         }

         if ( !(pEcbInfo =
(PECBINFO)dbgetuserdata(dbproc)) )
         {
                  pECB = gpECB;
                  iTermId = 0;
                  iSyncId = 0;
         }
```

```
        else
        {
                pECB = pEcbInfo->pECB;
                iTermId = pEcbInfo->iTermId;
                iSyncId = pEcbInfo->iSyncId;
        }

        if ( pEcbInfo && pEcbInfo->bFailed )
        {
                bError == FALSE;
                return INT_CANCEL;
        }

        if ( oserr != DBNOERR )
        {
                TMLog("DBLIB Error %s", oserrstr);
                if ( pEcbInfo )
                {
                        pEcbInfo->bFailed = TRUE;
                        bError = TRUE;
                }

                GetLocalTime(&systemTime);
                fp = fopen(szErrorLogPath, "ab");

                sprintf(szTmp, "ErrorHandler:
DBLIB(%d): %s", oserr, oserrstr);

                TMLog("%2.2d/%2.2d/%2.2d
%2.2d:%2.2d:%2.2d\r\n\r\n%s\r\n\r\n",
                        systemTime.wYear,
systemTime.wMonth, systemTime.wDay,
                        systemTime.wHour,
systemTime.wMinute, systemTime.wSecond,
                        szTmp);

                fclose(fp);
        }
        return INT_CANCEL;
}


/* FUNCTION: int msg_handler(DBPROCESS *dbproc, DBINT
msgno, int msgstate, int severity, char *msgtext)
 *
 * PURPOSE:         This function handles DB-Library
SQL Server error messages
 *
 * ARGUMENTS:       DBPROCESS           *dbproc
                    DBPROCESS id pointer
 *                                      DBINT
                    msgno
        message number
 *                                      int
                            msgstate
        message state
 *                                      int
                            severity
        message severity
 *                                      char
                    *msgtext            printable
message description
 *
 * RETURNS:                   int
                    INT_CONTINUE        continue if
error is SQLETIME else INT_CANCEL action
 *
                            INT_CANCEL
        cancel operation
 *
 * COMMENTS:        This function also sets the dead
lock dbproc variable if necessary.
 *
 */

int msg_handler(DBPROCESS *dbproc, DBINT msgno, int
msgstate, int severity, char *msgtext)
{
        PECBINFO
        pEcbInfo;
        EXTENSION_CONTROL_BLOCK       *pECB;
        FILE
        *fp;
        SYSTEMTIME
        systemTime;
        char
        szTmp[256];
        int
                iTermId;
        int
                iSyncId;

        if ( !(pEcbInfo =
(PECBINFO)dbgetuserdata(dbproc)) )
        {
                pECB = gpECB;
                iTermId = 0;
                iSyncId = 0;
        }
        else
        {
                pECB = pEcbInfo->pECB;
                iTermId = pEcbInfo->iTermId;
                iSyncId = pEcbInfo->iSyncId;
        }


        if ( (msgno == 5701) || (msgno == 2528) ||
(msgno == 5703) || (msgno == 6006) )
                return INT_CONTINUE;

        // deadlock message
        if (msgno == 1205)
        {
                // set the deadlock indicator
                if ( pEcbInfo )
                        pEcbInfo->bDeadlock =
TRUE;
                else
                        TMLog("Error,
dbgetuserdata returned NULL.");
                return INT_CONTINUE;
        }
        if ( pEcbInfo && pEcbInfo->bFailed )
        {
                TMLog("SQL Error ");
                return INT_CANCEL;
        }

        if (msgno == 0)
                return INT_CONTINUE;
        else
        {
                TMLog("MsgHandler: SQL Error %s",
msgtext);

                if ( pEcbInfo )
                        pEcbInfo->bFailed = TRUE;

                bError = TRUE;

                sprintf(szTmp, "Error: SQLSVR(%d):
%s", msgno, msgtext);

                TMLog("%2.2d/%2.2d/%2.2d
%2.2d:%2.2d:%2.2d\r\n\r\n%s\r\n\r\n",
                        systemTime.wYear,
systemTime.wMonth, systemTime.wDay,
                        systemTime.wHour,
systemTime.wMinute, systemTime.wSecond,
                        szTmp);
        }
        return INT_CANCEL;
}


/* FUNCTION: BOOL GetParameters(int argc, char *argv[])
 *
 * PURPOSE:         This function parses the command
line passed in to the delivery executable, initializing
 *                          and filling in global
variable parameters.
 *
 * ARGUMENTS:       int                 argc
        number of command line arguments passed to
delivery
 *                                      char
        *argv[]   array of command line argument
pointers
 *
 * RETURNS:                   BOOL      FALSE
        parameter read successfull
 *
        TRUE      user has requested parameter
information screen be displayed.
 *
 * COMMENTS:        None
 *
 */

static BOOL GetParameters(int argc, char *argv[])
{
        int i;


        szServer[0]                   = 0;
        szPassword[0]       = 0;
        bFlush                        = FALSE;
        strcpy(szDatabase, "tpcc");
        strcpy(szUser, "sa");

        for(i=0; i<argc; i++)
        {
                if ( argv[i][0] == '-' ||
argv[i][0] == '/' )
                {
                        switch(argv[i][1])
                        {
```

```
                                        case 'S':
                                        case 's':

                strcpy(szServer, argv[i]+2);

                break;
                                        case 'V':
                                        case 'v':

                verbose = TRUE;

                break;
                                        case '?':

                return TRUE;
                                }
                        }
                }
                return FALSE;
}

/* FUNCTION: void PrintParameters(void)
 *
 * PURPOSE:             This function displays the
supported command line flags.
 *
 * ARGUMENTS:           None
 *
 * RETURNS:                     None
 *
 * COMMENTS:            None
 *
 */

static void PrintParameters(void)
{
                TMLog("Performance Tuning Corporation Tuxedo
Kit");
                TMLog("   www.perftuning.com   (281) 251-3495
");
                TMLog("OrderStatus: -S Server  [-v
(verbose)]" );
                TMLog("OrderStatus: Server %s",
                szServer);

}
```

Payment.c

```
/*              FILE:               PAYMENT.C
 *
 *              Based on: Microsoft TPC-C Kit Ver. 3.00.000
 *
 *                                      Copyright
Microsoft, 1996
 *                                      Copyright
Performance Tuning Corporation, 1997
 *
 *              PURPOSE:  New Order Tuxedo Server.
 *              Author:             Philip Durr
 *
                philipdu@Microsoft.com
 *
 *  MODIFIED            Changed for modularity and to allow
for the Tuxedo TM
 *
 *  Author:                     Edward Whalen
 *                                      Performance
Tuning Corporation
 *
                ewhalen@perftuning.com
 */

#include <windows.h>
#include <process.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 DBNTWIN32
#include <sqlfront.h>
#include <sqldb.h>

#include "trans.h"
                        //tpckit transaction header
contains definations of structures specific to TPC-C
#include "httpext.h"
                        //ISAPI DLL information header

#include "tpcc.h"
                        //this dlls specific structure,
value e.t. header.

#include <tmenv.h>
#include <xa.h>
#include <atmi.h>

BOOL      bLog                          = FALSE;
BOOL      bFlush;
                                //Flush delivery log info
when written.
BOOL      verbose                       = FALSE;
BOOL      bError                        = FALSE;

int                 iThreads            = 5;
int                 iMaxWareHouses      = 500;
int                 iDelayMs            = 100;
short     iMaxConnections = (short)1;
short     iDeadlockRetry      = (short)3;

DBPROCESS *pdbproc;

char
          szServer[32];
          //SQL server name
char
          szDatabase[32];
          //tpcc database name
char
          szUser[32];
                  //user name
char
          szPassword[32];
          //user password
int spId;

#ifdef LOCAL_ALLOC
PAYMENT_DATA PaymentData;
#else
TUX_DATA TuxData;
#endif
TERM Term;

static char         szTpccLogPath[256]; //path to html
log file if logging turned on in registry.
static char szErrorLogPath[256];        //path to error
log file.

static    CRITICAL_SECTION
          CriticalSection;
static    CRITICAL_SECTION
          ErrorLogCriticalSection;
static    EXTENSION_CONTROL_BLOCK       *gpECB = NULL;
static    int
                  bTpccExit;          //exit delivery
disconnect loop as dll exiting.

extern void TMLog();
extern BOOL SQLInit();
extern void UtilStrCpy();
extern void UtilStrCpy();
extern BOOL SQLOpenConnection();
extern BOOL SQLCloseConnection();
extern BOOL SQLDetectDeadlock();

/* FUNCTION: tpsvrinit ( int argc, char *argv[])
 *
 * PURPOSE:             Initialize the Server to Database
connection.
 *
 * RETURNS:                     int       0
          Success
 *                                                    -1
          Failure
 *
 *
 * COMMENTS:            None
 *
 */

int tpsvrinit ( int argc, char *argv[] )
{

          if ( GetParameters(argc, argv) )
          {
                  PrintParameters();
                  return -1;
          }

          if ( verbose )
                  TMLog("TPSVRINIT: Payment: Server
%s, Database %s, User %s, Password %s, Flush %d.",
                          szServer, szDatabase,
szUser, szPassword, bFlush);


          if ( ! SQLInit() )
          {
```

```
                    TMLog( "PAYMENT: SQLInit Failed" );
                    return -1;
          }

          if ( SQLOpenConnection ( NULL, 0, 0,
&pdbproc, szServer, szDatabase, szUser, szPassword,
szDatabase, &spId))
          {
                    TMLog ( "PAYMENT: SQLOpenConnection
Failed" );
                    dbexit();
                    return -1;
          }
          return 0;
}

/* FUNCTION: tpsvrdone ( void )
 *
 * PURPOSE:          Initialize the Server to Database
connection.
 *
 * RETURNS:                    int       0
          Success
 *                                                    -1
          Failure
 *
 *
 * COMMENTS:         None
 *
 */

void tpsvrdone ( void )
{
          SQLCloseConnection( NULL, pdbproc);
          dbexit();
}

/* FUNCTION: PAYMENT ( TPSVCINFO *rqst )
 *
 * PURPOSE:          Process a Payment request.
 *
 * RETURNS:                    int       0
          Success
 *                                                    -1
          Failure
 *
 *
 * COMMENTS:         None
 *
 */

void PAYMENT ( TPSVCINFO *rqst )
{
          PECBINFO pECBInfo = dbgetuserdata(pdbproc);
          int size = rqst->len;

#ifdef LOCAL_ALLOC
          memcpy(&PaymentData, rqst->data, size);

          if (verbose )
          {
                    TMLog(" PAYMENT: w_id %d ",
PaymentData.w_id);
                    TMLog(" PAYMENT: d_id %d ",
PaymentData.d_id);
          }

          bError = FALSE;

          PaymentData.retval = SQLPayment( NULL, 0, 0,
pdbproc, &PaymentData, iDeadlockRetry);

          if (bError == TRUE)
                    PaymentData.retval = -1;

          if (verbose )
                    TMLog(" PAYMENT: Return Value %d",
PaymentData.retval);

          memcpy( rqst->data, &PaymentData, size);
#else
          memcpy(&TuxData, rqst->data, size);

          if (verbose )
          {
                    TMLog(" PAYMENT: w_id %d ",
TuxData.PaymentData.w_id);
                    TMLog(" PAYMENT: d_id %d ",
TuxData.PaymentData.d_id);
          }

          bError = FALSE;

          TuxData.PaymentData.retval = SQLPayment(
NULL, 0, 0, pdbproc, &TuxData.PaymentData,
iDeadlockRetry);

          if (bError == TRUE)
                    TuxData.PaymentData.retval = -1;

          if (verbose )
                    TMLog(" PAYMENT: Return Value %d
error %d", TuxData.PaymentData.retval,
TuxData.PaymentData.error);

          memcpy( rqst->data, &TuxData, size);
#endif
          tpreturn( TPSUCCESS, 0, rqst->data, size, 0);
}

/* FUNCTION: int SQLPayment(EXTENSION_CONTROL_BLOCK
*pECB, int iTermId, int iSyncId, DBPROCESS *dbproc,
PAYMENT_DATA *pPayment, short deadlock_retry)
 *
 * PURPOSE:          This function handles the payment
transaction.
 *
 * ARGUMENTS:        EXTENSION_CONTROL_BLOCK       *pECB
                              passed in structure
pointer from inetsrv.
 *                                        int
          iTermId                       terminal id of
browser
 *                                        int
          iSyncId                       sync id of
browser
 *                                        DBPROCESS
                              *dbproc
          connection db process id
 *                                        PAYMENT_DATA
                              *pPayment
          pointer to payment input/output data
structure
 *                                        short
                              deadlock_retry
          deadlock retry count
 *
 * RETURNS:                   int       TRUE
          success
 *                                                  -1
                              max deadlocked reached
 *
 * COMMENTS:         None
 *
 */

static int SQLPayment(EXTENSION_CONTROL_BLOCK *pECB,
int iTermId, int iSyncId, DBPROCESS *dbproc,
PAYMENT_DATA *pPayment, short deadlock_retry)
{
          RETCODE             rc;
          int                           tryit;
          char                printbuf[26];
//        BOOL                by_name;
          DBDATETIME          datetime;
          BYTE                *pData;
          PECBINFO  pEcbInfo;

          if ( (pEcbInfo =
(PECBINFO)dbgetuserdata(dbproc)) )
          {
                    pEcbInfo->pECB = pECB;
                    pEcbInfo->bFailed = FALSE;
                    pEcbInfo->iTermId = iTermId;
                    pEcbInfo->iSyncId = iSyncId;
          }

          pPayment->num_deadlocks = 0;

//        if (pPayment->c_id == 0)
//                  by_name = TRUE;
//        else
//                  by_name = FALSE;
//
          for (tryit=0; tryit < deadlock_retry;
tryit++)
          {
                    if (dbrpcinit(dbproc,
"tpcc_payment", 0) == SUCCEED)
                    {
                              dbrpcparam(dbproc, NULL,
0, SQLINT2, -1, -1, (BYTE *) &pPayment->w_id);
                              dbrpcparam(dbproc, NULL,
0, SQLINT2, -1, -1, (BYTE *) &pPayment->c_w_id);
                              dbrpcparam(dbproc, NULL,
0, SQLFLT8, -1, -1, (BYTE *) &pPayment->h_amount);
                              dbrpcparam(dbproc, NULL,
0, SQLINT1, -1, -1, (BYTE *) &pPayment->d_id);
                              dbrpcparam(dbproc, NULL,
0, SQLINT1, -1, -1, (BYTE *) &pPayment->c_d_id);
                              dbrpcparam(dbproc, NULL,
0, SQLINT4, -1, -1, (BYTE *) &pPayment->c_id);
                              if (pPayment->c_id == 0)
                              {
```

```
          dbrpcparam(dbproc, NULL, 0, SQLCHAR, -1,
strlen(pPayment->c_last), pPayment->c_last);
                              }
                    }
                    if (dbrpcexec(dbproc) == SUCCEED)
                    {
                              while (((rc =
dbresults(dbproc)) != NO_MORE_RESULTS) && (rc != FAIL))
                              {
                                        if
(DBROWS(dbproc) && (dbnumcols(dbproc) == 27))
                                        {
                                                  while
(((rc = dbnextrow(dbproc)) != NO_MORE_ROWS) && (rc !=
FAIL))
                                                  {

          if(pData=dbdata(dbproc, 1))

                    pPayment->c_id = *((DBINT *)
pData);

          if(pData=dbdata(dbproc, 2))

                    UtilStrCpy(pPayment->c_last, pData,
dbdatlen(dbproc, 2));

          if(pData=dbdata(dbproc, 3))

          {

                    datetime = *((DBDATETIME *) pData);

                    dbdatecrack(dbproc, &pPayment-
>h_date, &datetime);

          }

          if(pData=dbdata(dbproc, 4))

                    UtilStrCpy(pPayment->w_street_1,
pData, dbdatlen(dbproc, 4));

          if(pData=dbdata(dbproc, 5))

                    UtilStrCpy(pPayment->w_street_2,
pData, dbdatlen(dbproc, 5));

          if(pData=dbdata(dbproc, 6))

                    UtilStrCpy(pPayment->w_city, pData,
dbdatlen(dbproc, 6));

          if(pData=dbdata(dbproc, 7))

                    UtilStrCpy(pPayment->w_state,
pData, dbdatlen(dbproc, 7));

          if(pData=dbdata(dbproc, 8))

                    UtilStrCpy(pPayment->w_zip, pData,
dbdatlen(dbproc, 8));

          if(pData=dbdata(dbproc, 9))

                    UtilStrCpy(pPayment->d_street_1,
pData, dbdatlen(dbproc, 9));

          if(pData=dbdata(dbproc, 10))

                    UtilStrCpy(pPayment->d_street_2,
pData, dbdatlen(dbproc, 10));

          if(pData=dbdata(dbproc, 11))

                    UtilStrCpy(pPayment->d_city, pData,
dbdatlen(dbproc, 11));

          if(pData=dbdata(dbproc, 12))

                    UtilStrCpy(pPayment->d_state,
pData, dbdatlen(dbproc, 12));

          if(pData=dbdata(dbproc, 13))

                    UtilStrCpy(pPayment->d_zip, pData,
dbdatlen(dbproc, 13));

          if(pData=dbdata(dbproc, 14))

                    UtilStrCpy(pPayment->c_first,
pData, dbdatlen(dbproc, 14));

          if(pData=dbdata(dbproc, 15))

                    UtilStrCpy(pPayment->c_middle,
pData, dbdatlen(dbproc, 15));

          if(pData=dbdata(dbproc, 16))

                    UtilStrCpy(pPayment->c_street_1,
pData, dbdatlen(dbproc, 16));

          if(pData=dbdata(dbproc, 17))

                    UtilStrCpy(pPayment->c_street_2,
pData, dbdatlen(dbproc, 17));

          if(pData=dbdata(dbproc, 18))

                    UtilStrCpy(pPayment->c_city, pData,
dbdatlen(dbproc, 18));

          if(pData=dbdata(dbproc, 19))

                    UtilStrCpy(pPayment->c_state,
pData, dbdatlen(dbproc, 19));

          if(pData=dbdata(dbproc, 20))

                    UtilStrCpy(pPayment->c_zip, pData,
dbdatlen(dbproc, 20));

          if(pData=dbdata(dbproc, 21))

                    UtilStrCpy(pPayment->c_phone,
pData, dbdatlen(dbproc, 21));

          if(pData=dbdata(dbproc, 22))

          {

                    datetime = *((DBDATETIME *) pData);

                    dbdatecrack(dbproc, &pPayment-
>c_since, &datetime);

          }

          if(pData=dbdata(dbproc, 23))

                    UtilStrCpy(pPayment->c_credit,
pData, dbdatlen(dbproc, 23));

          if(pData=dbdata(dbproc, 24))

                    pPayment->c_credit_lim = (*(DBFLT8
*) pData);

          if(pData=dbdata(dbproc, 25))

                    pPayment->c_discount = (*(DBFLT8 *)
pData);

          if(pData=dbdata(dbproc, 26))

                    pPayment->c_balance = (*(DBFLT8 *)
pData);

          if(pData=dbdata(dbproc, 27))

                    UtilStrCpy(pPayment->c_data, pData,
dbdatlen(dbproc, 27));
                                                  }
                                        }
                              }
                    }
                    if (SQLDetectDeadlock(dbproc))
                    {
                              pPayment-
>num_deadlocks++;

          sprintf(printbuf,"deadlock: retry:
%d",pPayment->num_deadlocks);

          Sleep(DEADLOCKWAIT*tryit);
                    }
                    else
                    {
                              if ( pPayment->c_id == 0
)
                              {

          strcpy(pPayment->execution_status,"Invalid
Customer id,name.");
                                        pPayment-
>error=ERR_NOSUCH_CUSTOMER;
                                        TMLog("
PAYMENT: No such customer ");
                                        return 0;
                              }
                              else

          strcpy(pPayment-
>execution_status,"Transaction commited.");
                              return TRUE;
```

```
                }
        }
        // If we reached here, it means we quit after
MAX_RETRY deadlocks
        strcpy(pPayment->execution_status,"Hit
deadlock max.  ");
        pPayment->error=ERR_TYPE_DEADLOCK;
        return -1; //"deadlock max retry reached!"
}


/*
 *      Common Code for all Servers
 */

 /* FUNCTION: BOOL SQLInit()
 *
 * PURPOSE:         This function initializes SQL
Server for later use.
 *
 *
 * RETURNS:                 BOOL      FALSE     if
successfull
 *
        TRUE      if an error occurs and connection
cannot be established.
 *
 * COMMENTS:        None
 *
 */
BOOL SQLInit ()
{

        dbinit();

        if ( dbgetmaxprocs() < iMaxConnections )
        {
                if ( dbsetmaxprocs(iMaxConnections)
== FAIL )
                {
                        //set for fail error
message when HttpExtensionProc() is called because
                        //at this point we don't
have a pECB so no way to show error message.
                        iMaxConnections = -1;
                }
        }

        // install error and message handlers
        dbmsghandle((DBMSGHANDLE_PROC)msg_handler);
        dberrhandle((DBERRHANDLE_PROC)err_handler);

        return TRUE;
}


/* FUNCTION: BOOL
SQLOpenConnection(EXTENSION_CONTROL_BLOCK
        *pECB, int iTermId, int iSyncId, DBPROCESS
**dbproc, char *server, char *database, char *user,
char *password, char *app, int *spid, long *pack_size)
 *
 * PURPOSE:         This function opens the sql
connection for use.
 *
 * ARGUMENTS:       EXTENSION_CONTROL_BLOCK       *pECB
        passed in structure pointer from inetsrv.
 *                              int
                        iTermId
        terminal id of browser
 *                              int
                        iSyncId             sync
id of browser
 *                              DBPROCESS
        **dbproc  pointer to returned DBPROCESS
 *                              char
                *server             SQL server name
 *                              char
                *database SQL server database
 *                              char
                *user               user name
 *                              char
                *password user password
 *                              char
                *app                pointer to
returned application array
 *                              int
                        *spid
        pointer to returned spid
 *                              long
                *pack_size          pointer to
returned default pack size
 *
 * RETURNS:                 BOOL      FALSE     if
successfull
 *
        TRUE      if an error occurs
 *
 * COMMENTS:        None
 *
 */


#ifdef USE_ODBC
        static BOOL
SQLOpenConnection(EXTENSION_CONTROL_BLOCK *pECB, int
iTermId, int iSyncId, DBPROCESS **dbproc, char *server,
char *database, char *user, char *password, char *app,
int *spid, long *pack_size)
        {

                RETCODE   rc;
                char      buffer[30];

                *dbproc = (DBPROCESS
*)malloc(sizeof(DBPROCESS));
                if ( !*dbproc )
                        return TRUE;

                //set pECB data into dbproc
                (*dbproc)->bDeadlock = FALSE;
                (*dbproc)->bFailed = FALSE;
                (*dbproc)->pECB = pECB;
                (*dbproc)->iTermId = iTermId;
                (*dbproc)->iSyncId = iSyncId;


                if ( SQLAllocConnect(henv,
&(*dbproc)->hdbc) == SQL_ERROR )
                        return TRUE;

                if ( SQLSetConnectOption((*dbproc)-
>hdbc, SQL_PACKET_SIZE, pack_size) == SQL_ERROR )
                        return TRUE;

                rc = SQLConnect((*dbproc)->hdbc,
server, SQL_NTS, user, SQL_NTS, password, SQL_NTS);
                if (rc != SQL_SUCCESS && rc !=
SQL_SUCCESS_WITH_INFO)
                        return TRUE;
                rc = SQLAllocStmt((*dbproc)->hdbc,
&(*dbproc)->hstmt);
                if (rc == SQL_ERROR)
                        return TRUE;

                sprintf(buffer,"use %s", Client-
>database);

                rc = SQLExecDirect((*dbproc)-
>hstmt, buffer, SQL_NTS);
                if (rc != SQL_SUCCESS && rc !=
SQL_SUCCESS_WITH_INFO)
                        return TRUE;

                SQLFreeStmt((*dbproc)->hstmt,
SQL_CLOSE);
                sprintf(buffer,"set nocount on");
                rc = SQLExecDirect((*dbproc)-
>hstmt, buffer, SQL_NTS);
                if (rc != SQL_SUCCESS && rc !=
SQL_SUCCESS_WITH_INFO)
                        return TRUE;
                SQLFreeStmt((*dbproc)->hstmt,
SQL_CLOSE);

                sprintf(buffer,"select @@spid");

                rc = SQLExecDirect((*dbproc)-
>hstmt, buffer, SQL_NTS);
                if (rc != SQL_SUCCESS && rc !=
SQL_SUCCESS_WITH_INFO)
                        return TRUE;

                if ( SQLBindCol((*dbproc)->hstmt,
1, SQL_C_SSHORT, &(*dbproc)->spid, 0, NULL) ==
SQL_ERROR )
                        return TRUE;


                if ( SQLFetch((*dbproc)->hstmt) ==
SQL_ERROR )
                        return TRUE;

                SQLFreeStmt((*dbproc)->hstmt,
SQL_CLOSE);

                return FALSE;
        }

#else

        static BOOL
SQLOpenConnection(EXTENSION_CONTROL_BLOCK *pECB, int
iTermId, int iSyncId, DBPROCESS **dbproc, char *server,
char *database, char *user, char *password, char *app,
int *spid)
        {
                LOGINREC  *login;
```

```
                    PECBINFO  pEcbInfo;

                    //set local msg proc for login
record
                    //attach pECB record

                    //this is necessary as dblib
provides no way to pass user data in a login structure.
So until
                    //there is an allocated dbproc we
need to use a static which means that the login attempt
must
                    //be serialized.

                    gpECB = pECB;

                    login = dblogin();
                    if ( !*user )
                              DBSETLUSER(login, "sa");
                    else
                              DBSETLUSER(login, user);

                    DBSETLPWD(login,  password);
                    DBSETLHOST(login, app);

//                  Do not set the packet size.  Use
the size set up in SQL Server.
//                  DBSETLPACKET(login, (unsigned
short)DEFCLPACKSIZE);

//                  This can potentially cut down on
data conversion
                    DBSETLVERSION(login, DBVER60);

                    if ((*dbproc = dbopen(login, server
)) == NULL)
                              return TRUE;


                    //set pECB data into dbproc
                    pEcbInfo =
(PECBINFO)malloc(sizeof(ECBINFO));
                    pEcbInfo->bDeadlock = FALSE;
                    pEcbInfo->pECB = pECB;
                    pEcbInfo->iTermId = iTermId;
                    pEcbInfo->iSyncId = iSyncId;
                    dbsetuserdata(*dbproc, pEcbInfo);


                    // Use the the right database
                    dbuse(*dbproc, database);


                    dbcmd(*dbproc, "select @@spid");


                    dbsqlexec(*dbproc);
                    while (dbresults(*dbproc) !=
NO_MORE_RESULTS)
                    {
                              dbbind(*dbproc, 1,
SMALLBIND, (DBINT) 0, (BYTE *) spid);
                              while (dbnextrow(*dbproc)
!= NO_MORE_ROWS)
                              ;
                    }
                    dbcmd(*dbproc, "set nocount on");

                    dbsqlexec(*dbproc);
                    while (dbresults(*dbproc) !=
NO_MORE_RESULTS)
                    {
                              while (dbnextrow(*dbproc)
!= NO_MORE_ROWS)
                              ;
                    }

                    //rollback transaction on abort
                    dbcmd(*dbproc, "set XACT_ABORT
ON");

                    dbsqlexec(*dbproc);
                    while (dbresults(*dbproc) !=
NO_MORE_RESULTS)
                    {
                              while (dbnextrow(*dbproc)
!= NO_MORE_ROWS)
                              ;
                    }

                    return FALSE;
          }

#endif

/* FUNCTION: BOOL
SQLCloseConnection(EXTENSION_CONTROL_BLOCK *pECB,
DBPROCESS *dbproc)
 *
 * PURPOSE:         This function closes the sql
connection.
 *
 * ARGUMENTS:       EXTENSION_CONTROL_BLOCK       *pECB
          passed in structure pointer from inetsrv.
 *                                  DBPROCESS
          *dbproc   pointer to DBPROCESS
 *
 * RETURNS:                   BOOL      FALSE     if
successfull
 *
          TRUE      if an error occurs
 *
 * COMMENTS:        None
 *
 */

#ifdef USE_ODBC
          static BOOL
SQLCloseConnection(EXTENSION_CONTROL_BLOCK *pECB,
DBPROCESS *dbproc)
          {
                    if ( dbproc )
                    {
                              SQLFreeStmt(dbproc-
>hstmt, SQL_DROP);
                              SQLDisconnect(dbproc-
>hdbc);
                              SQLFreeConnect(dbproc-
>hdbc);
                              free(dbproc);
                              dbproc = NULL;
                    }
                    return FALSE;
          }
#else
          static BOOL
SQLCloseConnection(EXTENSION_CONTROL_BLOCK *pECB,
DBPROCESS *dbproc)
          {
                    if (dbclose(dbproc) == FAIL)
                              return TRUE;
                    return FALSE;
          }
#endif

/* FUNCTION: BOOL SQLDetectDeadlock(DBPROCESS *dbproc)
 *
 * PURPOSE:         This function checks to see if a
sql server deadlock condition exists.
 *
 * ARGUMENTS:       DBPROCESS
          *dbproc                         connection db
process id to check
 *
 * RETURNS:                   BOOL      FALSE
          no deadlock detected
 *
          TRUE                deadlock condition exists
 *
 * COMMENTS:        None
 *
 */

BOOL SQLDetectDeadlock(DBPROCESS *dbproc)
{
          PECBINFO  pEcbInfo;

          if ( (pEcbInfo =
(PECBINFO)dbgetuserdata(dbproc)) )
          {
                    if ( pEcbInfo->bDeadlock )
                    {
                              pEcbInfo->bDeadlock =
FALSE;
                              return TRUE;
                    }
          }
          return FALSE;
}

// Lifted from HP FDR since they did such a nice job
void TMLog( char *format, ... )
{
          va_list args;
          char buf[4096];
          int len;
          va_start( args, format );
          _strtime( buf );
          strcat( buf," ");
          len = strlen( buf );
          (void)_vsnprintf( buf+ len, sizeof( buf) -
len - 1, format, args);
          buf[sizeof( buf )- 1]= '\0';
          va_end( args );
          userlog( buf );
}
```

```
/* FUNCTION: void UtilStrCpy(char *pDest, char *pSrc,
int n)
 *
 * PURPOSE:         This function copies n characters
from string pSrc to pDst and places a
 *                              null character at the end
of the destination string.
 *
 * ARGUMENTS:       char
          *pDest    destination string pointer
 *                                    char
                    *pSrc     source string pointer
 *                                  int
                              n
          number of characters to copy
 *
 * RETURNS:                   None
 *
 * COMMENTS:        Unlike strncpy this function
ensures that the result string is
 *                                  always null
terminated.
 *
 */

static void UtilStrCpy(char *pDest, char *pSrc, int n)
{
    strncpy(pDest, pSrc, n);
    pDest[n] = '\0';

          return;
}

/* FUNCTION: int err_handler(DBPROCESS *dbproc, int
severity, int dberr, int oserr, char *dberrstr, char
*oserrstr)
 *
 * PURPOSE:         This function handles DB-Library
errors
 *
 * ARGUMENTS:       DBPROCESS           *dbproc
                    DBPROCESS id pointer
 *                                  int
                              severity
          severity of error
 *                                  int
                              dberr
          error id
 *                                  int
                              oserr
          operating system specific error code
 *                                  char
                    *dberrstr           printable error
description of dberr
 *                                  char
                    *oserrstr           printable error
description of oserr
 *
 * RETURNS:                   int
                    INT_CONTINUE        continue if
error is SQLETIME else INT_CANCEL action
 *
 * COMMENTS:        None
 *
 */


int err_handler(DBPROCESS *dbproc, int severity, int
dberr, int oserr, char *dberrstr, char *oserrstr)
{
          PECBINFO
          pEcbInfo;
          EXTENSION_CONTROL_BLOCK       *pECB;
          FILE
          *fp;
          SYSTEMTIME
          systemTime;
          char
          szTmp[256];
          int
                    iTermId;
          int
                    iSyncId;

          pEcbInfo = NULL;

          if ((dbproc == NULL) || (DBDEAD(dbproc)))
          {
                    TMLog("DBPROC is invalid");
                    return INT_CANCEL;
          }

          if ( !(pEcbInfo =
(PECBINFO)dbgetuserdata(dbproc)) )
          {
                    pECB = gpECB;
                    iTermId = 0;
                    iSyncId = 0;
          }
          else
          {
                    pECB = pEcbInfo->pECB;
                    iTermId = pEcbInfo->iTermId;
                    iSyncId = pEcbInfo->iSyncId;
          }

          if ( pEcbInfo && pEcbInfo->bFailed )
          {
                    bError == FALSE;
                    return INT_CANCEL;
          }

          if ( oserr != DBNOERR )
          {
                    TMLog("DBLIB Error %s", oserrstr);
                    if ( pEcbInfo )
                    {
                              pEcbInfo->bFailed = TRUE;
                              bError = TRUE;
                    }

                    GetLocalTime(&systemTime);
                    fp = fopen(szErrorLogPath, "ab");

                    sprintf(szTmp, "ErrorHandler:
DBLIB(%d): %s", oserr, oserrstr);

                    TMLog("%2.2d/%2.2d/%2.2d
%2.2d:%2.2d:%2.2d\r\n\r\n%s\r\n\r\n",
                              systemTime.wYear,
systemTime.wMonth, systemTime.wDay,
                              systemTime.wHour,
systemTime.wMinute, systemTime.wSecond,
                              szTmp);

                    fclose(fp);
          }

          return INT_CANCEL;
}


/* FUNCTION: int msg_handler(DBPROCESS *dbproc, DBINT
msgno, int msgstate, int severity, char *msgtext)
 *
 * PURPOSE:         This function handles DB-Library
SQL Server error messages
 *
 * ARGUMENTS:       DBPROCESS           *dbproc
                    DBPROCESS id pointer
 *                                  DBINT
                    msgno
          message number
 *                                  int
                              msgstate
          message state
 *                                  int
                              severity
          message severity
 *                                  char
                    *msgtext            printable
message description
 *
 * RETURNS:                   int
                    INT_CONTINUE        continue if
error is SQLETIME else INT_CANCEL action
 *
                              INT_CANCEL
          cancel operation
 *
 * COMMENTS:        This function also sets the dead
lock dbproc variable if necessary.
 *
 */

int msg_handler(DBPROCESS *dbproc, DBINT msgno, int
msgstate, int severity, char *msgtext)
{
          PECBINFO
          pEcbInfo;
          EXTENSION_CONTROL_BLOCK       *pECB;
          FILE
          *fp;
          SYSTEMTIME
          systemTime;
          char
          szTmp[256];
          int
                    iTermId;
          int
                    iSyncId;

          if ( !(pEcbInfo =
(PECBINFO)dbgetuserdata(dbproc)) )
          {
                    pECB = gpECB;
                    iTermId = 0;
                    iSyncId = 0;
```

```
        }
        else
        {
                pECB = pEcbInfo->pECB;
                iTermId = pEcbInfo->iTermId;
                iSyncId = pEcbInfo->iSyncId;
        }


        if ( (msgno == 5701) || (msgno == 2528) ||
(msgno == 5703) || (msgno == 6006) )
                return INT_CONTINUE;

        // deadlock message
        if (msgno == 1205)
        {
                // set the deadlock indicator
                if ( pEcbInfo )
                        pEcbInfo->bDeadlock =
TRUE;
                else
                        TMLog("Error,
dbgetuserdata returned NULL.");
                return INT_CONTINUE;
        }
        if ( pEcbInfo && pEcbInfo->bFailed )
        {
                TMLog("SQL Error ");
                return INT_CANCEL;
        }

        if (msgno == 0)
                return INT_CONTINUE;
        else
        {
                TMLog("MsgHandler: SQL Error %s",
msgtext);

                if ( pEcbInfo )
                        pEcbInfo->bFailed = TRUE;

                bError = TRUE;

                sprintf(szTmp, "Error: SQLSVR(%d):
%s", msgno, msgtext);

                TMLog("%2.2d/%2.2d/%2.2d
%2.2d:%2.2d:%2.2d\r\n\r\n%s\r\n\r\n",
                        systemTime.wYear,
systemTime.wMonth, systemTime.wDay,
                        systemTime.wHour,
systemTime.wMinute, systemTime.wSecond,
                        szTmp);
        }
        return INT_CANCEL;
}

/* FUNCTION: BOOL GetParameters(int argc, char *argv[])
 *
 * PURPOSE:         This function parses the command
line passed in to the delivery executable, initializing
 *                  and filling in global
variable parameters.
 *
 * ARGUMENTS:       int             argc
        number of command line arguments passed to
delivery
 *                                  char
        *argv[]   array of command line argument
pointers
 *
 * RETURNS:                 BOOL      FALSE
        parameter read successfull
 *
        TRUE      user has requested parameter
information screen be displayed.
 *
 * COMMENTS:        None
 *
 */

static BOOL GetParameters(int argc, char *argv[])
{
        int i;


        szServer[0]                     = 0;
        szPassword[0]       = 0;
        bFlush                          = FALSE;
        strcpy(szDatabase, "tpcc");
        strcpy(szUser, "sa");

        for(i=0; i<argc; i++)
        {
                if ( argv[i][0] == '-' ||
argv[i][0] == '/' )
                {
                        switch(argv[i][1])
                        {
                                        case 'S':
                                        case 's':

                strcpy(szServer, argv[i]+2);

                break;
                                        case 'V':
                                        case 'v':

                verbose = TRUE;

                break;
                                        case '?':

                return TRUE;
                                }
                        }
                }
                return FALSE;
}

/* FUNCTION: void PrintParameters(void)
 *
 * PURPOSE:         This function displays the
supported command line flags.
 *
 * ARGUMENTS:       None
 *
 * RETURNS:                 None
 *
 * COMMENTS:        None
 *
 */

static void PrintParameters(void)
{
        TMLog("Performance Tuning Corporation Tuxedo
Kit");
        TMLog("   www.perftuning.com   (281) 251-3495
");
        TMLog("Payment: -S Server  [-v (verbose)]" );
        TMLog("Payment: Server %s",   szServer);

}
```

Resource.h

```
//{{NO_DEPENDENCIES}}
// Microsoft Developer Studio generated include file.
// Used by TPCC.rc
//

// Next default values for new objects
//
#ifdef APSTUDIO_INVOKED
#ifndef APSTUDIO_READONLY_SYMBOLS
#define _APS_NEXT_RESOURCE_VALUE        101
#define _APS_NEXT_COMMAND_VALUE         40001
#define _APS_NEXT_CONTROL_VALUE         1000
#define _APS_NEXT_SYMED_VALUE           101
#endif
#endif
```

Stocklevel.c

```
/*        FILE:             STOCKLEVEL.C
 *
 *        Based on: Microsoft TPC-C Kit Ver. 3.00.000
 *
 *                                  Copyright
Microsoft, 1996
 *                                  Copyright
Performance Tuning Corporation, 1997
 *
 *        PURPOSE:  New Order Tuxedo Server.
 *        Author:           Philip Durr
 *
        philipdu@Microsoft.com
 *
 *  MODIFIED        Changed for modularity and to allow
for the Tuxedo TM
 *
 *  Author:                 Edward Whalen
 *                                  Performance
Tuning Corporation
 *
        ewhalen@perftuning.com
 */

#include <windows.h>
#include <process.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 DBNTWIN32
#include <sqlfront.h>
#include <sqldb.h>

#include "trans.h"
                    //tpckit transaction header
contains defination of structures specific to TPC-C
#include "httpext.h"
                    //ISAPI DLL information header

#include "tpcc.h"
                    //this dlls specific structure,
value e.t. header.

#include <tmenv.h>
#include <xa.h>
#include <atmi.h>

BOOL      bLog                          = FALSE;
BOOL      bFlush;
                              //Flush delivery log info
when written.
BOOL      verbose                       = FALSE;
BOOL      bError                        = FALSE;

int                 iThreads            = 5;
int                 iMaxWareHouses      = 500;
int                 iDelayMs            = 100;
short     iMaxConnections = (short)1;
short     iDeadlockRetry      = (short)3;

DBPROCESS *pdbproc;

char
          szServer[32];
          //SQL server name
char
          szDatabase[32];
          //tpcc database name
char
          szUser[32];
                    //user name
char
          szPassword[32];
          //user password
int spId;

#ifdef LOCAL_ALLOC
STOCK_LEVEL_DATA StockLevelData;
#else
TUX_DATA TuxData;
#endif
TERM Term;

static char         szTpccLogPath[256]; //path to html
log file if logging turned on in registry.
static char szErrorLogPath[256];        //path to error
log file.

static    CRITICAL_SECTION
          CriticalSection;
static    CRITICAL_SECTION
          ErrorLogCriticalSection;
static    EXTENSION_CONTROL_BLOCK       *gpECB = NULL;
static    int
                    bTpccExit;          //exit delivery
disconnect loop as dll exiting.

extern void TMLog();
extern BOOL SQLInit();
extern void UtilStrCpy();
extern void UtilStrCpy();
extern BOOL SQLOpenConnection();
extern BOOL SQLCloseConnection();
extern BOOL SQLDetectDeadlock();

/* FUNCTION: tpsvrinit ( int argc, char *argv[])
 *
 * PURPOSE:         Initialize the Server to Database
connection.
 *
 * RETURNS:                   int       0
          Success
 *                                                -1
          Failure
 *
 *
 * COMMENTS:        None
 *
 */

int tpsvrinit ( int argc, char *argv[] )
{
          if ( GetParameters(argc, argv) )
          {
                    PrintParameters();
                    return -1;
          }

          if ( verbose )
                    TMLog("TPSVRINIT: StockLevel:
Server %s, Database %s, User %s, Password %s, Flush
%d.",
                              szServer, szDatabase,
szUser, szPassword, bFlush);


          if ( ! SQLInit() )
          {
                    TMLog( "STOCKLEVEL: SQLInit Failed"
);
                    return -1;
          }

          if ( SQLOpenConnection ( NULL, 0, 0,
&pdbproc, szServer, szDatabase, szUser, szPassword,
szDatabase, &spId))
          {
                    TMLog ( "STOCKLEVEL:
SQLOpenConnection Failed" );
                    dbexit();
                    return -1;
          }
          return 0;
}

/* FUNCTION: tpsvrdone ( void )
 *
 * PURPOSE:         Initialize the Server to Database
connection.
 *
 * RETURNS:                   int       0
          Success
 *                                                -1
          Failure
 *
 *
 * COMMENTS:        None
 *
 */

void tpsvrdone ( void )
{
          SQLCloseConnection( NULL, pdbproc);
          dbexit();
}


/* FUNCTION: STOCKLEVEL ( TPSVCINFO *rqst )
 *
 * PURPOSE:         Process a Stock Level request.
 *
 * RETURNS:                   int       0
          Success
 *                                                -1
          Failure
 *
 *
 * COMMENTS:        None
 *
 */

void STOCKLEVEL ( TPSVCINFO *rqst )
{
          PECBINFO pECBInfo = dbgetuserdata(pdbproc);
          int size = rqst->len;

#ifdef LOCAL_ALLOC
          memcpy(&StockLevelData, rqst->data, size);

          if (verbose )
          {
                    TMLog(" STOCKLEVEL: w_id %d ",
StockLevelData.w_id);
                    TMLog(" STOCKLEVEL: d_id %d ",
StockLevelData.d_id);
                    TMLog(" STOCKLEVEL: c_id %d ",
StockLevelData.thresh_hold);
          }

          bError = FALSE;

          StockLevelData.retval = SQLStockLevel( NULL,
0, 0, pdbproc, &StockLevelData, iDeadlockRetry);


          if (bError == TRUE)
                    StockLevelData.retval = -1;

          if ( verbose )
```

```
                    TMLog(" STOCKLEVEL: Return Value
%d", StockLevelData.retval);

          memcpy( rqst->data, &StockLevelData, size);
#else
          memcpy(&TuxData, rqst->data, size);

          if (verbose )
          {
                    TMLog(" STOCKLEVEL: w_id %d ",
TuxData.StockLevelData.w_id);
                    TMLog(" STOCKLEVEL: d_id %d ",
TuxData.StockLevelData.d_id);
                    TMLog(" STOCKLEVEL: c_id %d ",
TuxData.StockLevelData.thresh_hold);
          }

          bError = FALSE;

          TuxData.StockLevelData.retval =
SQLStockLevel( NULL, 0, 0, pdbproc,
&TuxData.StockLevelData, iDeadlockRetry);


          if (bError == TRUE)
                    TuxData.StockLevelData.retval = -1;

          if ( verbose )
                    TMLog(" STOCKLEVEL: Return Value
%d", TuxData.StockLevelData.retval);

          memcpy( rqst->data, &TuxData, size);
#endif
          tpreturn( TPSUCCESS, 0, rqst->data, size, 0);
}

/* FUNCTION: SQLStockLevel(EXTENSION_CONTROL_BLOCK
          *pECB, int iTermId, int iSyncId, DBPROCESS
*dbproc, STOCK_LEVEL_DATA *pStockLevel, short
deadlock_retry)
 *
 * PURPOSE:          This function handles the stock
level transaction.
 *
 * ARGUMENTS:        EXTENSION_CONTROL_BLOCK       *pECB
                              passed in structure
pointer from inetsrv.
 *                                    int

          iTermId                   terminal id of
browser
 *                                    int

          iSyncId                   sync id of
browser
 *                                    DBPROCESS
                              *dbproc
          connection db process id
 *
          STOCK_LEVEL_DATA          *pStockLevel
          stock level input / output data structure
 *                                    short
                                    deadlock_retry
          retry count if deadlocked
 *
 * RETURNS:                  BOOL      FALSE
          if successfull
 *
          TRUE                if deadlocked
 *
 * COMMENTS:         None
 *
 */

static BOOL SQLStockLevel(EXTENSION_CONTROL_BLOCK
*pECB, int iTermId, int iSyncId, DBPROCESS *dbproc,
STOCK_LEVEL_DATA *pStockLevel, short deadlock_retry)
{
          int                       tryit;
          RETCODE             rc;
          char                printbuf[25];
          BYTE                *pData;
          PECBINFO  pEcbInfo;

          //update pECB and bFailed flag
          if ( (pEcbInfo =
(PECBINFO)dbgetuserdata(dbproc)) )
          {
                    pEcbInfo->pECB = pECB;
                    pEcbInfo->bFailed = FALSE;
                    pEcbInfo->iTermId = iTermId;
                    pEcbInfo->iSyncId = iSyncId;
          }

          pStockLevel->num_deadlocks = 0;

          for (tryit=0; tryit < deadlock_retry;
tryit++)
          {
                    if (dbrpcinit(dbproc,
"tpcc_stocklevel", 0) == SUCCEED)
                    {
                              dbrpcparam(dbproc, NULL,
0, SQLINT2, -1, -1, (BYTE *) &pStockLevel->w_id);
                              dbrpcparam(dbproc, NULL,
0, SQLINT1, -1, -1, (BYTE *) &pStockLevel->d_id);
                              dbrpcparam(dbproc, NULL,
0, SQLINT2, -1, -1, (BYTE *) &pStockLevel-
>thresh_hold);

                              if (dbrpcexec(dbproc) ==
SUCCEED)
                              {
                                        while (((rc =
dbresults(dbproc)) != NO_MORE_RESULTS) && (rc != FAIL))
                                        {
                                                  if
(DBROWS(dbproc))
                                                  {

          while (((rc = dbnextrow(dbproc)) !=
NO_MORE_ROWS) && (rc != FAIL))

          {

                    if(pData=dbdata(dbproc, 1))

                              pStockLevel->low_stock =
*((long *) pData);

          }
                                                  }
                                        }
                              }
                    }
                    if (SQLDetectDeadlock(dbproc))
                    {
                              pStockLevel-
>num_deadlocks++;

          sprintf(printbuf,"deadlock: retry:
%d",pStockLevel->num_deadlocks);
                              Sleep(10 * tryit);
                    }
                    else
                    {
                              strcpy(pStockLevel-
>execution_status, "Transaction commited.");
                              return TRUE;
                    }
          }

          // If we reached here, it means we quit after
MAX_RETRY deadlocks
          strcpy(pStockLevel->execution_status, "Hit
deadlock max. ");
          pStockLevel->error=ERR_TYPE_DEADLOCK;
          return -1;
}

/*
 *        Common Code for all Servers
 */

 /* FUNCTION: BOOL SQLInit()
 *
 * PURPOSE:          This function initializes SQL
Server for later use.
 *
 *
 * RETURNS:                  BOOL      FALSE     if
successfull
 *
          TRUE      if an error occurs and connection
cannot be established.
 *
 * COMMENTS:         None
 *
 */
BOOL SQLInit ()
{

          dbinit();

          if ( dbgetmaxprocs() < iMaxConnections )
          {
                    if ( dbsetmaxprocs(iMaxConnections)
== FAIL )
                    {
                              //set for fail error
message when HttpExtensionProc() is called because
                              //at this point we don't
have a pECB so no way to show error message.
                              iMaxConnections = -1;
                    }
          }

          // install error and message handlers
```

```
        dbmsghandle((DBMSGHANDLE_PROC)msg_handler);
        dberrhandle((DBERRHANDLE_PROC)err_handler);

        return TRUE;
}


/* FUNCTION: BOOL
SQLOpenConnection(EXTENSION_CONTROL_BLOCK
        *pECB, int iTermId, int iSyncId, DBPROCESS
**dbproc, char *server, char *database, char *user,
char *password, char *app, int *spid, long *pack_size)
 *
 * PURPOSE:         This function opens the sql
connection for use.
 *
 * ARGUMENTS:       EXTENSION_CONTROL_BLOCK       *pECB
        passed in structure pointer from inetsrv.
 *                                      int
                            iTermId
        terminal id of browser
 *                                      int
                            iSyncId             sync
id of browser
 *                                      DBPROCESS
        **dbproc  pointer to returned DBPROCESS
 *                                      char
                    *server             SQL server name
 *                                      char
                    *database SQL server database
 *                                      char
                    *user               user name
 *                                      char
                    *password user password
 *                                      char
                    *app                pointer to
returned application array
 *                                      int
                            *spid
        pointer to returned spid
 *                                      long
                    *pack_size          pointer to
returned default pack size
 *
 * RETURNS:                   BOOL      FALSE     if
successfull
 *
        TRUE      if an error occurs
 *
 * COMMENTS:        None
 *
 */


#ifdef USE_ODBC
        static BOOL
SQLOpenConnection(EXTENSION_CONTROL_BLOCK *pECB, int
iTermId, int iSyncId, DBPROCESS **dbproc, char *server,
char *database, char *user, char *password, char *app,
int *spid, long *pack_size)
        {

                    RETCODE   rc;
                    char      buffer[30];

                    *dbproc = (DBPROCESS
*)malloc(sizeof(DBPROCESS));
                    if ( !*dbproc )
                            return TRUE;

                    //set pECB data into dbproc
                    (*dbproc)->bDeadlock = FALSE;
                    (*dbproc)->bFailed = FALSE;
                    (*dbproc)->pECB = pECB;
                    (*dbproc)->iTermId = iTermId;
                    (*dbproc)->iSyncId = iSyncId;



                    if ( SQLAllocConnect(henv,
&(*dbproc)->hdbc) == SQL_ERROR )
                            return TRUE;

                    if ( SQLSetConnectOption((*dbproc)-
>hdbc, SQL_PACKET_SIZE, pack_size) == SQL_ERROR )
                            return TRUE;

                    rc = SQLConnect((*dbproc)->hdbc,
server, SQL_NTS, user, SQL_NTS, password, SQL_NTS);
                    if (rc != SQL_SUCCESS && rc !=
SQL_SUCCESS_WITH_INFO)
                            return TRUE;
                    rc = SQLAllocStmt((*dbproc)->hdbc,
&(*dbproc)->hstmt);
                    if (rc == SQL_ERROR)
                            return TRUE;

                    sprintf(buffer,"use %s", Client-
>database);
                    rc = SQLExecDirect((*dbproc)-
>hstmt, buffer, SQL_NTS);
                    if (rc != SQL_SUCCESS && rc !=
SQL_SUCCESS_WITH_INFO)
                            return TRUE;

                    SQLFreeStmt((*dbproc)->hstmt,
SQL_CLOSE);
                    sprintf(buffer,"set nocount on");
                    rc = SQLExecDirect((*dbproc)-
>hstmt, buffer, SQL_NTS);
                    if (rc != SQL_SUCCESS && rc !=
SQL_SUCCESS_WITH_INFO)
                            return TRUE;
                    SQLFreeStmt((*dbproc)->hstmt,
SQL_CLOSE);

                    sprintf(buffer,"select @@spid");

                    rc = SQLExecDirect((*dbproc)-
>hstmt, buffer, SQL_NTS);
                    if (rc != SQL_SUCCESS && rc !=
SQL_SUCCESS_WITH_INFO)
                            return TRUE;

                    if ( SQLBindCol((*dbproc)->hstmt,
1, SQL_C_SSHORT, &(*dbproc)->spid, 0, NULL) ==
SQL_ERROR )
                            return TRUE;


                    if ( SQLFetch((*dbproc)->hstmt) ==
SQL_ERROR )
                            return TRUE;

                    SQLFreeStmt((*dbproc)->hstmt,
SQL_CLOSE);

                    return FALSE;
            }

#else

          static BOOL
SQLOpenConnection(EXTENSION_CONTROL_BLOCK *pECB, int
iTermId, int iSyncId, DBPROCESS **dbproc, char *server,
char *database, char *user, char *password, char *app,
int *spid)
          {
                    LOGINREC  *login;
                    PECBINFO  pEcbInfo;

                    //set local msg proc for login
record
                    //attach pECB record

                    //this is necessary as dblib
provides no way to pass user data in a login structure.
So until
                    //there is an allocated dbproc we
need to use a static which means that the login attempt
must
                    //be serialized.

                    gpECB = pECB;

                    login = dblogin();
                    if ( !*user )
                            DBSETLUSER(login, "sa");
                    else
                            DBSETLUSER(login, user);

                    DBSETLPWD(login,  password);
                    DBSETLHOST(login, app);

//                  Do not set the packet size.  Use
the size set up in SQL Server.
//                  DBSETLPACKET(login, (unsigned
short)DEFCLPACKSIZE);

//                  This can potentially cut down on
data conversion
                    DBSETLVERSION(login, DBVER60);

                    if ((*dbproc = dbopen(login, server
)) == NULL)
                            return TRUE;


                    //set pECB data into dbproc
                    pEcbInfo =
(PECBINFO)malloc(sizeof(ECBINFO));
                    pEcbInfo->bDeadlock = FALSE;
                    pEcbInfo->pECB = pECB;
                    pEcbInfo->iTermId = iTermId;
                    pEcbInfo->iSyncId = iSyncId;
                    dbsetuserdata(*dbproc, pEcbInfo);
```

```
                    // Use the the right database
                    dbuse(*dbproc, database);


                    dbcmd(*dbproc, "select @@spid");

                    dbsqlexec(*dbproc);
                    while (dbresults(*dbproc) !=
NO_MORE_RESULTS)
                    {
                              dbbind(*dbproc, 1,
SMALLBIND, (DBINT) 0, (BYTE *) spid);
                              while (dbnextrow(*dbproc)
!= NO_MORE_ROWS)
                              ;
                    }
                    dbcmd(*dbproc, "set nocount on");

                    dbsqlexec(*dbproc);
                    while (dbresults(*dbproc) !=
NO_MORE_RESULTS)
                    {
                              while (dbnextrow(*dbproc)
!= NO_MORE_ROWS)
                              ;
                    }

                    //rollback transaction on abort
                    dbcmd(*dbproc, "set XACT_ABORT
ON");

                    dbsqlexec(*dbproc);
                    while (dbresults(*dbproc) !=
NO_MORE_RESULTS)
                    {
                              while (dbnextrow(*dbproc)
!= NO_MORE_ROWS)
                              ;
                    }

                    return FALSE;
          }

#endif

/* FUNCTION: BOOL
SQLCloseConnection(EXTENSION_CONTROL_BLOCK *pECB,
DBPROCESS *dbproc)
 *
 * PURPOSE:          This function closes the sql
connection.
 *
 * ARGUMENTS:        EXTENSION_CONTROL_BLOCK       *pECB
          passed in structure pointer from inetsrv.
 *                                  DBPROCESS
          *dbproc   pointer to DBPROCESS
 *
 * RETURNS:                   BOOL      FALSE     if
successfull
 *
          TRUE      if an error occurs
 *
 * COMMENTS:         None
 *
 */

#ifdef USE_ODBC
          static BOOL
SQLCloseConnection(EXTENSION_CONTROL_BLOCK *pECB,
DBPROCESS *dbproc)
          {
                    if ( dbproc )
                    {
                              SQLFreeStmt(dbproc-
>hstmt, SQL_DROP);
                              SQLDisconnect(dbproc-
>hdbc);
                              SQLFreeConnect(dbproc-
>hdbc);
                              free(dbproc);
                              dbproc = NULL;
                    }
                    return FALSE;
          }
#else
          static BOOL
SQLCloseConnection(EXTENSION_CONTROL_BLOCK *pECB,
DBPROCESS *dbproc)
          {
                    if (dbclose(dbproc) == FAIL)
                              return TRUE;
                    return FALSE;
          }
#endif

/* FUNCTION: BOOL SQLDetectDeadlock(DBPROCESS *dbproc)
 *
 * PURPOSE:          This function checks to see if a
sql server deadlock condition exists.
 *
 * ARGUMENTS:        DBPROCESS
          *dbproc                        connection db
process id to check
 *
 * RETURNS:                   BOOL      FALSE
          no deadlock detected
 *
          TRUE                deadlock condition exists
 *
 * COMMENTS:         None
 *
 */

BOOL SQLDetectDeadlock(DBPROCESS *dbproc)
{
          PECBINFO  pEcbInfo;

          if ( (pEcbInfo =
(PECBINFO)dbgetuserdata(dbproc)) )
          {
                    if ( pEcbInfo->bDeadlock )
                    {
                              pEcbInfo->bDeadlock =
FALSE;
                              return TRUE;
                    }
          }
          return FALSE;
}

// Lifted from HP FDR since they did such a nice job
void TMLog( char *format, ... )
{
          va_list args;
          char buf[4096];
          int len;
          va_start( args, format );
          _strtime( buf );
          strcat( buf," ");
          len = strlen( buf );
          (void)_vsnprintf( buf+ len, sizeof( buf) -
len - 1, format, args);
          buf[sizeof( buf )- 1]= '\0';
          va_end( args );
          userlog( buf );
}

/* FUNCTION: void UtilStrCpy(char *pDest, char *pSrc,
int n)
 *
 * PURPOSE:          This function copies n characters
from string pSrc to pDst and places a
 *                                  null character at the end
of the destination string.
 *
 * ARGUMENTS:        char
          *pDest    destination string pointer
 *                                  char
                    *pSrc     source string pointer
 *                                  int
                              n
          number of characters to copy
 *
 * RETURNS:                   None
 *
 * COMMENTS:         Unlike strncpy this function
ensures that the result string is
 *                                  always null
terminated.
 *
 */

static void UtilStrCpy(char *pDest, char *pSrc, int n)
{
    strncpy(pDest, pSrc, n);
    pDest[n] = '\0';

          return;
}

/* FUNCTION: int err_handler(DBPROCESS *dbproc, int
severity, int dberr, int oserr, char *dberrstr, char
*oserrstr)
 *
 * PURPOSE:          This function handles DB-Library
errors
 *
 * ARGUMENTS:        DBPROCESS           *dbproc
                    DBPROCESS id pointer
 *                                  int
                              severity
          severity of error
 *                                  int
                              dberr
          error id
 *                                  int
                              oserr
          operating system specific error code
```

```
 *                                    char
                  *dberrstr           printable error
description of dberr
 *                                    char
                  *oserrstr           printable error
description of oserr
 *
 * RETURNS:                  int
                  INT_CONTINUE        continue if
error is SQLETIME else INT_CANCEL action
 *
 * COMMENTS:        None
 *
 */


int err_handler(DBPROCESS *dbproc, int severity, int
dberr, int oserr, char *dberrstr, char *oserrstr)
{
          PECBINFO
          pEcbInfo;
          EXTENSION_CONTROL_BLOCK       *pECB;
          FILE
          *fp;
          SYSTEMTIME
          systemTime;
          char
          szTmp[256];
          int
                    iTermId;
          int
                    iSyncId;

          pEcbInfo = NULL;

          if ((dbproc == NULL) || (DBDEAD(dbproc)))
          {
                    TMLog("DBPROC is invalid");
                    return INT_CANCEL;
          }

          if ( !(pEcbInfo =
(PECBINFO)dbgetuserdata(dbproc)) )
          {
                    pECB = gpECB;
                    iTermId = 0;
                    iSyncId = 0;
          }
          else
          {
                    pECB = pEcbInfo->pECB;
                    iTermId = pEcbInfo->iTermId;
                    iSyncId = pEcbInfo->iSyncId;
          }

          if ( pEcbInfo && pEcbInfo->bFailed )
          {
                    bError == FALSE;
                    return INT_CANCEL;
          }

          if ( oserr != DBNOERR )
          {
                    TMLog("DBLIB Error %s", oserrstr);
                    if ( pEcbInfo )
                    {
                              pEcbInfo->bFailed = TRUE;
                              bError = TRUE;
                    }

                    GetLocalTime(&systemTime);
                    fp = fopen(szErrorLogPath, "ab");

                    sprintf(szTmp, "ErrorHandler:
DBLIB(%d): %s", oserr, oserrstr);

                    TMLog("%2.2d/%2.2d/%2.2d
%2.2d:%2.2d:%2.2d\r\n\r\n%s\r\n\r\n",
                              systemTime.wYear,
systemTime.wMonth, systemTime.wDay,
                              systemTime.wHour,
systemTime.wMinute, systemTime.wSecond,
                              szTmp);

                    fclose(fp);
          }

          return INT_CANCEL;
}


/* FUNCTION: int msg_handler(DBPROCESS *dbproc, DBINT
msgno, int msgstate, int severity, char *msgtext)
 *
 * PURPOSE:         This function handles DB-Library
SQL Server error messages
 *
 * ARGUMENTS:       DBPROCESS           *dbproc
                  DBPROCESS id pointer
 *                                    DBINT
                  msgno
          message number
 *                                    int
                              msgstate
          message state
 *                                    int
                              severity
          message severity
 *                                    char
                  *msgtext            printable
message description
 *
 * RETURNS:                  int
                  INT_CONTINUE        continue if
error is SQLETIME else INT_CANCEL action
 *
                              INT_CANCEL
          cancel operation
 *
 * COMMENTS:        This function also sets the dead
lock dbproc variable if necessary.
 *
 */

int msg_handler(DBPROCESS *dbproc, DBINT msgno, int
msgstate, int severity, char *msgtext)
{
          PECBINFO
          pEcbInfo;
          EXTENSION_CONTROL_BLOCK       *pECB;
          FILE
          *fp;
          SYSTEMTIME
          systemTime;
          char
          szTmp[256];
          int
                    iTermId;
          int
                    iSyncId;

          if ( !(pEcbInfo =
(PECBINFO)dbgetuserdata(dbproc)) )
          {
                    pECB = gpECB;
                    iTermId = 0;
                    iSyncId = 0;
          }
          else
          {
                    pECB = pEcbInfo->pECB;
                    iTermId = pEcbInfo->iTermId;
                    iSyncId = pEcbInfo->iSyncId;
          }


          if ( (msgno == 5701) || (msgno == 2528) ||
(msgno == 5703) || (msgno == 6006) )
                    return INT_CONTINUE;

          // deadlock message
          if (msgno == 1205)
          {
                    // set the deadlock indicator
                    if ( pEcbInfo )
                              pEcbInfo->bDeadlock =
TRUE;
                    else
                              TMLog("Error,
dbgetuserdata returned NULL.");
                    return INT_CONTINUE;
          }
          if ( pEcbInfo && pEcbInfo->bFailed )
          {
                    TMLog("SQL Error ");
                    return INT_CANCEL;
          }

          if (msgno == 0)
                    return INT_CONTINUE;
          else
          {
                    TMLog("MsgHandler: SQL Error %s",
msgtext);

                    if ( pEcbInfo )
                              pEcbInfo->bFailed = TRUE;

                    bError = TRUE;

                    sprintf(szTmp, "Error: SQLSVR(%d):
%s", msgno, msgtext);

                    TMLog("%2.2d/%2.2d/%2.2d
%2.2d:%2.2d:%2.2d\r\n\r\n%s\r\n\r\n",
                              systemTime.wYear,
systemTime.wMonth, systemTime.wDay,
```

```
                              systemTime.wHour,
systemTime.wMinute, systemTime.wSecond,
                              szTmp);
          }
          return INT_CANCEL;
}

/* FUNCTION: BOOL GetParameters(int argc, char *argv[])
 *
 * PURPOSE:         This function parses the command
line passed in to the delivery executable, initializing
 *                          and filling in global
variable parameters.
 *
 * ARGUMENTS:       int                 argc
          number of command line arguments passed to
delivery
 *                                      char
          *argv[]   array of command line argument
pointers
 *
 * RETURNS:                   BOOL      FALSE
          parameter read successfull
 *
          TRUE      user has requested parameter
information screen be displayed.
 *
 * COMMENTS:        None
 *
 */

static BOOL GetParameters(int argc, char *argv[])
{
          int i;

          szServer[0]                   = 0;
          szPassword[0]       = 0;
          bFlush                        = FALSE;
          strcpy(szDatabase, "tpcc");
          strcpy(szUser, "sa");

          for(i=0; i<argc; i++)
          {
                    if ( argv[i][0] == '-' ||
argv[i][0] == '/' )
                    {
                              switch(argv[i][1])
                              {
                                        case 'S':
                                        case 's':

          strcpy(szServer, argv[i]+2);

          break;
                                        case 'V':
                                        case 'v':

          verbose = TRUE;

          break;
                                        case '?':

          return TRUE;
                              }
                    }
          }
          return FALSE;
}

/* FUNCTION: void PrintParameters(void)
 *
 * PURPOSE:         This function displays the
supported command line flags.
 *
 * ARGUMENTS:       None
 *
 * RETURNS:                   None
 *
 * COMMENTS:        None
 *
 */

static void PrintParameters(void)
{
          TMLog("Performance Tuning Corporation Tuxedo
Kit");
          TMLog("   www.perftuning.com   (281) 251-3495
");
          TMLog("StockLevel: -S Server [-v (verbose)]"
);
          TMLog("StockLevel: Server %s", szServer);

}
```

Tpcc.c

```
/*        FILE:               TPCC.C
 *
 *        Based on: Microsoft TPC-C Kit Ver. 3.00.000
 *
 *                                      Copyright
Microsoft, 1996
 *                                      Copyright
Performance Tuning Corporation, 1997
 *
 *        PURPOSE:  TPC-C main program.
 *        Author:             Philip Durr
 *
          philipdu@Microsoft.com
 *
 *  MODIFIED        Changed for modularity and to allow
for the Tuxedo TM
 *
 *  Author:                     Edward Whalen
 *                                      Performance
Tuning Corporation
 *
          ewhalen@perftuning.com
 *
*/


#include <windows.h>
#include <process.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 DBNTWIN32
#include <sqlfront.h>
#include <sqldb.h>

#include "trans.h"
                    //tpckit transaction header
contains defination of structures specific to TPC-C
#include "httpext.h"
                    //ISAPI DLL information header

#include "tpcc.h"
                    //this dlls specific structure,
value e.t. header.

#include <tmenv.h>
#include <xa.h>
#include <atmi.h>

static TPINIT       *tpinf;
static DWORD        TLSIsTpInitedKey;
static int                  ThrTpInit();

char      szServer[32]        = "EDW";
          //global variables used with this DLL
char      szUser[32]                  = "sa";
char      szPassword[32]      = "";
char      szDatabase[32]      = "tpcc";

BOOL      bLog                        = FALSE;
BOOL      dLog                        = FALSE;

int                 iThreads            = 5;
int                 iMaxWareHouses      = 500;
int                 iQSlotts            = 3000;
int                 iDelayMs            = 100;
int                 iConnectDelay       = 500;
short     iDeadlockRetry      = (short)3;
short     iMaxConnections = (short)25;
int                 iErrVal                     = 0;

//char buffer[256];

//allowable client command strings i.e. CMD=command
char *szCmds[] =
{
          "..NewOrder..", "..Payment..",
"..Delivery..", "..Order-Status..", "..Stock-Level..",
"..Exit..",
                    "Submit", "Begin", "Process", "Menu",
"Clear", "Users", ""
};

//defined command string functions, called via
CMD=command http string from html client.

void (*DoCmd[])(EXTENSION_CONTROL_BLOCK *pECB, int
iFormId, int iTermId, int iSyncId) =
{
          NewOrderForm,
          PaymentForm,
```

```
          DeliveryForm,
          OrderStatusForm,
          StockLevelForm,
          Exitcmd,
          SubmitCmd,
          BeginCmd,
          ProcessCmd,
          MenuCmd,
          ClearCmd,
          NumberOfConnectionsCmd
};


//Terminal client id structure and interface defination
TERM      Term = { 0, 0, 0, FALSE, NULL, TermInit,
TermAllocate, TermRestore, TermAdd, TermDelete };

//welcome to tpc-c html form buffer, this is first form
client sees.
static char         *szWelcomeForm =    "<HTML>"

                              "<HEAD><TITLE>Welcome To
TPC-C</TITLE></HEAD><BODY>"

                              "Please Identify your
Warehouse and District for this session.<BR>"

                              "<FORM
ACTION=\"tpcc.dll\" METHOD=\"GET\">"

                              "<INPUT TYPE=\"hidden\"
NAME=\"STATUSID\" VALUE=\"0\">"

                              "<INPUT TYPE=\"hidden\"
NAME=\"ERROR\" VALUE=\"0\">"

                              "<INPUT TYPE=\"hidden\"
NAME=\"FORMID\" VALUE=\"1\">"

                              "<INPUT TYPE=\"hidden\"
NAME=\"TERMID\" VALUE=\"-2\">"

                              "<INPUT TYPE=\"hidden\"
NAME=\"SYNCID\" VALUE=\"0\">"

                              "Warehouse ID <INPUT
NAME=\"w_id\" SIZE=4><BR>"

                              "District ID <INPUT
NAME=\"d_id\" SIZE=2><BR>"

                              "<HR>"

                              "<INPUT TYPE=\"submit\"
NAME=\"CMD\" VALUE=\"Submit\">"

                              "</FORM><BODY>"

                              "</HTML>";


static char         szTpccLogPath[256]; //path to html
log file if logging turned on in registry.
static char szErrorLogPath[256];        //path to error
log file.

static    CRITICAL_SECTION
          CriticalSection;
static    CRITICAL_SECTION
          ErrorLogCriticalSection;

static    EXTENSION_CONTROL_BLOCK       *gpECB;
static    int
                    bTpccExit;          //exit delivery
disconnect loop as dll exiting.

/* FUNCTION: BOOL APIENTRY DllMain(HANDLE hModule,
DWORD ul_reason_for_call, LPVOID lpReserved)
 *
 * PURPOSE:         This function is the entry point
for the DLL this implementation is baised on the
 *                              fact that
DLL_PROCESS_ATTACH is only called from the inet service
once. Connections
 *                              are sent to this function
as thread attachments.
 *
 * ARGUMENTS:       HANDLE    hModule
                    module handle
 *                                        DWORD
          ul_reason_for_call  reason for call
 *                                        LPVOID
          lpReserved
          reserved for future use
 *
 * RETURNS:                   BOOL      FALSE
                              errors occured in
initialization
 *
          TRUE                                      DLL
successfully initialized
 *
 * COMMENTS:        None
 *
 */

BOOL APIENTRY DllMain(HANDLE hModule, DWORD
ul_reason_for_call, LPVOID lpReserved)
{
          int
          i;
          static SECURITY_ATTRIBUTES    sa;
          static PSECURITY_DESCRIPTOR pSD;

          switch( ul_reason_for_call )
          {
                    case DLL_PROCESS_ATTACH:
                              if (
ReadRegistrySettings() )
                              {

          MessageBox(NULL, "Cannot Find TPCC Key in
registry (run install.exe).", "Init", MB_OK |
MB_ICONSTOP);
                                        return FALSE;
                              }


          InitializeCriticalSection(&CriticalSection);

          InitializeCriticalSection(&ErrorLogCriticalSe
ction);

                              (*Term.Init)();
                              if ( !(*Term.Allocate)()
)
                              {

          MessageBox(NULL, "Error Trm.Allocate().",
"Init", MB_OK | MB_ICONSTOP);
                                        return FALSE;
                              }
                              for(i=Term.iNext;
i<Term.iAvailable; i++)

          Term.pClientData[i].inUse = 0;
                              Term.pClientData[0].inUse
= 1;

                              TLSIsTpInitedKey =
TlsAlloc(); // check for failure later
                              // assumption:value
inited to 0
                              break;
                    case DLL_THREAD_ATTACH:
                              break;
                    case DLL_THREAD_DETACH:
                              if ( dLog )
                              {
                                        SYSTEMTIME
          systemTime;
                                        FILE *fp;


          GetLocalTime(&systemTime);
                                        fp =
fopen(szErrorLogPath, "ab");
                                        fprintf(fp,
"\r\nError: %2.2d/%2.2d/%2.2d %2.2d:%2.2d:%2.2d\r\n",

          systemTime.wYear, systemTime.wMonth,
systemTime.wDay,

          systemTime.wHour, systemTime.wMinute,
systemTime.wSecond);
                                        fprintf(fp,
"DLL_THREAD_DETACH \r\n");
                                        fclose(fp);
                              }
                              break;
                    case DLL_PROCESS_DETACH:
                              if ( pSD )
                                        free( pSD );

                              bTpccExit = TRUE;

                              (*Term.Restore)();


          DeleteCriticalSection(&CriticalSection);

          DeleteCriticalSection(&ErrorLogCriticalSectio
n);


          TlsFree(TLSIsTpInitedKey);
                              break;
```

```
        }
        return TRUE;
}


/* FUNCTION: BOOL WINAPI
GetExtensionVersion(HSE_VERSION_INFO *pVer)
 *
 * PURPOSE:         This function is called by the inet
service when the DLL is first loaded.
 *
 * ARGUMENTS:       HSE_VERSION_INFO    *pVer
        passed in structure in which to place
expected version number.
 *
 * RETURNS:                 TRUE      inet service
expected return value.
 *
 * COMMENTS:        None
 *
 */

BOOL WINAPI GetExtensionVersion(HSE_VERSION_INFO *pVer)
{

        pVer->dwExtensionVersion =
MAKELONG(HSE_VERSION_MINOR, HSE_VERSION_MAJOR);
        lstrcpyn(pVer->lpszExtensionDesc, "TPC-C
Server.", HSE_MAX_EXT_DLL_NAME_LEN);

        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 pointer to passed in 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)
{
        int iCmd, FormId, TermId, iSyncId;
        FILE *fp;

//      static BOOL bReadRegistry = FALSE;

        if ( iMaxConnections == -1 )
        {
                 ErrorMessage(pECB,
ERR_CAN_NOT_SET_MAX_CONNECTIONS, ERR_TYPE_WEBDLL, NULL,
-1, -1);
                 return HSE_STATUS_SUCCESS;
        }

        //if registry setting is for html logging
then show http string passed in.
        if ( bLog )
        {
                 SYSTEMTIME          systemTime;

                 fp = fopen(szTpccLogPath, "ab");

                 GetLocalTime(&systemTime);

                 fprintf(fp, "* QUERY *
%2.2d/%2.2d/%2.2d %2.2d:%2.2d:%2.2d\r\n\r\n%s\r\n\r\n",
                          systemTime.wYear,
systemTime.wMonth, systemTime.wDay,
                          systemTime.wHour,
systemTime.wMinute, systemTime.wSecond,
                          pECB->lpszQueryString);
                 fclose(fp);
        }


        //process http query
        if ( !ProcessQueryString(pECB, &iCmd,
&FormId, &TermId, &iSyncId) )
        {
                 if ( TermId < 0 )
                          ErrorMessage(pECB,
ERR_INVALID_TERMID, ERR_TYPE_WEBDLL, NULL, TermId,
iSyncId);
                 else
                          ErrorMessage(pECB,
ERR_COMMAND_UNDEFINED, ERR_TYPE_WEBDLL, NULL, TermId,
iSyncId);
                 return
HSE_STATUS_SUCCESS_AND_KEEP_CONN;
        }

        if ( TermId != 0 )
        {
                 if ( !IsValidTermId(TermId) )
                 {
                          ErrorMessage(pECB,
ERR_INVALID_TERMID, ERR_TYPE_WEBDLL, NULL, TermId,
iSyncId);
                          return
HSE_STATUS_SUCCESS_AND_KEEP_CONN;
                 }

                 //must have a valid syncid here
since termid is valid
                 if ( iSyncId < 1 || iSyncId !=
Term.pClientData[TermId].iSyncId )
                 {
                          ErrorMessage(pECB,
ERR_INVALID_SYNC_CONNECTION, ERR_TYPE_WEBDLL, NULL,
TermId, iSyncId);
                          return
HSE_STATUS_SUCCESS_AND_KEEP_CONN;
                 }

        }

        //set use time
        Term.pClientData[TermId].iTickCount =
GetTickCount();

        //go execute http: command
        (*DoCmd[iCmd])(pECB, FormId, TermId,
iSyncId);

        //finish up and keep connection
        return HSE_STATUS_SUCCESS_AND_KEEP_CONN;
}

/* FUNCTION: static BOOL IsValidTermId(int TermId)
 *
 * PURPOSE:         This function checks to see of the
passed in terminal id is valid.
 *
 * ARGUMENTS:       int
        TermId
        client terminal id
 *
 * RETURNS:                 BOOL      FALSE

        Terminal ID Invalid
 *
        TRUE
                 Terminal ID valid
 *
 * COMMENTS:        None
 *
 */

static BOOL IsValidTermId(int TermId)
{
        return (BOOL) ( TermId > 0 && TermId <=
Term.iAvailable && Term.pClientData[TermId].inUse );
}

/* FUNCTION: BOOL
ProcessQueryString(EXTENSION_CONTROL_BLOCK *pECB, int
*pCmd, int *pFormId, int *pTermId, int *pSyncId)
 *
 * PURPOSE:         This function extracts the relevent
information out of the http command passed in from
 *                          the browser.
 *
 * ARGUMENTS:       EXTENSION_CONTROL_BLOCK       *pECB
                 structure pointer to passed in
internet
 *

                          service information.
 *                                 int
                          *pCmd
                 returned command id
 *                                 int
                          *pFormId
        returned active form client browser is on
 *                                 int
                          *pTermId
        returned client terminal id
 *
```

```
 * RETURNS:                    BOOL      FALSE

          success
 *
          TRUE
                    command passed in is invalid
 *
 * 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.
 */

BOOL ProcessQueryString(EXTENSION_CONTROL_BLOCK *pECB,
int *pCmd, int *pFormId, int *pTermId, int *pSyncId)
{
          char *ptr;
          char szBuffer[25];
          char szTmp[25];
          char *dest = szBuffer;
          int i;

          if ( (ptr = strstr(pECB->lpszQueryString,
"FORMID=")) )
                    *pFormId = *(ptr+7) & 0x0F;

          if ( (ptr = strstr(pECB->lpszQueryString,
"TERMID=")) )
          {
                    *pTermId = atoi((ptr+7));
                    if ( *pTermId == 0 )
          //terminal id 0 used internally
                              *pTermId = -1;
                    if ( *pTermId == -2 )
          //login screen
                              *pTermId = 0;
          }
          else
                    *pTermId = 0;


          if ( (ptr = strstr(pECB->lpszQueryString,
"SYNCID=")) )
                    *pSyncId = atoi((ptr+7));
          else
                    *pSyncId = 0;

          if ( !(ptr = strstr(pECB->lpszQueryString,
"CMD=")) )
          {

                    ptr = szBuffer;
                    if ( !stricmp(szBuffer, "Default")
)
                              strcpy(szBuffer,
"CMD=Begin");
                    switch( *pFormId )
                    {
                              case WELCOME_FORM:

          strcpy(szBuffer, "CMD=Submit");
                                        break;
                              case MAIN_MENU_FORM:

          strcpy(szBuffer, "CMD=NewOrder");
                                        break;
                              case NEW_ORDER_FORM:
                              case PAYMENT_FORM:
                              case DELIVERY_FORM:
                              case ORDER_STATUS_FORM:
                              case STOCK_LEVEL_FORM:
                                        if (
!(*pTermId) )

          return FALSE;
                                        if (
GetKeyValue(pECB->lpszQueryString, "PI*", szTmp,
sizeof(szTmp)) )

          strcpy(szBuffer, "CMD=Process");
                                        else
                                        {

          strcpy(szBuffer, "CMD=");

          strcat(szBuffer, szCmds[*pFormId -
NEW_ORDER_FORM]);
                                        }
                                        break;
                              default:
                                        return FALSE;
                    }
          }

          ptr += 4;

          while( *ptr && *ptr != '&' )
                    *dest++ = *ptr++;
          *dest = 0;

          for(i=0; szCmds[i][0]; i++)
          {
                    if ( !strcmp(szCmds[i], szBuffer) )
                    {
                              *pCmd = i;
                              return TRUE;
                    }
          }
          return FALSE;
}

/* FUNCTION: void NewOrderForm(EXTENSION_CONTROL_BLOCK
*pECB, int iFormId, int iTermId, int iSyncId)
 *
 * PURPOSE:          This function wraps the
functionality needed for the TPC-C New Order Form.
 *
 * ARGUMENTS:        int
                              iFormId
          unused
 *                                   int

          iTermId             id of calling browser,
i.e. TERMID= from http command line
 *
          EXTENSION_CONTROL_BLOCK       *pECB
          structure pointer to passed in internet
 *
                              service information.
 *
 * RETURNS:                   None
 *
 * COMMENTS:         None
 *
 */

void NewOrderForm(EXTENSION_CONTROL_BLOCK *pECB, int
iFormId, int iTermId, int iSyncId)
{
          WriteZString(pECB, MakeNewOrderForm(iTermId,
iSyncId, FALSE, TRUE, FALSE));

          UNUSEDPARAM(iFormId);

          return;
}

/* FUNCTION: void PaymentForm(EXTENSION_CONTROL_BLOCK
*pECB, int iFormId, int iTermId, int iSyncId)
 *
 * PURPOSE:          This function wraps the
functionality needed for the TPC-C Payment Form.
 *
 * ARGUMENTS:        int
                              iFormId
          unused
 *                                   int

          iTermId             id of calling browser,
i.e. TERMID= from http command line
 *                                   int

          iSyncId             sync id of calling
browser
 *
          EXTENSION_CONTROL_BLOCK       *pECB
          structure pointer to passed in internet
 *
                              service information.
 * RETURNS:                   None
 *
 * COMMENTS:         None
 *
 */

void PaymentForm(EXTENSION_CONTROL_BLOCK *pECB, int
iFormId, int iTermId, int iSyncId)
{
          WriteZString(pECB, MakePaymentForm(iTermId,
iSyncId, TRUE) );

          UNUSEDPARAM(iFormId);

}

/* FUNCTION: void DeliveryForm(EXTENSION_CONTROL_BLOCK
*pECB, int iFormId, int iTermId, int iSyncId)
 *
 * PURPOSE:          This function wraps the
functionality needed for the TPC-C Delivery Form.
 *
 * ARGUMENTS:        int
                              iFormId
          unused
```

```
 *                                      int

          iTermId             id of calling browser,
i.e. TERMID= from http command line
 *                                      int

          iSyncId             sync id of calling
browser
 *
          EXTENSION_CONTROL_BLOCK       *pECB
          structure pointer to passed in internet
 *

                              service information.
 * RETURNS:                  None
 *
 * COMMENTS:        None
 *
 */

void DeliveryForm(EXTENSION_CONTROL_BLOCK *pECB, int
iFormId, int iTermId, int iSyncId)
{
//        WriteZString(pECB, MakeDeliveryForm(iTermId,
iSyncId, TRUE) );
          WriteZString(pECB, MakeDeliveryForm(iTermId,
iSyncId, TRUE, TRUE) );

          UNUSEDPARAM(iFormId);
}

/* FUNCTION: void
OrderStatusForm(EXTENSION_CONTROL_BLOCK *pECB, int
iFormId, int iTermId, int iSyncId)
 *
 * PURPOSE:          This function wraps the
functionality needed for the TPC-C Order Status Form.
 *
 * ARGUMENTS:       int
                              iFormId
          unused
 *                                      int

          iTermId             id of calling browser,
i.e. TERMID= from http command line
 *                                      int

          iSyncId             sync id of calling
borwser
 *
          EXTENSION_CONTROL_BLOCK       *pECB
          structure pointer to passed in internet
 *

                              service information.
 * RETURNS:                  None
 *
 * COMMENTS:        None
 *
 */

void OrderStatusForm(EXTENSION_CONTROL_BLOCK *pECB, int
iFormId, int iTermId, int iSyncId)
{
          WriteZString(pECB,
MakeOrderStatusForm(iTermId, iSyncId, TRUE) );

          UNUSEDPARAM(iFormId);

}

/* FUNCTION: void
StockLevelForm(EXTENSION_CONTROL_BLOCK *pECB, int
iFormId, int iTermId, int iSyncId)
 *
 * PURPOSE:          This function wraps the
functionality needed for the TPC-C Stock Level Form.
 *
 * ARGUMENTS:       int
                              iFormId
          unused
 *                                      int

          iTermId             id of calling browser,
i.e. TERMID= from http command line
 *                                      int

          iSyncId             sync id of calling
browser
 *
          EXTENSION_CONTROL_BLOCK       *pECB
          structure pointer to passed in internet
 *

                              service information.
 * RETURNS:                  None
 *
 * COMMENTS:        None
 *
 */

void StockLevelForm(EXTENSION_CONTROL_BLOCK *pECB, int
iFormId, int iTermId, int iSyncId)
{
          WriteZString(pECB,
MakeStockLevelForm(iTermId, iSyncId, TRUE) );

          return;
}

/* FUNCTION: void Exitcmd(EXTENSION_CONTROL_BLOCK
*pECB, int iFormId, int iTermId, int iSyncId)
 *
 * PURPOSE:          This function removes a terminal id
from use, the allocated structure however remains
 *                              valid so the next request
for a new client will not require a new memory
allocation.
 *
 * ARGUMENTS:       int
                              iFormId
          unused
 *                                      int

          iTermId             id of calling browser,
i.e. TERMID= from http command line
 *                                      int

          iSyncId             sync id of calling
browser
 *
          EXTENSION_CONTROL_BLOCK       *pECB
          structure pointer to passed in internet
 *

                              service information.
 * RETURNS:                  None
 *
 * COMMENTS:        None
 *
 */

void Exitcmd(EXTENSION_CONTROL_BLOCK *pECB, int
iFormId, int iTermId, int iSyncId)
{
          (*Term.Delete)(pECB, iTermId);

          WriteZString(pECB, MakeWelcomeForm() );

          UNUSEDPARAM(iFormId);
          UNUSEDPARAM(iSyncId);

          return;
}

/* FUNCTION: void SubmitCmd(EXTENSION_CONTROL_BLOCK
*pECB, int iFormId, int iTermId, int iSyncId)
 *
 * PURPOSE:          This function allocated a new
terminal id in the Term structure array.
 *
 * ARGUMENTS:       int
                              iFormId
          unused
 *                                      int

          iTermId             id of calling browser,
i.e. TERMID= from http command line
 *                                      int

          iSyncId             sync id of calling
browser
 *
          EXTENSION_CONTROL_BLOCK       *pECB
          structure pointer to passed in internet
 *

                              service information.
 * 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
iFormId, int iTermId, int iSyncId)
{
          int       iCurrent;

          if ( (iCurrent = (*Term.Add)(pECB, pECB-
>lpszQueryString)) < 0 )
          {
```

```
                    ErrorMessage(pECB,
ERR_CANNOT_INIT_TERMINAL, ERR_TYPE_WEBDLL, NULL,
iCurrent, iSyncId);
                    return;
          }

          if ( Term.pClientData[iCurrent].w_id >
iMaxWareHouses || Term.pClientData[iCurrent].w_id < 1 )
          {
                    ErrorMessage(pECB,
ERR_W_ID_INVALID, ERR_TYPE_WEBDLL, NULL, iCurrent,
iSyncId);
                    (*Term.Delete)(pECB, iCurrent);
                    return;
          }
          if ( Term.pClientData[iCurrent].d_id < 1 ||
Term.pClientData[iCurrent].d_id > 10 )
          {
                    ErrorMessage(pECB,
ERR_D_ID_INVALID, ERR_TYPE_WEBDLL, NULL, iCurrent,
iSyncId);
                    (*Term.Delete)(pECB, iCurrent);
                    return;
          }

          WriteZString(pECB, MakeMainMenuForm(iCurrent,
Term.pClientData[iCurrent].iSyncId) );

          return;
}

/* FUNCTION: void BeginCmd(EXTENSION_CONTROL_BLOCK
*pECB, int iFormId, int iTermId, int iSyncId)
 *
 * PURPOSE:          This function is the first command
executed. It is executed with the command
 *                              CMD=Begin?Server=xxx from
the http command line.
 *
 * ARGUMENTS:       int
                              iFormId
          unused
 *                                        int

          iTermId             id of calling browser,
i.e. TERMID= from http command line
 *                                        int

          iSyncId             sync id of calling
browser
 *
          EXTENSION_CONTROL_BLOCK       *pECB
          structure pointer to passed in internet
 *
                              service information.
 * RETURNS:                   None
 *
 * COMMENTS:        SQL server must be specified,
however the user and password parameters are optional.
 *                                        The complete
command line is CMD=Begin&Server=server&User=sa&Psw=&.
The & are used
 *                                        to separate
parameters which is internet browser standard.
 */

void BeginCmd(EXTENSION_CONTROL_BLOCK *pECB, int
iFormId, int iTermId, int iSyncId)
{
          LPSTR pQueryString;

          pQueryString = pECB->lpszQueryString;

          WriteZString(pECB, MakeWelcomeForm() );

          UNUSEDPARAM(iFormId);

          return;
}

/* FUNCTION: void ProcessCmd(EXTENSION_CONTROL_BLOCK
*pECB, int iFormId, int iTermId, int iSyncId)
 *
 * PURPOSE:          This function process the passed in
http command
 *
 * ARGUMENTS:       int
                              iFormId
          unused
 *                                        int

          iTermId             id of calling browser,
i.e. TERMID= from http command line
 *                                        int

          iSyncId             sync id of calling
browser
 *
          EXTENSION_CONTROL_BLOCK       *pECB
          structure pointer to passed in internet
 *
                              service information.
 * RETURNS:                   None
 *
 * COMMENTS:        None
 *
 */

void ProcessCmd(EXTENSION_CONTROL_BLOCK *pECB, int
iFormId, int iTermId, int iSyncId)
{
          switch( iFormId )
          {
                    case WELCOME_FORM:
                              return;
                    case MAIN_MENU_FORM:
                              return;
                    case NEW_ORDER_FORM:
                              ProcessNewOrderForm(pECB,
iTermId, iSyncId);
                              return;
                    case PAYMENT_FORM:
                              ProcessPaymentForm(pECB,
iTermId, iSyncId);
                              return;
                    case DELIVERY_FORM:
                              ProcessDeliveryForm(pECB,
iTermId, iSyncId);
                              return;
                    case ORDER_STATUS_FORM:

          ProcessOrderStatusForm(pECB, iTermId,
iSyncId);
                              return;
                    case STOCK_LEVEL_FORM:

          ProcessStockLevelForm(pECB, iTermId,
iSyncId);
                              return;
          }
}

/* FUNCTION: void ClearCmd(EXTENSION_CONTROL_BLOCK
*pECB, int iFormId, int iTermId, int iSyncId)
 *
 * PURPOSE:          This function frees all currently
logged in terminal ids.
 *
 * ARGUMENTS:       int
                              iFormId
          unused
 *                                        int

          iTermId             id of calling browser,
i.e. TERMID= from http command line
 *                                        int

          iSyncId             sync id of calling
browser
 *
          EXTENSION_CONTROL_BLOCK       *pECB
          structure pointer to passed in internet
 *
                              service information.
 * RETURNS:                   None
 *
 * COMMENTS:        Use this function with caution, it
may cause unpredictable results
 *                                        if existing
browsers attempt to use the web client with out
 *                                        beginning at
the login screen for each client.
 */

void ClearCmd(EXTENSION_CONTROL_BLOCK *pECB, int
iFormId, int iTermId, int iSyncId)
{
          int i;

          EnterCriticalSection(&CriticalSection);

          for(i=0; i<Term.iAvailable; i++)
          {
                    if ( Term.pClientData[i].inUse )
                              (*Term.Delete)(pECB, i);
          }

          Term.iNext                                  = 0;
          Term.iAvailable             = 0;
          Term.iMasterSyncId  = 1;

          if ( Term.pClientData )
                    free(Term.pClientData);
          Term.pClientData    = NULL;
```

```
          Term.bInit                              =
FALSE;

          (*Term.Init)();
          if ( !(*Term.Allocate)() )
          {
                    ErrorMessage(pECB,
ERR_MAX_CONNECT_PARAM, ERR_TYPE_WEBDLL, NULL, iTermId,
iSyncId);
                    return;
          }
          for(i=Term.iNext; i<Term.iAvailable; i++)
                    Term.pClientData[i].inUse = 0;
          Term.pClientData[0].inUse = 1;

          LeaveCriticalSection(&CriticalSection);

          WriteZString(pECB, MakeWelcomeForm() );

          return;
}

/* FUNCTION: void MenuCmd(EXTENSION_CONTROL_BLOCK
*pECB, int iFormId, int iTermId, int iSyncId)
 *
 * PURPOSE:          This function causes an exit to the
main menu
 *
 * ARGUMENTS:        int
                              iFormId
          unused
 *                                    int

          iTermId             id of calling browser,
i.e. TERMID= from http command line
 *                                    int

          iSyncId             sync id of calling
browser
 *
          EXTENSION_CONTROL_BLOCK       *pECB
          structure pointer to passed in internet
 *
                              service information.
 * RETURNS:                  None
 *
 * COMMENTS:         None
 *
 */

void MenuCmd(EXTENSION_CONTROL_BLOCK *pECB, int
iFormId, int iTermId, int iSyncId)
{
          WriteZString(pECB, MakeMainMenuForm(iTermId,
iSyncId) );

          return;
}

/* FUNCTION: void
NumberOfConnectionsCmd(EXTENSION_CONTROL_BLOCK *pECB,
int iFormId, int iTermId, int iSyncId)
 *
 * PURPOSE:          This function returns to the
browser the total number of active terminal ids
 *
 * ARGUMENTS:        int
                              iFormId
          unused
 *                                    int

          iTermId             id of calling browser,
i.e. TERMID= from http command line
 *                                    int

          iSyncId             sync id of calling
browser
 *
          EXTENSION_CONTROL_BLOCK       *pECB
          structure pointer to passed in internet
 *

                              service information.
 * RETURNS:                  None
 *
 * COMMENTS:         None
 */

void NumberOfConnectionsCmd(EXTENSION_CONTROL_BLOCK
*pECB, int iFormId, int iTermId, int iSyncId)
{
          int i;
          int       iTotal;

          // EnterCriticalSection(&CriticalSection);

          iTotal = 0;
          for(i=0; i<Term.iAvailable; i++)
          {
                    if ( Term.pClientData[i].inUse )
                              iTotal++;
          }

          // LeaveCriticalSection(&CriticalSection);

          h_printf(pECB, "Total Active Connections:
%d", iTotal);

          return;
}

/* FUNCTION: void WriteZString(EXTENSION_CONTROL_BLOCK
*pECB, char *szStr)
 *
 * PURPOSE:          This function is the low level
output function. It writes a string of text back to the
 *                              client browser.
 *
 * ARGUMENTS:        EXTENSION_CONTROL_BLOCK       *pECB
          passed in structure pointer from inetsrv.
 *                                    char
                    *szStr
          string to display in the client browser.
 *
 * RETURNS:                  None
 *
 * COMMENTS:         This function assumes that the
string to written to the client browser has
 *                                    been formatted
in an HTML manner.
 */

static void WriteZString(EXTENSION_CONTROL_BLOCK *pECB,
char *szStr)
{
          FILE      *fp;
          int       lpbSize;
          int       iSize;
          char      szHeader[128];
          char      szHeader1[128];

          lpbSize = strlen(szStr)+1;

          if ( bLog )
          {
                    SYSTEMTIME          systemTime;

                    fp = fopen(szTpccLogPath, "ab");

                    GetLocalTime(&systemTime);

                    fprintf(fp, "* HTML PAGE *
%2.2d/%2.2d/%2.2d %2.2d:%2.2d:%2.2d\r\n\r\n%s\r\n\r\n",
                              systemTime.wYear,
systemTime.wMonth, systemTime.wDay,
                              systemTime.wHour,
systemTime.wMinute, systemTime.wSecond,
                              szStr);

                    fclose(fp);
          }

          iSize = sprintf(szHeader, "200 Ok");
          sprintf(szHeader1, "Connection: keep-
alive\r\nContent-type: text/html\r\nContent-length:
%d\r\n\r\n", lpbSize);


#ifdef PURE_PERFORMIX
          (*pECB->ServerSupportFunction)(pECB->ConnID,
HSE_REQ_DONE_WITH_SESSION, NULL, 0, 0);
#else
          (*pECB->ServerSupportFunction)(pECB->ConnID,
HSE_REQ_SEND_RESPONSE_HEADER, szHeader, &iSize,
(LPDWORD)szHeader1);
#endif

          (*pECB->WriteClient)(pECB->ConnID, szStr,
&lpbSize, 0);

          return;
}

/* FUNCTION: void h_printf(EXTENSION_CONTROL_BLOCK
*pECB, char *format, ...)
 *
 * PURPOSE:          This function forms a high level
printf for an HTML browser
 *
 * ARGUMENTS:        EXTENSION_CONTROL_BLOCK       *pECB
          passed in structure pointer from inetsrv.
 *                                    char
                    *format
          printf style format string
 *                                    ...
```

```
                    other arguments as required by
printf style format string.
 *
 * RETURNS:                    None
 *
 * COMMENTS:         This function is mainly used for
developmental support.
 */

static void h_printf(EXTENSION_CONTROL_BLOCK *pECB,
char *format, ...)
{
//        int lpbSize;
          char szBuff[512];
          char szTmp[512];

          va_list marker;
          va_start( marker, format );
          vsprintf(szTmp, format, marker);
          va_end( marker );

//        lpbSize = wsprintf(szBuff, "<html>%s</html>",
szTmp) + 1;
//
//        (*pECB->WriteClient)(pECB->ConnID, szBuff,
&lpbSize, 0);

          wsprintf(szBuff, "<html>%s</html>", szTmp) +
1;

          WriteZString(pECB, szBuff);

          return;
}

void LogTuxError( int TpErrno, char *ErrMessage )
{
          FILE *fp;
          SYSTEMTIME          systemTime;

          GetLocalTime(&systemTime);

          fp = fopen(szErrorLogPath, "ab");
          fprintf(fp, "\r\nError: %2.2d/%2.2d/%2.2d
%2.2d:%2.2d:%2.2d\r\n",
                    systemTime.wYear,
systemTime.wMonth, systemTime.wDay,
                    systemTime.wHour,
systemTime.wMinute, systemTime.wSecond);
          fprintf(fp, "Thread %d: TPCCWEB(%d): %s: %s",
                    GetCurrentThreadId(), TpErrno,
tpstrerror(TpErrno), ErrMessage);
          fclose(fp);
}

/* FUNCTION: void ErrorMessage(EXTENSION_CONTROL_BLOCK
*pECB, int iError, int iErrorType, char *szMsg)
 *
 * PURPOSE:          This function displays an error
message in the client browser.
 *
 * ARGUMENTS:        EXTENSION_CONTROL_BLOCK       *pECB
          passed in structure pointer from inetsrv.
 *                                   int
                    iError
          id of error message
 *                                   int
                    iErrorType
          error type, ERR_TYPE_SQL, ERR_TYPE_DBLIB, or
ERR_TYPE_WEBDLL
 *                                   int
                    iTermId
          terminal id from browser
 *                                   int
                    iSyncid
          sync id from browser
 *                                   char *
                    szMsg
          optional error message string used with
ERR_TYPE_SQL and
 *
                    ERR_TYPE_DBLIB
 *
 * RETURNS:                    None
 *
 * COMMENTS:         If the error type is
ERR_TYPE_WEBDLL the szmsg parameter may be NULL because
it
 *                                   is ignored. If
the error type is ERR_TYPE_SQL or ERR_TYPE_DBLIB then
the szMsg
 *                                   parameter
contains the text of the error message, so the szMsg
parameter cannot
 *                                   be NULL.
 *
 */

void ErrorMessage(EXTENSION_CONTROL_BLOCK *pECB, int
iError, int iErrorType, char *szMsg, int iTermId, int
iSyncId)
{
          int i;
          SYSTEMTIME          systemTime;

          static SERRORMSG errorMsgs[] =
          {
                    {         ERR_SUCCESS,

          "Success, no error."

                                                  },
                    {         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
corrisponding Item_Id."       },
                {
          ERR_NEWORDER_QTY_WITHOUT_ITEMID,
          "New Order Qty entered without a
corrisponding 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_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*\"."
          },
                    {         0,

                              ""


                                                        }
          };

          static char szNoMsg[] = "";
          char                *szForm;

          GetLocalTime(&systemTime);

          if ( !szMsg  )
                    szMsg = szNoMsg;

          if ( iTermId > 0 && IsValidTermId(iTermId) )
                    szForm =
Term.pClientData[iTermId].szBuffer; //if termid valid
use common terminal static buffer.
          else
                    szForm =
Term.pClientData[0].szBuffer; //else term id invalid so
use common terminal static buffer.
          switch(iErrorType)
          {
                    case ERR_TYPE_WEBDLL:
                              for(i=0;
errorMsgs[i].szMsg[0]; i++)
                              {
                                        if ( iError ==
errorMsgs[i].iError )

          break;
                              }
                              if (
!errorMsgs[i].szMsg[0] )
                                        i = 1;
                              strcpy(szForm,
          "<HTML><HEAD><TITLE>Welcome To TPC-
C</TITLE></HEAD><BODY><FORM ACTION=\"tpcc.dll\"
METHOD=\"GET\">");

          wsprintf(szForm+strlen(szForm), "<INPUT
TYPE=\"hidden\" NAME=\"STATUSID\" VALUE=\"%d\">",
iErrorType);

          wsprintf(szForm+strlen(szForm), "<INPUT
TYPE=\"hidden\" NAME=\"ERROR\" VALUE=\"%d\">", iError);

          wsprintf(szForm+strlen(szForm), "<INPUT
TYPE=\"hidden\" NAME=\"TERMID\" VALUE=\"%d\">",
iTermId);

          wsprintf(szForm+strlen(szForm), "<INPUT
TYPE=\"hidden\" NAME=\"SYNCID\" VALUE=\"%d\">",
iSyncId);

          wsprintf(szForm+strlen(szForm), "Error:
TPCCWEB(%d): %s", iError, errorMsgs[i].szMsg);
                              strcat(szForm,
"</FORM><BODY></HTML>");
                              WriteZString(pECB,
szForm);
                              break;
                    case ERR_TYPE_SQL:
                              strcpy(szForm,
          "<HTML><HEAD><TITLE>Welcome To TPC-
C</TITLE></HEAD><BODY><FORM ACTION=\"tpcc.dll\"
METHOD=\"GET\">");

          wsprintf(szForm+strlen(szForm), "<INPUT
TYPE=\"hidden\" NAME=\"STATUSID\" VALUE=\"%d\">",
iErrorType);

          wsprintf(szForm+strlen(szForm), "<INPUT
TYPE=\"hidden\" NAME=\"ERROR\" VALUE=\"%d\">", iError);

          wsprintf(szForm+strlen(szForm), "<INPUT
TYPE=\"hidden\" NAME=\"TERMID\" VALUE=\"%d\">",
iTermId);

          wsprintf(szForm+strlen(szForm), "<INPUT
TYPE=\"hidden\" NAME=\"SYNCID\" VALUE=\"%d\">",
iSyncId);

          wsprintf(szForm+strlen(szForm), "Error:
SQLSVR(%d): %s", iError, szMsg);
                              strcat(szForm,
"</FORM><BODY></HTML>");
                              WriteZString(pECB,
szForm);
                              break;
                    case ERR_TYPE_DBLIB:
                              strcpy(szForm,
          "<HTML><HEAD><TITLE>Welcome To TPC-
C</TITLE></HEAD><BODY><FORM ACTION=\"tpcc.dll\"
METHOD=\"GET\">");

          wsprintf(szForm+strlen(szForm), "<INPUT
TYPE=\"hidden\" NAME=\"STATUSID\" VALUE=\"%d\">",
iErrorType);

          wsprintf(szForm+strlen(szForm), "<INPUT
TYPE=\"hidden\" NAME=\"ERROR\" VALUE=\"%d\">", iError);

          wsprintf(szForm+strlen(szForm), "<INPUT
TYPE=\"hidden\" NAME=\"TERMID\" VALUE=\"%d\">",
iTermId);

          wsprintf(szForm+strlen(szForm), "<INPUT
TYPE=\"hidden\" NAME=\"SYNCID\" VALUE=\"%d\">",
iSyncId);

          wsprintf(szForm+strlen(szForm), "Error:
DBLIB(%d): %s", iError, szMsg);
                              strcat(szForm,
"</FORM><BODY></HTML>");
                              WriteZString(pECB,
szForm);
                              break;
                    case ERR_TYPE_ODBC:
                              strcpy(szForm,
          "<HTML><HEAD><TITLE>Welcome To TPC-
C</TITLE></HEAD><BODY><FORM ACTION=\"tpcc.dll\"
METHOD=\"GET\">");

          wsprintf(szForm+strlen(szForm), "<INPUT
TYPE=\"hidden\" NAME=\"STATUSID\" VALUE=\"%d\">",
iErrorType);

          wsprintf(szForm+strlen(szForm), "<INPUT
TYPE=\"hidden\" NAME=\"ERROR\" VALUE=\"%d\">", iError);

          wsprintf(szForm+strlen(szForm), "<INPUT
TYPE=\"hidden\" NAME=\"TERMID\" VALUE=\"%d\">",
iTermId);

          wsprintf(szForm+strlen(szForm), "<INPUT
TYPE=\"hidden\" NAME=\"SYNCID\" VALUE=\"%d\">",
iSyncId);

          wsprintf(szForm+strlen(szForm), "Error:
ODBC");
                              strcat(szForm,
"</FORM><BODY></HTML>");
                              WriteZString(pECB,
szForm);
                              break;
                    case ERR_TYPE_SOCKET:
                              strcpy(szForm,
          "<HTML><HEAD><TITLE>Welcome To TPC-
C</TITLE></HEAD><BODY><FORM ACTION=\"tpcc.dll\"
METHOD=\"GET\">");

          wsprintf(szForm+strlen(szForm), "<INPUT
```

```
TYPE=\"hidden\" NAME=\"STATUSID\" VALUE=\"%d\">",
iErrorType);

          wsprintf(szForm+strlen(szForm), "<INPUT
TYPE=\"hidden\" NAME=\"ERROR\" VALUE=\"%d\">", iError);

          wsprintf(szForm+strlen(szForm), "<INPUT
TYPE=\"hidden\" NAME=\"TERMID\" VALUE=\"%d\">",
iTermId);

          wsprintf(szForm+strlen(szForm), "<INPUT
TYPE=\"hidden\" NAME=\"SYNCID\" VALUE=\"%d\">",
iSyncId);

          wsprintf(szForm+strlen(szForm), "Error:
SOCKET");
                              strcat(szForm,
"</FORM><BODY></HTML>");
                              WriteZString(pECB,
szForm);
                              break;
                    case ERR_TYPE_DEADLOCK:
                              strcpy(szForm,
          "<HTML><HEAD><TITLE>Welcome To TPC-
C</TITLE></HEAD><BODY><FORM ACTION=\"tpcc.dll\"
METHOD=\"GET\">");

          wsprintf(szForm+strlen(szForm), "<INPUT
TYPE=\"hidden\" NAME=\"STATUSID\" VALUE=\"%d\">",
iErrorType);

          wsprintf(szForm+strlen(szForm), "<INPUT
TYPE=\"hidden\" NAME=\"ERROR\" VALUE=\"%d\">", iError);

          wsprintf(szForm+strlen(szForm), "<INPUT
TYPE=\"hidden\" NAME=\"TERMID\" VALUE=\"%d\">",
iTermId);

          wsprintf(szForm+strlen(szForm), "<INPUT
TYPE=\"hidden\" NAME=\"SYNCID\" VALUE=\"%d\">",
iSyncId);

          wsprintf(szForm+strlen(szForm), "Error:
Deadlock");
                              strcat(szForm,
"</FORM><BODY></HTML>");
                              WriteZString(pECB,
szForm);
                              break;
          }
          return;
}

/* FUNCTION: BOOL GetKeyValue(char *pQueryString, char
*pKey, char *pValue, int iMax)
 *
 * PURPOSE:          This function parses a http
formatted string for specific key values.
 *
 * ARGUMENTS:       char
          *pQueryString       http string from client
browser
 *                                        char
                    *pKey                           key
value to look for
 *                                        char
                    *pValue
          character array into which to place key's
value
 *                                        int
                              iMax
          maximum length of key value array.
 *
 * RETURNS:                   BOOL      FALSE     key
value not found
 *
          TRUE      key valud found
 *
 *
 * 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.
 */

static BOOL GetKeyValue(char *pQueryString, char *pKey,
char *pValue, int iMax)
{
          char *ptr;


          if ( !(ptr=strstr(pQueryString, pKey)) )
                    return FALSE;
          if ( !(ptr=strchr(ptr, '=')) )
                    return FALSE;
          ptr++;
          iMax--;
          while( *ptr && *ptr != '&' && iMax)
          {
                    *pValue++ = *ptr++;
                    iMax--;
          }
          *pValue = 0;
          return TRUE;
}

/* FUNCTION: void TermInit(void)
 *
 * PURPOSE:          This function initializes the
client ternimal structure it is called when the
TPCC.DLL
 *                              is first loaded by the
inet service.
 *
 * ARGUMENTS:        none
 *
 * RETURNS:                   None
 *
 * COMMENTS:         None
 *
 */

static void TermInit(void)
{
          if ( Term.bInit )
                    return;
          Term.iNext                                  = 0;
          Term.iMasterSyncId  = 1;

          Term.iAvailable               = 0;
          Term.pClientData    = NULL;
          Term.bInit                                  =
TRUE;

          return;
}

/* FUNCTION: void TermRestore(void)
 *
 * PURPOSE:          This function frees allocated
resources associated with the terminal structure.
 *
 * ARGUMENTS:        none
 *
 * RETURNS:                   None
 *
 * COMMENTS:         This function is called only with
the inet service unloads the TPCC.DLL
 *
 */

static void TermRestore(void)
{
          Term.iNext                                  = 0;
          Term.iAvailable               = 0;
          Term.iMasterSyncId  = 0;
          if ( Term.pClientData )
                    free(Term.pClientData);
          Term.pClientData    = NULL;
          Term.bInit                                  =
FALSE;


          return;
}

/* FUNCTION: int TermAllocate(void)
 *
 * PURPOSE:          This function allocates more
terminal array entries in the Term structure.
 *
 * ARGUMENTS:   None
 *
 * RETURNS:                   int       TRUE or 1 if
sucessfull
 *                                        int       FALSE
or 0 if terminal id cannot be allocated.
 *
 * COMMENTS:         None
 *
 */

static int TermAllocate(void)
{
          Term.iAvailable += 32;
          if ( !Term.pClientData )
                    Term.pClientData =
(PCLIENTDATA)malloc(Term.iAvailable *
sizeof(CLIENTDATA));
          else
                    Term.pClientData =
(PCLIENTDATA)realloc(Term.pClientData, Term.iAvailable
* sizeof(CLIENTDATA));
          return ( Term.pClientData ) ? 1 : 0;
}
```

```
/* FUNCTION: int TermAdd(EXTENSION_CONTROL_BLOCK *pECB,
char *pQueryString)
 *
 * PURPOSE:         This function assigns a terminal id
which is used to identify a client browser.
 *
 * ARGUMENTS:       EXTENSION_CONTROL_BLOCK       *pECB
                           passed in structure
pointer from inetsrv.
 *                                    char
                                      *pQueryString
          http query string passed to this DLL.
 *
 * RETURNS:                  int
          assigned terminal id
 *                                                  -1
          cannot assign id error occured.
 *
 *
 * COMMENTS:        if the terminal id cannot be
assigned it is because of insufficient memory or the
 *                                    SQL connection
cannot be allocated.
 *
 */

static int TermAdd(EXTENSION_CONTROL_BLOCK *pECB, char
*pQueryString)
{
          char      szTmp[32];
          int                 i, iCurrent,
iTotalConnections, iTickCount;

          EnterCriticalSection(&CriticalSection);

          for(i=0, iTotalConnections = 0;
i<Term.iAvailable; i++)
          {
                    if ( Term.pClientData[i].inUse )
                              iTotalConnections++;
          }

          if ( iTotalConnections >= iMaxConnections )
          {
                    for(iCurrent = 1, i=1, iTickCount =
0x7FFFFFFF; i<iMaxConnections; i++)
                    {
                              if ( iTickCount >
Term.pClientData[i].iTickCount )
                              {
                                        iTickCount =
Term.pClientData[i].iTickCount;
                                        iCurrent = i;
                              }
                    }
          }
          else
          {
                    for(i=0; i<Term.iAvailable; i++)
                    {
                              if (
!Term.pClientData[i].inUse )
                                        break;
                    }
                    iCurrent = i;
          }

          if ( i == Term.iAvailable )
          {
                    Term.iNext = Term.iAvailable;
                    if ( !(*Term.Allocate)() )
                              goto TermAddErr1;
                    for(i=Term.iNext;
i<Term.iAvailable; i++)
                              Term.pClientData[i].inUse
= 0;
                    iCurrent = Term.iNext;
          }

          Term.pClientData[iCurrent].inUse = 1;

          if ( !GetKeyValue(pQueryString, "w_id",
szTmp, sizeof(szTmp)) )
                    goto TermAddErr1;

          Term.pClientData[iCurrent].w_id =
(short)atoi(szTmp);

          if ( !GetKeyValue(pQueryString, "d_id",
szTmp, sizeof(szTmp)) )
                    goto TermAddErr1;

          Term.pClientData[iCurrent].d_id =
atoi(szTmp);

          Term.pClientData[iCurrent].iTickCount =
GetTickCount();
          Term.pClientData[iCurrent].iSyncId =
Term.iMasterSyncId++;

          if ( Init(pECB, iCurrent,
Term.pClientData[iCurrent].iSyncId, szServer, szUser,
szPassword, szDatabase) )
          {
                    (*Term.Delete)(pECB, iCurrent);
                    goto TermAddErr1;
          }

          LeaveCriticalSection(&CriticalSection);
          return iCurrent;

TermAddErr1:
          LeaveCriticalSection(&CriticalSection);
          return -1;          //terminal unsuccessfully
added
}

/* FUNCTION: void TermDelete(EXTENSION_CONTROL_BLOCK
*pECB, int id)
 *
 * PURPOSE:          This function makes a terminal
entry in the Term array available for reuse.
 *
 * ARGUMENTS:       EXTENSION_CONTROL_BLOCK       *pECB
          passed in structure pointer from inetsrv.
 *                                    int
                                                  id
                    Terminal id of client exiting
 *
 * RETURNS:                  None
 *
 * COMMENTS:        None
 *
 */

static void TermDelete(EXTENSION_CONTROL_BLOCK *pECB,
int id)
{
          if ( id >= 0 && id < Term.iAvailable )
          {
                    Close(pECB, id, -1);
                    Term.pClientData[id].inUse = 0;

#ifndef LOCAL_ALLOC
                    tpfree((char
*)Term.pClientData[id].TuxDataPtr);
#endif  // Not LOCAL_ALLOC

          }

          return;
}

/* FUNCTION: BOOL Init(EXTENSION_CONTROL_BLOCK *pECB,
int iTermId, int iSyncId, char *szServer, char *szUser,
char *szPassword, char *szDatabase)
 *
 * PURPOSE:          This function initializes the sql
connection for use.
 *
 * ARGUMENTS:       EXTENSION_CONTROL_BLOCK       *pECB
                    passed in structure pointer from
inetsrv.
 *                                    int

          iTermId             id of browser client that
this connection is for.
 *                                    int

          iSyncId             sync id for this client
session
 *                                    char
                                      *szServer sql
server name
 *                                    char
                                      *szUser
          user name
 *                                    char
                                      *szPassword
          user password
 *                                    char
                                      *szDatabase
          database to use
 *
 * RETURNS:                  BOOL      FALSE     if
successfull
 *
          TRUE      if an error occurs and connection
cannot be established.
 *
 * COMMENTS:        None
 *
 */

BOOL Init(EXTENSION_CONTROL_BLOCK *pECB, int iTermId,
int iSyncId, char *szServer, char *szUser, char
*szPassword, char *szDatabase)
{
```

```
          char      szApp[32];
#ifndef LOCAL_ALLOC
          char      buf[64];
          int                 TpRc;
#endif // Not LOCAL_ALLOC

          sprintf(szApp, "TPCC:%ld", (int)iTermId);

          Term.pClientData[iTermId].dbproc = NULL;

#ifndef LOCAL_ALLOC // Globally allocate tuxedo
structures

                    if ( dLog )
                    {
                              FILE *fp;
                              fp = fopen(szTpccLogPath,
"ab");
                              fprintf(fp,
"Sizeof(TUX_DATA) %d \r\n", sizeof(TUX_DATA));
                              fprintf(fp,
"Sizeof(NEW_ORDER_DATA) %d \r\n",
sizeof(NEW_ORDER_DATA));
                              fprintf(fp,
"Sizeof(PAYMENT_DATA) %d \r\n", sizeof(PAYMENT_DATA));
                              fprintf(fp,
"Sizeof(ORDER_STATUS_DATA) %d \r\n",
sizeof(ORDER_STATUS_DATA));
                              fprintf(fp,
"Sizeof(DELIVERY_DATA) %d \r\n",
sizeof(DELIVERY_DATA));
                              fprintf(fp,
"Sizeof(STOCK_LEVEL_DATA) %d \r\n",
sizeof(STOCK_LEVEL_DATA));
                              fclose(fp);
                    }

//        Add initialization of Tuxedo Structures

                    if
((Term.pClientData[iTermId].TuxDataPtr = (TUX_DATA
*)tpalloc("CARRAY", NULL, sizeof(TUX_DATA))) == NULL)
                    {
                              TpRc = tperrno;
                              sprintf(buf, "Tuxedo
tpalloc failed:");
                              LogTuxError(TpRc, buf);
                              ErrorMessage(pECB,
ERR_CANNOT_INIT_TERMINAL, ERR_TYPE_WEBDLL, NULL,
iTermId, iSyncId);
                              return TRUE;
                    }

                    if ( dLog )
                    {
                              FILE *fp;


                              fp = fopen(szTpccLogPath,
"ab");

                              fprintf(fp, "Thread %d
iTermId %d *  TuxDataPtr: %x \r\n",

          GetCurrentThreadId(), iTermId,
&Term.pClientData[iTermId].TuxDataPtr);
                              fclose(fp);
                    }

#endif // LOCAL_ALLOC

          return FALSE;
}

/* FUNCTION: BOOL Close(EXTENSION_CONTROL_BLOCK
          *pECB, int iTermId, int iSyncId)
 *
 * PURPOSE:          This function closes the sql
connection for use.
 *
 * ARGUMENTS:        EXTENSION_CONTROL_BLOCK       *pECB
          passed in structure pointer from inetsrv.
 *                                  int

          iTermId   id of browser client that this
connection is for.
 *                                  int

          iSyncId   sync id of client browser
 *
 * RETURNS:                  BOOL      FALSE     if
successfull
 *
          TRUE      if an error occurs and connection
cannot be terminated.
 *
 * COMMENTS:         None
 *
 */

static BOOL Close(EXTENSION_CONTROL_BLOCK *pECB, int
iTermId, int iSyncId)
{
          PECBINFO  pEcbInfo;

          if (Term.pClientData[iTermId].dbproc != NULL)
          {
                    if ( (pEcbInfo =
(PECBINFO)dbgetuserdata(Term.pClientData[iTermId].dbpro
c)) )
                    {
                              pEcbInfo->iTermId = -1;
                              pEcbInfo->iSyncId = -1;
                              free(pEcbInfo);
          //free up user info
                    }
//                  return SQLCloseConnection(pECB,
Term.pClientData[iTermId].dbproc);
                    return 1;
          }

          UNUSEDPARAM(iSyncId);
}


/* 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 placed
 *                                        char
          *szPic    picture string which describes how
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.
 *
 */

static 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: char *MakeStockLevelForm(int iTermId, int
iSyncId, BOOL bInput)
 *
 * PURPOSE:          This function constructs the Stock
Level HTML page.
 *
 * ARGUMENTS:        int
          iTermId   client browser terminal id
 *                                  int
                              iSyncId   client browser
sync id
 *                                  BOOL
                    bInput    TRUE if form is being
constructed for input else FALSE
 *
 * RETURNS:                  char *
          A pointer to buffer inside client structure
where HTML form is built.
 *
 * COMMENTS:         The internal client buffer is
created when the terminal id is assigned and should not
 *                                  be freed except
when the client terminal id is no longer needed.
 */
```

```
static char *MakeStockLevelForm(int iTermId, int
iSyncId, BOOL bInput)
{
          char      *szForm;

          szForm = (char
*)Term.pClientData[iTermId].szBuffer;

          Term.pClientData[iTermId].StockLevelData.w_id
                                =
(short)Term.pClientData[iTermId].w_id;
          Term.pClientData[iTermId].StockLevelData.d_id
                                =
(short)Term.pClientData[iTermId].d_id;
          Term.pClientData[iTermId].StockLevelData.num_
deadlocks = 0;

          strcpy(szForm, "<HTML><HEAD><TITLE>TPC-C
Stock Level</TITLE></HEAD>");
          strcat(szForm, "<FORM ACTION=\"tpcc.dll\"
METHOD=\"GET\">");
          if ( bInput )
                    strcat(szForm, "<INPUT
TYPE=\"hidden\" NAME=\"PI*\" VALUE=\"\">");
          strcat(szForm, "<INPUT TYPE=\"hidden\"
NAME=\"STATUSID\" VALUE=\"0\">");
          strcat(szForm, "<INPUT TYPE=\"hidden\"
NAME=\"ERROR\" VALUE=\"0\">");
          wsprintf(szForm+strlen(szForm), "<INPUT
TYPE=\"hidden\" NAME=\"FORMID\" VALUE=\"%d\">",
STOCK_LEVEL_FORM);
          wsprintf(szForm+strlen(szForm), "<INPUT
TYPE=\"hidden\" NAME=\"TERMID\" VALUE=\"%d\">",
iTermId);
          wsprintf(szForm+strlen(szForm), "<INPUT
TYPE=\"hidden\" NAME=\"SYNCID\" VALUE=\"%d\">",
iSyncId);
          strcat(szForm, "<PRE>
Stock-Level<BR>");
          wsprintf(szForm+strlen(szForm), "Warehouse:
%4.4d   District: %2.2d<BR><BR>",
Term.pClientData[iTermId].StockLevelData.w_id,
Term.pClientData[iTermId].StockLevelData.d_id);
          if ( bInput )
          {
                    strcat(szForm,      "Stock Level
Threshold: <INPUT NAME=\"TT*\" SIZE=2><BR><BR>"

          "low stock:    <BR><HR>"

          "<INPUT TYPE=\"submit\" NAME=\"CMD\"
VALUE=\"Process\">"

          "<INPUT TYPE=\"submit\" NAME=\"CMD\"
VALUE=\"Menu\">" );
          }
          else
          {
                    wsprintf(szForm+strlen(szForm),
"Stock Level Threshold: %2.2d<BR><BR>",
Term.pClientData[iTermId].StockLevelData.thresh_hold);

                    wsprintf(szForm+strlen(szForm),
"low stock: %3.3d</PRE><BR><HR>",
Term.pClientData[iTermId].StockLevelData.low_stock);
                    strcat(szForm,      "<INPUT
TYPE=\"submit\" NAME=\"CMD\" VALUE=\"..NewOrder..\">"

          "<INPUT TYPE=\"submit\" NAME=\"CMD\"
VALUE=\"..Payment..\">"

          "<INPUT TYPE=\"submit\" NAME=\"CMD\"
VALUE=\"..Delivery..\">"

          "<INPUT TYPE=\"submit\" NAME=\"CMD\"
VALUE=\"..Order-Status..\">"

          "<INPUT TYPE=\"submit\" NAME=\"CMD\"
VALUE=\"..Stock-Level..\">"

          "<INPUT TYPE=\"submit\" NAME=\"CMD\"
VALUE=\"..Exit..\">" );
          }

          strcat(szForm, "</FORM></HTML>");

          return szForm;
}

/* FUNCTION: char *MakeMainMenuForm(int iTermId, int
iSyncId)
 *
 * PURPOSE:         This function
 *
 * ARGUMENTS:       int
          iTermId   client browser terminal id
 *                                   int
                              iSyncId   client browser
sync id
 *
 * RETURNS:                  char *
          A pointer to buffer inside client structure
where HTML form is built.
 *
 * COMMENTS:        The internal client buffer is
created when the terminal id is assigned and should not
 *                                 be freed except
when the client terminal id is no longer needed.
 */

static char *MakeMainMenuForm(int iTermId, int iSyncId)
{
          char      *szForm;

          szForm = (char
*)Term.pClientData[iTermId].szBuffer;

          strcpy(szForm,      "<HTML><HEAD><TITLE>TPC-C
Main Menu</TITLE></HEAD><BODY>"

          "Select Desired Transaction.<BR><HR>"

          "<FORM ACTION=\"tpcc.dll\" METHOD=\"GET\">");
          strcat(szForm, "<INPUT TYPE=\"hidden\"
NAME=\"STATUSID\" VALUE=\"0\">");
          strcat(szForm, "<INPUT TYPE=\"hidden\"
NAME=\"ERROR\" VALUE=\"0\">");
          wsprintf(szForm+strlen(szForm), "<INPUT
TYPE=\"hidden\" NAME=\"TERMID\" VALUE=\"%d\">",
iTermId);
          wsprintf(szForm+strlen(szForm), "<INPUT
TYPE=\"hidden\" NAME=\"SYNCID\" VALUE=\"%d\">",
iSyncId);
          wsprintf(szForm+strlen(szForm), "<INPUT
TYPE=\"hidden\" NAME=\"FORMID\" VALUE=\"%d\">",
MAIN_MENU_FORM);
          strcat(szForm,      "<INPUT TYPE=\"submit\"
NAME=\"CMD\" VALUE=\"..NewOrder..\">"

          "<INPUT TYPE=\"submit\" NAME=\"CMD\"
VALUE=\"..Payment..\">"

          "<INPUT TYPE=\"submit\" NAME=\"CMD\"
VALUE=\"..Delivery..\">"

          "<INPUT TYPE=\"submit\" NAME=\"CMD\"
VALUE=\"..Order-Status..\">"

          "<INPUT TYPE=\"submit\" NAME=\"CMD\"
VALUE=\"..Stock-Level..\">"

          "<INPUT TYPE=\"submit\" NAME=\"CMD\"
VALUE=\"..Exit..\">"

          "</FORM>"

          "</HTML>" );

          return szForm;
}

/* FUNCTION: char *MakeWelcomeForm(void)
 *
 * PURPOSE:         This function
 *
 * ARGUMENTS:   None
 *
 * RETURNS:                  char *
          A pointer to the static HTML welcome form.
 *
 * COMMENTS:        The welcome form is static.
 */

static char *MakeWelcomeForm(void)
{
          return szWelcomeForm;
}

/* FUNCTION: char *MakeNewOrderForm(int iTermId, int
SyncId, BOOL Rollback, BOOL bInput, BOOL bValid)
 *
 * PURPOSE:         This function
 *
 * ARGUMENTS:       int
          iTermId   client browser terminal id
 *                                   int
                              iSyncId   client browser
sync id
 *                                   BOOL
                    bInput    TRUE if form is being
constructed for input else FALSE
 *                                   BOOL
                    bValid    TRUE if NewOrderData
valid, ELSE FALSE effects output only
 *
 * RETURNS:                  char *
          A pointer to buffer inside client structure
where HTML form is built.
```

```
 *
 * COMMENTS:        The internal client buffer is
created when the terminal id is assigned and should not
 *                                      be freed except
when the client terminal id is no longer needed.
 */

static char *MakeNewOrderForm(int iTermId, int iSyncId,
BOOL Rollback, BOOL bInput, BOOL bValid)
{
          char      *szForm;
          char      szName[146];
          char      szCredit[14];
          int                 i;

          szForm = (char
*)Term.pClientData[iTermId].szBuffer;

          Term.pClientData[iTermId].NewOrderData.w_id =
Term.pClientData[iTermId].w_id;

          strcpy(szForm,      "<HTML>"

          "<HEAD><TITLE>TPC-C New
Order</TITLE></HEAD><BODY>"

          "<FORM ACTION=\"tpcc.dll\" METHOD=\"GET\">"
);

          if ( bInput )
          {
                    strcat(szForm, "<INPUT
TYPE=\"hidden\" NAME=\"PI*\" VALUE=\"\">");
                    strcat(szForm, "<INPUT
TYPE=\"hidden\" NAME=\"STATUSID\" VALUE=\"0\">");
          }
          else
          {
                    if ( bValid )
                              strcat(szForm, "<INPUT
TYPE=\"hidden\" NAME=\"STATUSID\" VALUE=\"0\">");
                    else

          wsprintf(szForm+strlen(szForm), "<INPUT
TYPE=\"hidden\" NAME=\"STATUSID\" VALUE=\"%d\">",
ERR_BAD_ITEM_ID);
          }

          if (Rollback == FALSE)
                    strcat(szForm, "<INPUT
TYPE=\"hidden\" NAME=\"ERROR\" VALUE=\"0\">");
          else
                    strcat(szForm, "<INPUT
TYPE=\"hidden\" NAME=\"ERROR\" VALUE=\"1\">");

          wsprintf(szForm+strlen(szForm), "<INPUT
TYPE=\"hidden\" NAME=\"FORMID\" VALUE=\"%d\">",
NEW_ORDER_FORM);
          wsprintf(szForm+strlen(szForm),
          "<INPUT TYPE=\"hidden\" NAME=\"TERMID\"
VALUE=\"%d\">", iTermId);
          wsprintf(szForm+strlen(szForm), "<INPUT
TYPE=\"hidden\" NAME=\"SYNCID\" VALUE=\"%d\">",
iSyncId);
          strcat(szForm, "<PRE>
New Order<BR>");

          if ( bInput )
          {
                    wsprintf(szForm+strlen(szForm),
"Warehouse: %4.4d   District: <INPUT NAME=\"DID*\"
SIZE=1>                      Date:<BR>",
Term.pClientData[iTermId].NewOrderData.w_id);
                    strcat(szForm,      "Customer:
<INPUT NAME=\"CID*\" SIZE=4>   Name:
Credit:      %Disc:<BR>"

          "Order Number:           Number of Lines:
W_tax:         D_tax:<BR><BR>"

          " Supp_W  Item_Id  Item Name
Qty  Stock  B/G  Price    Amount<BR>"

          " <INPUT NAME=\"SP00*\" SIZE=4>  <INPUT
NAME=\"IID00*\" SIZE=6>
<INPUT NAME=\"Qty00*\" SIZE=1><BR>"

          " <INPUT NAME=\"SP01*\" SIZE=4>  <INPUT
NAME=\"IID01*\" SIZE=6>
<INPUT NAME=\"Qty01*\" SIZE=1><BR>"

          " <INPUT NAME=\"SP02*\" SIZE=4>  <INPUT
NAME=\"IID02*\" SIZE=6>
<INPUT NAME=\"Qty02*\" SIZE=1><BR>"

          " <INPUT NAME=\"SP03*\" SIZE=4>  <INPUT
NAME=\"IID03*\" SIZE=6>
<INPUT NAME=\"Qty03*\" SIZE=1><BR>"

          " <INPUT NAME=\"SP04*\" SIZE=4>  <INPUT
NAME=\"IID04*\" SIZE=6>
<INPUT NAME=\"Qty04*\" SIZE=1><BR>"

          " <INPUT NAME=\"SP05*\" SIZE=4>  <INPUT
NAME=\"IID05*\" SIZE=6>
<INPUT NAME=\"Qty05*\" SIZE=1><BR>"

          " <INPUT NAME=\"SP06*\" SIZE=4>  <INPUT
NAME=\"IID06*\" SIZE=6>
<INPUT NAME=\"Qty06*\" SIZE=1><BR>"

          " <INPUT NAME=\"SP07*\" SIZE=4>  <INPUT
NAME=\"IID07*\" SIZE=6>
<INPUT NAME=\"Qty07*\" SIZE=1><BR>"

          " <INPUT NAME=\"SP08*\" SIZE=4>  <INPUT
NAME=\"IID08*\" SIZE=6>
<INPUT NAME=\"Qty08*\" SIZE=1><BR>"

          " <INPUT NAME=\"SP09*\" SIZE=4>  <INPUT
NAME=\"IID09*\" SIZE=6>
<INPUT NAME=\"Qty09*\" SIZE=1><BR>"

          " <INPUT NAME=\"SP10*\" SIZE=4>  <INPUT
NAME=\"IID10*\" SIZE=6>
<INPUT NAME=\"Qty10*\" SIZE=1><BR>"

          " <INPUT NAME=\"SP11*\" SIZE=4>  <INPUT
NAME=\"IID11*\" SIZE=6>
<INPUT NAME=\"Qty11*\" SIZE=1><BR>"

          " <INPUT NAME=\"SP12*\" SIZE=4>  <INPUT
NAME=\"IID12*\" SIZE=6>
<INPUT NAME=\"Qty12*\" SIZE=1><BR>"

          " <INPUT NAME=\"SP13*\" SIZE=4>  <INPUT
NAME=\"IID13*\" SIZE=6>
<INPUT NAME=\"Qty13*\" SIZE=1><BR>"

          " <INPUT NAME=\"SP14*\" SIZE=4>  <INPUT
NAME=\"IID14*\" SIZE=6>
<INPUT NAME=\"Qty14*\" SIZE=1><BR>"

          "Execution Status:
Total:<BR><HR>"

          "<INPUT TYPE=\"submit\" NAME=\"CMD\"
VALUE=\"Process\">"

          "<INPUT TYPE=\"submit\" NAME=\"CMD\"
VALUE=\"Menu\">"

          "</FORM>"

          "</HTML>" );

          }
          else
          {
                    if ( bValid )
                    {

          wsprintf(szForm+strlen(szForm), "Warehouse:
%4.4d   District: %2.2d                    Date:
%2.2d-%2.2d-%4.4d %2.2d:%2.2d:%2.2d <BR>",

          Term.pClientData[iTermId].NewOrderData.w_id,

          Term.pClientData[iTermId].NewOrderData.d_id,

          Term.pClientData[iTermId].NewOrderData.o_entr
y_d.day,

          Term.pClientData[iTermId].NewOrderData.o_entr
y_d.month,

          Term.pClientData[iTermId].NewOrderData.o_entr
y_d.year,

          Term.pClientData[iTermId].NewOrderData.o_entr
y_d.hour,

          Term.pClientData[iTermId].NewOrderData.o_entr
y_d.minute,

          Term.pClientData[iTermId].NewOrderData.o_entr
y_d.second);
                    }
                    else
                    {

          wsprintf(szForm+strlen(szForm), "Warehouse:
%4.4d   District: %2.2d
Date:<BR>",

          Term.pClientData[iTermId].NewOrderData.w_id,
```

```
          Term.pClientData[iTermId].NewOrderData.d_id);
                    }

                    FormatHTMLString(szName,
Term.pClientData[iTermId].NewOrderData.c_last, 16),
                    FormatHTMLString(szCredit,
Term.pClientData[iTermId].NewOrderData.c_credit, 2);

                    wsprintf(szForm+strlen(szForm),
"Customer:  %4.4d   Name: %s   Credit: %s   ",

          Term.pClientData[iTermId].NewOrderData.c_id,
szName, szCredit);


                    if ( bValid )
                    {

          sprintf(szForm+strlen(szForm), "%%Disc: %5.2f
<BR>",
Term.pClientData[iTermId].NewOrderData.c_discount);

          sprintf(szForm+strlen(szForm), "Order Number:
%8.8d  Number of Lines: %2.2d        W_tax: %5.2f
D_tax: %5.2f  <BR><BR>",

          Term.pClientData[iTermId].NewOrderData.o_id,

          Term.pClientData[iTermId].NewOrderData.o_ol_c
nt,

          Term.pClientData[iTermId].NewOrderData.w_tax,

          Term.pClientData[iTermId].NewOrderData.d_tax)
;

                              strcat(szForm, " Supp_W
Item_Id  Item Name                Qty  Stock  B/G
Price    Amount<BR>");
                              for(i=0;
i<Term.pClientData[iTermId].NewOrderData.o_ol_cnt; i++)
                              {

          FormatHTMLString(szName,
Term.pClientData[iTermId].NewOrderData.Ol[i].ol_i_name,
24);


          sprintf(szForm+strlen(szForm), "  %4.4d
%6.6d   %s  %2.2d    %3.3d    %1.1s   $%6.2f  $%7.2f
<BR>",

          Term.pClientData[iTermId].NewOrderData.Ol[i].
ol_supply_w_id,

          Term.pClientData[iTermId].NewOrderData.Ol[i].
ol_i_id,

          szName,

          Term.pClientData[iTermId].NewOrderData.Ol[i].
ol_quantity,

          Term.pClientData[iTermId].NewOrderData.Ol[i].
ol_stock,

          Term.pClientData[iTermId].NewOrderData.Ol[i].
ol_brand_generic,

          Term.pClientData[iTermId].NewOrderData.Ol[i].
ol_i_price,

          Term.pClientData[iTermId].NewOrderData.Ol[i].
ol_amount );
                              }
                    }
                    else
                    {
                              strcat(szForm,
"%Disc:<BR>");

          sprintf(szForm+strlen(szForm), "Order Number:
%8.8d  Number of Lines:              W_tax:
D_tax:<BR><BR>",

          Term.pClientData[iTermId].NewOrderData.o_id);

                              strcat(szForm, " Supp_W
Item_Id  Item Name                Qty  Stock  B/G
Price    Amount<BR>");

                              i = 0;
                    }
                    for(; i<15; i++)
                              strcat(szForm, "<BR>");

                    if ( bValid )
                    {

          sprintf(szForm+strlen(szForm), "Execution
Status: %24.24s                   Total:  $%8.2f  ",

          Term.pClientData[iTermId].NewOrderData.execut
ion_status,

          Term.pClientData[iTermId].NewOrderData.total_
amount);
                    }
                    else
                    {

          sprintf(szForm+strlen(szForm), "Execution
Status: %24.24s                   Total:",

          Term.pClientData[iTermId].NewOrderData.execut
ion_status);
                    }

                    strcat(szForm,
          "</PRE><HR><BR>"

          "<INPUT TYPE=\"submit\" NAME=\"CMD\"
VALUE=\"..NewOrder..\">"

          "<INPUT TYPE=\"submit\" NAME=\"CMD\"
VALUE=\"..Payment..\">"

          "<INPUT TYPE=\"submit\" NAME=\"CMD\"
VALUE=\"..Delivery..\">"

          "<INPUT TYPE=\"submit\" NAME=\"CMD\"
VALUE=\"..Order-Status..\">"

          "<INPUT TYPE=\"submit\" NAME=\"CMD\"
VALUE=\"..Stock-Level..\">"

          "<INPUT TYPE=\"submit\" NAME=\"CMD\"
VALUE=\"..Exit..\">" );
                    strcat(szForm, "</FORM></HTML>");
          }

          return szForm;

}

/* FUNCTION: char *MakePaymentForm(int iTermId, int
iSyncId, BOOL bInput)
 *
 * PURPOSE:          This function
 *
 * ARGUMENTS:        int
          iTermId   client browser terminal id
 *                                        int
                              iSyncId   client browser
sync id
 *                                        BOOL
                    bInput    TRUE if form is being
constructed for input else FALSE
 *
 * RETURNS:                   char *
          A pointer to buffer inside client structure
where HTML form is built.
 *
 * COMMENTS:         The internal client buffer is
created when the terminal id is assigned and should not
 *                                        be freed except
when the client terminal id is no longer needed.
 */

static char *MakePaymentForm(int iTermId, int iSyncId,
BOOL bInput)
{
          char      *szForm;
          char      *ptr;
          char      szTmp[64];
          char      szW_Zip[26];
          char      szD_Zip[26];
          char      szC_Zip[26];
          char      szC_Phone[26];
          char      szTmpStr1[122];
          char      szTmpStr2[122];
          char      szTmpStr3[122];
          char      szTmpStr4[122];
          int                 i;
          int                 l;
          char      *szZipPic = "XXXXX-XXXX";

          szForm = (char
*)Term.pClientData[iTermId].szBuffer;

          Term.pClientData[iTermId].PaymentData.w_id =
Term.pClientData[iTermId].w_id;

          strcpy(szForm,      "<HTML><HEAD><TITLE>TPC-C
Payment</TITLE></HEAD><BODY>"

          "<FORM ACTION=\"tpcc.dll\" METHOD=\"GET\">");
```

```
          if ( bInput )
                    strcat(szForm, "<INPUT
TYPE=\"hidden\" NAME=\"PI*\" VALUE=\"\">");

          strcat(szForm, "<INPUT TYPE=\"hidden\"
NAME=\"STATUSID\" VALUE=\"0\">");
          strcat(szForm, "<INPUT TYPE=\"hidden\"
NAME=\"ERROR\" VALUE=\"0\">");
          wsprintf(szForm+strlen(szForm), "<INPUT
TYPE=\"hidden\" NAME=\"FORMID\" VALUE=\"%d\">",
PAYMENT_FORM);
          wsprintf(szForm+strlen(szForm), "<INPUT
TYPE=\"hidden\" NAME=\"TERMID\" VALUE=\"%d\">",
iTermId);
          wsprintf(szForm+strlen(szForm), "<INPUT
TYPE=\"hidden\" NAME=\"SYNCID\" VALUE=\"%d\">",
iSyncId);

          strcat(szForm,      "<PRE>
Payment<BR>");

          if ( bInput )
                    strcat(szForm,      "Date:<BR><BR>"
);
          else
          {
                    wsprintf(szForm+strlen(szForm),
"Date: %2.2d-%2.2d-%4.4d %2.2d:%2.2d:%2.2d <BR><BR>",

          Term.pClientData[iTermId].PaymentData.h_date.
day,

          Term.pClientData[iTermId].PaymentData.h_date.
month,

          Term.pClientData[iTermId].PaymentData.h_date.
year,

          Term.pClientData[iTermId].PaymentData.h_date.
hour,

          Term.pClientData[iTermId].PaymentData.h_date.
minute,

          Term.pClientData[iTermId].PaymentData.h_date.
second);
          }
          wsprintf(szForm+strlen(szForm), "Warehouse:
%4.4d", Term.pClientData[iTermId].PaymentData.w_id);

          if ( bInput )
          {
                    strcat(szForm,      "
District: <INPUT NAME=\"DID*\"
SIZE=1><BR><BR><BR><BR><BR>"

          "Customer: <INPUT NAME=\"CID*\" SIZE=4>"

          "Cust-Warehouse: <INPUT NAME=\"CWI*\" SIZE=4>
"

          "Cust-District: <INPUT NAME=\"CDI*\"
SIZE=1><BR>"

          "Name:                         <INPUT
NAME=\"CLT*\" SIZE=16>                    Since:<BR>"

          "
Credit:<BR>"

          "
Disc:<BR>"

          "
Phone:<BR><BR>"

          "Amount Paid:          $<INPUT NAME=\"HAM*\"
SIZE=7>      New Cust Balance:<BR>"

          "Credit Limit:<BR><BR>Cust-Data:
<BR><BR><BR><BR></PRE><HR>"

          "<INPUT TYPE=\"submit\" NAME=\"CMD\"
VALUE=\"Process\"><INPUT TYPE=\"submit\" NAME=\"CMD\"
VALUE=\"Menu\">"

          "</BODY></FORM></HTML>" );
          }
          else
          {
                    sprintf(szForm+strlen(szForm),
          "                          District:
%2.2d<BR>",

          Term.pClientData[iTermId].PaymentData.d_id);

                    FormatHTMLString(szTmpStr1,
Term.pClientData[iTermId].PaymentData.w_street_1, 20);
                    FormatHTMLString(szTmpStr2,
Term.pClientData[iTermId].PaymentData.d_street_1, 20);

                    sprintf(szForm+strlen(szForm),"%s
%s<BR>", szTmpStr1, szTmpStr2);

                    FormatHTMLString(szTmpStr1,
Term.pClientData[iTermId].PaymentData.w_street_2, 20);
                    FormatHTMLString(szTmpStr2,
Term.pClientData[iTermId].PaymentData.d_street_2, 20);

                    sprintf(szForm+strlen(szForm),"%s
%s<BR>", szTmpStr1, szTmpStr2);

                    FormatString(szW_Zip, szZipPic,
Term.pClientData[iTermId].PaymentData.w_zip);
                    FormatString(szD_Zip, szZipPic,
Term.pClientData[iTermId].PaymentData.d_zip);

                    FormatHTMLString(szTmpStr1,
Term.pClientData[iTermId].PaymentData.w_city, 20);
                    FormatHTMLString(szTmpStr2,
Term.pClientData[iTermId].PaymentData.w_state, 2);
                    FormatHTMLString(szTmpStr3,
Term.pClientData[iTermId].PaymentData.d_city, 20);
                    FormatHTMLString(szTmpStr4,
Term.pClientData[iTermId].PaymentData.d_state, 2);

                    wsprintf(szForm+strlen(szForm), "%s
%s %10.10s       %s %s %10.10s<BR><BR>",
                              szTmpStr1, szTmpStr2,
szW_Zip, szTmpStr3, szTmpStr4, szD_Zip );

                    wsprintf(szForm+strlen(szForm),
"Customer: %4.4d  Cust-Warehouse: %4.4d  Cust-District:
%2.2d<BR>",

          Term.pClientData[iTermId].PaymentData.c_id,

          Term.pClientData[iTermId].PaymentData.c_w_id,

          Term.pClientData[iTermId].PaymentData.c_d_id)
;

                    FormatHTMLString(szTmpStr1,
Term.pClientData[iTermId].PaymentData.c_first, 16);
                    FormatHTMLString(szTmpStr2,
Term.pClientData[iTermId].PaymentData.c_middle, 2);
                    FormatHTMLString(szTmpStr3,
Term.pClientData[iTermId].PaymentData.c_last, 16);

                    wsprintf(szForm+strlen(szForm),
"Name:   %s %s %s     Since:  %2.2d-%2.2d-%4.4d<BR>",
                              szTmpStr1, szTmpStr2,
szTmpStr3,

          Term.pClientData[iTermId].PaymentData.c_since
.day,

          Term.pClientData[iTermId].PaymentData.c_since
.month,

          Term.pClientData[iTermId].PaymentData.c_since
.year);

                    FormatHTMLString(szTmpStr1,
Term.pClientData[iTermId].PaymentData.c_street_1, 20);
                    FormatHTMLString(szTmpStr2,
Term.pClientData[iTermId].PaymentData.c_credit, 2);

          wsprintf(szForm+strlen(szForm), "        %s
Credit: %s<BR>", szTmpStr1, szTmpStr2);

                    FormatHTMLString(szTmpStr1,
Term.pClientData[iTermId].PaymentData.d_street_2, 20);
          sprintf(szForm+strlen(szForm), "        %s
%%Disc:  %5.2f<BR>",
                              szTmpStr1,
Term.pClientData[iTermId].PaymentData.c_discount);

                    FormatString(szC_Zip, szZipPic,
Term.pClientData[iTermId].PaymentData.c_zip);
                    FormatString(szC_Phone, "XXXXXX-
XXX-XXX-XXXX",
Term.pClientData[iTermId].PaymentData.c_phone);

                    FormatHTMLString(szTmpStr1,
Term.pClientData[iTermId].PaymentData.c_city, 20);
                    FormatHTMLString(szTmpStr2,
Term.pClientData[iTermId].PaymentData.c_state, 2);

                    wsprintf(szForm+strlen(szForm), "
%s %s %10.10s       Phone:  %-19.19s<BR><BR>",
                              szTmpStr1, szTmpStr2,
szC_Zip, szC_Phone );

                    sprintf(szForm+strlen(szForm),
"Amount Paid:          $%7.2f      New Cust Balance:
$%14.2f<BR>",
```

```
          Term.pClientData[iTermId].PaymentData.h_amoun
t,

          Term.pClientData[iTermId].PaymentData.c_balan
ce);

                    sprintf(szForm+strlen(szForm),
"Credit Limit:   $%13.2f<BR><BR>",

          Term.pClientData[iTermId].PaymentData.c_credi
t_lim);

                    ptr =
Term.pClientData[iTermId].PaymentData.c_credit;
                    if ( *ptr == 'B' && *(ptr+1) == 'C'
)
                    {
                              ptr =
Term.pClientData[iTermId].PaymentData.c_data;
                              l = strlen( ptr ) / 50;
                              for(i=0; i<4; i++, ptr +=
50)
                              {
                                        if ( i <= l )

          UtilStrCpy(szTmp, ptr, 50);
                                        else

          szTmp[0] = 0;
                                        if ( !i )
                                        {

          FormatHTMLString(szTmpStr1, szTmp, 50);

          wsprintf(szForm+strlen(szForm), "Cust-Data:
%s<BR>", szTmpStr1);
                                        }
                                        else
                                        {

          FormatHTMLString(szTmpStr1, szTmp, 50);

          wsprintf(szForm+strlen(szForm), "
%s<BR>", szTmpStr1);
                                        }
                              }
                    }
                    else
                              strcat(szForm, "Cust-
Data: <BR><BR><BR><BR>");

                    strcat(szForm,
          "</PRE><HR><BR>"

          "<INPUT TYPE=\"submit\" NAME=\"CMD\"
VALUE=\"..NewOrder..\">"

          "<INPUT TYPE=\"submit\" NAME=\"CMD\"
VALUE=\"..Payment..\">"

          "<INPUT TYPE=\"submit\" NAME=\"CMD\"
VALUE=\"..Delivery..\">"

          "<INPUT TYPE=\"submit\" NAME=\"CMD\"
VALUE=\"..Order-Status..\">"

          "<INPUT TYPE=\"submit\" NAME=\"CMD\"
VALUE=\"..Stock-Level..\">"

          "<INPUT TYPE=\"submit\" NAME=\"CMD\"
VALUE=\"..Exit..\">"

          "</BODY></FORM></HTML>");
          }

          return szForm;
}

/* FUNCTION: char *MakeOrderStatusForm(int iTermId, int
iSyncId, BOOL bInput)
 *
 * PURPOSE:          This function
 *
 * ARGUMENTS:        int
          iTermId   client browser terminal id
 *                                  int
                    iSyncId   client browser
sync id
 *                                  BOOL
                    bInput    TRUE if form is being
constructed for input else FALSE
 *
 * RETURNS:                   char *
          A pointer to buffer inside client structure
where HTML form is built.
 *
 * COMMENTS:         The internal client buffer is
created when the terminal id is assigned and should not
 *                                  be freed except
when the client terminal id is no longer needed.
 */

static char *MakeOrderStatusForm(int iTermId, int
iSyncId, BOOL bInput)
{
          char      *szForm;
          char      c_first[98];
          char      c_middle[14];
          char      c_last[98];
          int                 i;

          szForm = (char
*)Term.pClientData[iTermId].szBuffer;

          Term.pClientData[iTermId].OrderStatusData.w_i
d = Term.pClientData[iTermId].w_id;

          strcpy(szForm,      "<HTML><HEAD><TITLE>TPC-C
Order-Status</TITLE></HEAD><BODY>"

          "<FORM ACTION=\"tpcc.dll\" METHOD=\"GET\">");

          if ( bInput )
                    strcat(szForm, "<INPUT
TYPE=\"hidden\" NAME=\"PI*\" VALUE=\"\">");

          strcat(szForm, "<INPUT TYPE=\"hidden\"
NAME=\"STATUSID\" VALUE=\"0\">");
          strcat(szForm, "<INPUT TYPE=\"hidden\"
NAME=\"ERROR\" VALUE=\"0\">");
          wsprintf(szForm+strlen(szForm), "<INPUT
TYPE=\"hidden\" NAME=\"FORMID\" VALUE=\"%d\">",
ORDER_STATUS_FORM);
          wsprintf(szForm+strlen(szForm), "<INPUT
TYPE=\"hidden\" NAME=\"TERMID\" VALUE=\"%d\">",
iTermId);
          wsprintf(szForm+strlen(szForm), "<INPUT
TYPE=\"hidden\" NAME=\"SYNCID\" VALUE=\"%d\">",
iSyncId);

          strcat(szForm,      "<PRE>
Order-Status<BR>" );
          wsprintf(szForm+strlen(szForm), "Warehouse:
%4.4d   ",
Term.pClientData[iTermId].OrderStatusData.w_id);

          if ( bInput )
          {
                    strcat(szForm,      "District:
<INPUT NAME=\"DID*\" SIZE=1><BR>"

          "Customer: <INPUT NAME=\"CID*\" SIZE=4>
Name:                    <INPUT NAME=\"CLT*\"
SIZE=23><BR>"

          "Cust-Balance:<BR><BR>"

          "Order-Number:             Entry-Date:
Carrier-Number:<BR>"

          "Supply-W     Item-Id    Qty     Amount
Delivery-Date<BR></PRE>"

          "<HR><INPUT TYPE=\"submit\" NAME=\"CMD\"
VALUE=\"Process\"><INPUT TYPE=\"submit\" NAME=\"CMD\"
VALUE=\"Menu\">"

          "</BODY></FORM></HTML>" );
          }
          else
          {
                    wsprintf(szForm+strlen(szForm),
"District: %2.2d<BR>",
Term.pClientData[iTermId].OrderStatusData.d_id);

                    FormatHTMLString(c_first,
Term.pClientData[iTermId].OrderStatusData.c_first, 16);
                    FormatHTMLString(c_middle,
Term.pClientData[iTermId].OrderStatusData.c_middle, 2);
                    FormatHTMLString(c_last,
Term.pClientData[iTermId].OrderStatusData.c_last, 16);

                    wsprintf(szForm+strlen(szForm),
"Customer: %4.4d   Name: %s %s %s<BR>",

          Term.pClientData[iTermId].OrderStatusData.c_i
d, c_first, c_middle, c_last);

                    sprintf(szForm+strlen(szForm),
"Cust-Balance: $%9.2f<BR><BR>",

          Term.pClientData[iTermId].OrderStatusData.c_b
alance);

                    wsprintf(szForm+strlen(szForm),
"Order-Number: %8.8d   Entry-Date: %2.2d-%2.2d-%4.4d
%2.2d:%2.2d:%2.2d   Carrier-Number: %2.2d<BR>",
```

```
          Term.pClientData[iTermId].OrderStatusData.o_i
d,

          Term.pClientData[iTermId].OrderStatusData.o_e
ntry_d.day,

          Term.pClientData[iTermId].OrderStatusData.o_e
ntry_d.month,

          Term.pClientData[iTermId].OrderStatusData.o_e
ntry_d.year,

          Term.pClientData[iTermId].OrderStatusData.o_e
ntry_d.hour,

          Term.pClientData[iTermId].OrderStatusData.o_e
ntry_d.minute,

          Term.pClientData[iTermId].OrderStatusData.o_e
ntry_d.second,

          Term.pClientData[iTermId].OrderStatusData.o_c
arrier_id);
                    strcat(szForm+strlen(szForm),
"Supply-W     Item-Id    Qty     Amount      Delivery-
Date<BR>");

                    for(i=0;
i<Term.pClientData[iTermId].OrderStatusData.o_ol_cnt;
i++)
                    {

          sprintf(szForm+strlen(szForm), "  %4.4d
%6.6d     %2.2d     $%8.2f      %2.2d-%2.2d-%4.4d<BR>",

          Term.pClientData[iTermId].OrderStatusData.OlO
rderStatusData[i].ol_supply_w_id,

          Term.pClientData[iTermId].OrderStatusData.OlO
rderStatusData[i].ol_i_id,

          Term.pClientData[iTermId].OrderStatusData.OlO
rderStatusData[i].ol_quantity,

          Term.pClientData[iTermId].OrderStatusData.OlO
rderStatusData[i].ol_amount,

          Term.pClientData[iTermId].OrderStatusData.OlO
rderStatusData[i].ol_delivery_d.day,

          Term.pClientData[iTermId].OrderStatusData.OlO
rderStatusData[i].ol_delivery_d.month,

          Term.pClientData[iTermId].OrderStatusData.OlO
rderStatusData[i].ol_delivery_d.year);
                    }

                    strcat(szForm,
          "<BR></PRE><HR><INPUT TYPE=\"submit\"
NAME=\"CMD\" VALUE=\"..NewOrder..\">"

          "<INPUT TYPE=\"submit\" NAME=\"CMD\"
VALUE=\"..Payment..\">"

          "<INPUT TYPE=\"submit\" NAME=\"CMD\"
VALUE=\"..Delivery..\">"

          "<INPUT TYPE=\"submit\" NAME=\"CMD\"
VALUE=\"..Order-Status..\">"

          "<INPUT TYPE=\"submit\" NAME=\"CMD\"
VALUE=\"..Stock-Level..\">"

          "<INPUT TYPE=\"submit\" NAME=\"CMD\"
VALUE=\"..Exit..\">"

          "</BODY></FORM></HTML>" );
          }

          return szForm;
}

/* FUNCTION: char *MakeDeliveryForm(int iTermId, int
iSyncId, BOOL bInput, BOOL bSuccess)
 *
 * PURPOSE:          This function
 *
 * ARGUMENTS:        int
          iTermId   client browser terminal id
 *                                   int
                              iSyncId   client browser
sync id
 *                                   BOOL
                    bInput    TRUE if form is being
constructed for input else FALSE
 *                                   BOOL
                    bSuccess TRUE if Delivery succeeded
else FALSE
 *
 * RETURNS:                  char *
          A pointer to buffer inside client structure
where HTML form is built.
 *
 * COMMENTS:         The internal client buffer is
created when the terminal id is assigned and should not
 *                                   be freed except
when the client terminal id is no longer needed.
 */

static char *MakeDeliveryForm(int iTermId, int iSyncId,
BOOL bInput, BOOL bSuccess)
{
          char      *szForm;

          szForm = (char
*)Term.pClientData[iTermId].szBuffer;

          Term.pClientData[iTermId].DeliveryData.w_id =
Term.pClientData[iTermId].w_id;

          strcpy( szForm,     "<HTML><HEAD><TITLE>TPC-C
Delivery</TITLE></HEAD><BODY>"

          "<FORM ACTION=\"tpcc.dll\" METHOD=\"GET\">");

          if ( bInput )
          {
                    strcat(szForm, "<INPUT
TYPE=\"hidden\" NAME=\"PI*\" VALUE=\"\">");
                    strcat(szForm, "<INPUT
TYPE=\"hidden\" NAME=\"STATUSID\" VALUE=\"0\">");
          }
          else
          {
                    if ( !bSuccess )
                    {

          sprintf(szForm+strlen(szForm), "<INPUT
TYPE=\"hidden\" NAME=\"STATUSID\" VALUE=\"%d\">",
ERR_TYPE_DELIVERY_POST);
                              strcat(szForm, "<INPUT
TYPE=\"hidden\" NAME=\"ERROR\" VALUE=\"2\">");
                    }
                    else
                    {
                              strcat(szForm, "<INPUT
TYPE=\"hidden\" NAME=\"STATUSID\" VALUE=\"0\">");
                              strcat(szForm, "<INPUT
TYPE=\"hidden\" NAME=\"ERROR\" VALUE=\"0\">");
                    }
          }

          wsprintf(szForm+strlen(szForm), "<INPUT
TYPE=\"hidden\" NAME=\"FORMID\" VALUE=\"%d\">",
DELIVERY_FORM);
          wsprintf(szForm+strlen(szForm), "<INPUT
TYPE=\"hidden\" NAME=\"TERMID\" VALUE=\"%d\">",
iTermId);
          wsprintf(szForm+strlen(szForm), "<INPUT
TYPE=\"hidden\" NAME=\"SYNCID\" VALUE=\"%d\">",
iSyncId);

          strcat(szForm,      "<PRE>
Delivery<BR>" );

          wsprintf(szForm+strlen(szForm), "Warehouse:
%4.4d<BR><BR>",
Term.pClientData[iTermId].DeliveryData.w_id);

          if ( bInput )
                    strcat( szForm, "Carrier Number:
<INPUT NAME=\"OCD*\" SIZE=1><BR><BR>");
          else
          {
                    wsprintf(szForm+strlen(szForm),
"Carrier Number: %2.2d<BR><BR>",

          Term.pClientData[iTermId].DeliveryData.o_carr
ier_id);
          }
          if ( bInput )
          {
                    strcat( szForm, "Execution
Status:<BR></PRE>"

          "<HR><INPUT TYPE=\"submit\" NAME=\"CMD\"
VALUE=\"Process\">"

          "<INPUT TYPE=\"submit\" NAME=\"CMD\"
VALUE=\"Menu\">" );
          }
          else
          {
                    wsprintf(szForm+strlen(szForm),
"Execution Status: %25.25s<BR></PRE>",
```

```
          Term.pClientData[iTermId].DeliveryData.execut
ion_status);

                    strcat(szForm,      "<HR><INPUT
TYPE=\"submit\" NAME=\"CMD\" VALUE=\"..NewOrder..\">"

          "<INPUT TYPE=\"submit\" NAME=\"CMD\"
VALUE=\"..Payment..\">"

          "<INPUT TYPE=\"submit\" NAME=\"CMD\"
VALUE=\"..Delivery..\">"

          "<INPUT TYPE=\"submit\" NAME=\"CMD\"
VALUE=\"..Order-Status..\">"

          "<INPUT TYPE=\"submit\" NAME=\"CMD\"
VALUE=\"..Stock-Level..\">"

          "<INPUT TYPE=\"submit\" NAME=\"CMD\"
VALUE=\"..Exit..\">" );
          }

          strcat( szForm,     "</BODY></FORM></HTML>"
);

          return szForm;
}

/* FUNCTION: void UtilStrCpy(char * pDest, char * pSrc,
int n)
 *
 * PURPOSE:         This function copies n characters
from string pSrc to pDst and places a
 *                           null character at the end
of the destination string.
 *
 * ARGUMENTS:       char
          *pDest    destination string pointer
 *                                  char
                    *pSrc     source string pointer
 *                                  int
                    n
          number of characters to copy
 *
 * RETURNS:                 None
 *
 * COMMENTS:        Unlike strncpy this function
ensures that the result string is
 *                                  always null
terminated.
 *
 */

static void UtilStrCpy(char * pDest, char * pSrc, int
n)
{
    strncpy(pDest, pSrc, n);
    pDest[n] = '\0';

          return;
}

/* FUNCTION: void
ProcessNewOrderForm(EXTENSION_CONTROL_BLOCK
          *pECB, int iTermId, int iSyncId)
 *
 * PURPOSE:         This function gets and validates
the input data from the new order form
 *                           filling in the required
input variables. it then calls the SQLNewOrder
 *                           transaction, constructs
the output form and writes it back to client
 *                           browser.
 *
 * ARGUMENTS:       EXTENSION_CONTROL_BLOCK       *pECB
          passed in structure pointer from inetsrv.
 *                                  int

          iTermId   client browser terminal id
 *                                  int

          iSyncId client browser sync id
 *
 * RETURNS:                 None
 *
 * COMMENTS:        None
 *
 */

#ifdef LOCAL_ALLOC // Allocate the tpalloc structure
for each transaction
//        This saves on some memory at the expense of
some CPU cycles.
static void ProcessNewOrderForm(EXTENSION_CONTROL_BLOCK
          *pECB, int iTermId, int iSyncId)
{
           int      TpRc, iRc, iError;
           long     ilen, *olen;
           char     buf[128];

           NEW_ORDER_DATA
          *NewOrderDataPtr;   //New Order Tuxedo Buffer

           if((iRc = ThrTpInit()) <0)
           {
                     // This is bad
                     sprintf(buf, "ProcessNewOrder
Failed ThrTpInit: iRc = %d", iRc);
                     LogTuxError(0, buf);
                     ErrorMessage(pECB,
ERR_NEW_ORDER_NOT_PROCESSED, ERR_TYPE_WEBDLL, NULL,
iTermId, iSyncId);
                     return;
           }

          memset(&Term.pClientData[iTermId].NewOrderDat
a, 0, sizeof(NEW_ORDER_DATA));

          Term.pClientData[iTermId].NewOrderData.w_id =
Term.pClientData[iTermId].w_id;

          if ( (iError=GetNewOrderData(pECB-
>lpszQueryString,
&Term.pClientData[iTermId].NewOrderData)) !=
ERR_SUCCESS )
          {
                     ErrorMessage(pECB, iError,
ERR_TYPE_WEBDLL, NULL, iTermId, iSyncId);
                     return;
          }

          if ((NewOrderDataPtr = (NEW_ORDER_DATA
*)tpalloc("CARRAY", NULL, sizeof(NEW_ORDER_DATA))) ==
NULL)
          {
                     TpRc = tperrno;
                     sprintf(buf, "ProcessNewOrder
Tpcalloc Failed");
                     LogTuxError(TpRc, buf);
                     ErrorMessage(pECB,
ERR_NEW_ORDER_NOT_PROCESSED, ERR_TYPE_WEBDLL, NULL,
iTermId, iSyncId);
                     return;
          }

           *NewOrderDataPtr =
Term.pClientData[iTermId].NewOrderData;

     ilen = sizeof(NEW_ORDER_DATA);
     olen = &ilen;

           if ( dLog )
           {
                     FILE *fp;

                     fp = fopen(szTpccLogPath, "ab");
                     fprintf(fp, "* ProcessNewOrderL
Thread %d iTermId %d NewOrderDataPtr: %x size %d \r\n",
                               GetCurrentThreadId(),
iTermId, &NewOrderDataPtr, sizeof(*NewOrderDataPtr));
                     fclose(fp);
           }

     if ((iRc = tpcall("NEWORDER", (char
*)NewOrderDataPtr, ilen,
                     (char **)&NewOrderDataPtr, (long
*)olen, TPSIGRSTRT)) == -1)
           {
         TpRc = tperrno;
                     sprintf(buf, "Neworder tpcall
failed");
                     LogTuxError(TpRc, buf);
                     ErrorMessage(pECB,
ERR_NEW_ORDER_NOT_PROCESSED, ERR_TYPE_WEBDLL, NULL,
iTermId, iSyncId);
          return;
     }

           if ( dLog )
           {
                     FILE *fp;

                     fp = fopen(szTpccLogPath, "ab");
                     fprintf(fp, "** ProcessNewOrderL
Thread %d iTermId %d NewOrderDataPtr: %x size %d\r\n",
                               GetCurrentThreadId(),
iTermId, &NewOrderDataPtr, sizeof(*NewOrderDataPtr));
                     fclose(fp);
           }

           Term.pClientData[iTermId].NewOrderData =
*NewOrderDataPtr;

     iRc = NewOrderDataPtr->retval;
           iError = NewOrderDataPtr->error;

           tpfree((char *)NewOrderDataPtr);
```

```
          if ( iRc < 0 )
          {
                    if (iError == ERR_TYPE_DEADLOCK)
                              ErrorMessage(pECB,
ERR_NEW_ORDER_NOT_PROCESSED, ERR_TYPE_DEADLOCK, NULL,
iTermId, iSyncId);
                    else
                              ErrorMessage(pECB,
ERR_NEW_ORDER_NOT_PROCESSED, ERR_TYPE_WEBDLL, NULL,
iTermId, iSyncId);
          }
          else
                    if ( iError == ERR_BAD_ITEM_ID)
                              WriteZString(pECB,
MakeNewOrderForm(iTermId, iSyncId, TRUE, FALSE,
(BOOL)iRc) );
                    else
                              WriteZString(pECB,
MakeNewOrderForm(iTermId, iSyncId, FALSE, FALSE,
(BOOL)iRc) );

          return;
}
#else // Not LOCAL_ALLOC
static void ProcessNewOrderForm(EXTENSION_CONTROL_BLOCK
          *pECB, int iTermId, int iSyncId)
{
          int                 TpRc, iRc, iError;
          long      ilen, *olen;
          char      buf[128];

     if((iRc = ThrTpInit()) <0)
           {
                     // This is bad
                    sprintf(buf, "ProcessNewOrder
Failed ThrTpInit: iRc = %d", iRc);
                    LogTuxError(0, buf);
                    ErrorMessage(pECB,
ERR_NEW_ORDER_NOT_PROCESSED, ERR_TYPE_WEBDLL, NULL,
iTermId, iSyncId);
                    return;
           }

          memset(&Term.pClientData[iTermId].NewOrderDat
a, 0, sizeof(NEW_ORDER_DATA));

          Term.pClientData[iTermId].NewOrderData.w_id =
Term.pClientData[iTermId].w_id;

          if ( (iError=GetNewOrderData(pECB-
>lpszQueryString,
&Term.pClientData[iTermId].NewOrderData)) !=
ERR_SUCCESS )
          {
                    ErrorMessage(pECB, iError,
ERR_TYPE_WEBDLL, NULL, iTermId, iSyncId);
                    return;
          }

          Term.pClientData[iTermId].TuxDataPtr-
>NewOrderData = Term.pClientData[iTermId].NewOrderData;

     ilen = sizeof(TUX_DATA);
     olen = &ilen;

           if ( dLog )
           {
                    FILE *fp;

                    fp = fopen(szTpccLogPath, "ab");
                    fprintf(fp, "* ProcessNewOrder
Thread %d iTermId %d TuxDataPtr: %x size %d \r\n",
                              GetCurrentThreadId(),
iTermId, &Term.pClientData[iTermId].TuxDataPtr,

          sizeof(*Term.pClientData[iTermId].TuxDataPtr)
);
                    fclose(fp);
           }

     if ((iRc = tpcall("NEWORDER", (char
*)Term.pClientData[iTermId].TuxDataPtr, ilen,
                    (char
**)&Term.pClientData[iTermId].TuxDataPtr, (long *)olen,
TPSIGRSTRT)) == -1)
           {
         TpRc = tperrno;
                    sprintf(buf, "Neworder tpcall
failed");
                    LogTuxError(TpRc, buf);
                    ErrorMessage(pECB,
ERR_NEW_ORDER_NOT_PROCESSED, ERR_TYPE_WEBDLL, NULL,
iTermId, iSyncId);
         return;
     }

           if ( dLog )
           {
                    FILE *fp;

                    fp = fopen(szTpccLogPath, "ab");
                    fprintf(fp, "** ProcessNewOrder
Thread %d iTermId %d TuxDataPtr: %x size %d\r\n",
                              GetCurrentThreadId(),
iTermId, &Term.pClientData[iTermId].TuxDataPtr,

          sizeof(*Term.pClientData[iTermId].TuxDataPtr)
);
                    fclose(fp);
           }

     Term.pClientData[iTermId].NewOrderData =
Term.pClientData[iTermId].TuxDataPtr->NewOrderData;

     iRc = Term.pClientData[iTermId].TuxDataPtr-
>NewOrderData.retval;
          iError =
Term.pClientData[iTermId].TuxDataPtr-
>NewOrderData.error;

          if ( iRc < 0 )
          {
                    if (iError == ERR_TYPE_DEADLOCK)
                              ErrorMessage(pECB,
ERR_NEW_ORDER_NOT_PROCESSED, ERR_TYPE_DEADLOCK, NULL,
iTermId, iSyncId);
                    else
                              ErrorMessage(pECB,
ERR_NEW_ORDER_NOT_PROCESSED, ERR_TYPE_WEBDLL, NULL,
iTermId, iSyncId);
          }
          else
                    if ( iError == ERR_BAD_ITEM_ID)
                              WriteZString(pECB,
MakeNewOrderForm(iTermId, iSyncId, TRUE, FALSE,
(BOOL)iRc) );
                    else
                              WriteZString(pECB,
MakeNewOrderForm(iTermId, iSyncId, FALSE, FALSE,
(BOOL)iRc) );

          return;
}
#endif // LOCAL_ALLOC

/* FUNCTION: void
ProcessPaymentForm(EXTENSION_CONTROL_BLOCK *pECB, int
iTermId, int iSyncId)
 *
 * 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
          passed in structure pointer from inetsrv.
 *                                  int

          iTermId   client browser terminal id
 *                                  int

          iSyncId client browser sync id
 *
 * RETURNS:                  None
 *
 * COMMENTS:         None
 *
 */

#ifdef LOCAL_ALLOC // Allocate the tpalloc structure
for each transaction
//        This saves on some memory at the expense of
some CPU cycles.
static void ProcessPaymentForm(EXTENSION_CONTROL_BLOCK
*pECB, int iTermId, int iSyncId)
{
           int                TpRc, iRc, iError;
           long      ilen, *olen;
           char      buf[128];

           PAYMENT_DATA
          *PaymentDataPtr;    //Payment Tuxedo Buffer

     if((iRc = ThrTpInit()) <0)
           {
                     // This is bad
                    sprintf(buf, "ProcessPayment
Failed ThrTpInit: iRc = %d", iRc);
                    LogTuxError(0, buf);
                    ErrorMessage(pECB,
ERR_PAYMENT_NOT_PROCESSED, ERR_TYPE_WEBDLL, NULL,
iTermId, iSyncId);
                    return;
           }
```

```
memset(&Term.pClientData[iTermId].PaymentData, 0,
sizeof(PAYMENT_DATA));

     Term.pClientData[iTermId].PaymentData.w_id =
Term.pClientData[iTermId].w_id;

     if ( (iError=GetPaymentData(pECB->lpszQueryString,
&Term.pClientData[iTermId].PaymentData)) != ERR_SUCCESS
)
     {
          ErrorMessage(pECB, iError, ERR_TYPE_WEBDLL,
NULL, iTermId, iSyncId);
          return;
     }

           if ((PaymentDataPtr = (PAYMENT_DATA
*)tpalloc("CARRAY", NULL, sizeof(PAYMENT_DATA))) ==
NULL)
          {
                    TpRc = tperrno;
                    sprintf(buf, "ProcessPayment
Tpcalloc Failed");
                    LogTuxError(TpRc, buf);
                    ErrorMessage(pECB,
ERR_PAYMENT_NOT_PROCESSED, ERR_TYPE_WEBDLL, NULL,
iTermId, iSyncId);
                    return;
          }

     *PaymentDataPtr =
Term.pClientData[iTermId].PaymentData;

           ilen = sizeof(PAYMENT_DATA);
     olen = &ilen;

           if ( dLog )
           {
                    FILE *fp;

                    fp = fopen(szTpccLogPath, "ab");
                    fprintf(fp, "* ProcessPayment
Thread %d iTermId %d PaymentDataPtr: %x \r\n",
                              GetCurrentThreadId(),
iTermId, &PaymentDataPtr);
                    fclose(fp);
           }

     if (( iRc = tpcall("PAYMENT", (char
*)PaymentDataPtr, ilen,
                (char **)&PaymentDataPtr, (long
*)olen, TPSIGRSTRT)) == -1)
           {
         TpRc = tperrno;
                    sprintf(buf, "ProcessPayment
tpcall failed");
                    LogTuxError(TpRc, buf);
                    ErrorMessage(pECB,
ERR_PAYMENT_NOT_PROCESSED, ERR_TYPE_WEBDLL, NULL,
iTermId, iSyncId);
          return;
     }

           if ( dLog )
           {
                    FILE *fp;

                    fp = fopen(szTpccLogPath, "ab");
                    fprintf(fp, "** ProcessPayment
Thread %d iTermId %d PaymentDataPtr: %x \r\n",
                              GetCurrentThreadId(),
iTermId, &PaymentDataPtr);
                    fclose(fp);
           }

     Term.pClientData[iTermId].PaymentData =
*PaymentDataPtr;

     iRc = PaymentDataPtr->retval;
           iError = PaymentDataPtr->error;

           tpfree((char *)PaymentDataPtr);

     if ( iRc < 0 )
           {
                    if (iError == ERR_TYPE_DEADLOCK )
                              ErrorMessage(pECB,
ERR_PAYMENT_NOT_PROCESSED, ERR_TYPE_DEADLOCK, NULL,
iTermId, iSyncId);
                    else if (iError ==
ERR_NOSUCH_CUSTOMER)
                              ErrorMessage(pECB,
ERR_PAYMENT_INVALID_CUSTOMER, ERR_TYPE_WEBDLL, NULL,
iTermId, iSyncId);
                    else
                              ErrorMessage(pECB,
ERR_PAYMENT_NOT_PROCESSED, ERR_TYPE_WEBDLL, NULL,
iTermId, iSyncId);
     }
     else
          WriteZString(pECB, MakePaymentForm(iTermId,
iSyncId, FALSE) );

     return;

}
#else // Not LOCAL_ALLOC
static void ProcessPaymentForm(EXTENSION_CONTROL_BLOCK
*pECB, int iTermId, int iSyncId)
{
          int                 TpRc, iRc, iError;
          long      ilen, *olen;
          char      buf[128];

     if((iRc = ThrTpInit()) <0)
           {
                     // This is bad
                    sprintf(buf, "ProcessPayment
Failed ThrTpInit: iRc = %d", iRc);
                     LogTuxError(0, buf);
                     ErrorMessage(pECB,
ERR_PAYMENT_NOT_PROCESSED, ERR_TYPE_WEBDLL, NULL,
iTermId, iSyncId);
                    return;
           }


memset(&Term.pClientData[iTermId].PaymentData, 0,
sizeof(PAYMENT_DATA));

     Term.pClientData[iTermId].PaymentData.w_id =
Term.pClientData[iTermId].w_id;

     if ( (iError=GetPaymentData(pECB->lpszQueryString,
&Term.pClientData[iTermId].PaymentData)) != ERR_SUCCESS
)
     {
          ErrorMessage(pECB, iError, ERR_TYPE_WEBDLL,
NULL, iTermId, iSyncId);
          return;
     }

     Term.pClientData[iTermId].TuxDataPtr->PaymentData
= Term.pClientData[iTermId].PaymentData;

           ilen = sizeof(TUX_DATA);
     olen = &ilen;

           if ( dLog )
           {
                    FILE *fp;

                    fp = fopen(szTpccLogPath, "ab");
                    fprintf(fp, "* ProcessPayment
Thread %d iTermId %d PaymentDataPtr: %x \r\n",
                              GetCurrentThreadId(),
iTermId, &Term.pClientData[iTermId].TuxDataPtr);
                    fclose(fp);
           }

     if (( iRc = tpcall("PAYMENT", (char
*)Term.pClientData[iTermId].TuxDataPtr, ilen,
                (char
**)&Term.pClientData[iTermId].TuxDataPtr, (long *)olen,
TPSIGRSTRT)) == -1)
           {
         TpRc = tperrno;
                    sprintf(buf, "ProcessPayment
tpcall failed");
                    LogTuxError(TpRc, buf);
                    ErrorMessage(pECB,
ERR_PAYMENT_NOT_PROCESSED, ERR_TYPE_WEBDLL, NULL,
iTermId, iSyncId);
          return;
     }

           if ( dLog )
           {
                    FILE *fp;

                    fp = fopen(szTpccLogPath, "ab");
                    fprintf(fp, "** ProcessPayment
Thread %d iTermId %d TuxDataPtr: %x \r\n",
                              GetCurrentThreadId(),
iTermId, &Term.pClientData[iTermId].TuxDataPtr);
                    fclose(fp);
           }

     Term.pClientData[iTermId].PaymentData =
Term.pClientData[iTermId].TuxDataPtr->PaymentData;

     iRc = Term.pClientData[iTermId].TuxDataPtr-
>PaymentData.retval;
           iError =
Term.pClientData[iTermId].TuxDataPtr-
>PaymentData.error;
```

```
     if ( iRc < 0 )
          {
                    if (iError == ERR_TYPE_DEADLOCK )
                              ErrorMessage(pECB,
ERR_PAYMENT_NOT_PROCESSED, ERR_TYPE_DEADLOCK, NULL,
iTermId, iSyncId);
                    else if (iError ==
ERR_NOSUCH_CUSTOMER)
                              ErrorMessage(pECB,
ERR_PAYMENT_INVALID_CUSTOMER, ERR_TYPE_WEBDLL, NULL,
iTermId, iSyncId);
                    else
                              ErrorMessage(pECB,
ERR_PAYMENT_NOT_PROCESSED, ERR_TYPE_WEBDLL, NULL,
iTermId, iSyncId);
     }
     else
          WriteZString(pECB, MakePaymentForm(iTermId,
iSyncId, FALSE) );

     return;
}
#endif // LOCAL_ALLOC

/* FUNCTION: void
ProcessOrderStatusForm(EXTENSION_CONTROL_BLOCK *pECB,
int iTermId, int iSyncId)
 *
 * PURPOSE:         This function gets and validates
the input data from the Order Status
 *                         form filling in the
required input variables. It then calls the
 *                         SQLOrderStatus
transaction, constructs the output form and writes it
 *                         back to client browser.
 *
 * ARGUMENTS:       EXTENSION_CONTROL_BLOCK       *pECB
          passed in structure pointer from inetsrv.
 *                                   int

          iTermId   client browser terminal id
 *                                   int

          iSyncId client browser sync id
 *
 * RETURNS:                  None
 *
 * COMMENTS:        None
 *
 */

#ifdef LOCAL_ALLOC // Allocate the tpalloc structure
for each transaction
//        This saves on some memory at the expense of
some CPU cycles.
static void
ProcessOrderStatusForm(EXTENSION_CONTROL_BLOCK *pECB,
int iTermId, int iSyncId)
{
          int                TpRc, iRc, iError;
          long      ilen, *olen;
          char      buf[128];

          ORDER_STATUS_DATA   *OrderStatusDataPtr;
          //Order Status Tuxedo Buffer

     if((iRc = ThrTpInit()) <0)
          {
                    // This is bad
                    sprintf(buf, "ProcessOrderStatus
Failed ThrTpInit: iRc = %d", iRc);
                    LogTuxError(0, buf);
                    ErrorMessage(pECB,
ERR_ORDER_STATUS_NOT_PROCESSED, ERR_TYPE_WEBDLL, NULL,
iTermId, iSyncId);
                    return;
          }

     memset(&Term.pClientData[iTermId].OrderStatusData,
0, sizeof(ORDER_STATUS_DATA));

     Term.pClientData[iTermId].OrderStatusData.w_id =
Term.pClientData[iTermId].w_id;

     if ( (iError=GetOrderStatusData(pECB-
>lpszQueryString,
&Term.pClientData[iTermId].OrderStatusData)) !=
ERR_SUCCESS )
     {
          ErrorMessage(pECB, iError, ERR_TYPE_WEBDLL,
NULL, iTermId, iSyncId);
          return;
     }

          if ((OrderStatusDataPtr = (ORDER_STATUS_DATA
*)tpalloc("CARRAY", NULL, sizeof(ORDER_STATUS_DATA)))
== NULL)
          {
                    TpRc = tperrno;
                    sprintf(buf, "ProcessOrderStatus
Tpcalloc Failed");
                    LogTuxError(TpRc, buf);
                    ErrorMessage(pECB,
ERR_ORDER_STATUS_NOT_PROCESSED, ERR_TYPE_WEBDLL, NULL,
iTermId, iSyncId);
                    return;
          }

     *OrderStatusDataPtr =
Term.pClientData[iTermId].OrderStatusData;

           ilen = sizeof(ORDER_STATUS_DATA);
     olen = &ilen;

           if ( dLog )
           {
                    FILE *fp;

                    fp = fopen(szTpccLogPath, "ab");
                    fprintf(fp, "* ProcessOrderStatus
Thread %d iTermId %d OrderStatusDataPtr: %x \r\n",
                              GetCurrentThreadId(),
iTermId, &OrderStatusDataPtr);
                    fclose(fp);
           }

     if (( iRc = tpcall("ORDERSTATUS", (char
*)OrderStatusDataPtr, ilen,
                    (char **)&OrderStatusDataPtr,
(long *)olen, TPSIGRSTRT)) == -1)
          {
          TpRc = tperrno;
                    sprintf(buf, "ProcessOrderStatus
tpcall failed");
                    LogTuxError(TpRc, buf);
                    ErrorMessage(pECB,
ERR_ORDER_STATUS_NOT_PROCESSED, ERR_TYPE_WEBDLL, NULL,
iTermId, iSyncId);
          return;
     }

           if ( dLog )
           {
                    FILE *fp;

                    fp = fopen(szTpccLogPath, "ab");
                    fprintf(fp, "** ProcessOrderStatus
Thread %d iTermId %d OrderStatusDataPtr: %x \r\n",
                              GetCurrentThreadId(),
iTermId, &OrderStatusDataPtr);
                    fclose(fp);
           }

     Term.pClientData[iTermId].OrderStatusData =
*OrderStatusDataPtr;

     iRc = OrderStatusDataPtr->retval;
           iError = OrderStatusDataPtr->error;

           tpfree((char *)OrderStatusDataPtr);

     if ( iRc < 0 )
          {
                    if ( iError == ERR_TYPE_DEADLOCK )
                              ErrorMessage(pECB,
ERR_ORDER_STATUS_NOT_PROCESSED, ERR_TYPE_DEADLOCK,
NULL, iTermId, iSyncId);
                    else if (iError ==
ERR_NOSUCH_CUSTOMER)
                              ErrorMessage(pECB,
ERR_NOSUCH_CUSTOMER, ERR_TYPE_WEBDLL, NULL, iTermId,
iSyncId);
                    else
                              ErrorMessage(pECB,
ERR_ORDER_STATUS_NOT_PROCESSED, ERR_TYPE_WEBDLL, NULL,
iTermId, iSyncId);
     }
     else
          WriteZString(pECB,
MakeOrderStatusForm(iTermId, iSyncId, FALSE) );

     return;
}
#else // Not LOCAL_ALLOC
static void
ProcessOrderStatusForm(EXTENSION_CONTROL_BLOCK *pECB,
int iTermId, int iSyncId)
{
          int                TpRc, iRc, iError;
          long      ilen, *olen;
          char      buf[128];

     if((iRc = ThrTpInit()) <0)
          {
                    // This is bad
                    sprintf(buf, "ProcessOrderStatus
Failed ThrTpInit: iRc = %d", iRc);
                    LogTuxError(0, buf);
```

```
                    ErrorMessage(pECB,
ERR_ORDER_STATUS_NOT_PROCESSED, ERR_TYPE_WEBDLL, NULL,
iTermId, iSyncId);
                    return;
          }

     memset(&Term.pClientData[iTermId].OrderStatusData,
0, sizeof(ORDER_STATUS_DATA));

     Term.pClientData[iTermId].OrderStatusData.w_id =
Term.pClientData[iTermId].w_id;

     if ( (iError=GetOrderStatusData(pECB-
>lpszQueryString,
&Term.pClientData[iTermId].OrderStatusData)) !=
ERR_SUCCESS )
     {
          ErrorMessage(pECB, iError, ERR_TYPE_WEBDLL,
NULL, iTermId, iSyncId);
          return;
     }

     Term.pClientData[iTermId].TuxDataPtr-
>OrderStatusData =
Term.pClientData[iTermId].OrderStatusData;

          ilen = sizeof(TUX_DATA);
     olen = &ilen;

          if ( dLog )
          {
                    FILE *fp;

                    fp = fopen(szTpccLogPath, "ab");
                    fprintf(fp, "* ProcessOrderStatus
Thread %d iTermId %d TuxDataPtr: %x \r\n",
                              GetCurrentThreadId(),
iTermId, &Term.pClientData[iTermId].TuxDataPtr);
                    fclose(fp);
          }

     if (( iRc = tpcall("ORDERSTATUS", (char
*)Term.pClientData[iTermId].TuxDataPtr, ilen,
                    (char
**)&Term.pClientData[iTermId].TuxDataPtr, (long *)olen,
TPSIGRSTRT)) == -1)
          {
          TpRc = tperrno;
                    sprintf(buf, "ProcessOrderStatus
tpcall failed");
                    LogTuxError(TpRc, buf);
                    ErrorMessage(pECB,
ERR_ORDER_STATUS_NOT_PROCESSED, ERR_TYPE_WEBDLL, NULL,
iTermId, iSyncId);
          return;
     }

          if ( dLog )
          {
                    FILE *fp;

                    fp = fopen(szTpccLogPath, "ab");
                    fprintf(fp, "** ProcessOrderStatus
Thread %d iTermId %d TuxDataPtr: %x \r\n",
                              GetCurrentThreadId(),
iTermId, &Term.pClientData[iTermId].TuxDataPtr);
                    fclose(fp);
          }

     Term.pClientData[iTermId].OrderStatusData =
Term.pClientData[iTermId].TuxDataPtr->OrderStatusData;

     iRc = Term.pClientData[iTermId].TuxDataPtr-
>OrderStatusData.retval;
          iError =
Term.pClientData[iTermId].TuxDataPtr-
>OrderStatusData.error;

     if ( iRc < 0 )
          {
                    if ( iError == ERR_TYPE_DEADLOCK )
                              ErrorMessage(pECB,
ERR_ORDER_STATUS_NOT_PROCESSED, ERR_TYPE_DEADLOCK,
NULL, iTermId, iSyncId);
                    else if (iError ==
ERR_NOSUCH_CUSTOMER)
                              ErrorMessage(pECB,
ERR_NOSUCH_CUSTOMER, ERR_TYPE_WEBDLL, NULL, iTermId,
iSyncId);
                    else
                              ErrorMessage(pECB,
ERR_ORDER_STATUS_NOT_PROCESSED, ERR_TYPE_WEBDLL, NULL,
iTermId, iSyncId);
     }
     else
          WriteZString(pECB,
MakeOrderStatusForm(iTermId, iSyncId, FALSE) );

     return;
}
#endif // LOCAL_ALLOC

/* FUNCTION: void
ProcessDeliveryForm(EXTENSION_CONTROL_BLOCK *pECB, int
iTermId, int iSyncId)
 *
 * PURPOSE:         This function gets and validates
the input data from the delivery form
 *                              filling in the required
input variables. It then calls the PostDeliveryInfo
 *                              Api, The client is then
informed that the transaction has been posted.
 *
 * ARGUMENTS:       EXTENSION_CONTROL_BLOCK       *pECB
          passed in structure pointer from inetsrv.
 *                                   int

          iTermId   client browser terminal id
 *                                   int

          iSyncId   clinet browser sync id
 *
 * RETURNS:                  None
 *
 * COMMENTS:        None
 *
 */

#ifdef LOCAL_ALLOC // Allocate the tpalloc structure
for each transaction
//        This saves on some memory at the expense of
some CPU cycles.
static void ProcessDeliveryForm(EXTENSION_CONTROL_BLOCK
*pECB, int iTermId, int iSyncId)
{
          int                 TpRc, iRc;
          char      szTmp[26];
          BOOL      bSuccess;
          long      ilen, *olen;
          char      buf[128];

          DELIVERY_DATA
          *DeliveryDataPtr;   //Delivery Tuxedo Buffer

     if((iRc = ThrTpInit()) <0)
          {
                    // This is bad
                    sprintf(buf, "ProcessDelivery
Failed ThrTpInit: iRc = %d", iRc);
                    LogTuxError(0, buf);
                    ErrorMessage(pECB,
ERR_DELIVERY_MISSING_OCD_KEY, ERR_TYPE_WEBDLL, NULL,
iTermId, iSyncId);
                    return;
           }


memset(&Term.pClientData[iTermId].DeliveryData, 0,
sizeof(DELIVERY_DATA));

          if ( !GetKeyValue(pECB->lpszQueryString,
"OCD*", szTmp, sizeof(szTmp)) )
          {
                    ErrorMessage(pECB,
ERR_DELIVERY_MISSING_OCD_KEY, ERR_TYPE_WEBDLL, NULL,
iTermId, iSyncId);
                    return;
          }

          if ( !IsNumeric(szTmp) )
          {
                    ErrorMessage(pECB,
ERR_DELIVERY_CARRIER_INVALID, ERR_TYPE_WEBDLL, NULL,
iTermId, iSyncId);
                    return;
          }

          Term.pClientData[iTermId].DeliveryData.o_carr
ier_id    = atoi(szTmp);

          if (
Term.pClientData[iTermId].DeliveryData.o_carrier_id >
10 ||
Term.pClientData[iTermId].DeliveryData.o_carrier_id < 1
)
          {
                    ErrorMessage(pECB,
ERR_DELIVERY_CARRIER_ID_RANGE, ERR_TYPE_WEBDLL, NULL,
iTermId, iSyncId);
                    return;
          }

     Term.pClientData[iTermId].DeliveryData.w_id =
Term.pClientData[iTermId].w_id;
```

```
GetLocalTime(&Term.pClientData[iTermId].DeliveryData.qu
eue_time);

          if ((DeliveryDataPtr = (DELIVERY_DATA
*)tpalloc("CARRAY", NULL, sizeof(DELIVERY_DATA))) ==
NULL)
          {
                    TpRc = tperrno;
                    sprintf(buf, "ProcessDelivery
Tpcalloc Failed");
                    LogTuxError(TpRc, buf);

          strcpy(Term.pClientData[iTermId].DeliveryData
.execution_status, "Delivery Post Failed");
                    bSuccess = FALSE;
                    WriteZString(pECB,
MakeDeliveryForm(iTermId, iSyncId, FALSE, bSuccess) );
                    return;
          }

     *DeliveryDataPtr =
Term.pClientData[iTermId].DeliveryData;

     ilen = sizeof(DELIVERY_DATA);
     olen = &ilen;

           if ( dLog )
           {
                    FILE *fp;

                    fp = fopen(szTpccLogPath, "ab");
                    fprintf(fp, "* ProcessDelivery
Thread %d iTermId %d DeliveryDataPtr: %x \r\n",
                              GetCurrentThreadId(),
iTermId, &DeliveryDataPtr);
                    fclose(fp);
           }

     if (( iRc = tpacall("DELIVERY", (char
*)DeliveryDataPtr, ilen, TPNOREPLY)) == -1)
           {
                    TpRc = tperrno;
                    sprintf(buf, "ProcessDelivery
Tpcalloc Failed");
                    LogTuxError(TpRc, buf);

          strcpy(Term.pClientData[iTermId].DeliveryData
.execution_status, "Delivery Post Failed");
                    bSuccess = FALSE;
                    WriteZString(pECB,
MakeDeliveryForm(iTermId, iSyncId, FALSE, bSuccess) );
                    return;
     }

           if ( dLog )
           {
                    FILE *fp;

                    fp = fopen(szTpccLogPath, "ab");
                    fprintf(fp, "** ProcessDelivery
Thread %d iTermId %d DeliveryDataPtr: %x TpRc = %d
\r\n",
                              GetCurrentThreadId(),
iTermId, &DeliveryDataPtr, TpRc);
                    fclose(fp);
           }

          tpfree((char *)DeliveryDataPtr);

          strcpy(Term.pClientData[iTermId].DeliveryData
.execution_status, "Delivery has been queued.");
          bSuccess = TRUE;

          WriteZString(pECB, MakeDeliveryForm(iTermId,
iSyncId, FALSE, bSuccess) );

    return;

}
#else // Not LOCAL_ALLOC
static void ProcessDeliveryForm(EXTENSION_CONTROL_BLOCK
*pECB, int iTermId, int iSyncId)
{
          int                TpRc, iRc;
          char      szTmp[26];
          BOOL      bSuccess;
          long      ilen, *olen;
          char      buf[128];

     if((iRc = ThrTpInit()) <0)
           {
                     // This is bad
                    sprintf(buf, "ProcessDelivery
Failed ThrTpInit: iRc = %d", iRc);
                    LogTuxError(0, buf);
                    ErrorMessage(pECB,
ERR_DELIVERY_MISSING_OCD_KEY, ERR_TYPE_WEBDLL, NULL,
iTermId, iSyncId);
                    return;
           }

memset(&Term.pClientData[iTermId].DeliveryData, 0,
sizeof(DELIVERY_DATA));

          if ( !GetKeyValue(pECB->lpszQueryString,
"OCD*", szTmp, sizeof(szTmp)) )
          {
                    ErrorMessage(pECB,
ERR_DELIVERY_MISSING_OCD_KEY, ERR_TYPE_WEBDLL, NULL,
iTermId, iSyncId);
                    return;
          }

          if ( !IsNumeric(szTmp) )
          {
                    ErrorMessage(pECB,
ERR_DELIVERY_CARRIER_INVALID, ERR_TYPE_WEBDLL, NULL,
iTermId, iSyncId);
                    return;
          }

          Term.pClientData[iTermId].DeliveryData.o_carr
ier_id    = atoi(szTmp);

          if (
Term.pClientData[iTermId].DeliveryData.o_carrier_id >
10 ||
Term.pClientData[iTermId].DeliveryData.o_carrier_id < 1
)
          {
                    ErrorMessage(pECB,
ERR_DELIVERY_CARRIER_ID_RANGE, ERR_TYPE_WEBDLL, NULL,
iTermId, iSyncId);
                    return;
          }

     Term.pClientData[iTermId].DeliveryData.w_id =
Term.pClientData[iTermId].w_id;


GetLocalTime(&Term.pClientData[iTermId].DeliveryData.qu
eue_time);

     Term.pClientData[iTermId].TuxDataPtr->DeliveryData
= Term.pClientData[iTermId].DeliveryData;

     ilen = sizeof(TUX_DATA);
     olen = &ilen;

           if ( dLog )
           {
                    FILE *fp;

                    fp = fopen(szTpccLogPath, "ab");
                    fprintf(fp, "* ProcessDelivery
Thread %d iTermId %d TuxDataPtr: %x \r\n",
                              GetCurrentThreadId(),
iTermId, &Term.pClientData[iTermId].TuxDataPtr);
                    fclose(fp);
           }

     if (( iRc = tpacall("DELIVERY", (char
*)Term.pClientData[iTermId].TuxDataPtr, ilen,
TPNOREPLY)) == -1)
           {
                    TpRc = tperrno;
                    sprintf(buf, "ProcessDelivery
Tpcalloc Failed");
                    LogTuxError(TpRc, buf);

          strcpy(Term.pClientData[iTermId].DeliveryData
.execution_status, "Delivery Post Failed");
                    bSuccess = FALSE;
                    WriteZString(pECB,
MakeDeliveryForm(iTermId, iSyncId, FALSE, bSuccess) );
                    return;
     }

           if ( dLog )
           {
                    FILE *fp;

                    fp = fopen(szTpccLogPath, "ab");
                    fprintf(fp, "** ProcessDelivery
Thread %d iTermId %d TuxDataPtr: %x TpRc = %d \r\n",
                              GetCurrentThreadId(),
iTermId, &Term.pClientData[iTermId].TuxDataPtr, TpRc);
                    fclose(fp);
           }

          strcpy(Term.pClientData[iTermId].DeliveryData
.execution_status, "Delivery has been queued.");
          bSuccess = TRUE;

          WriteZString(pECB, MakeDeliveryForm(iTermId,
iSyncId, FALSE, bSuccess) );
```

```
    return;

}
#endif // LOCAL_ALLOC

/* FUNCTION: void
ProcessStockLevelForm(EXTENSION_CONTROL_BLOCK *pECB,
int iTermId, int iSyncId)
 *
 * 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
          passed in structure pointer from inetsrv.
 *                                    int

          iTermId   client browser terminal id
 *                                    int

          iSyncId   client browser sync id
 *
 * RETURNS:                  None
 *
 * COMMENTS:        None
 *
 */

#ifdef LOCAL_ALLOC // Allocate the tpalloc structure
for each transaction
//        This saves on some memory at the expense of
some CPU cycles.
static void
ProcessStockLevelForm(EXTENSION_CONTROL_BLOCK *pECB,
int iTermId, int iSyncId)
{
          int                 TpRc, iRc, iError;
          char      szTmp[26];
          long      ilen, *olen;
          char      buf[128];

          STOCK_LEVEL_DATA    *StockLevelDataPtr;
          //Stock Level Tuxedo Buffer

           if((iRc = ThrTpInit()) <0)
           {
                     // This is bad
                    sprintf(buf, "ProcessStockLevel
Failed ThrTpInit: iRc = %d", iRc);
                    LogTuxError(0, buf);
                    ErrorMessage(pECB,
ERR_STOCKLEVEL_NOT_PROCESSED, ERR_TYPE_WEBDLL, NULL,
iTermId, iSyncId);
                    return;
           }

     memset(&Term.pClientData[iTermId].StockLevelData,
0, sizeof(STOCK_LEVEL_DATA));

     Term.pClientData[iTermId].StockLevelData.w_id =
Term.pClientData[iTermId].w_id;
     Term.pClientData[iTermId].StockLevelData.d_id =
Term.pClientData[iTermId].d_id;


     if ( !GetKeyValue(pECB->lpszQueryString, "TT*",
szTmp, sizeof(szTmp)) )
     {
          ErrorMessage(pECB,
ERR_STOCKLEVEL_MISSING_THRESHOLD_KEY, ERR_TYPE_WEBDLL,
NULL, iTermId, iSyncId);
          return;
     }

     if ( !IsNumeric(szTmp) )
     {
          ErrorMessage(pECB,
ERR_STOCKLEVEL_THRESHOLD_INVALID, ERR_TYPE_WEBDLL,
NULL, iTermId, iSyncId);
          return;
     }


Term.pClientData[iTermId].StockLevelData.thresh_hold =
atoi(szTmp);

     if (
Term.pClientData[iTermId].StockLevelData.thresh_hold >=
100 ||
Term.pClientData[iTermId].StockLevelData.thresh_hold <
0 )
     {
          ErrorMessage(pECB,
ERR_STOCKLEVEL_THRESHOLD_RANGE, ERR_TYPE_WEBDLL, NULL,
iTermId, iSyncId);
          return;
     }

          if ((StockLevelDataPtr = (STOCK_LEVEL_DATA
*)tpalloc("CARRAY", NULL, sizeof(STOCK_LEVEL_DATA))) ==
NULL)
          {
                    TpRc = tperrno;
                    sprintf(buf, "ProcessStockLevel
Tpcalloc Failed");
                    LogTuxError(TpRc, buf);
                    ErrorMessage(pECB,
ERR_STOCKLEVEL_NOT_PROCESSED, ERR_TYPE_WEBDLL, NULL,
iTermId, iSyncId);
                    return;
          }

    *StockLevelDataPtr =
Term.pClientData[iTermId].StockLevelData;

     ilen = sizeof(STOCK_LEVEL_DATA);
     olen = &ilen;

           if ( dLog )
           {
                    FILE *fp;

                    fp = fopen(szTpccLogPath, "ab");
                    fprintf(fp, "* ProcessStockLevel
Thread %d iTermId %d StockLevelDataPtr: %x \r\n",
                              GetCurrentThreadId(),
iTermId, &StockLevelDataPtr);
                    fclose(fp);
           }

     if (( iRc = tpcall("STOCKLEVEL", (char
*)StockLevelDataPtr, ilen,
                    (char **)&StockLevelDataPtr, (long
*) olen, TPSIGRSTRT)) == -1)
          {
          TpRc = tperrno;
                    sprintf(buf, "ProcessStockLevel
tpcall failed");
                    LogTuxError(TpRc, buf);
                    ErrorMessage(pECB,
ERR_STOCKLEVEL_NOT_PROCESSED, ERR_TYPE_WEBDLL, NULL,
iTermId, iSyncId);
          return;
     }

           if ( dLog )
           {
                    FILE *fp;

                    fp = fopen(szTpccLogPath, "ab");
                    fprintf(fp, "** ProcessStockLevel
Thread %d iTermId %d StockLevelDataPtr: %x \r\n",
                              GetCurrentThreadId(),
iTermId, &StockLevelDataPtr);
                    fclose(fp);
           }

     Term.pClientData[iTermId].StockLevelData =
*StockLevelDataPtr;

     iRc = StockLevelDataPtr->retval;
          iError = StockLevelDataPtr->error;

          tpfree((char *)StockLevelDataPtr);

          if ( iRc == 0 )
          {
                    if ( iError == ERR_TYPE_DEADLOCK )
                              ErrorMessage(pECB,
ERR_STOCKLEVEL_NOT_PROCESSED, ERR_TYPE_DEADLOCK, NULL,
iTermId, iSyncId);
                    else
                              ErrorMessage(pECB,
ERR_STOCKLEVEL_NOT_PROCESSED, ERR_TYPE_WEBDLL, NULL,
iTermId, iSyncId);
     }
     else
          WriteZString(pECB,
MakeStockLevelForm(iTermId, iSyncId, FALSE) );

     return;
}
#else // Not LOCAL_ALLOC
static void
ProcessStockLevelForm(EXTENSION_CONTROL_BLOCK *pECB,
int iTermId, int iSyncId)
{
          int                 TpRc, iRc, iError;
          char      szTmp[26];
          long      ilen, *olen;
          char      buf[128];

     if((iRc = ThrTpInit()) <0)
          {
```

```
                    // This is bad
                    sprintf(buf, "ProcessStockLevel
Failed ThrTpInit: iRc = %d", iRc);
                    LogTuxError(0, buf);
                    ErrorMessage(pECB,
ERR_STOCKLEVEL_NOT_PROCESSED, ERR_TYPE_WEBDLL, NULL,
iTermId, iSyncId);
                    return;
          }

     memset(&Term.pClientData[iTermId].StockLevelData,
0, sizeof(STOCK_LEVEL_DATA));

     Term.pClientData[iTermId].StockLevelData.w_id =
Term.pClientData[iTermId].w_id;
     Term.pClientData[iTermId].StockLevelData.d_id =
Term.pClientData[iTermId].d_id;


     if ( !GetKeyValue(pECB->lpszQueryString, "TT*",
szTmp, sizeof(szTmp)) )
     {
          ErrorMessage(pECB,
ERR_STOCKLEVEL_MISSING_THRESHOLD_KEY, ERR_TYPE_WEBDLL,
NULL, iTermId, iSyncId);
          return;
     }

     if ( !IsNumeric(szTmp) )
     {
          ErrorMessage(pECB,
ERR_STOCKLEVEL_THRESHOLD_INVALID, ERR_TYPE_WEBDLL,
NULL, iTermId, iSyncId);
          return;
     }


Term.pClientData[iTermId].StockLevelData.thresh_hold =
atoi(szTmp);

     if (
Term.pClientData[iTermId].StockLevelData.thresh_hold >=
100 ||
Term.pClientData[iTermId].StockLevelData.thresh_hold <
0 )
     {
          ErrorMessage(pECB,
ERR_STOCKLEVEL_THRESHOLD_RANGE, ERR_TYPE_WEBDLL, NULL,
iTermId, iSyncId);
          return;
     }

     Term.pClientData[iTermId].TuxDataPtr-
>StockLevelData =
Term.pClientData[iTermId].StockLevelData;

     ilen = sizeof(TUX_DATA);
     olen = &ilen;

          if ( dLog )
          {
                    FILE *fp;

                    fp = fopen(szTpccLogPath, "ab");
                    fprintf(fp, "* ProcessStockLevel
Thread %d iTermId %d TuxDataPtr: %x \r\n",
                              GetCurrentThreadId(),
iTermId, &Term.pClientData[iTermId].TuxDataPtr);
                    fclose(fp);
          }

     if (( iRc = tpcall("STOCKLEVEL", (char
*)Term.pClientData[iTermId].TuxDataPtr, ilen,
                     (char
**)&Term.pClientData[iTermId].TuxDataPtr, (long *)
olen, TPSIGRSTRT)) == -1)
          {
         TpRc = tperrno;
                     sprintf(buf, "ProcessStockLevel
tpcall failed");
                     LogTuxError(TpRc, buf);
                     ErrorMessage(pECB,
ERR_STOCKLEVEL_NOT_PROCESSED, ERR_TYPE_WEBDLL, NULL,
iTermId, iSyncId);
          return;
     }

          if ( dLog )
          {
                    FILE *fp;

                    fp = fopen(szTpccLogPath, "ab");
                    fprintf(fp, "** ProcessStockLevel
Thread %d iTermId %d TuxDataPtr: %x \r\n",
                              GetCurrentThreadId(),
iTermId, &Term.pClientData[iTermId].TuxDataPtr);
                    fclose(fp);
          }

     Term.pClientData[iTermId].StockLevelData =
Term.pClientData[iTermId].TuxDataPtr->StockLevelData;

     iRc = Term.pClientData[iTermId].TuxDataPtr-
>StockLevelData.retval;
          iError =
Term.pClientData[iTermId].TuxDataPtr-
>StockLevelData.error;

          if ( iRc == 0 )
          {
                    if ( iError == ERR_TYPE_DEADLOCK )
                              ErrorMessage(pECB,
ERR_STOCKLEVEL_NOT_PROCESSED, ERR_TYPE_DEADLOCK, NULL,
iTermId, iSyncId);
                    else
                              ErrorMessage(pECB,
ERR_STOCKLEVEL_NOT_PROCESSED, ERR_TYPE_WEBDLL, NULL,
iTermId, iSyncId);
     }
     else
          WriteZString(pECB,
MakeStockLevelForm(iTermId, iSyncId, FALSE) );

          return;

}
#endif // LOCAL_ALLOC

/* FUNCTION: int GetNewOrderData(LPSTR lpszQueryString,
NEW_ORDER_DATA *pNewOrderData)
 *
 * PURPOSE:          This function extracts and
validates the new order form data from an http command
string.
 *
 * ARGUMENTS:        LPSTR
          lpszQueryString               client browser
http command string
 *                                      NEW_ORDER_DATA
          *pNewOrderData                pointer to new
order data structure
 *
 * RETURNS:                   int

                    error code indicating reason for
failure
 *                                      ERR_SUCCESS

                    new order input data successfully
parsed
 *
 *
 * COMMENTS:         None
 *
 */

static int GetNewOrderData(LPSTR lpszQueryString,
NEW_ORDER_DATA *pNewOrderData)
{
          char      szTmp[26];
          char      szKey[26];
          int                 i;
          short     items;
          BOOL      bCheck;

          if ( !GetKeyValue(lpszQueryString, "DID*",
szTmp, sizeof(szTmp)) )
                    return
ERR_NEWORDER_FORM_MISSING_DID;

          if ( !IsNumeric(szTmp) )
                    return
ERR_NEWORDER_DISTRICT_INVALID;

          pNewOrderData->d_id = atoi(szTmp);

          if ( !GetKeyValue(lpszQueryString, "CID*",
szTmp, sizeof(szTmp)) )
                    return ERR_NEWORDER_CUSTOMER_KEY;

          if ( !IsNumeric(szTmp) )
                    return
ERR_NEWORDER_CUSTOMER_INVALID;
          pNewOrderData->c_id = atoi(szTmp);

          bCheck = FALSE;
          for(i=0, items=0; i<15; i++)
          {
                    wsprintf(szKey, "IID%2.2d*", i);
                    if ( !GetKeyValue(lpszQueryString,
szKey, szTmp, sizeof(szTmp)) )
                              return
ERR_NEWORDER_MISSING_IID_KEY;
                    if ( szTmp[0] )
                    {
                              //if blank lines between
item ids
                              if ( bCheck )
```

```
                                        return
ERR_NEWORDER_ITEM_BLANK_LINES;
                                if ( !IsNumeric(szTmp) )
                                        return
ERR_NEWORDER_ITEMID_INVALID;
                                pNewOrderData-
>Ol[i].ol_i_id = atoi(szTmp);

                                wsprintf(szKey,
"SP%2.2d*", i);
                                if (
!GetKeyValue(lpszQueryString, szKey, szTmp,
sizeof(szTmp)) )
                                        return
ERR_NEWORDER_MISSING_SUPPW_KEY;
                                if ( !IsNumeric(szTmp) )
                                        return
ERR_NEWORDER_SUPPW_INVALID;
                                pNewOrderData-
>Ol[i].ol_supply_w_id = (short)atoi(szTmp);

                                wsprintf(szKey,
"Qty%2.2d*", i);
                                if (
!GetKeyValue(lpszQueryString, szKey, szTmp,
sizeof(szTmp)) )
                                        return
ERR_NEWORDER_MISSING_QTY_KEY;

                                if ( !IsNumeric(szTmp) )
                                        return
ERR_NEWORDER_QTY_INVALID;

                                pNewOrderData-
>Ol[i].ol_quantity = atoi(szTmp);
                                items++;

                                if ( pNewOrderData-
>Ol[i].ol_i_id >= 1000000 || pNewOrderData-
>Ol[i].ol_i_id < 1 )
                                        return
ERR_NEWORDER_ITEMID_RANGE;
                                if ( pNewOrderData-
>Ol[i].ol_quantity >= 100 || pNewOrderData-
>Ol[i].ol_quantity < 1 )
                                        return
ERR_NEWORDER_QTY_RANGE;
                        }
                        else
                        {
                                wsprintf(szKey,
"SP%2.2d*", i);
                                if (
!GetKeyValue(lpszQueryString, szKey, szTmp,
sizeof(szTmp)) )
                                        return
ERR_NEWORDER_MISSING_QTY_KEY;

                                if ( szTmp[0] )
                                        return
ERR_NEWORDER_SUPPW_WITHOUT_ITEMID;

                                wsprintf(szKey,
"Qty%2.2d*", i);
                                if (
!GetKeyValue(lpszQueryString, szKey, szTmp,
sizeof(szTmp)) )
                                        return
ERR_NEWORDER_MISSING_QTY_KEY;

                                if ( szTmp[0] )
                                        return
ERR_NEWORDER_QTY_WITHOUT_ITEMID;

                                bCheck = TRUE;
                        }
                }
                if ( items == 0 )
                        return
ERR_NEWORDER_NOITEMS_ENTERED;

                pNewOrderData->o_ol_cnt = items;

                return ERR_SUCCESS;
}

/* FUNCTION: int GetPaymentData(LPSTR lpszQueryString,
PAYMENT_DATA *pPaymentData)
 *
 * PURPOSE:         This function extracts and
validates the payment form data from an http command
string.
 *
 * ARGUMENTS:       LPSTR
                lpszQueryString                client browser
http command string
 *                                              PAYMENT_DATA
                *pPaymentData                  pointer to
payment data structure
 *
 * RETURNS:                                     int

                        error code indicating reason for
failure
 *
                ERR_SUCCESS
                                        all input data
successfully parsed
 *
 * COMMENTS:        None
 *
 */

static int GetPaymentData(LPSTR lpszQueryString,
PAYMENT_DATA *pPaymentData)
{
                char      szTmp[26];
                char      *ptr;

                if ( !GetKeyValue(lpszQueryString, "DID*",
szTmp, sizeof(szTmp)) )
                        return ERR_PAYMENT_MISSING_DID_KEY;
                if ( !IsNumeric(szTmp) )
                        return
ERR_PAYMENT_DISTRICT_INVALID;
                pPaymentData->d_id = atoi(szTmp);

                if ( !GetKeyValue(lpszQueryString, "CID*",
szTmp, sizeof(szTmp)) )
                        return ERR_PAYMENT_MISSING_CID_KEY;

                if ( szTmp[0] && !IsNumeric(szTmp) )
                        return
ERR_PAYMENT_CUSTOMER_INVALID;


                pPaymentData->c_id = atoi(szTmp);

                if ( szTmp[0] == 0 )
                {
                        if ( !GetKeyValue(lpszQueryString,
"CLT*", szTmp, sizeof(szTmp)) )
                                return
ERR_PAYMENT_MISSING_CLT;
                        _strupr( szTmp );

                        strcpy(pPaymentData->c_last,
szTmp);
                        if ( strlen(pPaymentData->c_last) >
16 )
                                return
ERR_PAYMENT_LAST_NAME_TO_LONG;
                }
                else
                {
                        if ( !GetKeyValue(lpszQueryString,
"CLT*", szTmp, sizeof(szTmp)) )
                                return
ERR_PAYMENT_MISSING_CLT_KEY;
                        if ( szTmp[0] )
                                return
ERR_PAYMENT_CID_AND_CLT;
                }

                if ( !GetKeyValue(lpszQueryString, "CDI*",
szTmp, sizeof(szTmp)) )
                        return ERR_PAYMENT_MISSING_CDI_KEY;
                if ( !IsNumeric(szTmp) )
                        return ERR_PAYMENT_CDI_INVALID;
                pPaymentData->c_d_id = atoi(szTmp);

                if ( !GetKeyValue(lpszQueryString, "CWI*",
szTmp, sizeof(szTmp)) )
                        return ERR_PAYMENT_MISSING_CWI_KEY;

                if ( !IsNumeric(szTmp) )
                        return ERR_PAYMENT_CWI_INVALID;

                pPaymentData->c_w_id = atoi(szTmp);


                if ( !GetKeyValue(lpszQueryString, "HAM*",
szTmp, sizeof(szTmp)) )
                        return ERR_PAYMENT_MISSING_HAM_KEY;

                ptr = szTmp;

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

```
                                ptr++;
                                if ( !*ptr )
                                        break;
                                if ( *ptr < '0' || *ptr >
'9' )
                                        return
ERR_PAYMENT_HAM_INVALID;
                                if ( !*ptr )
                                        return
ERR_PAYMENT_HAM_INVALID;
                        }
                        else if ( *ptr < '0' || *ptr > '9'
)
                                        return
ERR_PAYMENT_HAM_INVALID;
                        ptr++;
                }

                pPaymentData->h_amount = atof(szTmp);
                if ( pPaymentData->h_amount >= 10000.00 ||
pPaymentData->h_amount < 0 )
                        return ERR_PAYMENT_HAM_RANGE;

                return ERR_SUCCESS;
}

/* FUNCTION: int GetOrderStatusData(LPSTR
lpszQueryString, ORDER_STATUS_DATA *pOrderStatusData)
 *
 * PURPOSE:         This function extracts and
validates the payment form data from an http command
string.
 *
 * ARGUMENTS:       LPSTR
        lpszQueryString                 client browser
http command string
 *
        ORDER_STATUS_DATA   *pOrderStatusData
        pointer to order status data structure
 *
 * RETURNS:                     int

                        error code indicating reason for
failure
 *                                      ERR_SUCCESS

                        successfully parsed all required
input data
 *
 * COMMENTS:        None
 *
 */
static int GetOrderStatusData(LPSTR lpszQueryString,
ORDER_STATUS_DATA *pOrderStatusData)
{
        char      szTmp[26];

        if ( !GetKeyValue(lpszQueryString, "DID*",
szTmp, sizeof(szTmp)) )
                return
ERR_ORDERSTATUS_MISSING_DID_KEY;
        if ( !IsNumeric(szTmp) )
                return ERR_ORDERSTATUS_DID_INVALID;
        pOrderStatusData->d_id = atoi(szTmp);

        if ( !GetKeyValue(lpszQueryString, "CID*",
szTmp, sizeof(szTmp)) )
                return
ERR_ORDERSTATUS_MISSING_CID_KEY;

        if ( szTmp[0] == 0 )
        {
                pOrderStatusData->c_id = 0;
                if ( !GetKeyValue(lpszQueryString,
"CLT*", szTmp, sizeof(szTmp)) )
                        return
ERR_ORDERSTATUS_MISSING_CLT_KEY;
                _strupr( szTmp );
                strcpy(pOrderStatusData->c_last,
szTmp);
                if ( strlen(pOrderStatusData-
>c_last) > 16 )
                        return
ERR_ORDERSTATUS_CLT_RANGE;
        }
        else
        {
                if ( !IsNumeric(szTmp) )
                        return
ERR_ORDERSTATUS_CID_INVALID;
                pOrderStatusData->c_id =
atoi(szTmp);
                if ( !GetKeyValue(lpszQueryString,
"CLT*", szTmp, sizeof(szTmp)) )
                        return
ERR_ORDERSTATUS_MISSING_CLT_KEY;
                if ( szTmp[0] )
                        return
ERR_ORDERSTATUS_CID_AND_CLT;
        }

        return ERR_SUCCESS;
}

/* FUNCTION: BOOL ReadRegistrySettings(void)
 *
 * PURPOSE:         This function reads the NT registry
for startup parameters. There parameters are
 *                          under the TPCC key.
 *
 * ARGUMENTS:   None
 *
 * RETURNS:                 None
 *
 * COMMENTS:        This function also sets up required
operation variables to their default value
 *                                  so if registry
is not setup the default values will be used.
 *
 */

static BOOL ReadRegistrySettings(void)
{
        HKEY      hKey;
        DWORD     size;
        DWORD     type;
        char      szTmp[256];

        bLog                        = FALSE;
        dLog                        = FALSE;
        iMaxWareHouses      = 500;
        iThreads            = 5;
        iQSlotts            = 3000;
        iDelayMs            = 100;
        iDeadlockRetry      = (short)3;
        strcpy(szTpccLogPath, "tpcclog.");
        strcpy(szErrorLogPath, "tpccerr.");


        if ( RegOpenKeyEx(HKEY_LOCAL_MACHINE,
"SOFTWARE\\Microsoft\\TPCC", 0, KEY_READ, &hKey) !=
ERROR_SUCCESS )
                return TRUE;
        size = sizeof(szTmp);

        if ( RegQueryValueEx(hKey, "PATH", 0, &type,
szTmp, &size) == ERROR_SUCCESS )
        {
                strcpy(szTpccLogPath, szTmp);
                strcat(szTpccLogPath, "tpcclog.");
                strcpy(szErrorLogPath, szTmp);
                strcat(szErrorLogPath, "tpccerr.");
        }

        size = sizeof(szTmp);
        if ( RegQueryValueEx(hKey, "LOG", 0, &type,
szTmp, &size) == ERROR_SUCCESS )
        {
                if ( !stricmp(szTmp, "ON") )
                        bLog = TRUE;
        }

        size = sizeof(szTmp);
        if ( RegQueryValueEx(hKey, "DEBUG", 0, &type,
szTmp, &size) == ERROR_SUCCESS )
        {
                if ( !stricmp(szTmp, "ON") )
                        dLog = TRUE;
        }

        size = sizeof(szTmp);
        if ( RegQueryValueEx(hKey,
"MaximumWarehouses", 0, &type, szTmp, &size) ==
ERROR_SUCCESS )
        {
                iMaxWareHouses = atoi(szTmp);
                if ( iMaxWareHouses == 0 )
                        iMaxWareHouses = 500;
        }

        size = sizeof(szTmp);
        if ( RegQueryValueEx(hKey,
"NumberOfDeliveryThreads", 0, &type, szTmp, &size) ==
ERROR_SUCCESS )
                iThreads = atoi(szTmp);
        if ( !iThreads )
                iThreads = 5;

        size = sizeof(szTmp);
        if ( RegQueryValueEx(hKey, "QueueSlotts", 0,
&type, szTmp, &size) == ERROR_SUCCESS )
                iQSlotts = atoi(szTmp);
                if ( !iQSlotts )
                        iQSlotts = 3000;

                size = sizeof(szTmp);
        if ( RegQueryValueEx(hKey, "BackoffDelay", 0,
&type, szTmp, &size) == ERROR_SUCCESS )
```

```
                    iDelayMs = atoi(szTmp);
                    if ( !iDelayMs )
                              iDelayMs = 100;

          size = sizeof(szTmp);
          if ( RegQueryValueEx(hKey, "DeadlockRetry",
0, &type, szTmp, &size) == ERROR_SUCCESS )
                    iDeadlockRetry =
(short)atoi(szTmp);
                    if ( !iDeadlockRetry )
                              iDeadlockRetry =
(short)3;

          size = sizeof(szTmp);
          if ( RegQueryValueEx(hKey, "MaxConnections",
0, &type, szTmp, &size) == ERROR_SUCCESS )
                    iMaxConnections =
(short)atoi(szTmp);
                    if ( !iMaxConnections )
                              iMaxConnections =
(short)25;

          RegCloseKey(hKey);

          return FALSE;

}



/* FUNCTION: BOOL IsNumeric(char *ptr)
 *
 * PURPOSE:         This function determines if a
string is numeric. It fails if any characters other
 *                           than numeric and null
terminator are present.
 *
 * ARGUMENTS:       char                        *ptr
          pointer to string to check.
 *
 * RETURNS:                  BOOL      FALSE     if
string is not all numeric
 *
          TRUE      if string contains only numeric
characters i.e. '0' - '9'
 *
 * COMMENTS:        None
 *
 */

static BOOL IsNumeric(char *ptr)
{
          if ( *ptr == 0 )
                    return FALSE;

          while( *ptr && isdigit(*ptr) )
                    ptr++;
          return ( !*ptr );
}


/* FUNCTION: void FormatHTMLString(char *szBuff, int
iLen, char *szStr)
 *
 * PURPOSE:         This function Handles translation
of HTML specific character field data
 *                           when an HTML output form
is generated.
 *
 * ARGUMENTS:       char      *szBuff   Returned string
information
 *                                     char
          *szStr    input string to be formatted.
 *                                     int
          iLen      Length of returned string
 *
 * RETURNS:                  none
 *
 * COMMENTS:        The length paramter is the absolute
length of the returned string in
 *                                     HTML
characters. For example the input string > would be
returned as
 *                                     &gt; which
would be counted as 1 character.If the number of input
 *                                     characters is
less than the iLen parameter spaces are appended to
 *                                     the end of the
string to ensure that at least iLen characters are
 *                                     returned in the
szBuff parameter.
 *
 */

static void FormatHTMLString(char *szBuff, char *szStr,
int iLen)
{
          while( iLen && *szStr )
          {
                    switch( *szStr )
                    {
                              case '>':
                                        *szBuff++ =
'&';
                                        *szBuff++ =
'g';
                                        *szBuff++ =
't';
                                        *szBuff++ =
';';
                                        szStr++;
                                        break;
                              case '<':
                                        *szBuff++ =
'&';
                                        *szBuff++ =
'l';
                                        *szBuff++ =
't';
                                        *szBuff++ =
';';
                                        szStr++;
                                        break;
                              case '&':
                                        *szBuff++ =
'&';
                                        *szBuff++ =
'a';
                                        *szBuff++ =
'm';
                                        *szBuff++ =
'p';
                                        *szBuff++ =
';';
                                        szStr++;
                                        break;
                              case '\"':
                                        *szBuff++ =
'&';
                                        *szBuff++ =
'q';
                                        *szBuff++ =
'u';
                                        *szBuff++ =
'o';
                                        *szBuff++ =
't';
                                        *szBuff++ =
';';
                                        szStr++;
                                        break;
                              default:
                                        *szBuff++ =
*szStr++;
                                        break;
                    }
                    iLen--;
          }
          while( iLen-- )
                    *szBuff++ = ' ';

          *szBuff = 0;

          return;
}


static int ThrTpInit()
{

     static int num_tpinits=0;
     static int x=1;
     static int once=0;
     static CRITICAL_SECTION     TpCriticalSection;
           int lasterr, iRc, TpRc;
           int retry = 0;
           BOOL Success = FALSE;

     if(!TlsGetValue(TLSIsTpInitedKey))
     {
                    if (!once)
                    {

          InitializeCriticalSection(&TpCriticalSection)
;
                              once=1;
                    }

                    if ( dLog )
                    {
                              FILE *fp;

                              fp = fopen(szTpccLogPath,
"ab");
                              fprintf(fp, "* In
ThrTpInit Thread %d * \r\n", GetCurrentThreadId());
                              fclose(fp);
                    }
```

```
                    while ( retry < TP_MAX_RETRIES )
                    {

          EnterCriticalSection(&TpCriticalSection);
                              if(tpinf == NULL)
                              {
                                        if ((tpinf = (
TPINIT *)tpalloc("TPINIT", NULL, sizeof(TPINIT))) ==
NULL)
                                  {

          LeaveCriticalSection(&TpCriticalSection);
                                                  TpRc
= tperrno;
                                                  {

          FILE *fp;


          fp = fopen(szErrorLogPath, "ab");

          fprintf(fp, ">>>> ThrTpInit:%d : tpalloc of
tpinit failed: %d : %s\r\n",

                    GetCurrentThreadId(), TpRc,
tpstrerror(TpRc));

          fclose(fp);
                                                  }

          retry++;

          continue;
                                        }
                              tpinf-
>flags|=TPMULTICONTEXTS;
                              }

                              if (retry == 0)

          itoa(++num_tpinits, tpinf->cltname, 10);

// Do the TPINIT
                              iRc = tpinit(tpinf);
                              TpRc = tperrno;

                              // check tpalloc() ?
                              if (iRc < 0)
                              {

          LeaveCriticalSection(&TpCriticalSection);
                                        retry++;
                                        lasterr =
GetLastError();
/*                                      TpRc = tperrno;
                                        {
                                                  FILE
*fp;

                                                  fp =
fopen(szErrorLogPath, "ab");

          fprintf(fp, ">>>> ThrTpInit:%d : tpinit
failed: %d %s :try # %d\r\n",

          GetCurrentThreadId(), iRc, tpstrerror(TpRc),
retry);

          fclose(fp);
                                        }
*/
                              }
                              else
                              {
                                        Success = TRUE;

          LeaveCriticalSection(&TpCriticalSection);
                                        break;
                              }

                              Sleep(50); // Relinquish
thread timeslice
                    } // retry the tpinit if it failed
the first time

                    if ( Success == FALSE )
                    {
                              {
                                        char ebuf[128];

                                        sprintf(ebuf,
">>>> ThrTpInit %d : Cannot tpinit after %d tries iRc =
%d LastErr = %d \r\n",

          GetCurrentThreadId(), TP_MAX_RETRIES, iRc,
lasterr);

          LogTuxError(TpRc, ebuf);
                              }
                              return -1;
                    }
                    if ( Success == TRUE )
                    {
                              if ( retry > 0 )
                              {
                                        char ebuf[128];

                                        sprintf(ebuf,
">>>> ThrTpInit %d : Cannot tpinit after %d tries iRc =
%d LastErr = %d \r\n",

          GetCurrentThreadId(), TP_MAX_RETRIES, iRc,
lasterr);

                                        sprintf(ebuf,
"* ThrTpInit Thread %d Success retry count %d with
LastErr = %d * \r\n",

          GetCurrentThreadId(), retry, lasterr);

          LogTuxError(TpRc, ebuf);
                              }

                              if ( (
iRc=TlsSetValue(TLSIsTpInitedKey,&x)) == 0)
                              {
                                        {
                                                  FILE
*fp;

                                                  fp =
fopen(szErrorLogPath, "ab");

          fprintf(fp, ">>>> ThrTpInit %d : TlsSetValue
Failed iRc: %d \r\n",

          GetCurrentThreadId(), iRc);

          fclose(fp);
                                        }
                              }
                    }
                    else
                    {
                              if ( dLog )
                              {
                                        FILE *fp;

                                        fp = fopen(szTpccLogPath,
"ab");
                                        fprintf(fp, "* ThrTpInit
Thread %d already tpinited * \r\n",
GetCurrentThreadId());
                                        fclose(fp);
                              }
                    }
          return 0;
}
```

Tpcc.h

```
/*        FILE:               TPCC.H
 *                                        Microsoft TPC-C
Kit Ver. 3.00.001
 *                                        Audited
08/23/96, By Francois Raab
 *
 *                                        Copyright
Microsoft, 1996
 *
 *        PURPOSE:  Header file for ISAPI TPCC.DLL,
defines structures and functions used in the isapi
tpcc.dll.
 *        Author:             Philip Durr
 *
          philipdu@Microsoft.com
 */

//#define LOCAL_ALLOC 1

//VERSION RESOURCE DEFINES
#define _APS_NEXT_RESOURCE_VALUE
                    101
#define _APS_NEXT_COMMAND_VALUE
                                        40001
#define _APS_NEXT_CONTROL_VALUE
                                        1000
#define _APS_NEXT_SYMED_VALUE
                    101

#define TP_MAX_RETRIES
                                        50
```

```
#define ERR_BAD_ITEM_ID
                                        1
          //expected abort record in txnRecord
#define ERR_TYPE_DELIVERY_POST
                                2
          //expected delivery post failed
#define   ERR_TYPE_WEBDLL
                                        3
          //tpcc web generated error
#define   ERR_TYPE_SQL
                                        4
          //sql server generated error
#define   ERR_TYPE_DBLIB
                                        5
          //dblib generated error
#define   ERR_TYPE_ODBC
                                        6
          //odbc generated error
#define ERR_TYPE_SOCKET
                                        7
          //error on communication socket client rte
only
#define ERR_TYPE_DEADLOCK
                                8
          //dblib and odbc only deadlock condition
#define ERR_TYPE_TUXEDO
                                        9
          //tuxedo error

#define   ERR_SUCCESS
                                                        1000
          //"Success, no error.
#define   ERR_COMMAND_UNDEFINED
                                1001      //"Command
undefined.
#define   ERR_NOT_IMPLEMENTED_YET
                                1002      //"Not
Implemented Yet.
#define   ERR_CANNOT_INIT_TERMINAL
                        1003      //"Cannot initialize
client connection.
#define   ERR_OUT_OF_MEMORY
                                1004      //"insufficient
memory.
#define   ERR_NEW_ORDER_NOT_PROCESSED
                        1005      //"Cannot process new
Order form.
#define   ERR_PAYMENT_NOT_PROCESSED
                        1006      //"Cannot process payment
form.
#define   ERR_NO_SERVER_SPECIFIED
                                1007      //"No Server
name specified.
#define   ERR_ORDER_STATUS_NOT_PROCESSED
                        1008      //"Cannot process order
status form.
#define   ERR_W_ID_INVALID
                                1009      //"Invalid
Warehouse ID.
#define   ERR_CAN_NOT_SET_MAX_CONNECTIONS
                        1010      //"Insufficient memory to
allocate # connections.
#define   ERR_NOSUCH_CUSTOMER
                                1011      //"No such
customer.
#define   ERR_D_ID_INVALID
                                1012      //"Invalid
District ID Must be 1 to 10.
#define   ERR_MAX_CONNECT_PARAM
                                1013      //"Max client
connections exceeded, run install to increase.
#define   ERR_INVALID_SYNC_CONNECTION
                        1014      //"Invalid Terminal Sync
ID.
#define   ERR_INVALID_TERMID
                                1015      //"Invalid
Terminal ID.
#define   ERR_PAYMENT_INVALID_CUSTOMER
          1016      //"Payment Form, No such Customer.
#define   ERR_SQL_OPEN_CONNECTION
                                1017
          //"SQLOpenConnection API Failed.
#define   ERR_STOCKLEVEL_MISSING_THRESHOLD_KEY    1018
          //"Stock Level missing Threshold key "TT*".
#define   ERR_STOCKLEVEL_THRESHOLD_INVALID
          1019      //"Stock Level Threshold invalid
data type range = 1 - 99.
#define   ERR_STOCKLEVEL_THRESHOLD_RANGE
                        1020      //"Stock Level Threshold
out of range, range must be 1 - 99.
#define   ERR_STOCKLEVEL_NOT_PROCESSED
          1021      //"Stock Level not processed.
#define   ERR_NEWORDER_FORM_MISSING_DID
          1022      //"New Order missing District key
"DID*".
#define   ERR_NEWORDER_DISTRICT_INVALID
          1023      //"New Order District ID Invalid
range 1 - 10.
#define   ERR_NEWORDER_DISTRICT_RANGE
                        1024      //"New Order District ID
out of Range. Range = 1 - 10.
#define   ERR_NEWORDER_CUSTOMER_KEY
                        1025      //"New Order missing
Customer key "CID*".
#define   ERR_NEWORDER_CUSTOMER_INVALID
          1026      //"New Order customer id invalid
data type, range = 1 to 3000.
#define   ERR_NEWORDER_CUSTOMER_RANGE
                        1027      //"New Order customer id
out of range, range = 1 to 3000.
#define   ERR_NEWORDER_MISSING_IID_KEY
          1028      //"New Order missing Item Id key
"IID*".
#define   ERR_NEWORDER_ITEM_BLANK_LINES
          1029      //"New Order blank order lines all
orders must be continuous.
#define   ERR_NEWORDER_ITEMID_INVALID
                        1030      //"New Order Item Id is
wrong data type, must be numeric.
#define   ERR_NEWORDER_MISSING_SUPPW_KEY
                        1031      //"New Order missing
Supp_W key "SP##*".
#define   ERR_NEWORDER_SUPPW_INVALID
                        1032      //"New Order Supp_W
invalid data type must be numeric.
#define   ERR_NEWORDER_MISSING_QTY_KEY
          1033      //"New Order Missing Qty key
"Qty##*".
#define   ERR_NEWORDER_QTY_INVALID
                        1034      //"New Order Qty invalid
must be numeric range 1 - 99.
#define   ERR_NEWORDER_SUPPW_RANGE
                        1035      //"New Order Supp_W value
out of range range = 1 - Max Warehouses.
#define   ERR_NEWORDER_ITEMID_RANGE
                        1036      //"New Order Item Id is
out of range. Range = 1 to 999999.
#define   ERR_NEWORDER_QTY_RANGE
                                1037      //"New Order
Qty is out of range. Range = 1 to 99.
#define   ERR_PAYMENT_DISTRICT_INVALID
          1038      //"Payment District ID is invalid
must be 1 - 10.
#define   ERR_NEWORDER_SUPPW_WITHOUT_ITEMID
          1039      //"New Order Supp_W field entered
without a corrisponding Item_Id.
#define   ERR_NEWORDER_QTY_WITHOUT_ITEMID
                        1040      //"New Order Qty entered
without a corrisponding Item_Id.
#define   ERR_NEWORDER_NOITEMS_ENTERED
          1041      //"New Order Blank Items between
items, items must be continuous.
#define   ERR_PAYMENT_MISSING_DID_KEY
                        1042      //"Payment missing
District Key "DID*".
#define   ERR_PAYMENT_DISTRICT_RANGE
                        1043      //"Payment District Out
of range, range = 1 - 10.
#define   ERR_PAYMENT_MISSING_CID_KEY
                        1044      //"Payment missing
Customer Key "CID*".
#define   ERR_PAYMENT_CUSTOMER_INVALID
          1045      //"Payment Customer data type
invalid, must be numeric.
#define   ERR_PAYMENT_MISSING_CLT
                                1046      //"Payment
missing Customer Last Name Key "CLT*".
#define   ERR_PAYMENT_LAST_NAME_TO_LONG
          1047      //"Payment Customer last name
longer than 16 characters.
#define   ERR_PAYMENT_CUSTOMER_RANGE
                        1048      //"Payment Customer ID
out of range, must be 1 to 3000.
#define   ERR_PAYMENT_CID_AND_CLT
                                1049      //"Payment
Customer ID and Last Name entered must be one or other.
#define   ERR_PAYMENT_MISSING_CDI_KEY
                        1050      //"Payment missing
Customer district key "CDI*".
#define   ERR_PAYMENT_CDI_INVALID
                                1051      //"Payment
Customer district invalid must be numeric.
#define   ERR_PAYMENT_CDI_RANGE
                                1052      //"Payment
Customer district out of range must be 1 - 10.
#define   ERR_PAYMENT_MISSING_CWI_KEY
                        1053      //"Payment missing
Customer Warehouse key "CWI*".
#define   ERR_PAYMENT_CWI_INVALID
                                1054      //"Payment
Customer Warehouse invalid must be numeric.
#define   ERR_PAYMENT_CWI_RANGE
                                1055      //"Payment
Customer Warehouse out of range, 1 to Max Warehouses.
#define   ERR_PAYMENT_MISSING_HAM_KEY
                        1056      //"Payment missing Amount
key "HAM*".
```

```
#define   ERR_PAYMENT_HAM_INVALID
                              1057      //"Payment
Amount invalid data type must be numeric.
#define   ERR_PAYMENT_HAM_RANGE
                              1058      //"Payment
Amount out of range, 0 - 9999.99.
#define   ERR_ORDERSTATUS_MISSING_DID_KEY
                    1059      //"Order Status missing
District key "DID*".
#define   ERR_ORDERSTATUS_DID_INVALID
                    1060      //"Order Status District
invalid, value must be numeric 1 - 10.
#define   ERR_ORDERSTATUS_DID_RANGE
                    1061      //"Order Status District
out of range must be 1 - 10.
#define   ERR_ORDERSTATUS_MISSING_CID_KEY
                    1062      //"Order Status missing
Customer key "CID*".
#define   ERR_ORDERSTATUS_MISSING_CLT_KEY
                    1063      //"Order Status missing
Customer Last Name key "CLT*".
#define   ERR_ORDERSTATUS_CLT_RANGE
                    1064      //"Order Status Customer
last name longer than 16 characters.
#define   ERR_ORDERSTATUS_CID_INVALID
                    1065      //"Order Status Customer
ID invalid, range must be numeric 1 - 3000.
#define   ERR_ORDERSTATUS_CID_RANGE
                    1066      //"Order Status Customer
ID out of range must be 1 - 3000.
#define   ERR_ORDERSTATUS_CID_AND_CLT
                    1067      //"Order Status Customer
ID and LastName entered must be only one."
#define   ERR_DELIVERY_MISSING_OCD_KEY
          1068      //"Delivery missing Carrier ID key
\"OCD*\".
#define   ERR_DELIVERY_CARRIER_INVALID
          1069      //"Delivery Carrier ID invalid must
be numeric 1 - 10.
#define   ERR_DELIVERY_CARRIER_ID_RANGE
          1070      //"Delivery Carrier ID out of range
must be 1 - 10.
#define ERR_PAYMENT_MISSING_CLT_KEY
                    1071      //"Payment missing
Customer Last Name key "CLT*".
#define ERR_TPINIT_BAD
                                        5001
          //"Bad TPINIT"
#define ERR_TPALLOC_BAD
                                        5002
          //"Bad TPALLOC"
#define ERR_TPCALL_BAD
                                        5003
          //"Bad TPCALL"

//note that the welcome form must be processed first as
terminal ids assigned here, once the
//terminal id is assigned then the forms can be
processed in any order.
#define WELCOME_FORM
                              1
          //beginning form no term id assigned, form id
#define MAIN_MENU_FORM
                              2
          //term id assigned main menu form id
#define NEW_ORDER_FORM
                              3                   //new
order form id
#define PAYMENT_FORM
                              4
          //payment form id
#define DELIVERY_FORM
                              5
          //delivery form id
#define ORDER_STATUS_FORM
                    6                   //order status
id
#define STOCK_LEVEL_FORM
                    7                   //stock level
form id

//This macro is used to prevent the compiler error
unused formal parameter
#define UNUSEDPARAM(x) (x = x)

//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;

//This structure is used for posting delivery
transactions
typedef struct _DELIVERY_TRANSACTION
{
          SYSTEMTIME          queue;
          //time delivery transaction queued
          short               w_id;
          //delivery warehouse
          short               o_carrier_id;
          //carrier id
} DELIVERY_TRANSACTION;

#ifdef USE_ODBC
          typedef struct _DBPROCESS
          {
                    HDBC      hdbc;
                    HSTMT     hstmt;
                    int                 spid;
                    void      *uPtr;
          } DBPROCESS, *PDBPROCESS;

          //dblib error message return values
          #define INT_EXIT        0
          #define INT_CONTINUE    1
          #define INT_CANCEL      2
#endif

//This structure defines the data necessary to keep
distinct for each terminal or client connection.
typedef struct _CLIENTDATA
{
          int                               inUse;
                                            //in use flag
allows client entries to be reused
          int                               w_id;
                                            //warehouse id
assigned at welcome form
          int                               d_id;
                                            //district id
assigned at welcome form

          PDBPROCESS          dbproc;
                                            //dblib connection
pointer
          int                               spid;
                                            //spid assigned
from dblib
          int                               iSyncId;
                              //syncronization id
          int                               iTickCount;
                                            //time of last
access;
          int                               iTermId;
                              //terminal id of http
stream connection

          char
          szBuffer[4096];     //form buffer each HTML
form is built for a client in here

          NEW_ORDER_DATA                    NewOrderData;
                    //new order form data
          PAYMENT_DATA                      PaymentData;
                    //payment form data
          ORDER_STATUS_DATA   OrderStatusData;
          //order status form data
          DELIVERY_DATA                     DeliveryData;
                    //delivery form data
          STOCK_LEVEL_DATA    StockLevelData;
          //stock level form data

#ifndef LOCAL_ALLOC
          TUX_DATA                          *TuxDataPtr;
                    //Tuxedo Data Structure for all
transactions
#endif // LOCAL_ALLOC

} CLIENTDATA;

typedef CLIENTDATA *PCLIENTDATA;
          //pointer to client structure

//This structure is used to define the operational
interface for terminal id support
typedef struct _TERM
{
          int                               iAvailable;

          //total allocated terminal array entries
          int                               iNext;

          //next available terminal array element
          int                               iMasterSyncId;

          //syncronization id
          BOOL                bInit;

          //structure has been initialized flag
          CLIENTDATA          *pClientData;
                                            //pointer to
allocated client data
```

```
          void                (*Init)(void);
                                        //API to
initialize this structure
          int
          (*Allocate)(void);
          //API to allocate a new terminal entry array
id returned
          void                (*Restore)(void);
                              //API to free terminal
data
          int
          (*Add)(EXTENSION_CONTROL_BLOCK *pECB, char
*pQueryString);     //API to add a terminal id to
array, this context will


                    //be passed from the browser to the
tpcc.dll in the


                    //TERMID= key in the HTTP string.
          void
          (*Delete)(EXTENSION_CONTROL_BLOCK *pECB, int
id);      //API to free resources used by a terminal
array entry
} TERM;

typedef TERM *PTERM;
                                        //pointer to
terminal structure type

//this structure allows the EXTENSION CONTROL BLOCK to
be passed to the msg and error handlers.
typedef struct _ECBINFO
{
          int
                    iTermId;  //terminal id
          int
                    iSyncId;  //browser sync id
          BOOL
          bDeadlock;          //deadlock condition flag
          BOOL
          bFailed;  //cleared before sql transaction,
set in err handlers if an error occurs
          EXTENSION_CONTROL_BLOCK *pECB;
          //inetsrv current connection structure
information
} ECBINFO, *PECBINFO;


//function prototypes

BOOL APIENTRY DllMain(HANDLE hModule, DWORD
ul_reason_for_call, LPVOID lpReserved);
static void DeliveryDisconnect(void *ptr);
static BOOL IsValidTermId(int TermId);
BOOL ProcessQueryString(EXTENSION_CONTROL_BLOCK *pECB,
int *pCmd, int *pFormId, int *pTermId, int *pSyncId);
void NewOrderForm(EXTENSION_CONTROL_BLOCK *pECB, int
iFormId, int iTermId, int iSyncId);
void PaymentForm(EXTENSION_CONTROL_BLOCK *pECB, int
iFormId, int iTermId, int iSyncId);
void DeliveryForm(EXTENSION_CONTROL_BLOCK *pECB, int
iFormId, int iTermId, int iSyncId);
void OrderStatusForm(EXTENSION_CONTROL_BLOCK *pECB, int
iFormId, int iTermId, int iSyncId);
void StockLevelForm(EXTENSION_CONTROL_BLOCK *pECB, int
iFormId, int iTermId, int iSyncId);
void Exitcmd(EXTENSION_CONTROL_BLOCK *pECB, int
iFormId, int iTermId, int iSyncId);
void SubmitCmd(EXTENSION_CONTROL_BLOCK *pECB, int
iFormId, int iTermId, int iSyncId);
void BeginCmd(EXTENSION_CONTROL_BLOCK *pECB, int
iFormId, int iTermId, int iSyncId);
void ProcessCmd(EXTENSION_CONTROL_BLOCK *pECB, int
iFormId, int iTermId, int iSyncId);
void ClearCmd(EXTENSION_CONTROL_BLOCK *pECB, int
iFormId, int iTermId, int iSyncId);
void MenuCmd(EXTENSION_CONTROL_BLOCK *pECB, int
iFormId, int iTermId, int iSyncId);
void NumberOfConnectionsCmd(EXTENSION_CONTROL_BLOCK
*pECB, int iFormId, int iTermId, int iSyncId);
static void WriteZString(EXTENSION_CONTROL_BLOCK *pECB,
char *szStr);
static void h_printf(EXTENSION_CONTROL_BLOCK *pECB,
char *format, ...);
void LogTuxError(int TpRc, char *ErrMessage);
void ErrorMessage(EXTENSION_CONTROL_BLOCK *pECB, int
iError, int iErrorType, char *szMsg, int iTermId, int
iSyncId);
static BOOL GetKeyValue(char *pQueryString, char *pKey,
char *pValue, int iMax);
static void TermInit(void);
int err_handler(DBPROCESS *dbproc, int severity, int
dberr, int oserr, char *dberrstr, char *oserrstr);
int msg_handler(DBPROCESS *dbproc, DBINT msgno, int
msgstate, int severity, char *msgtext);
static void TermRestore(void);
static int TermAllocate(void);
static int TermAdd(EXTENSION_CONTROL_BLOCK *pECB, char
*pQueryString);
static void TermDelete(EXTENSION_CONTROL_BLOCK *pECB,
int id);
BOOL Init(EXTENSION_CONTROL_BLOCK *pECB, int iTermId,
int iSyncId, char *szServer, char *szUser, char
*szPassword, char *szDatabase);
static BOOL Close(EXTENSION_CONTROL_BLOCK *pECB, int
iTermId, int iSyncId);
static BOOL SQLOpenConnection(EXTENSION_CONTROL_BLOCK
*pECB, int iTermId, int iSyncId, DBPROCESS **dbproc,
char *server, char *database, char *user, char
*password, char *app, int *spid);
static BOOL SQLCloseConnection(EXTENSION_CONTROL_BLOCK
*pECB, DBPROCESS *dbproc);
static BOOL SQLStockLevel(EXTENSION_CONTROL_BLOCK
*pECB, int iTermId, int iSyncId, DBPROCESS *dbproc,
STOCK_LEVEL_DATA *pStockLevel, short deadlock_retry);
static int SQLNewOrder(EXTENSION_CONTROL_BLOCK
          *pECB, int iTermId, int iSyncId, DBPROCESS
*dbproc, NEW_ORDER_DATA  *pNewOrder, short
deadlock_retry);
static int SQLPayment(EXTENSION_CONTROL_BLOCK *pECB,
int iTermId, int iSyncId, DBPROCESS *dbproc,
PAYMENT_DATA *pPayment, short deadlock_retry);
static int SQLOrderStatus(EXTENSION_CONTROL_BLOCK
*pECB, int iTermId, int iSyncId, DBPROCESS *dbproc,
ORDER_STATUS_DATA *pOrderStatus, short deadlock_retry);
static int SQLDelivery(DBPROCESS *dbproc, DELIVERY_DATA
*pDelivery, short deadlock_retry);
static void WriteLog(DELIVERY_DATA *pDelivery,
SYSTEMTIME *trans_end );
static void CalculateElapsedTime(int *pElapsed,
LPSYSTEMTIME lpBegin, LPSYSTEMTIME lpEnd);
BOOL SQLDetectDeadlock(DBPROCESS *dbproc);
static void FormatString(char *szDest, char *szPic,
char *szSrc);
static char *MakeStockLevelForm(int iTermId, int
iSyncId, BOOL bInput);
static char *MakeMainMenuForm(int iTermId, int
iSyncId);
static char *MakeWelcomeForm(void);
static char *MakeNewOrderForm(int iTermId, int iSyncId,
BOOL Rollback, BOOL bInput, BOOL bValid);
static char *MakePaymentForm(int iTermId, int iSyncId,
BOOL bInput);
static char *MakeOrderStatusForm(int iTermId, int
iSyncId, BOOL bInput);
static char *MakeDeliveryForm(int iTermId, int iSyncId,
BOOL bInput, BOOL bSuccess);
static void UtilStrCpy(char * pDest, char * pSrc, int
n);
static void ProcessNewOrderForm(EXTENSION_CONTROL_BLOCK
          *pECB, int iTermId, int iSyncId);
static void ProcessPaymentForm(EXTENSION_CONTROL_BLOCK
*pECB, int iTermId, int iSyncId);
static void
ProcessOrderStatusForm(EXTENSION_CONTROL_BLOCK *pECB,
int iTermId, int iSyncId);
static void ProcessDeliveryForm(EXTENSION_CONTROL_BLOCK
*pECB, int iTermId, int iSyncId);
static void
ProcessStockLevelForm(EXTENSION_CONTROL_BLOCK *pECB,
int iTermId, int iSyncId);
static int GetNewOrderData(LPSTR lpszQueryString,
NEW_ORDER_DATA *pNewOrderData);
static int GetPaymentData(LPSTR lpszQueryString,
PAYMENT_DATA *pPaymentData);
static int GetOrderStatusData(LPSTR lpszQueryString,
ORDER_STATUS_DATA *pOrderStatusData);
static BOOL ReadRegistrySettings(void);
static BOOL PostDeliveryInfo(short w_id, short
o_carrier_id);
static BOOL IsNumeric(char *ptr);
static void FormatHTMLString(char *szBuff, char *szStr,
int iLen);
static void         PrintParameters(void);

#ifdef USE_ODBC
          void dbsetuserdata(PDBPROCESS dbproc, void
*uPtr);
          void *dbgetuserdata(PDBPROCESS dbproc);
          void BindParameter(PDBPROCESS dbproc, UWORD
ipar, SWORD fCType, SWORD fSqlType, UDWORD cbColDef,
SWORD ibScale, PTR rgbValue, SDWORD cbValueMax);
          void ODBCError(PDBPROCESS dbproc);
          BOOL ExecuteStatement(PDBPROCESS dbproc, char
*szStatement);
          BOOL BindColumn(PDBPROCESS dbproc,
SQLUSMALLINT icol, SQLSMALLINT fCType, SQLPOINTER
rgbValue, SQLINTEGER cbValueMax);
          BOOL GetResults(PDBPROCESS dbproc);
          BOOL MoreResults(PDBPROCESS  dbproc);
          BOOL ReopenConnection(PDBPROCESS dbproc);
#endif
```

Trans.h

```
/*        FILE:               TRANS.H
 *                                  Microsoft TPC-C
Kit Ver. 3.00.000
 *                                  Audited
08/23/96  By Francois Raab
 *        PURPOSE:  Header file for ISAPI TPCC.DLL,
defines structures and functions used in the isapi
tpcc.dll.
 *
 *                                  Copyright
Microsoft inc. 1996, All Rights Reserved
 *
 *        Author:             PhilipDu, from tpcc.h by
DamienL
 *
          DamienL@Microsoft.com
 *
          philipdu@Microsoft.com
 */

#ifndef _INC_TRANS

          #define _INC_TRANS

          #ifdef USE_ODBC
                    #ifndef TIMESTAMP_STRUCT
                              #include <sqltypes.h>
                    #endif
          #else
                    #ifndef _INC_SQLFRONT
                              #include <sqlfront.h>
                    #endif
          #endif

          #ifndef DBINT
                    typedef long DBINT;
          #endif

          #define   DEFCLPACKSIZE
                    4096
          #define   DEADLOCKWAIT
                    10

          // String length constants
          #define SERVER_NAME_LEN            20
          #define DATABASE_NAME_LEN          20
          #define USER_NAME_LEN              20
          #define PASSWORD_LEN               20
          #define TABLE_NAME_LEN             20
          #define I_DATA_LEN                 50
          #define I_NAME_LEN                 24
          #define BRAND_LEN                   1
          #define LAST_NAME_LEN              16
          #define W_NAME_LEN                 10
          #define ADDRESS_LEN                20
          #define STATE_LEN                   2
          #define ZIP_LEN                     9
          #define S_DIST_LEN                 24
          #define S_DATA_LEN                 50
          #define D_NAME_LEN                 10
          #define FIRST_NAME_LEN             16
          #define MIDDLE_NAME_LEN             2
          #define PHONE_LEN                  16
          #define DATETIME_LEN               30
          #define CREDIT_LEN                  2
          #define C_DATA_LEN                250
          #define H_DATA_LEN                 24
          #define DIST_INFO_LEN              24
          #define MAX_OL_NEW_ORDER_ITEMS     15
          #define MAX_OL_ORDER_STATUS_ITEMS  15
          #define STATUS_LEN                 25
          #define OL_DIST_INFO_LEN                    24

          // transaction structures

          typedef struct
          {
                    short
          ol_supply_w_id;
                    long
          ol_i_id;
                    char
          ol_i_name[I_NAME_LEN+1];
                    short
          ol_quantity;
                    char
          ol_brand_generic[BRAND_LEN+1];
                    double
          ol_i_price;
                    double
          ol_amount;
                    short
          ol_stock;
                    short
          num_warehouses;
          } OL_NEW_ORDER_DATA;

          typedef struct
          {
                    short               w_id;
                    short               d_id;
                    long                c_id;
                    short               o_ol_cnt;
                    char
          c_last[LAST_NAME_LEN+1];
                    char
          c_credit[CREDIT_LEN+1];
                    double              c_discount;
                    double              w_tax;
                    double              d_tax;
                    long                                o_id;
                    short
          o_commit_flag;
          #ifdef USE_ODBC
                    TIMESTAMP_STRUCT    o_entry_d;
          #else
                    DBDATEREC           o_entry_d;
          #endif
                    short               o_all_local;
                    double              total_amount;
                    long                num_deadlocks;
                    int
                    retval;
                    int
                    error;
                    char
          execution_status[STATUS_LEN];
                    OL_NEW_ORDER_DATA
          Ol[MAX_OL_NEW_ORDER_ITEMS];
          } NEW_ORDER_DATA;

          typedef struct
          {
                    short
           w_id;
                    short
           d_id;
                    long
           c_id;
                    short
           c_d_id;
                    short
           c_w_id;
                    double
           h_amount;
          #ifdef USE_ODBC
                    TIMESTAMP_STRUCT     h_date;
          #else
                    DBDATEREC
h_date;
          #endif
                    char
           w_street_1[ADDRESS_LEN+1];
                    char
           w_street_2[ADDRESS_LEN+1];
                    char
           w_city[ADDRESS_LEN+1];
                    char
           w_state[STATE_LEN+1];
                    char
           w_zip[ZIP_LEN+1];
                    char
           d_street_1[ADDRESS_LEN+1];
                    char
           d_street_2[ADDRESS_LEN+1];
                    char
           d_city[ADDRESS_LEN+1];
                    char
           d_state[STATE_LEN+1];
                    char
d_zip[ZIP_LEN+1];
                    char
           c_first[FIRST_NAME_LEN+1];
                    char
           c_middle[MIDDLE_NAME_LEN + 1];
                    char
c_last[LAST_NAME_LEN+1];
                    char
           c_street_1[ADDRESS_LEN+1];
                    char
           c_street_2[ADDRESS_LEN+1];
                    char
           c_city[ADDRESS_LEN+1];
                    char
           c_state[STATE_LEN+1];
                    char
           c_zip[ZIP_LEN+1];
                    char
           c_phone[PHONE_LEN+1];
          #ifdef USE_ODBC
```

```
                TIMESTAMP_STRUCT     c_since;
        #else
                DBDATEREC
c_since;
        #endif
                char
         c_credit[CREDIT_LEN+1];
                double
         c_credit_lim;
                double
         c_discount;
                double
         c_balance;
                char
         c_data[200+1];
                long
         num_deadlocks;
                int
                 retval;
                int
                 error;
                char
         execution_status[STATUS_LEN];
        } PAYMENT_DATA;

        typedef struct
        {
                long
        ol_i_id;
                short
        ol_supply_w_id;
                short
        ol_quantity;
                double
        ol_amount;
        #ifdef USE_ODBC
                TIMESTAMP_STRUCT    ol_delivery_d;
        #else
                DBDATEREC
        ol_delivery_d;
        #endif
        } OL_ORDER_STATUS_DATA;

        typedef struct
        {
                short               w_id;
                short               d_id;
                long                c_id;
                char
c_first[FIRST_NAME_LEN+1];
                char
c_middle[MIDDLE_NAME_LEN+1];
                char
c_last[LAST_NAME_LEN+1];
                double              c_balance;
                long                o_id;
        #ifdef USE_ODBC
                TIMESTAMP_STRUCT    o_entry_d;
        #else
                DBDATEREC           o_entry_d;
        #endif
                short               o_carrier_id;
                OL_ORDER_STATUS_DATA
OlOrderStatusData[MAX_OL_ORDER_STATUS_ITEMS];
                short               o_ol_cnt;

                long                num_deadlocks;
                int
                 retval;
                int
                 error;
                char
execution_status[STATUS_LEN];
        } ORDER_STATUS_DATA;

        typedef struct
        {
                long
        o_id;
        } DEL_ITEM;

        typedef struct
        {
                short                       w_id;
                short
        o_carrier_id;
                SYSTEMTIME
        queue_time;
                long
        num_deadlocks;
                long
        o_id[10];
                int
                retval;
                int
                error;
                char
        execution_status[STATUS_LEN];
        } DELIVERY_DATA;
```

```
        typedef struct
        {
                short
        w_id;
                short
        d_id;
                short
        thresh_hold;
                long
        low_stock;
                long
        num_deadlocks;
                int
                retval;
                int
                error;
                char
        execution_status[STATUS_LEN];
        } STOCK_LEVEL_DATA;

        typedef struct
        {
                NEW_ORDER_DATA
        NewOrderData;               //new order
form data
                PAYMENT_DATA
        PaymentData;                //payment form
data
                ORDER_STATUS_DATA
        OrderStatusData;    //order status form data
                DELIVERY_DATA
        DeliveryData;               //delivery form
data
                STOCK_LEVEL_DATA    StockLevelData;
                //stock level form data
        } TUX_DATA;

#endif
```

Database Design

Createdb.sql

```
/*  TPC-C Benchmark Kit                                 */
/*                                                      */
/*  CREATEDB.SQL                                        */
/*                                                      */
/*  This script is used to create the database    */


use master
go

if exists ( select name from sysdatabases where name =
"tpcc" )
          drop database tpcc
go

create database tpcc on
                    misc_dev1  =  5500,
                    oline_dev1 = 27500,
                    cs_dev1    =  7350,
                    cs_dev2    =  7350,
                    cs_dev3    =  7350,
                    cs_dev4    =  7350,
                    cs_dev5    =  7350,
                    cs_dev6    =  7350,
                    cs_dev7    =  7350,
                    cs_dev1    =  2100,
                    cs_dev2    =  2100,
                    cs_dev3    =  2100,
                    cs_dev4    =  2100,
                    cs_dev5    =  2100,
                    cs_dev6    =  2100,
                    cs_dev7    =  2100,
                    cs_dev1    =  1050,
                    cs_dev2    =  1050,
                    cs_dev3    =  1050,
                    cs_dev4    =  1050,
                    cs_dev5    =  1050,
                    cs_dev6    =  1050,
                    cs_dev7    =  1050,
                    cs_dev8    = 10000
          log on
                  log_dev1   = 32000
go
```

Diskinit.sql

```
/*  TPC-C Benchmark Kit
*/
/*
*/
/*  DISKINIT.SQL
*/
/*
*/
/*  This script is used create the database devices for
a 1200    */
/*  warehouse database.
*/

use master
go

disk init name = "oline_dev1",
          physname = "E:",
          vdevno   = 14,
          size     = 12800000
go

disk init name = "misc_dev1",
          physname = "F:",
          vdevno   = 15,
          size     = 2560000
go

disk init name = "stock_dev1",
          physname = "G:",
          vdevno   = 16,
          size     = 2885720
go

disk init name = "stock_dev2",
          physname = "H:",
          vdevno   = 17,
          size     = 2885720
go

disk init name = "stock_dev3",
          physname = "I:",
          vdevno   = 18,
          size     = 2885720
go

disk init name = "stock_dev4",
          physname = "J:",
          vdevno   = 19,
          size     = 2885720
go

disk init name = "stock_dev5",
          physname = "K:",
          vdevno   = 20,
          size     = 2885720
go

disk init name = "stock_dev6",
          physname = "L:",
          vdevno   = 21,
          size     = 2885720
go

disk init name = "stock_dev7",
          physname = "M:",
          vdevno   = 22,
          size     = 2885720
go

disk init name = "cust_dev1",
          physname = "N:",
          vdevno   = 23,
          size     = 2028580
go

disk init name = "cust_dev2",
          physname = "O:",
          vdevno   = 24,
          size     = 2028580
go

disk init name = "cust_dev3",
          physname = "P:",
          vdevno   = 25,
          size     = 2028580
go

disk init name = "cust_dev4",
          physname = "Q:",
          vdevno   = 26,
          size     = 2028580
go

disk init name = "cust_dev5",
          physname = "R:",
          vdevno   = 27,
          size     = 2028580
go

disk init name = "cust_dev6",
          physname = "S:",
          vdevno   = 28,
          size     = 2028580
go

disk init name = "cust_dev7",
          physname = "T:",
          vdevno   = 29,
          size     = 2028580
go

disk init name = "ovf_dev1",
          physname = "U:",
          vdevno   = 30,
          size     = 5000000
go

disk init name = "log_dev1",
          physname = "V:",
          vdevno   = 31,
          size     = 16384000
go
```

Appendix B – Database Design and Loader

Segment.sql

```
/*  TPC-C Benchmark Kit
*/
/*
*/
/*  SEGMENT.SQL
*/
/*
*/
/*  This script is used to create the database segments
*/


use tpcc
go

checkpoint
go

dbcc gaminit
go

exec sp_addsegment    misc_seg, misc_dev1

exec sp_addsegment    oline_seg, oline_dev1

exec sp_addsegment    cs_seg, cs_dev1
exec sp_extendsegment cs_seg, cs_dev2
exec sp_extendsegment cs_seg, cs_dev3
exec sp_extendsegment cs_seg, cs_dev4
exec sp_extendsegment cs_seg, cs_dev5
exec sp_extendsegment cs_seg, cs_dev6
exec sp_extendsegment cs_seg, cs_dev7
exec sp_extendsegment cs_seg, cs_dev8

go
```

Tables.sql

```
/*  TPC-C Benchmark Kit
*/
/*
*/
/*  TABLES.SQL
*/
/*
*/
/*  Creates TPC-C tables (seg)
*/


use tpcc
go

checkpoint
go


if exists ( select name from sysobjects where name =
'warehouse' )
          drop table warehouse
go

create table warehouse
(
          w_id
          smallint,
          w_name
          char(10),
          w_street_1
          char(20),
          w_street_2
          char(20),
          w_city
          char(20),
          w_state
          char(2),
          w_zip
          char(9),
          w_tax
          numeric(4,4),
          w_ytd
          numeric(12,2)
) on misc_seg
go


if exists ( select name from sysobjects where name =
'district' )
          drop table district
go

create table district
(
          d_id
          tinyint,
          d_w_id
          smallint,
          d_name
          char(10),
          d_street_1
          char(20),
          d_street_2
          char(20),
          d_city
          char(20),
          d_state
          char(2),
          d_zip
          char(9),
          d_tax
          numeric(4,4),
          d_ytd
          numeric(12,2),
          d_next_o_id                              int
) on misc_seg
go


if exists ( select name from sysobjects where name =
'customer' )
          drop table customer
go

create table customer
(
          c_id                                     int,
          c_d_id
          tinyint,
          c_w_id
          smallint,
          c_first
          char(16),
          c_middle                      char(2),
          c_last
          char(16),
          c_street_1
          char(20),
          c_street_2
          char(20),
          c_city
          char(20),
          c_state
          char(2),
          c_zip
          char(9),
          c_phone
          char(16),
          c_since
          datetime,
          c_credit                      char(2),
          c_credit_lim                  numeric(12,2),
          c_discount
          numeric(4,4),
          c_balance                     numeric(12,2),
          c_ytd_payment                 numeric(12,2),
          c_payment_cnt                 smallint,
          c_delivery_cnt                smallint,
          c_data_1                      char(250),
          c_data_2                      char(250)
) on cs_seg
go


if exists ( select name from sysobjects where name =
'history' )
          drop table history
go

create table history
(
          h_c_id                                   int,
          h_c_d_id                      tinyint,
          h_c_w_id                      smallint,
          h_d_id
          tinyint,
          h_w_id
          smallint,
          h_date
          datetime,
          h_amount                      numeric(6,2),
          h_data
          char(24)
) on misc_seg
go


if exists ( select name from sysobjects where name =
'new_order' )
          drop table new_order
go

create table new_order
```

```
(
          no_o_id                                   int,
          no_d_id
          tinyint,
          no_w_id
          smallint
) on misc_seg
go


if exists ( select name from sysobjects where name =
'orders' )
          drop table orders
go

create table orders
(
          o_id                                      int,
          o_d_id
          tinyint,
          o_w_id
          smallint,
          o_c_id                                    int,
          o_entry_d                        datetime,
          o_carrier_id                     tinyint,
          o_ol_cnt                         tinyint,
          o_all_local
          tinyint
) on misc_seg
go


if exists ( select name from sysobjects where name =
'order_line' )
          drop table order_line
go

create table order_line
(
          ol_o_id                                   int,
          ol_d_id
          tinyint,
          ol_w_id
          smallint,
          ol_number                        tinyint,
          ol_i_id                                   int,
          ol_supply_w_id                   smallint,
          ol_delivery_d                    datetime,
          ol_quantity
          smallint,
          ol_amount                        numeric(6,2),
          ol_dist_info                     char(24)
) on oline_seg
go


if exists ( select name from sysobjects where name =
'item' )
          drop table item
go

create table item
(
          i_id                                      int,
          i_im_id                                   int,
          i_name
          char(24),
          i_price
          numeric(5,2),
          i_data
          char(50)
) on misc_seg
go


if exists ( select name from sysobjects where name =
'stock' )
          drop table stock
go

create table stock
(
          s_i_id                                    int,
          s_w_id
          smallint,
          s_quantity
          smallint,
          s_dist_01                        char(24),
          s_dist_02                        char(24),
          s_dist_03                        char(24),
          s_dist_04                        char(24),
          s_dist_05                        char(24),
          s_dist_06                        char(24),
          s_dist_07                        char(24),
          s_dist_08                        char(24),
          s_dist_09                        char(24),
          s_dist_10                        char(24),
          s_ytd                                     int,
          s_order_cnt
          smallint,
          s_remote_cnt
smallint,
          s_data
          char(50)
) on cs_seg
go
```

Idxcuscl.sql

```
/*  TPC-C Benchmark Kit
*/
/*
*/
/*  IDXCUSCL.SQL
*/
/*
*/
/*  Creates clustered index on customer (seg)
*/


use tpcc
go


if exists ( select name from sysindexes where name =
'customer_c1' )
          drop index customer.customer_c1
go

select getdate()
go
create unique clustered index customer_c1 on
customer(c_w_id, c_d_id, c_id)
          with sorted_data on cs_seg
go
select getdate()
go
```

Idxcusnc.sql

```
/*  TPC-C Benchmark Kit
*/
/*
*/
/*  IDXCUSNC.SQL
*/
/*
*/
/*  Creates non-clustered index on customer (seg)
*/


use tpcc
go


if exists ( select name from sysindexes where  name =
'customer_nc1' )
          drop index customer.customer_nc1
go

select getdate()
go
create unique nonclustered index customer_nc1 on
customer(c_w_id, c_d_id, c_last, c_first, c_id)
          on cs_seg
go
select getdate()
go
```

Idxdiscl.sql

```
/*  TPC-C Benchmark Kit
*/
/*
*/
/*  IDXDISCL.SQL
*/
/*
*/
/*  Creates clustered index on district (seg)
*/


use tpcc
go


if exists ( select name from sysindexes where name =
'district_c1' )
```

```
          drop index district.district_c1
go

select getdate()
go
create unique clustered index  district_c1 on
district(d_w_id, d_id)
          with fillfactor=1 on misc_seg
go
select getdate()
go
```

Idxitmcl.sql

```
/*  TPC-C Benchmark Kit
*/
/*
*/
/*  IDXITMCL.SQL
*/
/*
*/
/*  Creates clustered index on item (seg)
*/


use tpcc
go


if exists ( select name from sysindexes where  name =
'item_c1' )
          drop index item.item_c1
go

select getdate()
go
create unique clustered index item_c1 on item(i_id)
          with sorted_data on misc_seg
go
select getdate()
go
```

Idxnodcl.sql

```
/*  TPC-C Benchmark Kit
*/
/*
*/
/*  IDXNODCL.SQL
*/
/*
*/
/*  Creates clustered index on new-order (seg)
*/


use tpcc
go


if exists ( select name from sysindexes where  name =
'new_order_c1' )
          drop index new_order.new_order_c1
go

select getdate()
go
create unique clustered index new_order_c1 on
new_order(no_w_id, no_d_id, no_o_id)
          with sorted_data on misc_seg
go
select getdate()
go
```

Idxodlcl.sql

```
/*  TPC-C Benchmark Kit
*/
/*
*/
/*  IDXODLCL.SQL
*/
/*
*/
/*  Creates clustered index on order-line (seg)
*/


use tpcc
go


if exists ( select name from sysindexes where  name =
'order_line_c1' )
          drop index order_line.order_line_c1
go

select getdate()
go
create unique clustered index order_line_c1 on
order_line(ol_w_id, ol_d_id, ol_o_id, ol_number)
          with sorted_data on oline_seg
go
select getdate()
go
```

Idxordcl.sql

```
/*  TPC-C Benchmark Kit
*/
/*
*/
/*  IDXORDCL.SQL
*/
/*
*/
/*  Creates clustered index on orders (seg)
*/


use tpcc
go


if exists ( select name from sysindexes where  name =
'orders_c1' )
          drop index orders.orders_c1
go

select getdate()
go
create unique clustered index orders_c1 on
orders(o_w_id, o_d_id, o_id)
          with sorted_data on misc_seg
go
select getdate()
go
```

Idxstkcl.sql

```
/*  TPC-C Benchmark Kit
*/
/*
*/
/*  IDXSTKCL.SQL
*/
/*
*/
/*  Creates clustered index on stock (seg)
*/


use tpcc
go


if exists ( select name from sysindexes where  name =
'stock_c1' )
          drop index stock.stock_c1
go

select getdate()
go
create unique clustered index stock_c1 on stock(s_i_id,
s_w_id)
          with sorted_data on cs_seg
go
select getdate()
go
```

Idxwarcl.sql

```
/*  TPC-C Benchmark Kit
*/
/*
*/
/*  IDXWARCL.SQL
*/
/*
*/
/*  Creates clustered index on warehouse (seg)
*/
```

```
use tpcc
go


if exists ( select name from sysindexes where name =
'warehouse_c1' )
          drop index warehouse.warehouse_c1
go

select getdate()
go
create unique clustered index warehouse_c1 on
warehouse(w_id)
          with fillfactor=1 on misc_seg
go
select getdate()
go
```

Dbopt1.sql

```
/*  TPC-C Benchmark Kit                                  */
/*                                                       */
/*  DBOPT1.SQL                                           */
/*                                                       */
/*  Set database options for database load               */


use master
go

sp_dboption tpcc,'select into/bulkcopy',true
go

sp_dboption tpcc,'trunc. log on chkpt.',true
go

use tpcc
go

checkpoint
go

use tpcc_admin
go

sp_dboption tpcc,'trunc. log on chkpt.',true
go
```

Dbopt2.sql

```
/*  TPC-C Benchmark Kit                                  */
/*                                                       */
/*  DBOPT2.SQL                                           */
/*                                                       */
/*  Reset database options after database load           */


use master
go

sp_dboption tpcc,'select ',false
go

sp_dboption tpcc,'trunc. ',false
go

use tpcc
go

checkpoint
go
```

Pintable.sql

```
/*  TPC-C Benchmark Kit                                  */
/*                                                       */
/*  PINTABLE.SQL                                         */
/*                                                       */
/*  This script file is used to 'pin' certain tables in the data cache   */

use tpcc
go

exec sp_tableoption "district","pintable",true
exec sp_tableoption "warehouse","pintable",true
exec sp_tableoption "new_order","pintable",true
exec sp_tableoption "item","pintable",true
go
```

Tpccbcp.sql

```
/*  TPC-C Benchmark Kit                                  */
/*                                                       */
/*  TPCCBCP.SQL                                          */
/*                                                       */
/*  This script file sets the table lock option for bulk load            */


use tpcc
go

exec sp_tableoption "warehouse","table lock on bulk load",true
exec sp_tableoption "district","table lock on bulk load",true
exec sp_tableoption "stock","table lock on bulk load",true
exec sp_tableoption "item","table lock on bulk load",true
exec sp_tableoption "customer","table lock on bulk load",true
exec sp_tableoption "history","table lock on bulk load",true
exec sp_tableoption "orders","table lock on bulk load",true
exec sp_tableoption "order_line","table lock on bulk load",true
exec sp_tableoption "new_order","table lock on bulk load",true
go
```

Tpccirl.sql

```
/*  TPC-C Benchmark Kit                                  */
/*                                                       */
/*  TPCCIRL.SQL                                          */
/*                                                       */
/*  This script file sets the insert row lock option on selected tables   */


use tpcc
go

exec sp_tableoption "history","insert row lock",true
exec sp_tableoption "new_order","insert row lock",true
exec sp_tableoption "orders","insert row lock",true
exec sp_tableoption "order_line","insert row lock",true
go
```

Stored Procedures

Neword.sql

```
/*  File:      NEWORD.SQL                                */
/*             Microsoft TPC-C Kit Ver. 3.00.000         */
/*             Audited 08/23/96, By Francois Raab        */
/*                                                       */
/*             Copyright Microsoft, 1996                 */
/*                                                       */
/*  Purpose:    New-Order transaction for Microsoft TPC-C Benchmark Kit   */
/*  Author:     Damien Lindauer                           */
/*             damienl@Microsoft.com                     */


use tpcc
go

/* new-order transaction stored procedure */

if exists ( select name from sysobjects where name = "tpcc_neworder" )
          drop procedure tpcc_neworder
go

create proc tpcc_neworder

                    @w_id          smallint,

                    @d_id          tinyint,

                    @c_id          int,

                    @o_ol_cnt      tinyint,

                    @o_all_local   tinyint,
```

```
                        @i_id1  int = 0, @s_w_id1 smallint = 0, @ol_qty1
smallint = 0,
                        @i_id2  int = 0, @s_w_id2 smallint = 0, @ol_qty2
smallint = 0,
                        @i_id3  int = 0, @s_w_id3 smallint = 0, @ol_qty3
smallint = 0,
                        @i_id4  int = 0, @s_w_id4 smallint = 0, @ol_qty4
smallint = 0,
                        @i_id5  int = 0, @s_w_id5 smallint = 0, @ol_qty5
smallint = 0,
                        @i_id6  int = 0, @s_w_id6 smallint = 0, @ol_qty6
smallint = 0,
                        @i_id7  int = 0, @s_w_id7 smallint = 0, @ol_qty7
smallint = 0,
                        @i_id8  int = 0, @s_w_id8 smallint = 0, @ol_qty8
smallint = 0,
                        @i_id9  int = 0, @s_w_id9 smallint = 0, @ol_qty9
smallint = 0,
                        @i_id10 int = 0, @s_w_id10 smallint = 0,
@ol_qty10 smallint = 0,
                        @i_id11 int = 0, @s_w_id11 smallint = 0,
@ol_qty11 smallint = 0,
                        @i_id12 int = 0, @s_w_id12 smallint = 0,
@ol_qty12 smallint = 0,
                        @i_id13 int = 0, @s_w_id13 smallint = 0,
@ol_qty13 smallint = 0,
                        @i_id14 int = 0, @s_w_id14 smallint = 0,
@ol_qty14 smallint = 0,
                        @i_id15 int = 0, @s_w_id15 smallint = 0,
@ol_qty15 smallint = 0


as
declare @w_tax          numeric(4,4),
        @d_tax          numeric(4,4),
        @c_last         char(16),
        @c_credit       char(2),
        @c_discount     numeric(4,4),
        @i_price        numeric(5,2),
        @i_name         char(24),
        @i_data         char(50),
        @o_entry_d      datetime,
        @remote_flag    int,
        @s_quantity     smallint,
        @s_data         char(50),
        @s_dist         char(24),
                        @li_no          int,
                        @o_id                                   int,
                        @commit_flag    tinyint,
        @li_id          int,
        @li_s_w_id      smallint,
        @li_qty         smallint,
                        @ol_number              int,
                        @c_id_local             int

begin

                begin transaction n

    /* get order date */

    select @o_entry_d = getdate()

    /* get district tax and next availible order id and update */

    update district
                set @d_tax      = d_tax,
                    @o_id       = d_next_o_id,
                                  d_next_o_id = d_next_o_id + 1
                    where d_w_id = @w_id and
                          d_id   = @d_id

                /*  process orderlines */

select  @li_no = 0

                /*  set commit flag */
                select @commit_flag = 1

while (@li_no < @o_ol_cnt)
                begin

    select @li_no = @li_no + 1

                    /*  Set i_id, s_w_id, and qty for this lineitem */

                    select @li_id = case @li_no
                        when 1 then @i_id1
                                        when 2 then @i_id2
                                        when 3 then @i_id3
                                        when 4 then @i_id4
                                        when 5 then @i_id5
                                        when 6 then @i_id6
                                        when 7 then @i_id7
                                        when 8 then @i_id8
                                        when 9 then @i_id9
                                        when 10 then @i_id10
                                        when 11 then @i_id11
                                        when 12 then @i_id12
                                        when 13 then @i_id13
                                        when 14 then @i_id14
                                        when 15 then @i_id15
                                        end

                                select          @li_s_w_id = case @li_no
                                        when 1 then @s_w_id1
                                        when 2 then @s_w_id2
                                        when 3 then @s_w_id3
                                        when 4 then @s_w_id4
                                        when 5 then @s_w_id5
                                        when 6 then @s_w_id6
                                        when 7 then @s_w_id7
                                        when 8 then @s_w_id8
                                        when 9 then @s_w_id9
                                        when 10 then @s_w_id10
                                        when 11 then @s_w_id11
                                        when 12 then @s_w_id12
                                        when 13 then @s_w_id13
                                        when 14 then @s_w_id14
                                        when 15 then @s_w_id15
                                        end

                                select          @li_qty = case  @li_no
                                        when 1 then @ol_qty1
                                        when 2 then @ol_qty2
                                        when 3 then @ol_qty3
                                        when 4 then @ol_qty4
                                        when 5 then @ol_qty5
                                        when 6 then @ol_qty6
                                        when 7 then @ol_qty7
                                        when 8 then @ol_qty8
                                        when 9 then @ol_qty9
                                        when 10 then @ol_qty10
                                        when 11 then @ol_qty11
                                        when 12 then @ol_qty12
                                        when 13 then @ol_qty13
                                        when 14 then @ol_qty14
                                        when 15 then @ol_qty15
                                        end

    /* get item data (no one updates item) */

    select @i_price = i_price,
           @i_name  = i_name,
           @i_data  = i_data
    from item (tablock holdlock)
                    where i_id = @li_id

                /* if there actually is an item with this id, go to work */

                                if (@@rowcount > 0)
                                begin
        update stock set s_ytd          = s_ytd + @li_qty,
                    @s_quantity  = s_quantity,
                    s_quantity   = s_quantity - @li_qty +
                        case when (s_quantity - @li_qty < 10) then 91 else 0 end,
                    s_order_cnt  = s_order_cnt + 1,
                    s_remote_cnt = s_remote_cnt + case
                        when (@li_s_w_id = @w_id) then 0 else 1 end,
                    @s_data      = s_data,
                    @s_dist      = case @d_id
```

```
                                                when 1  then
s_dist_01
                                                when 2  then
s_dist_02
                                                when 3  then
s_dist_03
                                                when 4  then
s_dist_04
                                                when 5  then
s_dist_05
                                                when 6  then
s_dist_06
                                                when 7  then
s_dist_07
                                                when 8  then
s_dist_08
                                                when 9  then
s_dist_09
                                                when 10 then
s_dist_10
                                        end
        where s_i_id = @li_id and
                                                s_w_id = @li_s_w_id

                                        /* insert order_line data (using data
from item and stock) */

        insert into order_line values(@o_id,            /* from district update */
                        @d_id,                                  /* input param
*/
                        @w_id,          /* input param          */
                        @li_no,         /* orderline number     */
                        @li_id,         /* lineitem id          */
                        @li_s_w_id,     /* lineitem warehouse   */
                        "jan 1, 1900",  /* constant             */
                        @li_qty,        /* lineitem qty         */
                        @i_price * @li_qty, /* ol_amount        */
                        @s_dist)        /* from stock           */


        /* send line-item data to client */

                                select @i_name,
            @s_quantity,
            b_g = case when ( (patindex("%ORIGINAL%",@i_data) > 0) and
                                (patindex("%ORIGINAL%",@s_data) > 0) )
                then "B" else "G" end,
            @i_price,
            @i_price * @li_qty

    end
    else
                        begin

                            /*  no item found - triggers rollback condition */


                                select "",0,"",0,0
                                select @commit_flag = 0

                        end
                end

    /* get customer last name, discount, and credit rating */

    select @c_last     = c_last,
        @c_discount = c_discount,
        @c_credit   = c_credit,
                                @c_id_local = c_id
    from customer holdlock
    where c_id   = @c_id and
        c_w_id = @w_id and
        c_d_id = @d_id

    /* insert fresh row into orders table */

    insert into orders values (@o_id,
                                        @d_id,
                                                @w_id,

@c_id_local,

@o_entry_d,

0,

@o_ol_cnt,

@o_all_local)

        /* insert corresponding row into new-order table */

        insert into new_order values (@o_id,

                                        @d_id,

                                        @w_id)

        /*  select warehouse tax */

        select @w_tax = w_tax
        from warehouse holdlock
        where w_id = @w_id

        if (@commit_flag = 1)

                commit transaction n
        else
                /* all that work for nuthin!!! */
                rollback transaction n

        /* return order data to client */
        select @w_tax,
            @d_tax,
                @o_id,
                @c_last,
                @c_discount,
                @c_credit,
                @o_entry_d,
                @commit_flag

end

go
```

Payment.sql

```
/*  File:       PAYMENT.SQL                                     */
/*              Microsoft TPC-C Kit Ver. 3.00.000               */
/*              Audited 08/23/96, By Francois Raab              */
/*                                                              */
/*              Copyright Microsoft, 1996                       */
/*                                                              */
/*  Purpose:    Payment transaction for Microsoft TPC-C Benchmark Kit      */
/*  Author:     Damien Lindauer                                 */
/*              damienl@Microsoft.com                           */


use tpcc
go

if exists (select name from sysobjects where name = "tpcc_payment" )
        drop procedure tpcc_payment
go

create proc tpcc_payment @w_id          smallint,

        @c_w_id         smallint,

        @h_amount       numeric(6,2),

        @d_id           tinyint,

        @c_d_id         tinyint,

        @c_id           int,

        @c_last         char(16) = ""



as
declare  @w_street_1     char(20),
        @w_street_2     char(20),
        @w_city         char(20),
        @w_state        char(2),
        @w_zip          char(9),
        @w_name         char(10),
        @d_street_1     char(20),
        @d_street_2     char(20),
        @d_city         char(20),
        @d_state        char(2),
        @d_zip          char(9),
        @d_name         char(10),
        @c_first        char(16),
        @c_middle       char(2),
```

```
        @c_street_1     char(20),
        @c_street_2     char(20),
        @c_city         char(20),
        @c_state        char(2),
        @c_zip          char(9),
        @c_phone        char(16),
        @c_since        datetime,
        @c_credit       char(2),
        @c_credit_lim   numeric(12,2),
        @c_balance      numeric(12,2),
        @c_discount     numeric(4,4),
        @data1          char(250),
        @data2          char(250),
        @c_data_1       char(250),
        @c_data_2       char(250),
        @datetime       datetime,
        @w_ytd          numeric(12,2),
        @d_ytd          numeric(12,2),
        @cnt            smallint,
        @val            smallint,
        @screen_data                char(200),
                        @d_id_local     tinyint,
                        @w_id_local     smallint,
                        @c_id_local     int

select @screen_data = ""

begin tran p

                /* get payment date */

                select @datetime = getdate()

                if (@c_id = 0)
                begin
                        /* get customer id and info using last name */

                        select @cnt = count(*)
                        from customer holdlock
                        where c_last = @c_last and
                             c_w_id = @c_w_id and
                             c_d_id = @c_d_id


                        select @val = (@cnt + 1) / 2
                        set rowcount @val

                        select @c_id = c_id
                        from customer holdlock
                        where c_last = @c_last and
                             c_w_id = @c_w_id and
                             c_d_id = @c_d_id
                        order by c_w_id, c_d_id, c_last, c_first

                        set rowcount 0
                end

                /* get customer info and update balances */

                update customer set
                        @c_balance      = c_balance = c_balance -
@h_amount,
                        c_payment_cnt   = c_payment_cnt + 1,
                        c_ytd_payment   = c_ytd_payment + @h_amount,
                        @c_first        = c_first,
                        @c_middle       = c_middle,
                    @c_last         = c_last,
                    @c_street_1     = c_street_1,
                        @c_street_2     = c_street_2,
                        @c_city         = c_city,
                        @c_state        = c_state,
                        @c_zip          = c_zip,
                        @c_phone        = c_phone,
                        @c_credit       = c_credit,
                        @c_credit_lim   = c_credit_lim,
                        @c_discount     = c_discount,
                        @c_since        = c_since,
                        @data1          = c_data_1,
                        @data2          = c_data_2,
                        @c_id_local     = c_id
                where c_id   = @c_id and
                     c_w_id = @c_w_id and
                     c_d_id = @c_d_id

                /* if customer has bad credit get some more info */

                if (@c_credit = "BC")
                begin
                        /* compute new info */

                        select @c_data_2 = substring(@data1,209,42) +

                    substring(@data2, 1, 208)
                        select @c_data_1 = convert(char(5),@c_id) +

                    convert(char(4),@c_d_id) +

convert(char(5),@c_w_id) +

convert(char(4),@d_id) +

convert(char(5),@w_id) +

convert(char(19),@h_amount) +

substring(@data1, 1, 208)

                        /* update customer info */

                        update customer set
                             c_data_1 = @c_data_1,
                                  c_data_2 = @c_data_2
                        where c_id   = @c_id and
                                  c_w_id = @c_w_id and
                             c_d_id = @c_d_id

                        select @screen_data = substring (@c_data_1,1,200)
                end


                /* get district data and update year-to-date */

                update district
                        set d_ytd       = d_ytd + @h_amount,
                                  @d_street_1 = d_street_1,
                                  @d_street_2 = d_street_2,
                                  @d_city     = d_city,
                                  @d_state    = d_state,
                                  @d_zip      = d_zip,
                                  @d_name     = d_name,
                                  @d_id_local = d_id
                        where d_w_id = @w_id and
                             d_id   = @d_id

                /* get warehouse data and update year-to-date */

                update warehouse
                set w_ytd       = w_ytd + @h_amount,
                                  @w_street_1 = w_street_1,
                    @w_street_2 = w_street_2,
                    @w_city     = w_city,
                    @w_state    = w_state,
                    @w_zip      = w_zip,
                    @w_name     = w_name,
                                  @w_id_local = w_id
                where w_id = @w_id

                /* create history record */

                insert into history values  (@c_id_local,

                                @c_d_id,

                                                @c_w_id,

                                                @d_id_local,

                                                @w_id_local,

                                                @datetime,

                                                @h_amount,

                                                @w_name + "    " + @d_name)

commit tran p

/* return data to client */

select  @c_id,
                        @c_last,
                        @datetime,
                        @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,
                        @screen_data

go
```

Delivery.sql

```
/*  File:       DELIVERY.SQL                                    */
/*              Microsoft TPC-C Kit Ver. 3.00.000               */
/*              Audited 08/23/96, By Francois Raab              */
/*                                                              */
/*              Copyright Microsoft, 1996                       */
/*                                                              */
/*  Purpose:    Delivery transaction for Microsoft TPC-C Benchmark Kit     */
/*  Author:     Damien Lindauer                                 */
/*              damienl@Microsoft.com                           */


use tpcc
go

/* delivery transaction */

if exists (select name from sysobjects where name = "tpcc_delivery" )
                drop procedure tpcc_delivery
go

create proc tpcc_delivery                                       @w_id
smallint,


                                                @o_carrier_id   smallint
as


declare @d_id tinyint,
        @o_id int,
        @c_id int,
        @total numeric(12,2),
        @oid1 int,
        @oid2 int,
        @oid3 int,
        @oid4 int,
        @oid5 int,
        @oid6 int,
        @oid7 int,
        @oid8 int,
        @oid9 int,
        @oid10 int

select @d_id = 0

begin tran d

    while (@d_id < 10)
    begin

        select @d_id  = @d_id + 1,
               @total = 0,
               @o_id  = 0

        select @o_id = min(no_o_id)
        from new_order holdlock
        where no_w_id = @w_id and
                                        no_d_id = @d_id

        if (@@rowcount <> 0)
        begin

            /* claim the order for this district */

            delete new_order
            where no_w_id = @w_id and
                                        no_d_id = @d_id and
                                                no_o_id = @o_id

            /* set carrier_id on this order (and get customer id) */

            update orders
                                        set o_carrier_id = @o_carrier_id,
                @c_id       = o_c_id
            where o_w_id = @w_id and
                                        o_d_id = @d_id and
                                                o_id   = @o_id

            /* set date in all lineitems for this order (and sum amounts) */

            update order_line
                                        set ol_delivery_d = getdate(),
                                @total      = @total + ol_amount
            where ol_w_id = @w_id and
                ol_d_id = @d_id and
                                                ol_o_id = @o_id

            /* accummulate lineitem amounts for this order into customer */

                                        update customer
                                                set c_balance      = c_balance +
@total,
                                                        c_delivery_cnt = c_delivery_cnt +
1
            where c_w_id = @w_id and
                                        c_d_id = @d_id and
                                                c_id   = @c_id

        end

        select @oid1 = case @d_id when  1  then @o_id else @oid1 end,
               @oid2 = case @d_id when  2  then @o_id else @oid2 end,
               @oid3 = case @d_id when  3  then @o_id else @oid3 end,
               @oid4 = case @d_id when  4  then @o_id else @oid4 end,
               @oid5 = case @d_id when  5  then @o_id else @oid5 end,
               @oid6 = case @d_id when  6  then @o_id else @oid6 end,
               @oid7 = case @d_id when  7  then @o_id else @oid7 end,
               @oid8 = case @d_id when  8  then @o_id else @oid8 end,
               @oid9 = case @d_id when  9  then @o_id else @oid9 end,
               @oid10 = case @d_id when 10 then @o_id else @oid10 end

    end

commit tran d

select @oid1,
       @oid2,
       @oid3,
       @oid4,
       @oid5,
       @oid6,
       @oid7,
       @oid8,
       @oid9,
       @oid10

go
```

Ordstat.sql

```
/*  File:       ORDSTAT.SQL                                     */
/*              Microsoft TPC-C Kit Ver. 3.00.000               */
/*              Audited 08/23/96, By Francois Raab              */
/*                                                              */
/*              Copyright Microsoft, 1996                       */
/*                                                              */
/*  Purpose:    Order-Status transaction for Microsoft TPC-C Benchmark Kit  */
/*  Author:     Damien Lindauer                                 */
/*              damienl@Microsoft.com                           */


use tpcc
go

if exists ( select name from sysobjects where name = "tpcc_orderstatus" )
                drop procedure   tpcc_orderstatus
go

create proc tpcc_orderstatus @w_id                              smallint,

                                        @d_id                   tinyint,
```

```
                        @c_id                   int,

                        @c_last         char(16) = ""

as

declare @c_balance                      numeric(12,2),
        @c_first                char(16),
        @c_middle                       char(2),
        @o_id                           int,
        @o_entry_d                      datetime,
        @o_carrier_id           smallint,
        @val                            smallint,
        @cnt                            smallint

begin tran o

                if (@c_id = 0)
                        begin
                        /* get customer id and info using last name */


                        select @cnt = count(*)
                        from customer holdlock
                        where c_last = @c_last and
                          c_w_id = @w_id and
                 c_d_id = @d_id

                        select @val = (@cnt + 1) / 2
                        set rowcount @val

                        select @c_id = c_id,
                                        @c_balance = c_balance,
                                        @c_first   = c_first,
                                        @c_last    = c_last,
                                        @c_middle  = c_middle
                        from customer holdlock
                        where c_last = @c_last and
                          c_w_id = @w_id and
                 c_d_id = @d_id
                        order by c_w_id, c_d_id, c_last, c_first

                        set rowcount 0
                        end

                else
                        begin

                        /*  get customer info if by id*/

                        select @c_balance = c_balance,
                              @c_first   = c_first,
                              @c_middle  = c_middle,
                              @c_last    = c_last
                        from customer holdlock
                        where c_id   = @c_id and
                             c_d_id = @d_id and
                             c_w_id = @w_id

                        select @cnt = @@rowcount

                        end

                /* if no such customer */
                if (@cnt = 0)
                begin
                        raiserror("Customer not found",18,1)
                        goto custnotfound
                end

                /*  get order info */

                select @o_id = o_id,
                                @o_entry_d    = o_entry_d,
                   @o_carrier_id = o_carrier_id
                from orders holdlock
                where o_c_id = @c_id and
        o_d_id = @d_id and
        o_w_id = @w_id

                /*  select order lines for the current order */

                select ol_supply_w_id,
                  ol_i_id,
                     ol_quantity,
                     ol_amount,
                     ol_delivery_d
                from order_line holdlock
                where ol_o_id = @o_id and
                     ol_d_id = @d_id and
                     ol_w_id = @w_id

custnotfound:

commit tran o

/*  return data to client  */

select @c_id,
                @c_last,
                @c_first,
                @c_middle,
                @o_entry_d,
                @o_carrier_id,
                @c_balance,
                @o_id

go
```

Stocklev.sql

```
/*  File:      STOCKLEV.SQL                                    */
/*             Microsoft TPC-C Kit Ver. 3.00.000                  */
/*             Audited 08/23/96, By Francois Raab                 */
/*                                                    */
/*             Copyright Microsoft, 1996                  */
/*                                                    */
/*  Purpose:    Stock-Level transaction for Microsoft TPC-C Benchmark Kit  */
/*  Author:     Damien Lindauer                                 */
/*             damienl@Microsoft.com                           */


use tpcc
go

/* stock-level transaction stored procedure */

if exists (select name from sysobjects where name = "tpcc_stocklevel" )
                drop procedure tpcc_stocklevel
go

create proc tpcc_stocklevel    @w_id           smallint,

                @d_id           tinyint,

                @threshhold    smallint
as
declare @o_id_low int,
       @o_id_high int

   select @o_id_low  = (d_next_o_id - 20),
                  @o_id_high = (d_next_o_id - 1)
   from district
   where d_w_id = @w_id and
                                d_id   = @d_id

   select count(distinct(s_i_id))
                from  stock, order_line
   where ol_w_id    = @w_id and
                ol_d_id    = @d_id and
                ol_o_id between @o_id_low and @o_id_high and
        s_w_id     =  ol_w_id and
                s_i_id     =  ol_i_id and
                s_quantity <  @threshhold

go
```

Loader

Getargs.c

```
// TPC-C Benchmark Kit
//
// Module:  GETARGS.C
// Author:  DamienL
```

```
// Includes
#include "tpcc.h"


//==========================================================
==================
//
// Function name: GetArgsLoader
//
//==========================================================
==================

void GetArgsLoader(int argc, char **argv, TPCCLDR_ARGS
*pargs)
{
    int             i;
    char  *ptr;

#ifdef DEBUG
    printf("[%ld]DBG: Entering GetArgsLoader()\n",
(int) GetCurrentThreadId());
#endif

    /* init args struct with some useful values */
    pargs->server                       =  SERVER;
    pargs->user                         =  USER;
    pargs->password                     =  PASSWORD;
    pargs->database                     =  DATABASE;
    pargs->batch                        =  BATCH;
    pargs->num_warehouses               =  UNDEF;
    pargs->table                        =  NULL;
          pargs->loader_res_file                =
LOADER_RES_FILE;
          pargs->pack_size                      =
DEFLDPACKSIZE;
          pargs->starting_warehouse     =
DEF_STARTING_WAREHOUSE;
          pargs->build_index                    =
BUILD_INDEX;
          pargs->index_script_path      =
INDEX_SCRIPT_PATH;

    /* check for zero command line args */
    if ( argc == 1 )
                    GetArgsLoaderUsage();

    for (i = 1; i < argc; ++i)
    {
                    if (argv[i][0] != '-' && argv[i][0]
!= '/')
                    {
                    printf("\nUnrecognized command");
                    GetArgsLoaderUsage();
                    exit(1);
                    }

                    ptr = argv[i];

                    switch (ptr[1])
                    {
                    case 'h':     /* Fall throught */
                    case 'H':

          GetArgsLoaderUsage();
                                        break;

                    case 'D':
                                        pargs->database
= ptr+2;
                                        break;

                    case 'P':
                                        pargs->password
= ptr+2;
                                        break;

                    case 'S':
                                        pargs->server =
ptr+2;
                                        break;

                    case 'U':
                                        pargs->user =
ptr+2;
                                        break;

                    case 'b':
                                        pargs->batch =
atol(ptr+2);
                                        break;

                    case 'W':
                                        pargs-
>num_warehouses = atol(ptr+2);
                                        break;

                    case 's':
                                        pargs-
>starting_warehouse = atol(ptr+2);
                                        break;

                    case 't':
                                        pargs->table =
ptr+2;
                                        break;

                                case 'f':
                                        pargs-
>loader_res_file = ptr+2;
                                        break;

                                case 'p':
                                        pargs-
>pack_size = atol(ptr+2);
                                        break;

                                case 'i':
                                        pargs-
>build_index = atol(ptr+2);

                    case 'd':
                                        pargs-
>index_script_path = ptr+2;
                                        break;

                    default:
                                GetArgsLoaderUsage();
                                exit(-1);
                                break;
                    }
    }

    /* check for required args */
    if (pargs->num_warehouses == UNDEF )
    {
                    printf("Number of Warehouses is
required\n");
                    exit(-2);
    }

    return;
}


//==========================================================
==================
//
// Function name: GetArgsLoaderUsage
//
//==========================================================
==================

void GetArgsLoaderUsage()
{

#ifdef DEBUG
    printf("[%ld]DBG: Entering GetArgsLoaderUsage()\n",
(int) GetCurrentThreadId());
#endif


    printf("TPCCLDR:\n\n");
          printf("Parameter
Default\n");
          printf("-----------------------------------
-------------------------\n");
    printf("-W Number of Warehouses to Load
Required \n");
    printf("-S Server
%s\n", SERVER);
    printf("-U Username
%s\n", USER);
    printf("-P Password
%s\n", PASSWORD);
    printf("-D Database
%s\n", DATABASE);
          printf("-b Batch Size
%ld\n", (long) BATCH);
          printf("-p TDS packet size
%ld\n", (long) DEFLDPACKSIZE);
          printf("-f Loader Results Output Filename
%s\n", LOADER_RES_FILE);
          printf("-s Starting Warehouse
%ld\n", (long) DEF_STARTING_WAREHOUSE);
          printf("-i Build Option (data = 0, data and
index = 1)        %ld\n", (long) BUILD_INDEX);
          printf("-d Index Script Path
%s\n", INDEX_SCRIPT_PATH);
          printf("-t Table to Load
all tables \n");
    printf("   [item|warehouse|customer|orders]\n");

          printf("\nNote:  Command line switches are
case sensitive.\n");

    exit(0);
```

```
}


//=================================================
==================
//
// Function name: GetArgsMaster
//
//=================================================
==================

void GetArgsMaster(int argc, char **argv, MASTER_DATA
*pargs)
{
    int             i;
    char  *ptr;

#ifdef DEBUG
    printf("[%ld]DBG: Entering GetArgsMaster()\n",
(int) GetCurrentThreadId());
#endif

    pargs->server                   = SERVER;
    pargs->database                 = DATABASE;
          pargs->admin_database           =
ADMIN_DATABASE;
    pargs->user                     = USER;
    pargs->password                 = PASSWORD;
    pargs->ramp_up                  = RAMP_UP;
    pargs->steady_state             = STEADY_STATE;
    pargs->ramp_down                = RAMP_DOWN;
    pargs->num_users                = NUM_USERS;
    pargs->num_warehouses           = NUM_WAREHOUSES;
    pargs->think_times              = THINK_TIMES;
    pargs->display_data             = DISPLAY_DATA;
          pargs->deadlock_retry           =
DEADLOCK_RETRY;
    pargs->tran                     = TRANSACTION;
          pargs->client_mode              =
CLIENT_MODE;
          pargs->comment                  = NULL;
          pargs->load_multiplier        =
DEF_LOAD_MULTIPLIER;
          pargs->checkpoint_interval      =
DEF_CHECKPOINT_INTERVAL;
          pargs->first_checkpoint         =
DEF_FIRST_CHECKPOINT;
          pargs->delivery_backoff         =
DELIVERY_BACKOFF;
          pargs->num_deliveries           =
NUM_DELIVERIES;
          pargs->disable_90th
          = DISABLE_90TH;
          pargs->enable_sqlstat
          = ENABLE_SQLSTAT;
          pargs->resfilename
          = RESFILENAME;
          pargs->sqlstat_filename
          = SQLSTAT_FILENAME;
          pargs->sqlstat_period
          = SQLSTAT_PERIOD;
          pargs->shutdown_server
          = SHUTDOWN_SERVER;
          pargs->auto_run
                    = AUTO_RUN;
          pargs->disable_sqlperf
          = DISABLE_SQLPERF;

    /* check for zero command line args */
    if ( argc == 1 )
                    GetArgsMasterUsage();

    for (i = 1; i < argc; ++i)
    {
                    if (argv[i][0] != '-' && argv[i][0]
!= '/')
                    {
                    printf("\nUnrecognized command");
                    GetArgsMasterUsage();
                    exit(1);
                    }

                    ptr = argv[i];

                    switch (ptr[1])
                    {
                    case 'h':     /* Fall throught */

          GetArgsMasterUsage();
                                        break;

                    case 'S':
                                        pargs->server =
ptr+2;
                                        break;

                    case 'D':
                              pargs->database = ptr+2;
                                        break;

                    case 'A':
                                        pargs->admin_database =
ptr+2;
                                        break;

                    case 'U':
                                        pargs->user =
ptr+2;
                                        break;

                    case 'P':
                                        pargs->password
= ptr+2;
                                        break;

                    case 'u':
                                        pargs->ramp_up
= atol(ptr+2);
                                        break;

                    case 's':
                                        pargs-
>steady_state = atol(ptr+2);
                                        break;

                    case 'd':
                                        pargs-
>ramp_down = atol(ptr+2);
                                        break;

                    case 'c':
                                        pargs-
>num_users = atol(ptr+2);
                                        break;

                    case 'w':
                                        pargs-
>num_warehouses = atol(ptr+2);
                                        break;

                    case 'T':
                                        pargs-
>think_times = atol(ptr+2);
                                        break;

                    case 'o':
                                        pargs-
>display_data = atol(ptr+2);
                                        break;

                                  case 'm':
                                        pargs-
>load_multiplier = atof(ptr+2);
                                        break;

                    case 'f':
                                        pargs-
>first_checkpoint = atol(ptr+2);
                                        break;

                    case 'i':
                                        pargs-
>checkpoint_interval = atol(ptr+2);
                                        break;

                    case 'C':
                                        pargs->comment
= ptr+2;
                                        break;

                    case 'B':
                                        pargs-
>client_mode = atol(ptr+2);
                                        break;

                    case 'n':
                                        pargs-
>num_deliveries = atol(ptr+2);
                                  break;

                    case 'b':
                                        pargs-
>delivery_backoff = atol(ptr+2);
                                        break;

                                  case 'r':
                                        pargs-
>deadlock_retry = (short) atol(ptr+2);
                                  break;

                                  case 't':
                                        pargs->tran =
atol(ptr+2);
                                        break;

                                  case 'E':
                                        pargs-
>enable_sqlstat = atol(ptr+2);
```

```
                                        break;
                    case 'e':
                                        pargs->sqlstat_filename = ptr+2;
                                        break;

                                case 'g':
                                        pargs->shutdown_server = atol(ptr+2);
                                        break;

                    case 'F':
                                        pargs->resfilename = ptr+2;
                                        break;

                                case 'N':
                                        pargs->disable_90th = atol(ptr+2);
                                        break;

                                case 'a':
                                        pargs->auto_run = atol(ptr+2);
                                        break;

                                case 'q':
                                        pargs->disable_sqlperf = atol(ptr+2);
                                        break;

                                case 'W':
                                        pargs->sqlstat_period = atol(ptr+2);
                                        break;

                    default:

          GetArgsMasterUsage();
                                        exit(-1);
                                        break;
                    }
    }

    return;
}


//=====================================================================
//
// Function name: GetArgsMasterUsage
//
//=====================================================================

void GetArgsMasterUsage()
{

#ifdef DEBUG
    printf("[%ld]DBG: Entering GetArgsMasterUsage()\n",
(int) GetCurrentThreadId());
#endif

    printf("MASTER:\n\n");
          printf("Parameter
Default\n");
          printf("-------------------------------------
-----------------------------------\n");
          printf("-S Server
%s\n", SERVER);
    printf("-D Database
%s\n", DATABASE);
          printf("-A Admin Database
%s\n", ADMIN_DATABASE);
    printf("-U Username
%s\n", USER);
    printf("-P Password
%s\n", PASSWORD);
          printf("-u Ramp Up Time (seconds)
%ld\n", (long) RAMP_UP);
          printf("-s Steady State Time (seconds)
%ld\n", (long) STEADY_STATE);
          printf("-d Ramp Down Time (seconds)
%ld\n", (long) RAMP_DOWN);
    printf("-c Number of Users
%ld\n", (long) NUM_USERS);
          printf("-w Number of Warehouses
%ld\n", (long) NUM_WAREHOUSES);
          printf("-f First Checkpoint (seconds)
%ld\n", (long) DEF_FIRST_CHECKPOINT);
          printf("-i Checkpoint Interval (seconds)
%ld\n", (long) DEF_CHECKPOINT_INTERVAL);
          printf("-B Client mode (TPC-C Scaled = 0,
TPC-C Batch = 1)              %ld\n", (long)
CLIENT_MODE);
          printf("-n Number of Delivery Threads per
Client Driver                 %ld\n", (long)
NUM_DELIVERIES);
          printf("-b Delivery Queue Backoff Delay
(seconds)                       %ld\n", (long)
DELIVERY_BACKOFF);

          printf("-r Deadlock Retries
%ld\n", (long) DEADLOCK_RETRY);
          printf("-T Use Think Times (no = 0, yes = 1)
%ld\n", (long) THINK_TIMES);
          printf("-m Think Time Load Multiplier
%0.4f\n", DEF_LOAD_MULTIPLIER);
          printf("-o Display Data to Console (no = 0,
yes = 1)                      %ld\n", (long)
DISPLAY_DATA);
          printf("-t Transaction (0, 1, 2, 3, 4, 5)
%ld\n", (long) TRANSACTION);

          printf("-N Disable 90th Per. Calc. (no = 0,
yes = 1)                      %ld\n",(long)
DISABLE_90TH);
          printf("-E Enable Steady State Sqlstats
Collection (no = 0, yes = 1)    %ld\n",(long)
ENABLE_SQLSTAT);
          printf("-W Sqlstats Collection Period
(seconds)                         %ld\n",(long)
SQLSTAT_PERIOD);
          printf("-e Sqlstats File Name
%s\n", SQLSTAT_FILENAME);
          printf("-g Shutdown SQL Server at End of Test
(no = 0, yes = 1)         %ld\n",(long)
SHUTDOWN_SERVER);
          printf("-F Result File Name
%s\n", RESFILENAME);
    printf("-a Automated Test Run (no = 0, yes = 1)
%ld\n",(long) AUTO_RUN);
          printf("-C Comment to Include in Result File
None\n");
          printf("\nNote:  Command line switches are
case sensitive.\n");

    exit(0);
}


//=====================================================================
//
// Function name: GetArgsClient
//
//=====================================================================

void GetArgsClient(int argc, char **argv,
GLOBAL_CLIENT_DATA *pClient)
{
    int             i;
    char  *ptr;

#ifdef DEBUG
    printf("[%ld]DBG: Entering GetArgsClient()\n",
(int) GetCurrentThreadId());
#endif

          pClient->num_threads               =
NUM_THREADS;
    pClient->server                     = SERVER;
    pClient->database                   = DATABASE;
          pClient->admin_database           =
ADMIN_DATABASE;
    pClient->user                       = USER;
    pClient->password                   = PASSWORD;
          pClient->pack_size                = (long)
DEFCLPACKSIZE;
          pClient->synch_servername         =
SYNCH_SERVERNAME;
          pClient->disable_delivery_resfiles =
DISABLE_DELIVERY_RESFILES;
          pClient->enable_qj
             = ENABLE_QJ;

    /* check for 1 or more command line args */
    if ( argc != 1 )
    {
                    for (i = 1; i < argc; ++i)
                    {
                    if (argv[i][0] != '-' && argv[i][0]
!= '/')
                    {

          printf("\nUnrecognized command");

          GetArgsClientUsage();
                                        exit(1);
                    }

                    ptr = argv[i];
```

```
                    switch (ptr[1])
                    {
                                        case 'S':

          pClient->server = ptr+2;
                                        break;

                                        case 'D':

          pClient->database = ptr+2;
                                        break;

                                        case 'A':

          pClient->admin_database = ptr+2;
                                        break;

                                        case 'U':

          pClient->user = ptr+2;
                                        break;

                                        case 'P':

          pClient->password = ptr+2;
                                        break;

                                        case 'c':

          pClient->num_threads = atol(ptr+2);
                                        break;

                                        case 'p':

          pClient->pack_size = atol(ptr+2);

          break;

                                        case 'd':

          pClient->disable_delivery_resfiles =
atol(ptr+2);

          break;

                                        case 's':

          pClient->synch_servername = ptr+2;

          break;

                                        case 'q':

          pClient->enable_qj = atol(ptr+2);

          break;

                                        default:

          GetArgsClientUsage();

          exit(-1);

          break;
                    }
                    }
          }

    return;
}


//=====================================================
==================
//
// Function name: GetArgsClientUsage
//
//=====================================================
==================

void GetArgsClientUsage()
{

#ifdef DEBUG
    printf("[%ld]DBG: Entering GetArgsClientUsage()\n",
(int) GetCurrentThreadId());
#endif

    printf("CLIENT:\n\n");
          printf("Parameter
Default\n");
          printf("-------------------------------------
----------------------\n");
          printf("-S Server
%s\n", SERVER);
    printf("-D Database
%s\n", DATABASE);
          printf("-A Admin Database
%s\n", ADMIN_DATABASE);
    printf("-U Username
%s\n", USER);
    printf("-P Password
%s\n", PASSWORD);
          printf("-c Number of User Connections
%ld\n",(long) NUM_THREADS);
          printf("-p TDS Packet Size
%ld\n",(long) DEFCLPACKSIZE);
          printf("-d Disable Delivery Result Files (no
= 0, yes = 1)  %ld\n",(long)
DISABLE_DELIVERY_RESFILES);
          printf("-s Master Driver Servername
%s\n", SYNCH_SERVERNAME);

    printf("\nNote:  Command line switches are case
sensitive.\n");

    exit(0);
}


//=====================================================
==================
//
// Function name: GetArgsDelivery
//
//=====================================================
==================
void GetArgsDelivery(int argc, char **argv,
DELIVERY_ARGS *pDelivery)
{
    int             i;
    char  *ptr;

#ifdef DEBUG
    printf("[%ld]DBG: Entering GetArgsDelivery()\n",
(int) GetCurrentThreadId());
#endif

          pDelivery->pipe_num = 0;

    /* check for 1 or more command line args */
    if ( argc != 1 )
          {
                    for (i = 1; i < argc; ++i)
                    {
                    if (argv[i][0] != '-' && argv[i][0]
!= '/')
                    {

          printf("\nUnrecognized command");

          GetArgsClientUsage();
                                        exit(1);
                    }

                    ptr = argv[i];

                        switch (ptr[1])
                        {
                                        case 'p':

          pDelivery->pipe_num = (long) atol(ptr+2);

          break;

                                        default:

          printf("ERROR:  No pipe number specified.");

          exit(-1);

          break;
                    }
                    }
    }

    return;
}


//=====================================================
==================
//
// Function name: GetArgsSQLStat
//
//=====================================================
==================

void GetArgsSQLStat(int argc, char **argv, SQLSTAT_ARGS
*pargs)
{
    int             i;
    char  *ptr;

    /* init args struct with some useful values */
    pargs->server                       =  SERVER;
    pargs->user                   =  USER;
    pargs->password                     =  PASSWORD;
```

```
    pargs->admin_database       =  ADMIN_DATABASE;
          pargs->sqlstat_filename     =
SQLSTAT_FILENAME;
          pargs->run_id
          =  UNDEF;

    /* check for zero command line args */
    if ( argc == 1 )
                    GetArgsSQLStatUsage();

    for (i = 1; i < argc; ++i)
    {
                    if (argv[i][0] != '-' && argv[i][0]
!= '/')
                    {
                    printf("\nUnrecognized command");
                    GetArgsSQLStatUsage();
                    exit(1);
                    }

                    ptr = argv[i];

                    switch (ptr[1])
                    {

                    case 'S':
                                        pargs->server =
ptr+2;
                                        break;

                    case 'U':
                                        pargs->user =
ptr+2;
                                        break;

                    case 'P':
                                        pargs->password
= ptr+2;
                                        break;

                    case 'A':
                                        pargs-
>admin_database = ptr+2;
                                        break;

                              case 'i':
                                        pargs->run_id =
atol(ptr+2);
                                        break;

                              case 'f':
                                        pargs-
>sqlstat_filename = ptr+2;
                                        break;

                    default:
                              GetArgsSQLStatUsage();
                              exit(-1);
                              break;
                    }
    }

    /* check for required args */
    if (pargs->run_id == UNDEF )
    {
                    printf("Error, Run ID is
required.\n");
                    exit(-2);
    }

    return;
}


//=======================================================
==================
//
// Function name: GetArgsSQLStatUsage
//
//=======================================================
==================

void GetArgsSQLStatUsage()
{

    printf("SQLSTAT:\n\n");
          printf("Parameter
Default\n");
          printf("-------------------------------------
-------------------------\n");
    printf("-S Server
%s\n", SERVER);
    printf("-U Username
%s\n", USER);
    printf("-P Password
%s\n", PASSWORD);
    printf("-A Admin Database
%s\n", ADMIN_DATABASE);
          printf("-i Run ID
(required)\n");
          printf("-f Statistics Result file
%s\n", SQLSTAT_FILENAME);

          printf("\nNote:  Command line switches are
case sensitive.\n");

    exit(0);
}
```

Random.c

```
/*        FILE:               RANDOM.C
 *                                      Microsoft TPC-C
Kit Ver. 3.00.000
 *                                      Audited
08/23/96, By Francois Raab
 *
 *                                      Copyright
Microsoft, 1996
 *
 *        PURPOSE:  Random number generation functions
for Microsoft TPC-C Benchmark Kit
 *        Author:             Damien Lindauer
 *
          damienl@Microsoft.com
 */

// Includes
#include "tpcc.h"
#include "math.h"

// Defines
#define A            16807
#define M       2147483647
#define Q           127773      /* M div A */
#define R             2836      /* M mod A */
#define Thread      __declspec(thread)

// Globals
long      Thread Seed = 0;       /* thread local seed
*/

/*******************************************************
**********************
*
*
* random -
*
*       Implements a GOOD pseudo random number
generator.  This generator     *
*       will/should? run the complete period before
repeating.               *
*
*
* Copied from:
*
*       Random Numbers Generators: Good Ones Are Hard
to Find.               *
*       Communications of the ACM - October 1988 Volume
31 Number 10          *
*
*
* Machine Dependencies:
*
*       long must be 2 ^ 31 - 1 or greater.
*
*
*
*******************************************************
**********************/

/*******************************************************
**********************
* seed - load the Seed value used in irand and drand.
Should be used before  *
*       first call to irand or drand.
*
*******************************************************
**********************/

void seed(long val)
{

#ifdef DEBUG
    printf("[%ld]DBG: Entering seed()...\n", (int)
GetCurrentThreadId());
          printf("Old Seed %ld New Seed %ld\n",Seed,
val);
#endif

    if ( val < 0 )
              val = abs(val);

    Seed = val;
```

```
}


/*****************************************************
**********************
*
*
* irand - returns a 32 bit integer pseudo random number
with a period of     *
*       1 to 2 ^ 32 - 1.
*
*
*
* parameters:
*
*       none.
*
*
*
* returns:
*
*       32 bit integer - defined as long ( see above ).
*
*
*
* side effects:
*
*       seed get recomputed.
*
*****************************************************
*********************/

long irand()
{
    register long    s;      /* copy of seed */
    register long    test;   /* test flag */
    register long    hi;     /* tmp value for speed */
    register long    lo;     /* tmp value for speed */

#ifdef DEBUG
    printf("[%ld]DBG: Entering irand()...\n", (int)
GetCurrentThreadId());
#endif

    s = Seed;
    hi = s / Q;
    lo = s % Q;

    test = A * lo - R * hi;
    if ( test > 0 )
                    Seed = test;
    else
                    Seed = test + M;

    return( Seed );
}


/*****************************************************
**********************
*
*
* drand - returns a double pseudo random number between
0.0 and 1.0.         *
*       See irand.
*
*****************************************************
*********************/
double drand()
{

#ifdef DEBUG
    printf("[%ld]DBG: Entering drand()...\n", (int)
GetCurrentThreadId());
#endif

    return( (double)irand() / 2147483647.0);
}


//=====================================================
==================
// Function   : RandomNumber
//
// Description:
//=====================================================
==================
long RandomNumber(long lower, long upper)
{
    long rand_num;

#ifdef DEBUG
    printf("[%ld]DBG: Entering RandomNumber()...\n",
(int) GetCurrentThreadId());
#endif

          if ( upper == lower )         /* pgd 08-13-96
perf enhancement */
                    return lower;

          upper++;

    if ( upper <= lower )
                    rand_num = upper;
    else
                    rand_num = lower + irand() % (upper
- lower); /* pgd 08-13-96 perf enhancement */


#ifdef DEBUG
    printf("[%ld]DBG: RandomNumber between %ld & %ld
==> %ld\n",
                                          (int)
GetCurrentThreadId(), lower, upper, rand_num);
#endif


    return rand_num;
}


#if 0

//Orginal code pgd 08/13/96

long RandomNumber(long lower,
                                           long upper)
{
    long rand_num;

#ifdef DEBUG
    printf("[%ld]DBG: Entering RandomNumber()...\n",
(int) GetCurrentThreadId());
#endif

          upper++;

    if ((upper <= lower))
                    rand_num = upper;
    else
                    rand_num = lower + irand() %
((upper > lower) ? upper - lower : upper);


#ifdef DEBUG
    printf("[%ld]DBG: RandomNumber between %ld & %ld
==> %ld\n",
                                          (int)
GetCurrentThreadId(), lower, upper, rand_num);
#endif


    return rand_num;
}
#endif

//=====================================================
==================
// Function   : NURand
//
// Description:
//=====================================================
==================
long NURand(int iConst,
             long x,
             long y,
             long C)
{
    long rand_num;

#ifdef DEBUG
    printf("[%ld]DBG: Entering NURand()...\n", (int)
GetCurrentThreadId());
#endif

    rand_num = (((RandomNumber(0,iConst) |
RandomNumber(x,y)) + C) % (y-x+1))+x;

#ifdef DEBUG
    printf("[%ld]DBG: NURand: num = %d\n", (int)
GetCurrentThreadId(), rand_num);
#endif

    return rand_num;
}
```

Strings.c

```
/*        FILE:               STRINGS.C
 *                                        Microsoft TPC-C
Kit Ver. 3.00.000
 *                                        Audited
08/23/96, By Francois Raab
 *
 *                                        Copyright
Microsoft, 1996
```

```
 *
 *        PURPOSE:  String generation functions for
Microsoft TPC-C Benchmark Kit
 *        Author:             Damien Lindauer
 *
          damienl@Microsoft.com
 */

// Includes
#include "tpcc.h"
#include <string.h>
#include <ctype.h>

//=================================================
==================
//
// Function name: MakeAddress
//
//=================================================
==================

void MakeAddress(char *street_1,
                                        char
*street_2,
                                        char *city,
                                        char *state,
                                        char *zip)
{

#ifdef DEBUG
    printf("[%ld]DBG: Entering MakeAddress()\n", (int)
GetCurrentThreadId());
#endif

    MakeAlphaString (10, 20, ADDRESS_LEN, street_1);
    MakeAlphaString (10, 20, ADDRESS_LEN, street_2);
    MakeAlphaString (10, 20, ADDRESS_LEN, city);
    MakeAlphaString ( 2,  2, STATE_LEN, state);
    MakeZipNumberString( 9,  9, ZIP_LEN, zip);

#ifdef DEBUG
    printf("[%ld]DBG: MakeAddress: street_1: %s,
street_2: %s, city: %s, state: %s, zip: %s\n",
                               (int)
GetCurrentThreadId(), street_1, street_2, city, state,
zip);
#endif

    return;

}


//=================================================
==================
//
// Function name: LastName
//
//=================================================
==================

void LastName(int  num,
                          char *name)
{
    int                       i;
          int                             len;
    static char *n[] =
    {
                    "BAR" , "OUGHT", "ABLE" , "PRI"  ,
"PRES",
                    "ESE" , "ANTI" , "CALLY", "ATION",
"EING"
    };

#ifdef DEBUG
    printf("[%ld]DBG: Entering LastName()\n", (int)
GetCurrentThreadId());
#endif

    if ((num >= 0) && (num < 1000))
    {
                    strcpy(name, n[(num/100)%10]);
                    strcat(name, n[(num/10)%10]);
                    strcat(name, n[(num/1)%10]);

                    if (strlen(name) < LAST_NAME_LEN)
                    {
                              PaddString(LAST_NAME_LEN,
name);
                    }

    }
    else
    {
                    printf("\nError in LastName()...
num <%ld> out of range (0,999)\n", num);
                    exit(-1);
    }

#ifdef DEBUG
    printf("[%ld]DBG: LastName: num = [%d] ==>
[%d][%d][%d]\n",
                                        (int)
GetCurrentThreadId(), num, num/100, (num/10)%10,
num%10);
          printf("[%ld]DBG: LastName: String = %s\n",
(int) GetCurrentThreadId(), name);
#endif

    return;

}


//=================================================
==================
//
// Function name: MakeAlphaString
//
//=================================================
==================

//philipdu 08/13/96 Changed MakeAlphaString to use A-Z,
a-z, and 0-9 in
//accordance with spec see below:
//The spec says:
//4.3.2.2 The notation random a-string [x .. y]
//(respectively, n-string [x .. y]) represents a string
of random alphanumeric
//(respectively, numeric) characters of a random length
of minimum x, maximum y,
//and mean (y+x)/2. Alphanumerics are A..Z, a..z, and
0..9.  The only other
//requirement is that the character set used "must be
able to represent a minimum
//of 128 different characters".  We are using 8-bit
chars, so this is a non issue.
//It is completely unreasonable to stuff non-printing
chars into the text fields.
//-CLevine 08/13/96

int MakeAlphaString( int  x, int  y, int  z, char *str)
{
          int                 len;
          int                 i;
          static    char chArray[] =
"0123456789ABCDEFGHIJKLMNOPQRSTUVWXYZabcdefghijklmnopqr
stuvwxyz";
          static    int       chArrayMax = 61;

#ifdef DEBUG
    printf("[%ld]DBG: Entering MakeAlphaString()\n",
(int) GetCurrentThreadId());
#endif

          len= RandomNumber(x, y);

          for (i=0; i<len; i++)
                    str[i] = chArray[RandomNumber(0,
chArrayMax)];
          if ( len < z )
                    memset(str+len, ' ', z - len);
          str[len] = 0;

    return len;
}

#if 0
//philipdu 08/13/96 Orginal MakeAlphaString

int MakeAlphaString( int  x,
                                                  int  y,
                                                       int
z,
                                                  char *str)
{

          int                 len;
          int                 i;

#ifdef DEBUG
    printf("[%ld]DBG: Entering MakeAlphaString()\n",
(int) GetCurrentThreadId());
#endif

          len= RandomNumber(x, y);

          for (i=0; i<len; i++)
          {
                    str[i] =
RandomNumber(MINPRINTASCII, MAXPRINTASCII);
          }

          str[len] = '\0';

          if (len < z)
          {
```

```
                    PaddString(z, str);
          }

    return (len);
}
#endif


//=====================================================
==================
//
// Function name: MakeOriginalAlphaString
//
//=====================================================
==================

int MakeOriginalAlphaString(int  x,

              int  y,

                    int  z,

              char *str,

          int  percent)
{
    int             len;
    int             val;
    int             start;

#ifdef DEBUG
    printf("[%ld]DBG: Entering
MakeOriginalAlphaString()\n", (int)
GetCurrentThreadId());
#endif

    // verify prercentage is valid
    if ((percent < 0) || (percent > 100))
    {
                    printf("MakeOrigianlAlphaString:
Invalid percentage: %d\n", percent);
                    exit(-1);
    }

    // verify string is at least 8 chars in length
    if ((x + y) <= 8)
    {
                    printf("MakeOriginalAlphaString:
string length must be >= 8\n");
                    exit(-1);
    }

    // Make Alpha String
    len = MakeAlphaString(x,y, z, str);

    val = RandomNumber(1,100);
    if (val <= percent)
    {
                    start = RandomNumber(0, len - 8);
                    strncpy(str + start, "ORIGINAL",
8);
    }


#ifdef DEBUG
    printf("[%ld]DBG: MakeOriginalAlphaString: : %s\n",
                              (int)
GetCurrentThreadId(), str);
#endif

    return strlen(str);
}


//=====================================================
==================
//
// Function name: MakeNumberString
//
//=====================================================
==================
int MakeNumberString(int  x, int  y, int  z, char *str)
{
          char tmp[16];

          //MakeNumberString is always called
MakeZipNumberString(16, 16, 16, string)

          memset(str, '0', 16);
          itoa(RandomNumber(0, 99999999), tmp, 10);
          memcpy(str, tmp, strlen(tmp));

          itoa(RandomNumber(0, 99999999), tmp, 10);
          memcpy(str+8, tmp, strlen(tmp));

          str[16] = 0;

    return 16;
}

#if 0
int MakeNumberString(int  x,
                                                    int  y,
                                                          int
z,
                                                    char *str)
{
    int             len;
    int             i;

#ifdef DEBUG
    printf("[%ld]DBG: Entering MakeNumberString()\n",
(int) GetCurrentThreadId());
#endif

    len = RandomNumber(x,y);


    for (i=0; i < len; i++)
    {
                    str[i] = (char)
(RandomNumber(48,57));
    }

    str[len] = '\0';

          PaddString(z, str);

    return strlen(str);
}

#endif

//=====================================================
==================
//
// Function name: MakeZipNumberString
//
//=====================================================
==================
int MakeZipNumberString(int  x, int  y, int  z, char
*str)
{
          char tmp[16];

          //MakeZipNumberString is always called
MakeZipNumberString(9, 9, 9, string)

          strcpy(str, "000011111");

          itoa(RandomNumber(0, 9999), tmp, 10);
          memcpy(str, tmp, strlen(tmp));

    return 9;
}

#if 0
//pgd 08/14/96 Orginal Code Below
int MakeZipNumberString(int  x,
                                                          int
y,

          int  z,
                                                          char
*str)
{
    int             len;
    int             i;

#ifdef DEBUG
    printf("[%ld]DBG: Entering
MakeZipNumberString()\n", (int) GetCurrentThreadId());
#endif

    len = RandomNumber(x-5,y-5);

    for (i=0; i < len; i++)
    {
                    str[i] = (char)
(RandomNumber(48,57));
    }

    str[len] = '\0';

          strcat(str, "11111");

          PaddString(z, str);

    return strlen(str);
}
#endif

//=====================================================
==================
//
// Function name: InitString
//
```

```
//=====================================================
==================
void InitString(char *str, int len)
{
    int i;

#ifdef DEBUG
    printf("[%ld]DBG: Entering InitString()\n", (int)
GetCurrentThreadId());
#endif

          memset(str, ' ', len);
    str[len] = 0;
}

#if 0
//Orginal pgd 08/14/96
void InitString(char *str, int len)
{
    int i;

#ifdef DEBUG
    printf("[%ld]DBG: Entering InitString()\n", (int)
GetCurrentThreadId());
#endif


    for (i=0; i< len; i++)
                  str[i] = ' ';
    str[len] = '\0';
}

#endif

//=====================================================
==================
// Function name: InitAddress
//
// Description:
//
//=====================================================
==================

void InitAddress(char *street_1, char *street_2, char
*city, char *state, char *zip)
{
          int i;


          memset(street_1, ' ', ADDRESS_LEN+1);
          memset(street_2, ' ', ADDRESS_LEN+1);
          memset(city, ' ', ADDRESS_LEN+1);

    street_1[ADDRESS_LEN+1] = 0;
    street_2[ADDRESS_LEN+1] = 0;
    city[ADDRESS_LEN+1]     = 0;

          memset(state, ' ', STATE_LEN+1);
    state[STATE_LEN+1] = 0;

          memset(zip, ' ', ZIP_LEN+1);
    zip[ZIP_LEN+1] = 0;
}

#if 0
//Orginal pgd 08/14/96
void InitAddress(char *street_1,
                                        char
*street_2,
                                        char *city,
                                        char *state,
                                        char *zip)
{
          int i;

#ifdef DEBUG
    printf("[%ld]DBG: Entering InitAddress()\n", (int)
GetCurrentThreadId());
#endif

    for (i=0; i< ADDRESS_LEN+1; i++)
    {
                  street_1[i] = ' ';
                  street_2[i] = ' ';
                  city[i]     = ' ';
    }

    street_1[ADDRESS_LEN+1] = '\0';
    street_2[ADDRESS_LEN+1] = '\0';
    city[ADDRESS_LEN+1]     = '\0';

    for (i=0; i< STATE_LEN+1; i++)
                  state[i] = ' ';
    state[STATE_LEN+1] = '\0';

    for (i=0; i< ZIP_LEN+1; i++)
                  zip[i] = ' ';
    zip[ZIP_LEN+1] = '\0';
}

#endif
//=====================================================
==================
//
// Function name: PaddString
//
//=====================================================
==================

void PaddString(int max, char *name)
{
          int                 i;
          int                 len;

          len = strlen(name);
          if ( len < max )
                  memset(name+len, ' ', max - len);
          name[max] = 0;

          return;
}

#if 0
          //pgd 08/14/96 Orginal code below
          void PaddString(int           max,
                                                char
          *name)
          {

                    int                 i;
                    int                 len;

          #ifdef DEBUG
                    printf("[%ld]DBG: Entering
PaddString()\n", (int) GetCurrentThreadId());
          #endif

                    len = strlen(name);

                    for (i=1;i<=(max - len);i++)
                    {
                              strcat(name, " ");
                    }

          }
#endif
```

Tpccldr.c

```
/*          FILE:               TPCCLDR.C
 *                              Microsoft TPC-C Kit
Ver. 3.00.000
 *                              Audited 08/23/96, By
Francois Raab
 *
 *                              Copyright Microsoft,
1996
 *
 *          PURPOSE:    Database loader for Microsoft TPC-C Benchmark
Kit
 *          Author:             Damien Lindauer
 *
          damienl@Microsoft.com
 */


// Includes
#include "tpcc.h"
#include "search.h"

// Defines
#define MAXITEMS            100000
#define CUSTOMERS_PER_DISTRICT  3000
#define DISTRICT_PER_WAREHOUSE  10
#define ORDERS_PER_DISTRICT     3000
#define MAX_CUSTOMER_THREADS    2
#define MAX_ORDER_THREADS       3
#define MAX_MAIN_THREADS        4

// Functions declarations
long NURand();
void LoadItem();
void LoadWarehouse();

void Stock();
void District();
```

```
void LoadCustomer();
void CustomerBufInit();
void CustomerBufLoad();
void LoadCustomerTable();
void LoadHistoryTable();

void LoadOrders();
void OrdersBufInit();
void OrdersBufLoad();
void LoadOrdersTable();
void LoadNewOrderTable();
void LoadOrderLineTable();
void GetPermutation();
void CheckForCommit();
void OpenConnections();

void BuildIndex();

void CurrentDate();

// Shared memory structures

typedef struct
{
   long            ol;
   long            ol_i_id;
   short           ol_supply_w_id;
   short           ol_quantity;
   double           ol_amount;
   char            ol_dist_info[DIST_INFO_LEN+1];
                   // Added to insure ol_delivery_d set properly during load
                   char
                   ol_delivery_d[30];
} ORDER_LINE_STRUCT;

typedef struct
{
   long            o_id;
   short           o_d_id;
   short           o_w_id;
   long            o_c_id;
   short           o_carrier_id;
   short           o_ol_cnt;
   short           o_all_local;
                   ORDER_LINE_STRUCT   o_ol[15];
} ORDERS_STRUCT;

typedef struct
{
   long                                                    c_id;
   short                                                   c_d_id;
   short                                                   c_w_id;
                   char
                   c_first[FIRST_NAME_LEN+1];
   char
                   c_middle[MIDDLE_NAME_LEN+1];
   char
                   c_last[LAST_NAME_LEN+1];
   char
                   c_street_1[ADDRESS_LEN+1];
   char
                   c_street_2[ADDRESS_LEN+1];
   char
                   c_city[ADDRESS_LEN+1];
   char
                   c_state[STATE_LEN+1];
   char                                                    c_zip[ZIP_LEN+1];
   char
                   c_phone[PHONE_LEN+1];
   char
                   c_credit[CREDIT_LEN+1];
   double                                                  c_credit_lim;
   double                                                  c_discount;
   double                                                  c_balance;
   double                                                  c_ytd_payment;
                   short
                   c_payment_cnt;
                   short
                   c_delivery_cnt;
                   char
                   c_data_1[C_DATA_LEN+1];
   char
                   c_data_2[C_DATA_LEN+1];
                   double
                   h_amount;
   char
                   h_data[H_DATA_LEN+1];
} CUSTOMER_STRUCT;

typedef struct
{
                   char
                   c_last[LAST_NAME_LEN+1];
                   char
                   c_first[FIRST_NAME_LEN+1];
   long                                                    c_id;
} CUSTOMER_SORT_STRUCT;

typedef struct
{
   long            time_start;
} LOADER_TIME_STRUCT;


// Global variables
char          errfile[20];
DBPROCESS     *i_dbproc1;
DBPROCESS     *w_dbproc1, *w_dbproc2;
DBPROCESS     *c_dbproc1, *c_dbproc2;
DBPROCESS     *o_dbproc1, *o_dbproc2, *o_dbproc3;
ORDERS_STRUCT   orders_buf[ORDERS_PER_DISTRICT];
CUSTOMER_STRUCT customer_buf[CUSTOMERS_PER_DISTRICT];
long          main_threads_completed;
long          customer_threads_completed;
long          order_threads_completed;
long          orders_rows_loaded;
long          new_order_rows_loaded;
long          order_line_rows_loaded;
long          history_rows_loaded;
long          customer_rows_loaded;
long          stock_rows_loaded;
long          district_rows_loaded;
long          item_rows_loaded;
long          warehouse_rows_loaded;
long          main_time_start;
long          main_time_end;
TPCCLDR_ARGS    *aptr, args;


//=======================================================
==============
//
// Function name: main
//
//=======================================================
==============

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

                   DWORD          dwThreadID[MAX_MAIN_THREADS];
                   HANDLE         hThread[MAX_MAIN_THREADS];
                   FILE           *fLoader;
                   char           buffer[255];
                   int            main_threads_started;
                   RETCODE        retcode;
                   LOGINREC *login;

   printf("\n*************************************************");
                   printf("\n*                                *");
                   printf("\n*  Microsoft SQL Server 6.5              *");
                   printf("\n*                                *");
                   printf("\n*  TPC-C BENCHMARK KIT:  Database loader
*");
                   printf("\n*  Version %s                     *", TPCKIT_VER);
```

```
		printf("\n*                                                *");
		printf("\n**************************************************
*****\n\n");

	// process command line arguments

	aptr = &args;
	GetArgsLoader(argc, argv, aptr);

		if (aptr->build_index = 0)
			printf("data load only\n");
		if (aptr->build_index = 1)
			printf("data load and index creation\n");

		// install dblib error handlers

		dbmsghandle((DBMSGHANDLE_PROC)SQLMsgHandler);
		dberrhandle((DBERRHANDLE_PROC)SQLErrHandler);

		// open connections to SQL Server

		OpenConnections();

		// open file for loader results
	fLoader = fopen(aptr->loader_res_file, "a");

	if (fLoader == NULL)
		{
			printf("Error, loader result file open failed.");
			exit(-1);
		}

	// start loading data

	sprintf(buffer,"TPC-C load started for %ld warehouses:  ", aptr-
>num_warehouses);
		if(aptr->build_index = 0)
			strcat(buffer, "data load only\n");
		if (aptr->build_index = 1)
			strcat(buffer, "data load and index creation\n");

		printf("%s",buffer);
		fprintf(fLoader,"%s",buffer);

		main_time_start = (TimeNow() / MILLI);

		// start parallel load threads

		main_threads_completed = 0;
		main_threads_started = 0;

		if ((aptr->table == NULL) || !(strcmp(aptr->table,"item")))
		{
			fprintf(fLoader, "\nStarting loader threads for:
item\n");


			hThread[0] = CreateThread(NULL,

				0,


(LPTHREAD_START_ROUTINE) LoadItem,

				NULL,

				0,

				&dwThreadID[0]);

			if (hThread[0] == NULL)
			{
				printf("Error, failed in creating
creating thread = 0.\n");
				exit(-1);
			}

			main_threads_started++;
		}

		if ((aptr->table == NULL) || !(strcmp(aptr->table,"warehouse")))
		{
			fprintf(fLoader, "Starting loader threads for:
warehouse\n");

			hThread[1] = CreateThread(NULL,

				0,


(LPTHREAD_START_ROUTINE) LoadWarehouse,

				NULL,

				0,

				&dwThreadID[1]);

			if (hThread[1] == NULL)
			{
				printf("Error, failed in creating
creating thread = 1.\n");
				exit(-1);
			}

			main_threads_started++;
		}

	if ((aptr->table == NULL) || !(strcmp(aptr->table,"customer")))
		{
			fprintf(fLoader, "Starting loader threads for:
customer\n");

			hThread[2] = CreateThread(NULL,

				0,


(LPTHREAD_START_ROUTINE) LoadCustomer,

				NULL,

				0,

				&dwThreadID[2]);

			if (hThread[2] == NULL)
			{
				printf("Error, failed in creating
creating main thread = 2.\n");
				exit(-1);
			}

			main_threads_started++;
		}

	if ((aptr->table == NULL) || !(strcmp(aptr->table,"orders")))
		{
			fprintf(fLoader, "Starting loader threads for:
orders\n");

			hThread[3] = CreateThread(NULL,

				0,


(LPTHREAD_START_ROUTINE) LoadOrders,

				NULL,

				0,

				&dwThreadID[3]);

			if (hThread[3] == NULL)
```

```
                {
                        printf("Error, failed in creating
creating main thread = 3.\n");
                        exit(-1);
                }

        main_threads_started++;

        }

        while (main_threads_completed != main_threads_started)
                Sleep(1000L);

   main_time_end = (TimeNow() / MILLI);

   sprintf(buffer,"\nTPC-C load completed successfully in %ld minutes.\n",
                        (main_time_end -
main_time_start)/60);

        printf("%s",buffer);
        fprintf(fLoader, "%s", buffer);

        fclose(fLoader);

        dbexit();

   exit(0);
}


//=============================================================
==============
//
// Function name: LoadItem
//
//=============================================================
==============

void LoadItem()
{
   long   i_id;
        long   i_im_id;
   char   i_name[I_NAME_LEN+1];
   double i_price;
   char   i_data[I_DATA_LEN+1];
        char   name[20];
        long   time_start;

        printf("\nLoading item table...\n");

        // Seed with unique number
        seed(1);

        InitString(i_name, I_NAME_LEN+1);
        InitString(i_data, I_DATA_LEN+1);

        sprintf(name, "%s..%s", aptr->database, "item");
        bcp_init(i_dbproc1, name, NULL, "logs\\item.err", DB_IN);

        bcp_bind(i_dbproc1, (BYTE *) &i_id,      0, -1,         NULL, 0, 0,
1);
        bcp_bind(i_dbproc1, (BYTE *) &i_im_id,   0, -1,         NULL, 0,
0, 2);
        bcp_bind(i_dbproc1, (BYTE *) i_name,     0, I_NAME_LEN,
NULL, 0, 0, 3);
        bcp_bind(i_dbproc1, (BYTE *) &i_price,   0, -1,         NULL, 0,
SQLFLT8, 4);
        bcp_bind(i_dbproc1, (BYTE *) i_data,     0, I_DATA_LEN,
NULL, 0, 0, 5);

        time_start = (TimeNow() / MILLI);

        item_rows_loaded = 0;

        for (i_id = 1; i_id <= MAXITEMS; i_id++)
        {
                i_im_id = RandomNumber(1L, 10000L);
                MakeAlphaString(14, 24, I_NAME_LEN, i_name);

                i_price = ((float) RandomNumber(100L,
10000L))/100.0;

                MakeOriginalAlphaString(26, 50, I_DATA_LEN,
i_data, 10);

                if (!bcp_sendrow(i_dbproc1))
                        printf("Error, LoadItem() failed
calling bcp_sendrow().  Check error file.\n");
                item_rows_loaded++;
                CheckForCommit(i_dbproc1, item_rows_loaded,
"item", &time_start);
        }

        bcp_done(i_dbproc1);
        dbclose(i_dbproc1);

        printf("Finished loading item table.\n");

        if (aptr->build_index == 1)
                BuildIndex("idxitmcl");

        InterlockedIncrement(&main_threads_completed);
}


//=============================================================
==============
//
// Function   : LoadWarehouse
//
// Loads WAREHOUSE table and loads Stock and District as Warehouses are
created
//
//=============================================================
==============

void LoadWarehouse()
{
   short  w_id;
   char   w_name[W_NAME_LEN+1];
   char   w_street_1[ADDRESS_LEN+1];
   char   w_street_2[ADDRESS_LEN+1];
   char   w_city[ADDRESS_LEN+1];
   char   w_state[STATE_LEN+1];
   char   w_zip[ZIP_LEN+1];
   double w_tax;
   double w_ytd;
        char   name[20];
        long   time_start;


        printf("\nLoading warehouse table...\n");

        // Seed with unique number
        seed(2);

        InitString(w_name, W_NAME_LEN+1);
        InitAddress(w_street_1, w_street_2, w_city, w_state, w_zip);

        sprintf(name, "%s..%s", aptr->database, "warehouse");
        bcp_init(w_dbproc1, name, NULL, "logs\\whouse.err", DB_IN);

        bcp_bind(w_dbproc1, (BYTE *) &w_id,        0, -1,          NULL,
0, 0, 1);
        bcp_bind(w_dbproc1, (BYTE *) w_name,       0,
W_NAME_LEN,   NULL, 0, 0, 2);
        bcp_bind(w_dbproc1, (BYTE *) w_street_1,   0,
ADDRESS_LEN,  NULL, 0, 0, 3);
        bcp_bind(w_dbproc1, (BYTE *) w_street_2,   0,
ADDRESS_LEN,  NULL, 0, 0, 4);
        bcp_bind(w_dbproc1, (BYTE *) w_city,       0, ADDRESS_LEN,
NULL, 0, 0, 5);
        bcp_bind(w_dbproc1, (BYTE *) w_state,      0, STATE_LEN,
NULL, 0, 0, 6);
```

```
		bcp_bind(w_dbproc1, (BYTE *) w_zip,	0, ZIP_LEN,
NULL, 0, 0, 7);
		bcp_bind(w_dbproc1, (BYTE *) &w_tax,	0, -1,		NULL,
0, SQLFLT8, 8);
		bcp_bind(w_dbproc1, (BYTE *) &w_ytd,	0, -1,		NULL,
0, SQLFLT8, 9);

		time_start = (TimeNow() / MILLI);

		warehouse_rows_loaded = 0;

		for (w_id = aptr->starting_warehouse; w_id < aptr-
>num_warehouses+1; w_id++)
		{

			MakeAlphaString(6,10, W_NAME_LEN,
w_name);

			MakeAddress(w_street_1, w_street_2, w_city,
w_state, w_zip);

			w_tax = ((float)
RandomNumber(0L,2000L))/10000.00;

			w_ytd = 300000.00;

			if (!bcp_sendrow(w_dbproc1))
			printf("Error, LoadWarehouse() failed calling
bcp_sendrow().  Check error file.\n");
			warehouse_rows_loaded++;
			CheckForCommit(i_dbproc1,
warehouse_rows_loaded, "warehouse", &time_start);
		}

		bcp_done(w_dbproc1);
		dbclose(w_dbproc1);

		printf("Finished loading warehouse table.\n");

		if (aptr->build_index == 1)
			BuildIndex("idxwarcl");

		stock_rows_loaded = 0;
		district_rows_loaded = 0;

		District(w_id);
		Stock(w_id);

		InterlockedIncrement(&main_threads_completed);
}


//=======================================================
==============
//
// Function   : District
//
//=======================================================
==============

void District()
{
   short  d_id;
   short  d_w_id;
   char   d_name[D_NAME_LEN+1];
   char   d_street_1[ADDRESS_LEN+1];
   char   d_street_2[ADDRESS_LEN+1];
   char   d_city[ADDRESS_LEN+1];
   char   d_state[STATE_LEN+1];
   char   d_zip[ZIP_LEN+1];
   double d_tax;
   double d_ytd;
		char   name[20];
   long   d_next_o_id;
   int    rc;
		long   time_start;
		int		w_id;

		for (w_id = aptr->starting_warehouse; w_id < aptr-
>num_warehouses+1; w_id++)
		{

			printf("...Loading district table: w_id = %ld\n",
w_id);

			// Seed with unique number
			seed(4);

			InitString(d_name, D_NAME_LEN+1);

			InitAddress(d_street_1, d_street_2, d_city, d_state,
d_zip);

			sprintf(name, "%s..%s", aptr->database, "district");
			rc = bcp_init(w_dbproc2, name, NULL,
"logs\\district.err", DB_IN);

			bcp_bind(w_dbproc2, (BYTE *) &d_id,		0, -1,
NULL, 0, 0, 1);
			bcp_bind(w_dbproc2, (BYTE *) &d_w_id,		0, -
1,		NULL, 0, 0, 2);
			bcp_bind(w_dbproc2, (BYTE *) d_name,		0,
D_NAME_LEN,	NULL, 0, 0, 3);
			bcp_bind(w_dbproc2, (BYTE *) d_street_1,	0,
ADDRESS_LEN,	NULL, 0, 0, 4);
			bcp_bind(w_dbproc2, (BYTE *) d_street_2,	0,
ADDRESS_LEN,	NULL, 0, 0, 5);
			bcp_bind(w_dbproc2, (BYTE *) d_city,		0,
ADDRESS_LEN,	NULL, 0, 0, 6);
			bcp_bind(w_dbproc2, (BYTE *) d_state,		0,
STATE_LEN,	NULL, 0, 0, 7);
			bcp_bind(w_dbproc2, (BYTE *) d_zip,		0,
ZIP_LEN,	NULL, 0, 0, 8);
			bcp_bind(w_dbproc2, (BYTE *) &d_tax,		0, -
1,		NULL, 0, SQLFLT8, 9);
			bcp_bind(w_dbproc2, (BYTE *) &d_ytd,		0, -
1,		NULL, 0, SQLFLT8, 10);
			bcp_bind(w_dbproc2, (BYTE *) &d_next_o_id,	0,
-1,		NULL, 0, 0, 11);

			d_w_id = w_id;

			d_ytd  = 30000.0;

			d_next_o_id = 3001L;

			time_start = (TimeNow() / MILLI);

			for (d_id = 1; d_id <=
DISTRICT_PER_WAREHOUSE; d_id++)
			{

		MakeAlphaString(6,10,D_NAME_LEN, d_name);

				MakeAddress(d_street_1, d_street_2,
d_city, d_state, d_zip);

				d_tax = ((float)
RandomNumber(0L,2000L))/10000.00;

				if (!bcp_sendrow(w_dbproc2))
					printf("Error,
District() failed calling bcp_sendrow().  Check error file.\n");
				district_rows_loaded++;
				CheckForCommit(w_dbproc2,
district_rows_loaded, "district", &time_start);
			}

			rc = bcp_done(w_dbproc2);
		}

		printf("Finished loading district table.\n");

		if (aptr->build_index == 1)
			BuildIndex("idxdiscl");
```

```
   return;
}


//=========================================================
==============
//
// Function   : Stock
//
//=========================================================
==============

void Stock()
{
   long  s_i_id;
   short s_w_id;
   short s_quantity;
   char  s_dist_01[S_DIST_LEN+1];
   char  s_dist_02[S_DIST_LEN+1];
   char  s_dist_03[S_DIST_LEN+1];
   char  s_dist_04[S_DIST_LEN+1];
   char  s_dist_05[S_DIST_LEN+1];
   char  s_dist_06[S_DIST_LEN+1];
   char  s_dist_07[S_DIST_LEN+1];
   char  s_dist_08[S_DIST_LEN+1];
   char  s_dist_09[S_DIST_LEN+1];
   char  s_dist_10[S_DIST_LEN+1];
   long  s_ytd;
   short s_order_cnt;
   short s_remote_cnt;
   char  s_data[S_DATA_LEN+1];
   short i;
   short len;
   int   rc;
                char  name[20];
                long  time_start;

                // Seed with unique number
                seed(3);

                sprintf(name, "%s..%s", aptr->database, "stock");
                rc = bcp_init(w_dbproc2, name, NULL, "logs\\stock.err", DB_IN);

                bcp_bind(w_dbproc2, (BYTE *) &s_i_id,      0, -1,       NULL,
0, 0, 1);
                bcp_bind(w_dbproc2, (BYTE *) &s_w_id,      0, -1,       NULL,
0, 0, 2);
                bcp_bind(w_dbproc2, (BYTE *) &s_quantity,  0, -1,       NULL,
0, 0, 3);
                bcp_bind(w_dbproc2, (BYTE *) s_dist_01,    0, S_DIST_LEN,
NULL, 0, 0, 4);
                bcp_bind(w_dbproc2, (BYTE *) s_dist_02,    0, S_DIST_LEN,
NULL, 0, 0, 5);
                bcp_bind(w_dbproc2, (BYTE *) s_dist_03,    0, S_DIST_LEN,
NULL, 0, 0, 6);
                bcp_bind(w_dbproc2, (BYTE *) s_dist_04,    0, S_DIST_LEN,
NULL, 0, 0, 7);
                bcp_bind(w_dbproc2, (BYTE *) s_dist_05,    0, S_DIST_LEN,
NULL, 0, 0, 8);
                bcp_bind(w_dbproc2, (BYTE *) s_dist_06,    0, S_DIST_LEN,
NULL, 0, 0, 9);
                bcp_bind(w_dbproc2, (BYTE *) s_dist_07,    0, S_DIST_LEN,
NULL, 0, 0, 10);
                bcp_bind(w_dbproc2, (BYTE *) s_dist_08,    0, S_DIST_LEN,
NULL, 0, 0, 11);
                bcp_bind(w_dbproc2, (BYTE *) s_dist_09,    0, S_DIST_LEN,
NULL, 0, 0, 12);
                bcp_bind(w_dbproc2, (BYTE *) s_dist_10,    0, S_DIST_LEN,
NULL, 0, 0, 13);
                bcp_bind(w_dbproc2, (BYTE *) &s_ytd,       0, -1,       NULL,
0, 0, 14);
                bcp_bind(w_dbproc2, (BYTE *) &s_order_cnt,  0, -1,
NULL, 0, 0, 15);
                bcp_bind(w_dbproc2, (BYTE *) &s_remote_cnt, 0, -1,
NULL, 0, 0, 16);
                bcp_bind(w_dbproc2, (BYTE *) s_data,       0, S_DATA_LEN,
NULL, 0, 0, 17);

                s_ytd = s_order_cnt = s_remote_cnt = 0;

                time_start = (TimeNow() / MILLI);

                printf("...Loading stock table\n");

                for (s_i_id=1; s_i_id <= MAXITEMS; s_i_id++)
                {

                        for (s_w_id = aptr->starting_warehouse; s_w_id <
aptr->num_warehouses+1; s_w_id++)
                        {

                                s_quantity =
RandomNumber(10L,100L);
                                len =
MakeAlphaString(24,24,S_DIST_LEN, s_dist_01);
                                len =
MakeAlphaString(24,24,S_DIST_LEN, s_dist_02);
                                len =
MakeAlphaString(24,24,S_DIST_LEN, s_dist_03);
                                len =
MakeAlphaString(24,24,S_DIST_LEN, s_dist_04);
                                len =
MakeAlphaString(24,24,S_DIST_LEN, s_dist_05);
                                len =
MakeAlphaString(24,24,S_DIST_LEN, s_dist_06);
                                len =
MakeAlphaString(24,24,S_DIST_LEN, s_dist_07);
                                len =
MakeAlphaString(24,24,S_DIST_LEN, s_dist_08);
                                len =
MakeAlphaString(24,24,S_DIST_LEN, s_dist_09);
                                len =
MakeAlphaString(24,24,S_DIST_LEN, s_dist_10);

                                len =
MakeOriginalAlphaString(26,50, S_DATA_LEN, s_data,10);

                                if (!bcp_sendrow(w_dbproc2))
                                printf("Error, Stock() failed calling
bcp_sendrow().  Check error file.\n");
                                stock_rows_loaded++;
                                CheckForCommit(w_dbproc2,
stock_rows_loaded, "stock", &time_start);

                        }
                }

                bcp_done(w_dbproc2);
                dbclose(w_dbproc2);

                printf("Finished loading stock table.\n");

                if (aptr->build_index == 1)
                        BuildIndex("idxstkcl");

                return;
}


//=========================================================
==============
//
// Function   : LoadCustomer
//
//=========================================================
==============

void LoadCustomer()
{
                LOADER_TIME_STRUCT     customer_time_start;
                LOADER_TIME_STRUCT     history_time_start;
                short                  w_id;
   short                d_id;
                DWORD
                dwThreadID[MAX_CUSTOMER_THREADS];
```

```
        HANDLE
        hThread[MAX_CUSTOMER_THREADS];
        char                    name[20];
        char
        buf[250];

        printf("\nLoading customer and history tables...\n");

        // Seed with unique number
        seed(5);

        // Initialize bulk copy
        sprintf(name, "%s..%s", aptr->database, "customer");
        bcp_init(c_dbproc1, name, NULL, "logs\\customer.err", DB_IN);

        sprintf(name, "%s..%s", aptr->database, "history");
        bcp_init(c_dbproc2, name, NULL, "logs\\history.err", DB_IN);

        customer_rows_loaded    = 0;
        history_rows_loaded     = 0;

        CustomerBufInit();

        customer_time_start.time_start = (TimeNow() / MILLI);
        history_time_start.time_start = (TimeNow() / MILLI);

        for (w_id = aptr->starting_warehouse; w_id <= aptr-
>num_warehouses; w_id++)
        {
                for (d_id = 1L; d_id <=
DISTRICT_PER_WAREHOUSE; d_id++)
                {

                        CustomerBufLoad(d_id, w_id);

                        // Start parallel loading threads
here...

                        customer_threads_completed=0;

                        // Start customer table thread

                        printf("...Loading customer table for:
d_id = %d, w_id = %d\n", d_id, w_id);

                        hThread[0] = CreateThread(NULL,

                                0,


(LPTHREAD_START_ROUTINE) LoadCustomerTable,


&customer_time_start,

                                0,

                                &dwThreadID[0]);

                        if (hThread[0] == NULL)
                        {
                                printf("Error, failed in
creating creating thread = 0.\n");
                                exit(-1);
                        }

                        // Start History table thread

                        printf("...Loading history table for:
d_id = %d, w_id = %d\n", d_id, w_id);

                        hThread[1] = CreateThread(NULL,

                                0,


(LPTHREAD_START_ROUTINE) LoadHistoryTable,

                                &history_time_start,

                                0,

                                &dwThreadID[1]);

                        if (hThread[1] == NULL)
                        {
                                printf("Error, failed in
creating creating thread = 1.\n");
                                exit(-1);
                        }

                        while (customer_threads_completed
!= 2)
                                Sleep(1000L);
                }
        }

        // flush the bulk connection
        bcp_done(c_dbproc1);
        bcp_done(c_dbproc2);

   sprintf(buf,"update customer set c_first = 'C_LOAD = %d' where c_id = 1 and
c_w_id = 1 and c_d_id = 1",LOADER_NURAND_C);
        dbcmd(c_dbproc1, buf);
        dbsqlexec(c_dbproc1);
        while (dbresults(c_dbproc1) != NO_MORE_RESULTS);

        dbclose(c_dbproc1);
        dbclose(c_dbproc2);

        printf("Finished loading customer table.\n");

        if (aptr->build_index == 1)
                BuildIndex("idxcuscl");

        if (aptr->build_index == 1)
                BuildIndex("idxcusnc");

        InterlockedIncrement(&main_threads_completed);

   return;

}


//=========================================================
==============
//
// Function   : CustomerBufInit
//
//=========================================================
==============

void CustomerBufInit()
{
        int     i;

        for (i=0;i<CUSTOMERS_PER_DISTRICT;i++)
        {
                customer_buf[i].c_id = 0;
                customer_buf[i].c_d_id = 0;
                customer_buf[i].c_w_id = 0;

                strcpy(customer_buf[i].c_first,"");
                strcpy(customer_buf[i].c_middle,"");
                strcpy(customer_buf[i].c_last,"");
                strcpy(customer_buf[i].c_street_1,"");
                strcpy(customer_buf[i].c_street_2,"");
                strcpy(customer_buf[i].c_city,"");
                strcpy(customer_buf[i].c_state,"");
                strcpy(customer_buf[i].c_zip,"");
                strcpy(customer_buf[i].c_phone,"");
                strcpy(customer_buf[i].c_credit,"");

                customer_buf[i].c_credit_lim = 0;
```

```
                        customer_buf[i].c_discount = (float) 0;
                        customer_buf[i].c_balance = 0;
                        customer_buf[i].c_ytd_payment = 0;
                        customer_buf[i].c_payment_cnt = 0;
                        customer_buf[i].c_delivery_cnt = 0;

                        strcpy(customer_buf[i].c_data_1,"");
                        strcpy(customer_buf[i].c_data_2,"");

                        customer_buf[i].h_amount = 0;

                        strcpy(customer_buf[i].h_data,"");

                }



}


//=========================================================
==============
//
// Function   : CustomerBufLoad
//
// Fills shared buffer for HISTORY and CUSTOMER
//=========================================================
==============

void CustomerBufLoad(int d_id, int w_id)
{
                long                                                    i;
   CUSTOMER_SORT_STRUCT    c[CUSTOMERS_PER_DISTRICT];


                for (i=0;i<CUSTOMERS_PER_DISTRICT;i++)
                {
                        if (i < 1000)
                                LastName(i, c[i].c_last);
                        else

                LastName(NURand(255,0,999,LOADER_NURAND_C),
c[i].c_last);

                        MakeAlphaString(8,16,FIRST_NAME_LEN,
c[i].c_first);

                        c[i].c_id = i+1;

                }

                printf("...Loading customer buffer for: d_id = %d, w_id = %d\n",
                                        d_id, w_id);

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

                        customer_buf[i].c_d_id = d_id;
                        customer_buf[i].c_w_id = w_id;
                        customer_buf[i].h_amount = 10.0;
                        customer_buf[i].c_ytd_payment  = 10.0;
                        customer_buf[i].c_payment_cnt  = 1;
                        customer_buf[i].c_delivery_cnt = 0;

                        // Generate CUSTOMER and HISTORY data

                        customer_buf[i].c_id = c[i].c_id;

                        strcpy(customer_buf[i].c_first, c[i].c_first);
                        strcpy(customer_buf[i].c_last, c[i].c_last);


                        customer_buf[i].c_middle[0] = 'O';
                        customer_buf[i].c_middle[1] = 'E';

                        MakeAddress(customer_buf[i].c_street_1,

customer_buf[i].c_street_2,

customer_buf[i].c_city,

customer_buf[i].c_state,

customer_buf[i].c_zip);

                        MakeNumberString(16, 16, PHONE_LEN,
customer_buf[i].c_phone);

                        if (RandomNumber(1L, 100L) > 10)
                                customer_buf[i].c_credit[0] = 'G';
                        else
                                customer_buf[i].c_credit[0] = 'B';
                        customer_buf[i].c_credit[1] = 'C';

                        customer_buf[i].c_credit_lim = 50000.0;
                        customer_buf[i].c_discount = ((float)
RandomNumber(0L, 5000L)) / 10000.0;
                        customer_buf[i].c_balance = -10.0;

                        MakeAlphaString(250, 250, C_DATA_LEN,
customer_buf[i].c_data_1);
                        MakeAlphaString(50, 250, C_DATA_LEN,
customer_buf[i].c_data_2);

                        // Generate HISTORY data
                        MakeAlphaString(12, 24, H_DATA_LEN,
customer_buf[i].h_data);

                }
}

//=========================================================
==============
//
// Function   : LoadCustomerTable
//
//=========================================================
==============

void LoadCustomerTable(LOADER_TIME_STRUCT *customer_time_start)
{
                int        i;
   long       c_id;
   short      c_d_id;
   short      c_w_id;
   char       c_first[FIRST_NAME_LEN+1];
   char       c_middle[MIDDLE_NAME_LEN+1];
   char       c_last[LAST_NAME_LEN+1];
   char       c_street_1[ADDRESS_LEN+1];
   char       c_street_2[ADDRESS_LEN+1];
   char       c_city[ADDRESS_LEN+1];
   char       c_state[STATE_LEN+1];
   char       c_zip[ZIP_LEN+1];
   char       c_phone[PHONE_LEN+1];
   char       c_credit[CREDIT_LEN+1];
   double     c_credit_lim;
   double     c_discount;
   double     c_balance;
   double     c_ytd_payment;
   short      c_payment_cnt;
   short      c_delivery_cnt;
   char       c_data_1[C_DATA_LEN+1];
   char       c_data_2[C_DATA_LEN+1];
                char       name[20];
                char                                c_since[50];

   bcp_bind(c_dbproc1, (BYTE *) &c_id,         0, -1,          NULL,0,0, 1);
   bcp_bind(c_dbproc1, (BYTE *) &c_d_id,       0, -1,          NULL,0,0, 2);
   bcp_bind(c_dbproc1, (BYTE *) &c_w_id,       0, -1,          NULL,0,0, 3);
   bcp_bind(c_dbproc1, (BYTE *) c_first,       0, FIRST_NAME_LEN,
NULL,0,0, 4);
   bcp_bind(c_dbproc1, (BYTE *) c_middle,      0,
MIDDLE_NAME_LEN,NULL,0,0, 5);
   bcp_bind(c_dbproc1, (BYTE *) c_last,        0, LAST_NAME_LEN,
NULL,0,0, 6);
```

```
   bcp_bind(c_dbproc1, (BYTE *) c_street_1,     0, ADDRESS_LEN,
NULL,0,0, 7);
   bcp_bind(c_dbproc1, (BYTE *) c_street_2,     0, ADDRESS_LEN,
NULL,0,0, 8);
   bcp_bind(c_dbproc1, (BYTE *) c_city,         0, ADDRESS_LEN,    NULL,0,0,
9);
   bcp_bind(c_dbproc1, (BYTE *) c_state,        0, STATE_LEN,
NULL,0,0,10);
   bcp_bind(c_dbproc1, (BYTE *) c_zip,          0, ZIP_LEN,        NULL,0,0,11);
   bcp_bind(c_dbproc1, (BYTE *) c_phone,        0, PHONE_LEN,
NULL,0,0,12);
                bcp_bind(c_dbproc1, (BYTE *) c_since,        0, 50,
NULL,0,SQLCHAR,13);
   bcp_bind(c_dbproc1, (BYTE *) c_credit,       0, CREDIT_LEN,
NULL,0,0,14);
   bcp_bind(c_dbproc1, (BYTE *) &c_credit_lim,  0, -1,
NULL,0,SQLFLT8,15);
   bcp_bind(c_dbproc1, (BYTE *) &c_discount,    0, -1,
NULL,0,SQLFLT8,16);
   bcp_bind(c_dbproc1, (BYTE *) &c_balance,     0, -1,
NULL,0,SQLFLT8,17);
   bcp_bind(c_dbproc1, (BYTE *) &c_ytd_payment, 0, -1,
NULL,0,SQLFLT8,18);
   bcp_bind(c_dbproc1, (BYTE *) &c_payment_cnt, 0, -1,
NULL,0,0,19);
   bcp_bind(c_dbproc1, (BYTE *) &c_delivery_cnt,0, -1,            NULL,0,0,20);
   bcp_bind(c_dbproc1, (BYTE *) c_data_1,       0, C_DATA_LEN,
NULL,0,0,21);
   bcp_bind(c_dbproc1, (BYTE *) c_data_2,       0, C_DATA_LEN,
NULL,0,0,22);

   for (i = 0; i < CUSTOMERS_PER_DISTRICT; i++)
   {
                        c_id = customer_buf[i].c_id;
                        c_d_id = customer_buf[i].c_d_id;
                        c_w_id = customer_buf[i].c_w_id;

                        strcpy(c_first, customer_buf[i].c_first);
                        strcpy(c_middle, customer_buf[i].c_middle);
                        strcpy(c_last, customer_buf[i].c_last);
                        strcpy(c_street_1, customer_buf[i].c_street_1);
                        strcpy(c_street_2, customer_buf[i].c_street_2);
                        strcpy(c_city, customer_buf[i].c_city);
                        strcpy(c_state, customer_buf[i].c_state);
                        strcpy(c_zip, customer_buf[i].c_zip);
                        strcpy(c_phone, customer_buf[i].c_phone);
                        strcpy(c_credit, customer_buf[i].c_credit);

                        CurrentDate(&c_since);

                        c_credit_lim = customer_buf[i].c_credit_lim;
                        c_discount = customer_buf[i].c_discount;
                        c_balance = customer_buf[i].c_balance;
                        c_ytd_payment = customer_buf[i].c_ytd_payment;
                        c_payment_cnt = customer_buf[i].c_payment_cnt;
                        c_delivery_cnt = customer_buf[i].c_delivery_cnt;

                        strcpy(c_data_1, customer_buf[i].c_data_1);
                        strcpy(c_data_2, customer_buf[i].c_data_2);

                        // Send data to server
                        if (!bcp_sendrow(c_dbproc1))
                        printf("Error, LoadCustomerTable() failed calling
bcp_sendrow().  Check error file.\n");
                        customer_rows_loaded++;
                        CheckForCommit(c_dbproc1,
customer_rows_loaded, "customer", &customer_time_start->time_start);
   }

                InterlockedIncrement(&customer_threads_completed);

}


//=====================================================
=============
//
// Function   : LoadHistoryTable
//
//=====================================================
=============

void LoadHistoryTable(LOADER_TIME_STRUCT *history_time_start)
{
                int        i;
   long       c_id;
   short      c_d_id;
   short      c_w_id;
                double          h_amount;
   char       h_data[H_DATA_LEN+1];
                char                    h_date[50];

   bcp_bind(c_dbproc2, (BYTE *) &c_id,        0, -1,          NULL, 0, 0, 1);
   bcp_bind(c_dbproc2, (BYTE *) &c_d_id,      0, -1,          NULL, 0, 0, 2);
   bcp_bind(c_dbproc2, (BYTE *) &c_w_id,      0, -1,          NULL, 0, 0, 3);
   bcp_bind(c_dbproc2, (BYTE *) &c_d_id,      0, -1,          NULL, 0, 0, 4);
   bcp_bind(c_dbproc2, (BYTE *) &c_w_id,      0, -1,          NULL, 0, 0, 5);
   bcp_bind(c_dbproc2, (BYTE *) h_date,       0, 50,          NULL, 0,
SQLCHAR, 6);
   bcp_bind(c_dbproc2, (BYTE *) &h_amount,    0, -1,          NULL, 0,
SQLFLT8, 7);
   bcp_bind(c_dbproc2, (BYTE *) h_data,       0, H_DATA_LEN,   NULL, 0, 0,
8);

   for (i = 0; i < CUSTOMERS_PER_DISTRICT; i++)
   {
                        c_id = customer_buf[i].c_id;
                        c_d_id = customer_buf[i].c_d_id;
                        c_w_id = customer_buf[i].c_w_id;
                        h_amount = customer_buf[i].h_amount;
                        strcpy(h_data, customer_buf[i].h_data);
                        CurrentDate(&h_date);

                        // send to server
                        if (!bcp_sendrow(c_dbproc2))
                        printf("Error, LoadHistoryTable() failed calling
bcp_sendrow().  Check error file.\n");
                        history_rows_loaded++;
                        CheckForCommit(c_dbproc2, history_rows_loaded,
"history", &history_time_start->time_start);
   }

                InterlockedIncrement(&customer_threads_completed);

}


//=====================================================
===-===============
//
// Function   : LoadOrders
//
//=====================================================
==================

void LoadOrders()
{
                LOADER_TIME_STRUCT      orders_time_start;
                LOADER_TIME_STRUCT      new_order_time_start;
                LOADER_TIME_STRUCT      order_line_time_start;
                short                   w_id;
   short                d_id;
                DWORD
                dwThreadID[MAX_ORDER_THREADS];
                HANDLE
                hThread[MAX_ORDER_THREADS];
                char                    name[20];


                printf("\nLoading orders...\n");

                // seed with unique number
                seed(6);

                // initialize bulk copy
                sprintf(name, "%s..%s", aptr->database, "orders");
```

```
        bcp_init(o_dbproc1, name, NULL, "logs\\orders.err", DB_IN);

        sprintf(name, "%s..%s", aptr->database, "new_order");
        bcp_init(o_dbproc2, name, NULL, "logs\\neword.err", DB_IN);

        sprintf(name, "%s..%s", aptr->database, "order_line");
        bcp_init(o_dbproc3, name, NULL, "logs\\ordline.err", DB_IN);

        orders_rows_loaded     = 0;
        new_order_rows_loaded  = 0;
        order_line_rows_loaded  = 0;

        OrdersBufInit();

        orders_time_start.time_start = (TimeNow() / MILLI);
        new_order_time_start.time_start = (TimeNow() / MILLI);
        order_line_time_start.time_start = (TimeNow() / MILLI);

        for (w_id = aptr->starting_warehouse; w_id <= aptr-
>num_warehouses; w_id++)
        {
                for (d_id = 1L; d_id <=
DISTRICT_PER_WAREHOUSE; d_id++)
                {
                        OrdersBufLoad(d_id, w_id);

                        // start parallel loading threads here...

                        order_threads_completed=0;

                        // start Orders table thread

                        printf("...Loading Order Table for:
d_id = %d, w_id = %d\n", d_id, w_id);

                        hThread[0] = CreateThread(NULL,

                                0,


(LPTHREAD_START_ROUTINE) LoadOrdersTable,

                                &orders_time_start,

                                0,

                                &dwThreadID[0]);

                        if (hThread[0] == NULL)
                        {
                                printf("Error, failed in
creating creating thread = 0.\n");

                                exit(-1);
                        }

                        // start NewOrder table thread

                        printf("...Loading New-Order Table
for: d_id = %d, w_id = %d\n", d_id, w_id);

                        hThread[1] = CreateThread(NULL,

                                0,


(LPTHREAD_START_ROUTINE) LoadNewOrderTable,


&new_order_time_start,


                                0,

                                &dwThreadID[1]);

                        if (hThread[1] == NULL)
                        {
                                printf("Error, failed in
creating creating thread = 1.\n");

                                exit(-1);
                        }

                        // start Order-Line table thread

                        printf("...Loading Order-Line Table
for: d_id = %d, w_id = %d\n", d_id, w_id);

                        hThread[2] = CreateThread(NULL,

                                0,


(LPTHREAD_START_ROUTINE) LoadOrderLineTable,


&order_line_time_start,


                                0,

                                &dwThreadID[2]);

                        if (hThread[2] == NULL)
                        {
                                printf("Error, failed in
creating creating thread = 2.\n");

                                exit(-1);
                        }

                        while (order_threads_completed !=
3)
                                Sleep(1000L);

                }
        }

        printf("Finished loading orders.\n");

        InterlockedIncrement(&main_threads_completed);

   return;
}


//=========================================================
==============
//
// Function   : OrdersBufInit
//
// Clears shared buffer for ORDERS, NEWORDER, and ORDERLINE
//
//=========================================================
==============

void OrdersBufInit()
{
        int     i;
        int                     j;

        for (i=0;i<ORDERS_PER_DISTRICT;i++)
        {
                orders_buf[i].o_id = 0;
                orders_buf[i].o_d_id = 0;
                orders_buf[i].o_w_id = 0;
                orders_buf[i].o_c_id = 0;
                orders_buf[i].o_carrier_id = 0;
                orders_buf[i].o_ol_cnt = 0;
                orders_buf[i].o_all_local = 0;

                for (j=0;j<=14;j++)
                {
                        orders_buf[i].o_ol[j].ol = 0;
                        orders_buf[i].o_ol[j].ol_i_id = 0;
                        orders_buf[i].o_ol[j].ol_supply_w_id
= 0;
                        orders_buf[i].o_ol[j].ol_quantity = 0;
```

```
                                        orders_buf[i].o_ol[j].ol_amount = 0;

                strcpy(orders_buf[i].o_ol[j].ol_dist_info,"");
                                }
                }



}


//=========================================================
==============
//
// Function   : OrdersBufLoad
//
// Fills shared buffer for ORDERS, NEWORDER, and ORDERLINE
//
//=========================================================
==============

void OrdersBufLoad(int d_id, int w_id)
{

                int     cust[ORDERS_PER_DIST+1];
                long    o_id;
                short   ol;

                printf("...Loading Order Buffer for: d_id = %d, w_id = %d\n",
                                        d_id, w_id);

                GetPermutation(cust, ORDERS_PER_DIST);

                for (o_id=0;o_id<ORDERS_PER_DISTRICT;o_id++)
                {

                                // Generate ORDER and NEW-ORDER data

                                orders_buf[o_id].o_d_id = d_id;
                                orders_buf[o_id].o_w_id = w_id;
                                orders_buf[o_id].o_id = o_id+1;
                                orders_buf[o_id].o_c_id = cust[o_id+1];
                                orders_buf[o_id].o_ol_cnt = RandomNumber(5L,
15L);

                                if (o_id < 2100)
                                {
                                        orders_buf[o_id].o_carrier_id =
RandomNumber(1L, 10L);
                                        orders_buf[o_id].o_all_local  = 1;
                                }
                                else
                                {
                                        orders_buf[o_id].o_carrier_id = 0;
                                        orders_buf[o_id].o_all_local  = 1;
                                }

                                for (ol=0;ol<orders_buf[o_id].o_ol_cnt;ol++)
                                {


                                        orders_buf[o_id].o_ol[ol].ol = ol+1;
                                        orders_buf[o_id].o_ol[ol].ol_i_id =
RandomNumber(1L, MAXITEMS);

                orders_buf[o_id].o_ol[ol].ol_supply_w_id = w_id;

                orders_buf[o_id].o_ol[ol].ol_quantity = 5;
                                        MakeAlphaString(24, 24,
OL_DIST_INFO_LEN, &orders_buf[o_id].o_ol[ol].ol_dist_info);

                                        // Generate ORDER-LINE data
                                        if (o_id < 2100)
                                        {

                orders_buf[o_id].o_ol[ol].ol_amount = 0;
                                                        // Added to insure
ol_delivery_d set properly during load

                CurrentDate(&orders_buf[o_id].o_ol[ol].ol_delivery_d);
                                        }
                                        else
                                        {

                orders_buf[o_id].o_ol[ol].ol_amount =
RandomNumber(1,999999)/100.0;
                                                        // Added to insure
ol_delivery_d set properly during load

                strcpy(orders_buf[o_id].o_ol[ol].ol_delivery_d,"Dec 31, 1889");
                                        }
                                }
                }
}


//=========================================================
==============
//
// Function   : LoadOrdersTable
//
//=========================================================
==============

void LoadOrdersTable(LOADER_TIME_STRUCT *orders_time_start)
{
                int     i;
   long     o_id;
                short           o_d_id;
                short           o_w_id;
   long     o_c_id;
   short    o_carrier_id;
   short    o_ol_cnt;
   short    o_all_local;
                char                    o_entry_d[50];

                // bind ORDER data
   bcp_bind(o_dbproc1, (BYTE *) &o_id,         0, -1,       NULL, 0, 0, 1);
   bcp_bind(o_dbproc1, (BYTE *) &o_d_id,       0, -1,       NULL, 0, 0, 2);
   bcp_bind(o_dbproc1, (BYTE *) &o_w_id,       0, -1,       NULL, 0, 0, 3);
   bcp_bind(o_dbproc1, (BYTE *) &o_c_id,       0, -1,       NULL, 0, 0, 4);
   bcp_bind(o_dbproc1, (BYTE *) o_entry_d,     0, 50,       NULL, 0,
SQLCHAR, 5);
   bcp_bind(o_dbproc1, (BYTE *) &o_carrier_id, 0, -1,       NULL, 0, 0, 6);
   bcp_bind(o_dbproc1, (BYTE *) &o_ol_cnt,     0, -1,       NULL, 0, 0, 7);
   bcp_bind(o_dbproc1, (BYTE *) &o_all_local,  0, -1,       NULL, 0, 0, 8);

   for (i = 0; i < ORDERS_PER_DISTRICT; i++)
   {
                        o_id        = orders_buf[i].o_id;
                        o_d_id      = orders_buf[i].o_d_id;
                        o_w_id      = orders_buf[i].o_w_id;
                        o_c_id      = orders_buf[i].o_c_id;
                        o_carrier_id = orders_buf[i].o_carrier_id;
                        o_ol_cnt    = orders_buf[i].o_ol_cnt;
                        o_all_local = orders_buf[i].o_all_local;
                        CurrentDate(&o_entry_d);

                        // send data to server
                        if (!bcp_sendrow(o_dbproc1))
                        printf("Error, LoadOrdersTable() failed calling
bcp_sendrow().  Check error file.\n");
                        orders_rows_loaded++;
                        // CheckForCommit(o_dbproc1,
orders_rows_loaded, "ORDERS", &orders_time_start->time_start);
   }

                bcp_batch(o_dbproc1);

                if ((o_w_id == aptr->num_warehouses) && (o_d_id == 10))
                {
                        bcp_done(o_dbproc1);
                        dbclose(o_dbproc1);

                        if (aptr->build_index == 1)
                                BuildIndex("idxordcl");
```

```
                }

                InterlockedIncrement(&order_threads_completed);

}


//=======================================================
==============
//
// Function   : LoadNewOrderTable
//
//=======================================================
==============

void LoadNewOrderTable(LOADER_TIME_STRUCT *new_order_time_start)
{
   int        i;
   long       o_id;
   short      o_d_id;
   short      o_w_id;

                // Bind NEW-ORDER data
   bcp_bind(o_dbproc2, (BYTE *) &o_id,          0, -1, NULL, 0, 0, 1);
   bcp_bind(o_dbproc2, (BYTE *) &o_d_id,        0, -1, NULL, 0, 0, 2);
   bcp_bind(o_dbproc2, (BYTE *) &o_w_id,        0, -1, NULL, 0, 0, 3);

                for (i = 2100; i < 3000; i++)
                {
                        o_id    = orders_buf[i].o_id;
                        o_d_id  = orders_buf[i].o_d_id;
                        o_w_id  = orders_buf[i].o_w_id;

                        if (!bcp_sendrow(o_dbproc2))
                        printf("Error, LoadNewOrderTable() failed calling
bcp_sendrow().  Check error file.\n");
                        new_order_rows_loaded++;
                        // CheckForCommit(o_dbproc2,
new_order_rows_loaded, "NEW_ORDER", &new_order_time_start->time_start);
                }

                bcp_batch(o_dbproc2);

                if ((o_w_id == aptr->num_warehouses) && (o_d_id == 10))
                {
                        bcp_done(o_dbproc2);
                        dbclose(o_dbproc2);

                        if (aptr->build_index == 1)
                                BuildIndex("idxnodcl");
                }

                InterlockedIncrement(&order_threads_completed);

}


//=======================================================
==============
//
// Function   : LoadOrderLineTable
//
//=======================================================
==============

void LoadOrderLineTable(LOADER_TIME_STRUCT *order_line_time_start)
{
                int        i,j;
   long       o_id;
                short              o_d_id;
                short              o_w_id;
   long       ol;
                long               ol_i_id;
   short      ol_supply_w_id;
   short      ol_quantity;
   double      ol_amount;
   short      o_all_local;
   char       ol_dist_info[DIST_INFO_LEN+1];
                char                       ol_delivery_d[50];

                // bind ORDER-LINE data
   bcp_bind(o_dbproc3, (BYTE *) &o_id,               0, -1, NULL, 0, 0, 1);
   bcp_bind(o_dbproc3, (BYTE *) &o_d_id,             0, -1, NULL, 0, 0, 2);
   bcp_bind(o_dbproc3, (BYTE *) &o_w_id,             0, -1, NULL, 0, 0, 3);
   bcp_bind(o_dbproc3, (BYTE *) &ol,                 0, -1, NULL, 0, 0, 4);
   bcp_bind(o_dbproc3, (BYTE *) &ol_i_id,            0, -1, NULL, 0, 0, 5);
   bcp_bind(o_dbproc3, (BYTE *) &ol_supply_w_id,     0, -1, NULL, 0, 0, 6);
                bcp_bind(o_dbproc3, (BYTE *) ol_delivery_d,
                        0, 50, NULL, 0, SQLCHAR, 7);
   bcp_bind(o_dbproc3, (BYTE *) &ol_quantity,        0, -1, NULL, 0, 0, 8);
   bcp_bind(o_dbproc3, (BYTE *) &ol_amount,          0, -1, NULL, 0,
SQLFLT8, 9);
   bcp_bind(o_dbproc3, (BYTE *) ol_dist_info,        0, DIST_INFO_LEN,
NULL, 0, 0, 10);

                for (i = 0; i < ORDERS_PER_DISTRICT; i++)
   {
                        o_id    = orders_buf[i].o_id;
                        o_d_id  = orders_buf[i].o_d_id;
                        o_w_id  = orders_buf[i].o_w_id;

                        for (j=0; j < orders_buf[i].o_ol_cnt; j++)
                        {
                                ol          = orders_buf[i].o_ol[j].ol;
                                ol_i_id     =
orders_buf[i].o_ol[j].ol_i_id;
                                ol_supply_w_id =
orders_buf[i].o_ol[j].ol_supply_w_id;
                                ol_quantity    =
orders_buf[i].o_ol[j].ol_quantity;
                                ol_amount      =
orders_buf[i].o_ol[j].ol_amount;
                                //  Changed to insure ol_delivery_d
set properly (now set in OrdersBufLoad)
                                //  CurrentDate(&ol_delivery_d);

                strcpy(ol_delivery_d,orders_buf[i].o_ol[j].ol_delivery_d);


                strcpy(ol_dist_info,orders_buf[i].o_ol[j].ol_dist_info);

                                if (!bcp_sendrow(o_dbproc3))
                                        printf("Error,
LoadOrderLineTable() failed calling bcp_sendrow().  Check error file.\n");
                                order_line_rows_loaded++;
                                // CheckForCommit(o_dbproc3,
order_line_rows_loaded, "ORDER_LINE", &order_line_time_start->time_start);
                        }

                }

                bcp_batch(o_dbproc3);

                if ((o_w_id == aptr->num_warehouses) && (o_d_id == 10))
                {
                        bcp_done(o_dbproc3);
                        dbclose(o_dbproc3);

                        if (aptr->build_index == 1)
                                BuildIndex("idxodlcl");
                }

                InterlockedIncrement(&order_threads_completed);

}


//=======================================================
==============
//
// Function   : GetPermutation
//
//=======================================================
==============

void GetPermutation(int perm[], int n)
```

```
{
        int i, r, t;

        for (i=1;i<=n;i++)
                perm[i] = i;

        for (i=1;i<=n;i++)
        {
                r = RandomNumber(i,n);
                t = perm[i];
                perm[i] = perm[r];
                perm[r] = t;
        }

}


//=========================================================
==============
//
// Function   : CheckForCommit
//
//=========================================================
==============

void CheckForCommit(DBPROCESS *dbproc,
                                                int rows_loaded,
                                                        char
*table_name,
                                                long *time_start)
{

   long         time_end, time_diff;

   // commit every "batch" rows

   if ( !(rows_loaded % aptr->batch) )
   {
                bcp_batch(dbproc);

                time_end = (TimeNow() / MILLI);
                time_diff = time_end - *time_start;

                printf("-> Loaded %ld rows into %s in %ld sec -
Total = %d (%.2f rps)\n",
                        aptr->batch,
                        table_name,
                                time_diff,
                        rows_loaded,
                                (float) aptr->batch /
(time_diff ? time_diff : 1L));

                *time_start = time_end;
   }

   return;
}


//=========================================================
==============
//
// Function   : OpenConnections
//
//=========================================================
==============

void OpenConnections()
{
        RETCODE     retcode;

        LOGINREC *login;

   login = dblogin();

   retcode = DBSETLUSER(login, aptr->user);
        if (retcode == FAIL)
        {
                printf("DBSETLUSER failed.\n");
        }
        retcode = DBSETLPWD(login, aptr->password);
        if (retcode == FAIL)
        {
                printf("DBSETLPWD failed.\n");
        }

        retcode = DBSETLPACKET(login, (USHORT) aptr->pack_size);
        if (retcode == FAIL)
        {
                printf("DBSETLPACKET failed.\n");
        }

        printf("DB-Library packet size: %ld\n",aptr->pack_size);

   // turn connection into a BCP connection
   retcode = BCP_SETL(login, TRUE);
        if (retcode == FAIL)
        {
                printf("BCP_SETL failed.\n");
        }

   // open connections to SQL Server */

   if ((i_dbproc1 = dbopen(login, aptr->server)) == NULL)
   {
                printf("Error on login 1 to server %s.\n", aptr-
>server);
                exit(-1);
   }

   if ((w_dbproc1 = dbopen(login, aptr->server)) == NULL)
   {
                printf("Error on login 2 to server %s.\n", aptr-
>server);
                exit(-1);
   }

   if ((w_dbproc2 = dbopen(login, aptr->server)) == NULL)
   {
                printf("Error on login 3 to server %s.\n", aptr-
>server);
                exit(-1);
   }

   if ((c_dbproc1 = dbopen(login, aptr->server)) == NULL)
   {
                printf("Error on login 4 to server %s.\n", aptr-
>server);
                exit(-1);
   }

   if ((c_dbproc2 = dbopen(login, aptr->server)) == NULL)
   {
                printf("Error on login 5 to server %s.\n", aptr-
>server);
                exit(-1);
   }

   if ((o_dbproc1 = dbopen(login, aptr->server)) == NULL)
   {
                printf("Error on login 6 to server %s.\n", aptr-
>server);
                exit(-1);
   }

   if ((o_dbproc2 = dbopen(login, aptr->server)) == NULL)
   {
                printf("Error on login 7 to server %s.\n", aptr-
>server);
                exit(-1);
   }

   if ((o_dbproc3 = dbopen(login, aptr->server)) == NULL)
   {
                printf("Error on login 8 to server %s.\n", aptr-
>server);
```

```
                exit(-1);
    }

}



//=========================================================
==============
//
// Function name: SQLErrHandler
//
//=========================================================
==============

int SQLErrHandler(SQLCONN *dbproc,
                                        int     severity,
                                        int     err,
                                        int     oserr,
                                        char    *dberrstr,
                                        char    *oserrstr)
{

        char msg[256];
        FILE *fp1;
        char timebuf[128];
        char datebuf[128];

        _strtime(timebuf);
        _strdate(datebuf);

        sprintf(msg, "%s %s : DBLibrary (%ld) %s\n", datebuf, timebuf,
err, dberrstr);
    printf("%s",msg);

        fp1 = fopen("logs\tpccldr.err","a");
        if (fp1 == NULL)
        {
                printf("Error in opening errorlog file.\n");
        }
        else
        {
                fprintf(fp1, msg);
                fclose(fp1);
        }

    if (oserr != DBNOERR)
    {
                sprintf(msg, "%s %s : OSError (%ld) %s\n",
datebuf, timebuf, oserr, oserrstr);
                printf("%s",msg);

                fp1 = fopen("logs\\tpccldr.err","a");
                if (fp1 == NULL)
                {
                        printf("Error in opening errorlog
file.\n");
                }
                else
                {
                        fprintf(fp1, msg);
                        fclose(fp1);
                }
    }

        if ((dbproc == NULL) || (DBDEAD(dbproc)))
        {
                exit(-1);
        }

        return (INT_CANCEL);

}


//=========================================================
==============
//
// Function name: SQLMsgHandler
//
//=========================================================
==============

int SQLMsgHandler(SQLCONN   *dbproc,
                                                DBINT   msgno,
                                                  int   msgstate,
                                                  int   severity,
                                                  char   *msgtext)
{
    char msg[256];
                FILE            *fp1;
                char timebuf[128];
                char datebuf[128];

    if ( (msgno == 5701) || (msgno == 2528) || (msgno == 5703) || (msgno ==
6006) )
                {
                        return(INT_CONTINUE);
                }

                if (msgno == 0)
                {
                        return(INT_CONTINUE);
                }
                else
                {
                        _strtime(timebuf);
                        _strdate(datebuf);

                        sprintf(msg, "%s %s : SQLServer (%ld) %s\n",
datebuf, timebuf, msgno, msgtext);


                        printf("%s",msg);


                        fp1 = fopen("logs\\tpccldr.err","a");
                        if (fp1 == NULL)
                        {
                                printf("Error in opening errorlog
file.\n");
                        }
                        else
                        {
                                fprintf(fp1, msg);
                                fclose(fp1);
                        }

                        exit(-1);
                }

                return (INT_CANCEL);
}



//=========================================================
==============
//
// Function name: CurrentDate
//
//=========================================================
==============

void CurrentDate(char           *datetime)
{

                char timebuf[128];
                char datebuf[128];

                _strtime(timebuf);
                _strdate(datebuf);

                sprintf(datetime, "%s %s", datebuf, timebuf);

}
```

```
//=============================================================
==============
//
// Function name: BuildIndex
//
//=============================================================
==============

void BuildIndex(char            *index_script)
{
                char            cmd[256];

                printf("Starting index creation:  %s\n",index_script);

                sprintf(cmd, "isql -S%s -U%s -P%s -e -i%s\\%s.sql >>
logs\\%s.out",
                                                        aptr->server,
                                                        aptr->user,
                                                        aptr->password,
                                                        aptr-
>index_script_path,
                                                        index_script,
                                                        index_script);

                system(cmd);

                printf("Finished index creation:  %s\n",index_script);
}
```

Trans.h

```
//FILE: TRANS.H
// TPC-C Benchmark Kit
//
// Module:  TRANS.H
// Author:  PhilipDu, from tpcc.h, Author DamienL
//
//                              Copyright Microsoft inc.
1996, All Rights Reserved


#ifndef _INC_TRANS

          #define _INC_TRANS

          #ifdef USE_ODBC
                    #ifndef TIMESTAMP_STRUCT
                              #include <sqltypes.h>
                    #endif
          #else
                    #ifndef _INC_SQLFRONT
                              #include <sqlfront.h>
                    #endif
          #endif

          #ifndef DBINT
                    typedef long DBINT;
          #endif

          #define   DEFCLPACKSIZE
                    4096
          #define   DEADLOCKWAIT
                    10

          // String length constants
          #define SERVER_NAME_LEN           20
          #define DATABASE_NAME_LEN         20
          #define USER_NAME_LEN             20
          #define PASSWORD_LEN              20
          #define TABLE_NAME_LEN            20
          #define I_DATA_LEN                50
          #define I_NAME_LEN                24
          #define BRAND_LEN                  1
          #define LAST_NAME_LEN             16
          #define W_NAME_LEN                10
          #define ADDRESS_LEN               20
          #define STATE_LEN                  2
          #define ZIP_LEN                    9
          #define S_DIST_LEN                24
          #define S_DATA_LEN                50
          #define D_NAME_LEN                10
          #define FIRST_NAME_LEN            16
          #define MIDDLE_NAME_LEN            2
          #define PHONE_LEN                 16
          #define DATETIME_LEN              30
          #define CREDIT_LEN                 2
          #define C_DATA_LEN               250
          #define H_DATA_LEN                24
          #define DIST_INFO_LEN             24
          #define MAX_OL_NEW_ORDER_ITEMS    15
          #define MAX_OL_ORDER_STATUS_ITEMS 15
          #define STATUS_LEN                25
          #define OL_DIST_INFO_LEN                    24

          // transaction structures

          typedef struct
          {
                    short
          ol_supply_w_id;
                    long
          ol_i_id;
                    char
          ol_i_name[I_NAME_LEN+1];
                    short
          ol_quantity;
                    char
          ol_brand_generic[BRAND_LEN+1];
                    double
          ol_i_price;
                    double
          ol_amount;
                    short
          ol_stock;
                    short
          num_warehouses;
          } OL_NEW_ORDER_DATA;

          typedef struct
          {
                    short               w_id;
                    short               d_id;
                    long                c_id;
                    short               o_ol_cnt;
                    char
          c_last[LAST_NAME_LEN+1];
                    char
          c_credit[CREDIT_LEN+1];
                    double              c_discount;
                    double              w_tax;
                    double              d_tax;
                    long                          o_id;
                    short
          o_commit_flag;
          #ifdef USE_ODBC
                    TIMESTAMP_STRUCT    o_entry_d;
          #else
                    DBDATEREC           o_entry_d;
          #endif
                    short               o_all_local;
                    double              total_amount;
                    long                num_deadlocks;

                    char
          execution_status[STATUS_LEN];
                    OL_NEW_ORDER_DATA
Ol[MAX_OL_NEW_ORDER_ITEMS];
          } NEW_ORDER_DATA;

          typedef struct
          {
                    short
           w_id;
                    short
           d_id;
                    long
           c_id;
                    short
           c_d_id;
                    short
           c_w_id;
                    double
           h_amount;
          #ifdef USE_ODBC
                    TIMESTAMP_STRUCT     h_date;
          #else
                    DBDATEREC
h_date;
          #endif
                    char
           w_street_1[ADDRESS_LEN+1];
                    char
           w_street_2[ADDRESS_LEN+1];
                    char
           w_city[ADDRESS_LEN+1];
                    char
           w_state[STATE_LEN+1];
                    char
           w_zip[ZIP_LEN+1];
                    char
           d_street_1[ADDRESS_LEN+1];
                    char
           d_street_2[ADDRESS_LEN+1];
                    char
           d_city[ADDRESS_LEN+1];
```

```
                char
          d_state[STATE_LEN+1];
                char
d_zip[ZIP_LEN+1];
                char
          c_first[FIRST_NAME_LEN+1];
                char
          c_middle[MIDDLE_NAME_LEN + 1];
                char
c_last[LAST_NAME_LEN+1];
                char
          c_street_1[ADDRESS_LEN+1];
                char
          c_street_2[ADDRESS_LEN+1];
                char
          c_city[ADDRESS_LEN+1];
                char
          c_state[STATE_LEN+1];
                char
          c_zip[ZIP_LEN+1];
                char
          c_phone[PHONE_LEN+1];
          #ifdef USE_ODBC
                TIMESTAMP_STRUCT     c_since;
          #else
                DBDATEREC
c_since;
          #endif
                char
          c_credit[CREDIT_LEN+1];
                double
          c_credit_lim;
                double
          c_discount;
                double
          c_balance;
                char
          c_data[200+1];
                long
          num_deadlocks;
                char
          execution_status[STATUS_LEN];
          } PAYMENT_DATA;

          typedef struct
          {
                long
          ol_i_id;
                short
          ol_supply_w_id;
                short
          ol_quantity;
                double
          ol_amount;
          #ifdef USE_ODBC
                TIMESTAMP_STRUCT    ol_delivery_d;
          #else
                DBDATEREC
          ol_delivery_d;
          #endif
          } OL_ORDER_STATUS_DATA;

          typedef struct
          {
                short                w_id;
                short                d_id;
                long                 c_id;
                char
c_first[FIRST_NAME_LEN+1];
                char
c_middle[MIDDLE_NAME_LEN+1];
                char
c_last[LAST_NAME_LEN+1];
                double               c_balance;
                long                 o_id;
          #ifdef USE_ODBC
                TIMESTAMP_STRUCT     o_entry_d;
          #else
                DBDATEREC            o_entry_d;
          #endif
                short                o_carrier_id;
                OL_ORDER_STATUS_DATA
OlOrderStatusData[MAX_OL_ORDER_STATUS_ITEMS];
                short                o_ol_cnt;

                long                 num_deadlocks;

                char
execution_status[STATUS_LEN];
          } ORDER_STATUS_DATA;

          typedef struct
          {
                long
          o_id;
          } DEL_ITEM;

          typedef struct
          {
                short                          w_id;
                short
          o_carrier_id;
                SYSTEMTIME
          queue_time;
                long
          num_deadlocks;
                DEL_ITEM
          DelItems[10];
                char
          execution_status[STATUS_LEN];
          } DELIVERY_DATA;

          typedef struct
          {
                short
          w_id;
                short
          d_id;
                short
          thresh_hold;
                long
          low_stock;
                long
          num_deadlocks;
                char
          execution_status[STATUS_LEN];
          } STOCK_LEVEL_DATA;

#endif
```

Tpcc.h

```
/*        FILE:               TPCC.H
 *                                    Microsoft TPC-C
Kit Ver. 3.00.000
 *                                    Audited
08/23/96, By Francois Raab
 *
 *                                    Copyright
Microsoft, 1996
 *
 *        PURPOSE:  Header file for Microsoft TPC-C
Benchmark Kit
 *        Author:             Damien Lindauer
 *
          damienl@Microsoft.com
 */

// Build number of TPC Benchmark Kit
#define TPCKIT_VER  "3.00.02"

// General headers
#include <windows.h>
#include <winbase.h>
#include <stdlib.h>
#include <stdio.h>
#include <process.h>
#include <stddef.h>
#include <stdarg.h>
#include <string.h>
#include <signal.h>
#include <time.h>
#include <timeb.h>
#include <types.h>
#include <wincon.h>

#ifdef USE_ODBC
// ODBC headers
#include <sql.h>
#include <sqlext.h>
HENV                                          henv;
#endif

// DB-Library headers
#include <sqlfront.h>
#include <sqldb.h>

#include "trans.h"                            //pgd
5-6-96 split transaction structs defination into own
header

                              //for tpcform.c i.e.
telnet application

// Critical section declarations
CRITICAL_SECTION              ConsoleCritSec;
CRITICAL_SECTION              QueuedDeliveryCritSec;
CRITICAL_SECTION              WriteDeliveryCritSec;
CRITICAL_SECTION
          DroppedConnectionsCritSec;
CRITICAL_SECTION              ClientErrorLogCritSec;

// General constants
#define SQLCONN DBPROCESS
```

```
#define DUMB_MESSAGE                    5701
#define ABORT_ERROR                     6104
#define INVALID_ITEM_ID                         0
#define MILLI                           1000
#define MAX_THREADS                     2510
#define STATS_MSG_LOW                            3600
#define STATS_MSG_HIGH                           3700
#define SHOWPLAN_MSG_LOW                6200
#define SHOWPLAN_MSG_HIGH               6300
#define FALSE                                   0
#define TRUE                                    1
#define UNDEF
            -1
#define MINPRINTASCII                              32
#define MAXPRINTASCII                             126

// Default environment constants
#define SERVER                                  ""
#define DATABASE
         "tpcc"
#define USER                                    "sa"
#define PASSWORD                          ""
#define SYNCH_SERVERNAME                        ""

// Statistic constants
#define INTERVAL                          20    //
Total interval of buckets, in sec
#define UNIT                               .1    //
Time period of each bucket
#define HIST_MAX                          200    // Num
of histogram buckets = INTERVAL/UNIT
#define BUCKET                            100    //
Division factor for response time

// Default master arguments
#define ADMIN_DATABASE
         "tpcc_admin"
#define RAMP_UP                  600
#define STEADY_STATE            1200
#define RAMP_DOWN                120
#define NUM_USERS                 10
#define NUM_WAREHOUSES                  1
#define THINK_TIMES
         0
#define DISPLAY_DATA                    0
#define DEFMSPACKSIZE                4096
#define TRANSACTION                     0
#define CLIENT_MODE                     1
#define DEF_WW_T                                  120
#define DEF_WW_a
         1
#define DEADLOCK_RETRY                          4
#define DELIVERY_BACKOFF                        2
#define DELIVERY_MODE
         0
#define NEWORDER_MODE
         0
#define DEF_LOAD_MULTIPLIER     1.0
#define DEF_CHECKPOINT_INTERVAL   960
#define DEF_FIRST_CHECKPOINT    240
#define DISABLE_90TH
         0
#define   RESFILENAME
                  "results.txt"
#define SQLSTAT_FILENAME
         "sqlstats.txt"
#define ENABLE_SQLSTAT
         0
#define SQLSTAT_PERIOD                            100
#define SHUTDOWN_SERVER
         0
#define AUTO_RUN
         0
#define DISABLE_SQLPERF
         0

// Default client arguments
#define NUM_THREADS                       10
#define X_FLAG                      0
#define Y_FLAG                      1
#define NUM_DELIVERIES
         2
#define CLIENT_NURAND                        223
#define DISABLE_DELIVERY_RESFILES   1
#define ENABLE_QJ
         0

// Globals for queued delivery handling
typedef struct      delivery_node *DELIVERY_PTR;
DELIVERY_PTR        delivery_head, delivery_tail;
short                       queued_delivery_cnt;
HANDLE                      hDeliveryMonPipe;
struct delivery_node
{
         short                                  w_id;
         short
         o_carrier_id;
         SYSTEMTIME
         queue_time;
         long
         tran_start_time;
         struct
         delivery_node *next_delivery;
};

// Default loader arguments
#define BATCH                           10000
#define DEFLDPACKSIZE                                4096
#define ORDERS_PER_DIST                  3000
#define LOADER_RES_FILE     "load.out"
#define LOADER_NURAND_C                               123
#define DEF_STARTING_WAREHOUSE                      1
#define BUILD_INDEX
         1
#define INDEX_SCRIPT_PATH     "scripts"

// Transaction types
#define EMPTY                           0
#define NEW_ORDER_TRAN                  1
#define PAYMENT_TRAN                    2
#define ORDER_STATUS_TRAN               3
#define DELIVERY_TRAN                   4
#define STOCK_LEVEL_TRAN                5

// Statistic structures
typedef struct
{
    long
         tran_count;
    long
         total_time;
    long
         resp_time;
    long
         resp_min;
    long
         resp_max;
    long
         rolled_back;
    long
         tran_2sec;
    long
         tran_5sec;
    long
         tran_sqr;
         long
         num_deadlocks;
    long
         resp_hist[HIST_MAX];
} TRAN_STATS;

typedef struct
{
    TRAN_STATS                          NewOrderStats;
    TRAN_STATS                          PaymentStats;
    TRAN_STATS
         OrderStatusStats;
    TRAN_STATS
         QueuedDeliveryStats;
         TRAN_STATS
         DeliveryStats;
    TRAN_STATS
         StockLevelStats;
} CLIENT_STATS;

// driver structures
typedef struct
{
    char
         *server;
    char
         *database;
    char
         *user;
    char
         *password;
    char
         *table;
    long
         num_warehouses;
    long
         batch;
    long
         verbose;
         long
         pack_size;
         char
         *loader_res_file;
         char
         *synch_servername;
         long
         case_sensitivity;
         long
         starting_warehouse;
         long
         build_index;
         char
         *index_script_path;
```

```
} TPCCLDR_ARGS;

typedef struct
{
    char
          *server;
    char
          *user;
    char
          *password;
          char
          *admin_database;
    char
          *sqlstat_filename;
          long
          run_id;
} SQLSTAT_ARGS;

typedef struct
{
    SQLCONN                         *sqlconn;
    char                            *server;
    char                            *database;
          char
          *admin_database;
    char                            *user;
    char                            *password;
    long                            ramp_up;
    long                            steady_state;
    long                            ramp_down;
    long                            num_users;
    long                            num_warehouses;
    long                            think_times;
    long                            display_data;
          long                      client_mode;

          long                      tran;
          long
          deadlock_retry;
          long
          delivery_backoff;
          long
          num_deliveries;
          char
          *comment;
          double
          load_multiplier;
          long
          checkpoint_interval;
          long
          first_checkpoint;
          long
          disable_90th;
          char
          *resfilename;
          char
          *sqlstat_filename;
          long
          enable_sqlstat;
          long
          sqlstat_period;
          long
          shutdown_server;
          long
          auto_run;
          long
          dropped_connections;
    short                           spid;
          long
          disable_sqlperf;
} MASTER_DATA;

typedef struct
{
          long
          num_threads;
    char                            *server;
    char                            *database;
          char
          *admin_database;
    char                            *user;
    char                            *password;

          long
          pack_size;
          short
          x_flag;
          char
          *synch_servername;
          long
          disable_delivery_resfiles;
          long
          enable_qj;
#ifdef USE_CONMON
          HANDLE
          hConMon;
          short
          con_id;
          short
          con_x;
          short
          con_y;
#endif
} GLOBAL_CLIENT_DATA;

typedef struct
{
#ifdef USE_ODBC
          HDBC                                  hdbc;
          HSTMT
          hstmt;
#else
    SQLCONN                         *sqlconn;
#endif
          short
          threadid;
    char                            *server;
    char                            *database;
          char
          *admin_database;
    char                            *user;
    char                            *password;

          long
          ramp_up;
          long
          steady_state;
    long                            ramp_down;
    long                            num_warehouses;
          long                      client_mode;
          long                      tran;
          long
          deadlock_retry;
          long
          think_times;
          long
          pack_size;
    long
          tran_start_time;
    long                            tran_end_time;
    long                            display_data;
          long                      id;

          short                                 w_id;
    short                           spid;
          long
          disable_90th;
          double
          load_multiplier;
          long
          num_deliveries;
          long
          enable_qj;
#ifdef USE_CONMON
          HANDLE
          hConMon;
          short
          con_id;
          short
          con_x;
          short
          con_y;
          short
          fTimerStat;
#endif
} CLIENT_DATA;

typedef struct
{
#ifdef USE_ODBC
          HDBC                                  hdbc;
          HSTMT
          hstmt;
#else
          SQLCONN
          *sqlconn;
#endif
          SYSTEMTIME
          queue_time;
          SYSTEMTIME
          completion_time;
    long
          tran_start_time;
    long                            tran_end_time;
          short
          threadid;
          FILE
          *fDelivery;
    short                           spid;
    short                           w_id;
          short                                 d_id;
          short
          o_carrier_id;
          DEL_ITEM
          DelItems[10];
          char
          *server;
```

```
    char                                *database;
          char
          *admin_database;
    char                                *user;
    char                                *password;

          long
          ramp_up;
    long                                steady_state;
    long                                ramp_down;

          long
          pack_size;
          long                          id;
          long
          disable_90th;
          long
          delivery_backoff;
          long
          disable_delivery_resfiles;
          long
          enable_qj;
} DELIVERY;

typedef struct
{
          long
          pipe_num;
} DELIVERY_ARGS;

// For client synchronization
#define LINE_LEN   80
#define NAME_SIZE  25
#define IN_BUF_SIZE        1000
#define OUT_BUF_SIZE       1000
#define TIME_OUT           0
#define PLEASE_READ        1000
#define PLEASE_WRITE       1000

typedef struct _WRTHANDLE
{         HANDLE              hPipe;
    DWORD             threadID;
          CHAR                Name[NAME_SIZE];
          struct              _WRTHANDLE *        next;
}WRTHANDLE;

// For client console monitor
#ifdef USE_CONMON
#define   CON_LINE_SIZE                 40
#define   DEADLOCK_X                              17
#define DEADLOCK_Y                      4
#define CUR_STATE_X                     15
#define CUR_STATE_Y                     3
#define   YELLOW                                  0
#define   RED
          1
#define   GREEN                                   2
int                 total_deadlocks;
#endif

// Functions in random.c
void      seed();
long      irand();
double    drand();
void      WUCreate();
short     WURand();

// Functions in getargs.c;
void      GetArgsLoader();
void      GetArgsLoaderUsage();
void      GetArgsMaster();
void      GetArgsMasterUsage();
void      GetArgsClient();
void      GetArgsClientUsage();
void      GetArgsDelivery();
void      GetArgsDeliveryUsage();
void      GetArgsSQLStat();
void      GetArgsSQLStatUsage();

// Functions in master.c
void      ReadClientDone();
BOOL    CtrlHandler();

// Functions in client.c
void      ClientMain();
void      DeliveryMain();
void      Delivery();
void      ClientEmulate();
short     ClientSelectTransaction();
void      ClientShuffleDeck();

//Functions in tran.c
BOOL      TranNewOrder();
BOOL      TranPayment();
BOOL      TranOrderStatus();
BOOL      TranDelivery();
BOOL      TranStockLevel();

// Functions in data.c
void      DataNewOrder();
void      DataPayment();
void      DataOrderStatus();
void      DataDelivery();
void      DataStockLevel();
short     DataRemoteWarehouse();

// Functions in time.c
long      TimeNow();
void      TimeInit();
void      TimeKeying();
void      TimeThink();

// Functions in stats.c
void      StatsInit();
void      StatsInitTran();
void      StatsGeneral();
void      StatsDelivery();

// Functions in sqlfuncs.c
BOOL      SQLExec();
BOOL      SQLExecCmd();
BOOL      SQLOpenConnection();
void      SQLClientInit();
int       SQLMasterInit();
void      SQLDeliveryInit();
int       SQLClientStats();
int       SQLDeliveryStats();
void      SQLTranStats();
void      SQLMasterStats();
void      SQLMasterTranStats();
void      SQLIOStats();
void      SQLCheckpointStats();
void      SQLInitResFile();
void      SQLGetRunId();
BOOL      SQLNewOrder();
BOOL      SQLPayment();
BOOL      SQLOrderStatus();
BOOL      SQLStockLevel();
void    SQLDelivery();
int       SQLGetCustId();
void      SQLExit();
void      SQLInit();
void      SQLInitPrivate();
void      SQLClientInitPrivate();
void      SQLDeliveryInitPrivate();
int       SQLMsgHandler();
int       SQLErrHandler();
int       SQLClientMsgHandler();
int       SQLClientErrHandler();
int       SQLDeliveryMsgHandler();
int       SQLDeliveryErrHandler();
void      SQLInitDate();
void      SQLShutdown();
#ifdef USE_ODBC
void      ODBCOpenConnection();
void      ODBCOpenDeliveryConnection();
BOOL      ODBCError();
void      ODBCExit();
#endif

// Functions in util.c
void      UtilSleep();
void      UtilPrintNewOrder();
void      UtilPrintPayment();
void      UtilPrintOrderStatus();
void      UtilPrintDelivery();
void      UtilPrintStockLevel();
void      UtilPrintOlTable();
void      UtilError();
void      UtilFatalError();
void      UtilStrCpy();
#ifdef USE_CONMON
void      WriteConsoleString();
#endif
void      WriteDeliveryString();
BOOL      AddDeliveryQueueNode();
BOOL      GetDeliveryQueueNode();


// Functions in strings.c
void      MakeAddress();
void      LastName();
int       MakeAlphaString();
int       MakeOriginalAlphaString();
int       MakeNumberString();
int       MakeZipNumberString();
void      InitString();
void      InitAddress();
void      PaddString();

// Functions in delivery.c
void      DeliveryHMain();
void      DeliveryH();
```

Appendix C – Tunable Parameters

Microsoft Windows NT Server version 4.0 Tunable Parameters

No Windows NT registry parameters were modified for this benchmark.

Microsoft SQL Server version 6.5 Startup Parameters

Microsoft SQL Server was started with the following command line options

sqlservr -c -x -t1081 -t3502 –Cd1447000 –Cp4800

where

-c	Start SQL Server independently of the Microsoft Windows NT Service Control Manager.
-x	Disable the keeping of CPU time and cache-hit ratio statistics.
-t1081	Allow the index pages a second trip through cache before those pages are released.
-Cp	Specifies number of 2k pages to apply to procedure cache
-Cd	Specifies number of 2k pages to apply to data cache
-t3502	Prints a message to the log at the beginning and end of each checkpoint.

Microsoft SQL Server 6.5 Configuration Parameters

```
sp_configure "show advanced",1
1> 2> reconfigure with override
1> 2> sp_configure
 name                                 minimum     maximum
config_value
      run_value
 ------------------------------------ ----------- ----------- -----------
-
      -----------
 affinity mask                                  0  2147483647
255
              255
 allow updates                                  0           1
0
                0
 backup buffer size                             1          32
1
                1
 backup threads                                 0          32
32
               32
 cursor threshold                              -1  2147483647          -
1
               -1
 database size                                  2       10000
2
                2
```

```
 default language                          0         9999
0
                0
 default sortorder id                      0          255
50
               50
 fill factor                               0          100
0
                0
 free buffers                             20       524288
3000
             3000
 hash buckets                           4999      1677716
1000003
          1000003
 language in cache                         3          100
3
                3
 LE threshold maximum                      2       500000
301
              301
 LE threshold minimum                      2       500000
20
               20
 LE threshold percent                      1          100
0
                0
 locks                                  5000   2147483647
8000
             8000
 LogLRU buffers                            0   2147483647
2000
             2000
 logwrite sleep (ms)                      -1          500           -
1
               -1
 max async IO                              1         1024
96
               96
 max lazywrite IO                          1         1024
64
               64
 max text repl size                        0   2147483647
65536
            65536
 max worker threads                       10         1024
160
              160
 media retention                           0          365
0
                0
 memory                                 2800      1048576
512000
           512000
 nested triggers                           0            1
1
                1
 network packet size                     512        32767
4096
             4096
```

```
 open databases                              5       32767
10
               10
 open objects                              100  2147483647
500
              500
 priority boost                              0           1
0
                0
 procedure cache                             1          99
2
                2
 Protection cache size                       1        8192
15
               15
 RA cache hit limit                          1         255
4
                4
 RA cache miss limit                         1         255
3
                3
 RA delay                                    0         500
15
               15
 RA pre-fetches                              1        1000
3
                3
 RA slots per thread                         1         255
5
                5
 RA worker threads                           0         255
0
                0
 recovery flags                              0           1
0
                0
 recovery interval                           1       32767
32767
            32767
 remote access                               0           1
1
                1
 remote conn timeout                        -1       32767
10
               10
 remote login timeout                        0  2147483647
5
                5
 remote proc trans                           0           1
0
                0
 remote query timeout                        0  2147483647
0
                0
 remote sites                                0         256
10
               10
 resource timeout                            5  2147483647
10
               10
```

```
 set working set size                          0           1
1
                1
 show advanced options                         0           1
1
                1
 SMP concurrency                              -1          64           -
1
               -1
 sort pages                                   64         511
64
               64
 spin counter                                  1  2147483647
10000
            10000
 tempdb in ram (MB)                            0        2044
5
                5
 time slice                                   50        1000
100
              100
 user connections                              5       32767
350
              350
 user options                                  0        4095
0
                0

(1 row affected)
1>
```

SQL Server Stack Size

The default stack size for Microsoft SQL Server 6.5. SP4 (6.50.258) was changed using the EDITBIN utility. The EDITBIN utility ships with Microsoft Visual C++ V4.0. The command used to change the stack size is:

editbin /S: 65536 sqlservr. exe

This command is fully documented as an article in the Microsoft Knowledge Base on the Microsoft Web Site at www. microsoft. com/ support.

DBCC GAMINIT

Prior to the execution of the benchmark, the following script was run to proactively populate the Global Allocation Map (GAM) rather than allowing it to be populated on an as needed basis.

use tpcc
go
dbcc gaminit
go
This command is fully documented as an article in the Microsoft Knowledge Base on the

Microsoft Web Site at www. microsoft. com/ support.

'Cache' Column of Sysobjects Table

Prior to the execution of the benchmark, the following script was run and SQL Server was restarted to improve cache performance of tables which are accessed non-uniformly. Use of this feature is fully documented as an article in the Microsoft Knowledge Base on the Microsoft Web Site at www. microsoft. com/ support.

use tpcc
go
update sysobjects set cache= 2 from sysobjects where name= 'stock'
go

Microsoft Windows NT Server version 4.0 Configuration

```
Microsoft Diagnostics Report For \\CORIANDER
------------------------------------------------------------------------

OS Version Report
------------------------------------------------------------------------
Microsoft (R) Windows NT (TM) Server
Version 4.0 (Build 1381: Service Pack 3) x86 Multiprocessor Free
Registered Owner: Paul McKenzie, Axil Computer
Product Number: 50382-270-0402215-34504
------------------------------------------------------------------------

System Report
------------------------------------------------------------------------
System: AT/AT COMPATIBLE
Hardware Abstraction Layer: MPS 1.4 - APIC platform
BIOS Date: 07/12/97
BIOS Version: PhoenixBIOS ServerBIOS Release 1

Processor list:
   0:  x86 Family 6 Model 1 Stepping 9 GenuineIntel ~199 Mhz
   1:  x86 Family 6 Model 1 Stepping 9 GenuineIntel ~199 Mhz
   2:  x86 Family 6 Model 1 Stepping 9 GenuineIntel ~199 Mhz
   3:  x86 Family 6 Model 1 Stepping 9 GenuineIntel ~199 Mhz
   4:  x86 Family 6 Model 1 Stepping 9 GenuineIntel ~199 Mhz
   5:  x86 Family 6 Model 1 Stepping 9 GenuineIntel ~199 Mhz
   6:  x86 Family 6 Model 1 Stepping 9 GenuineIntel ~199 Mhz
   7:  x86 Family 6 Model 1 Stepping 9 GenuineIntel ~199 Mhz
------------------------------------------------------------------------

Video Display Report
------------------------------------------------------------------------
BIOS Date: 03/14/96
BIOS Version: Stealth64 Video 2001 Vers. 1.06 (c) Diamond Multimedia Systems, Inc.MB
installed03/14/9603/14/96

Adapter:
   Setting: 1152 x 864 x 256
            75 Hz
   Type: s3 compatible display adapter
   String: Diamond Stealth
   Memory: 2 MB
   Chip Type: S3 765
   DAC Type: S3
Driver:
   Vendor: Microsoft Corporation
   File(s): s3.sys, rp32ntv1.dll
   Version: 4.00, 4.0.0
```

Appendix C – Tunable Parameters

```
Drives Report
------------------------------------------------------------------------
C:\  (Local - NTFS)  Total: 0KB, Free: 0KB
   Serial Number: 486B - FD80
   Bytes per cluster: 512
   Sectors per cluster: 1
   Filename length: 255
W:\  (Local - NTFS)  Total: 65,535,980KB, Free: 24,377,556KB
   Serial Number: 3033 - E651
   Bytes per cluster: 512
   Sectors per cluster: 8
   Filename length: 255
X:\  (Local - NTFS)  Total: 65,535,980KB, Free: 24,416,004KB
   Serial Number: DC56 - A344
   Bytes per cluster: 512
   Sectors per cluster: 8
   Filename length: 255
Y:\  (Local - NTFS)  Total: 65,535,980KB, Free: 24,377,524KB
   Serial Number: C029 - BCFF
   Bytes per cluster: 512
   Sectors per cluster: 8
   Filename length: 255
Z:\  (Local - NTFS)  Total: 65,535,980KB, Free: 24,415,972KB
   Serial Number: 1C41 - 2BB3
   Bytes per cluster: 512
   Sectors per cluster: 8
   Filename length: 255

Memory Report
------------------------------------------------------------------------
Handles: 1,944
Threads: 177
Processes: 20

Physical Memory (K)
   Total: 3,931,568
   Available: 2,941,748
   File Cache: 19,944

Kernel Memory (K)
   Total: 995,780
   Paged: 23,104
   Nonpaged: 972,676

Commit Charge (K)
   Total: 2,048,828
   Limit: 4,825,708
   Peak: 3,405,872

Pagefile Space (K)
   Total: 1,048,576
   Total in use: 777,184
   Peak: 777,184

   C:\pagefile.sys
      Total: 1,048,576
      Total in use: 777,184
      Peak: 777,184



Services Report
------------------------------------------------------------------------
Alerter                                    Running   (Automatic)
   C:\WINNT\System32\services.exe
   Service Account Name: LocalSystem
   Error Severity: Normal
   Service Flags: Shared Process
   Service Dependencies:
      LanmanWorkstation
Computer Browser                           Stopped   (Disabled)
   C:\WINNT\System32\services.exe
   Service Account Name: LocalSystem
   Error Severity: Normal
   Service Flags: Shared Process
   Service Dependencies:
```

```
      LanmanWorkstation
      LanmanServer
      LmHosts
ClipBook Server                                Stopped   (Manual)
   C:\WINNT\system32\clipsrv.exe
   Service Account Name: LocalSystem
   Error Severity: Normal
   Service Flags: Own Process
   Service Dependencies:
      NetDDE
DHCP Client (TDI)                              Stopped   (Disabled)
   C:\WINNT\System32\services.exe
   Service Account Name: LocalSystem
   Error Severity: Normal
   Service Flags: Shared Process
   Service Dependencies:
      Tcpip
      Afd
      NetBT
Disk Array Monitor                             Running   (Automatic)
   C:\SYMSM\arraymon.exe
   Service Account Name: LocalSystem
   Error Severity: Normal
   Service Flags: Own Process
EventLog (Event log)                           Running   (Automatic)
   C:\WINNT\system32\services.exe
   Service Account Name: LocalSystem
   Error Severity: Normal
   Service Flags: Shared Process
Gopher Publishing Service                      Stopped   (Manual)
   C:\WINNT\System32\inetsrv\inetinfo.exe
   Service Account Name: LocalSystem
   Error Severity: Ignore
   Service Flags: Shared Process
   Service Dependencies:
      RPCSS
      NTLMSSP
Server                                         Running   (Automatic)
   C:\WINNT\System32\services.exe
   Service Account Name: LocalSystem
   Error Severity: Normal
   Service Flags: Shared Process
   Group Dependencies:
      TDI
Workstation (NetworkProvider)                  Running   (Automatic)
   C:\WINNT\System32\services.exe
   Service Account Name: LocalSystem
   Error Severity: Normal
   Service Flags: Shared Process
   Group Dependencies:
      TDI
License Logging Service                        Stopped   (Disabled)
   C:\WINNT\System32\llssrv.exe
   Service Account Name: LocalSystem
   Error Severity: Normal
   Service Flags: Own Process
TCP/IP NetBIOS Helper                          Running   (Automatic)
   C:\WINNT\System32\services.exe
   Service Account Name: LocalSystem
   Error Severity: Normal
   Service Flags: Shared Process
   Group Dependencies:
      NetworkProvider
Messenger                                      Running   (Automatic)
   C:\WINNT\System32\services.exe
   Service Account Name: LocalSystem
   Error Severity: Normal
   Service Flags: Shared Process
   Service Dependencies:
      LanmanWorkstation
      Netbios
MSDTC (MS Transactions)                        Stopped   (Manual)
   C:\MSSQL\BINN\msdtc.exe
   Service Account Name: LocalSystem
   Error Severity: Normal
   Service Flags: Own Process
```

```
   Service Dependencies:
      RPCSS
FTP Publishing Service                          Stopped   (Manual)
   C:\WINNT\System32\inetsrv\inetinfo.exe
   Service Account Name: LocalSystem
   Error Severity: Ignore
   Service Flags: Shared Process
   Service Dependencies:
      RPCSS
      NTLMSSP
MSSQLServer                                     Running   (Manual)
   C:\MSSQL\BINN\SQLSERVR.EXE
   Service Account Name: LocalSystem
   Error Severity: Normal
   Service Flags: Own Process, Interactive
Network DDE (NetDDEGroup)                       Stopped   (Manual)
   C:\WINNT\system32\netdde.exe
   Service Account Name: LocalSystem
   Error Severity: Normal
   Service Flags: Shared Process
   Service Dependencies:
      NetDDEDSDM
Network DDE DSDM                                Stopped   (Manual)
   C:\WINNT\system32\netdde.exe
   Service Account Name: LocalSystem
   Error Severity: Normal
   Service Flags: Shared Process
Net Logon (RemoteValidation)                    Running   (Automatic)
   C:\WINNT\System32\lsass.exe
   Service Account Name: LocalSystem
   Error Severity: Normal
   Service Flags: Shared Process
   Service Dependencies:
      LanmanWorkstation
      LmHosts
NT LM Security Support Provider                 Stopped   (Disabled)
   C:\WINNT\System32\SERVICES.EXE
   Service Account Name: LocalSystem
   Error Severity: Normal
   Service Flags: Shared Process
Plug and Play (PlugPlay)                        Running   (Automatic)
   C:\WINNT\system32\services.exe
   Service Account Name: LocalSystem
   Error Severity: Normal
   Service Flags: Shared Process
Directory Replicator                            Stopped   (Manual)
   C:\WINNT\System32\lmrepl.exe
   Service Account Name: LocalSystem
   Error Severity: Normal
   Service Flags: Own Process
   Service Dependencies:
      LanmanWorkstation
      LanmanServer
Remotely Possible/32                            Stopped   (Disabled)
   C:\PROGRA~1\Avalan\REMOTE~1\rp32serv.exe
   Service Account Name: LocalSystem
   Error Severity: Normal
   Service Flags: Own Process, Interactive
Remote Procedure Call (RPC) Locator             Stopped   (Manual)
   C:\WINNT\System32\LOCATOR.EXE
   Service Account Name: LocalSystem
   Error Severity: Normal
   Service Flags: Own Process
   Service Dependencies:
      LanmanWorkstation
      Rdr
Remote Procedure Call (RPC) Service             Running   (Automatic)
   C:\WINNT\system32\RpcSs.exe
   Service Account Name: LocalSystem
   Error Severity: Normal
   Service Flags: Own Process
Schedule                                        Stopped   (Manual)
   C:\WINNT\System32\AtSvc.Exe
   Service Account Name: LocalSystem
   Error Severity: Normal
   Service Flags: Own Process
```

```
Spooler (SpoolerGroup)                          Stopped   (Disabled)
   C:\WINNT\system32\spoolss.exe
   Service Account Name: LocalSystem
   Error Severity: Normal
   Service Flags: Own Process, Interactive
SQLExecutive                                    Stopped   (Manual)
   C:\MSSQL\BINN\SQLEXEC.EXE
   Service Account Name: LocalSystem
   Error Severity: Normal
   Service Flags: Own Process
Telephony Service                               Stopped   (Manual)
   C:\WINNT\system32\tapisrv.exe
   Service Account Name: LocalSystem
   Error Severity: Normal
   Service Flags: Own Process
UPS                                             Stopped   (Manual)
   C:\WINNT\System32\ups.exe
   Service Account Name: LocalSystem
   Error Severity: Normal
   Service Flags: Own Process
World Wide Web Publishing Service               Stopped   (Manual)
   C:\WINNT\System32\inetsrv\inetinfo.exe
   Service Account Name: LocalSystem
   Error Severity: Ignore
   Service Flags: Shared Process
   Service Dependencies:
      RPCSS
      NTLMSSP


Drivers Report
--------------------------------------------------------------------------
Abiosdsk (Primary disk)                         Stopped   (Disabled)
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
AFD Networking Support Environment (TDI)        Running   (Automatic)
   C:\WINNT\System32\drivers\afd.sys
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
Aha154x (SCSI miniport)                         Stopped   (Disabled)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
Aha174x (SCSI miniport)                         Stopped   (Disabled)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
aic78xx (SCSI miniport)                         Stopped   (Disabled)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
Always (SCSI miniport)                          Stopped   (Disabled)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
ami0nt (SCSI miniport)                          Stopped   (Disabled)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
amsint (SCSI miniport)                          Stopped   (Disabled)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
Arrow (SCSI miniport)                           Stopped   (Disabled)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
atapi (SCSI miniport)                           Stopped   (Boot)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
Atdisk (Primary disk)                           Stopped   (Disabled)
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
ati (Video)                                     Stopped   (Disabled)
   System32\DRIVERS\ati.sys
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
Beep (Base)                                     Running   (System)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
BusLogic (SCSI miniport)                        Stopped   (Disabled)
   Error Severity: Normal
```

```
   Service Flags: Kernel Driver, Shared Process
Busmouse (Pointer Port)                          Stopped   (Disabled)
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
Cdaudio (Filter)                                 Stopped   (System)
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
Cdfs (File system)                               Running   (Disabled)
   Error Severity: Normal
   Service Flags: File System Driver, Shared Process
   Group Dependencies:
      SCSI CDROM Class
Cdrom (SCSI CDROM Class)                         Running   (System)
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
   Group Dependencies:
      SCSI miniport
Changer (Filter)                                 Stopped   (System)
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
cirrus (Video)                                   Stopped   (Disabled)
   System32\DRIVERS\cirrus.sys
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
Cpqarray (SCSI miniport)                         Stopped   (Disabled)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
cpqfws2e (SCSI miniport)                         Stopped   (Disabled)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
dac960nt (SCSI miniport)                         Stopped   (Disabled)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
dce376nt (SCSI miniport)                         Stopped   (Disabled)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
Delldsa (SCSI miniport)                          Stopped   (Disabled)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
Dell_DGX (Video)                                 Stopped   (Disabled)
   System32\DRIVERS\dell_dgx.sys
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
Disk (SCSI Class)                                Running   (Boot)
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
   Group Dependencies:
      SCSI miniport
Diskperf (Filter)                                Stopped   (Disabled)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
DptScsi (SCSI miniport)                          Stopped   (Disabled)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
dtc329x (SCSI miniport)                          Stopped   (Disabled)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
Intel 82557-based PRO Adapter Driver (NDIS)      Running   (Automatic)
   C:\WINNT\System32\drivers\e100b.sys
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
et4000 (Video)                                   Stopped   (Disabled)
   System32\DRIVERS\et4000.sys
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
Fastfat (Boot file system)                       Running   (Disabled)
   Error Severity: Normal
   Service Flags: File System Driver, Shared Process
Fd16_700 (SCSI miniport)                         Stopped   (Disabled)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
Fd7000ex (SCSI miniport)                         Stopped   (Disabled)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
Fd8xx (SCSI miniport)                            Stopped   (Disabled)
   Error Severity: Normal
```

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   Service Flags: Kernel Driver, Shared Process
flashpnt (SCSI miniport)                        Stopped   (Disabled)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
Floppy (Primary disk)                           Running   (System)
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
Ftdisk (Filter)                                 Running   (Boot)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
i8042 Keyboard and PS/2 Mouse Port Driver (Keyboard Port) Running   (System)
   System32\DRIVERS\i8042prt.sys
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
Inport (Pointer Port)                           Stopped   (Disabled)
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
Jazzg300 (Video)                                Stopped   (Disabled)
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
Jazzg364 (Video)                                Stopped   (Disabled)
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
Jzvxl484 (Video)                                Stopped   (Disabled)
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
Keyboard Class Driver (Keyboard Class)          Running   (System)
   System32\DRIVERS\kbdclass.sys
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
KSecDD (Base)                                   Running   (System)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
mga (Video)                                     Stopped   (Disabled)
   System32\DRIVERS\mga.sys
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
mga_mil (Video)                                 Stopped   (Disabled)
   System32\DRIVERS\mga_mil.sys
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
mitsumi (SCSI miniport)                         Stopped   (Disabled)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
mkecr5xx (SCSI miniport)                        Stopped   (Disabled)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
Modem (Extended base)                           Stopped   (Manual)
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
Mouse Class Driver (Pointer Class)              Running   (System)
   System32\DRIVERS\mouclass.sys
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
Msfs (File system)                              Running   (System)
   Error Severity: Normal
   Service Flags: File System Driver, Shared Process
Mup (Network)                                   Running   (Manual)
   C:\WINNT\System32\drivers\mup.sys
   Error Severity: Normal
   Service Flags: File System Driver, Shared Process
NetBEUI Protocol (PNP_TDI)                      Running   (Automatic)
   C:\WINNT\System32\drivers\nbf.sys
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
Ncr53c9x (SCSI miniport)                        Stopped   (Disabled)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
ncr77c22 (Video)                                Stopped   (Disabled)
   System32\DRIVERS\ncr77c22.sys
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
Ncrc700 (SCSI miniport)                         Stopped   (Disabled)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
Ncrc710 (SCSI miniport)                         Stopped   (Disabled)
```

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   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
Microsoft NDIS System Driver (NDIS)           Running   (System)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
NetBIOS Interface (NetBIOSGroup)              Running   (Manual)
   C:\WINNT\System32\drivers\netbios.sys
   Error Severity: Normal
   Service Flags: File System Driver, Shared Process
   Group Dependencies:
      TDI
WINS Client(TCP/IP) (PNP_TDI)                 Running   (Automatic)
   C:\WINNT\System32\drivers\netbt.sys
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
   Service Dependencies:
      Tcpip
NetDetect                                     Stopped   (Manual)
   C:\WINNT\system32\drivers\netdtect.sys
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
Npfs (File system)                            Running   (System)
   Error Severity: Normal
   Service Flags: File System Driver, Shared Process
Ntfs (File system)                            Running   (Disabled)
   Error Severity: Normal
   Service Flags: File System Driver, Shared Process
Null (Base)                                   Running   (System)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
Oliscsi (SCSI miniport)                       Stopped   (Disabled)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
Parallel (Extended base)                      Running   (Automatic)
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
   Service Dependencies:
      Parport
   Group Dependencies:
      Parallel arbitrator
Parport (Parallel arbitrator)                 Running   (Automatic)
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
ParVdm (Extended base)                        Running   (Automatic)
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
   Service Dependencies:
      Parport
   Group Dependencies:
      Parallel arbitrator
PCIDump (PCI Configuration)                   Stopped   (System)
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
Pcmcia (System Bus Extender)                  Stopped   (Disabled)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
PnP ISA Enabler Driver (Base)                 Stopped   (System)
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
psidisp (Video)                               Stopped   (Disabled)
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
Ql10wnt (SCSI miniport)                       Stopped   (Disabled)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
qv (Video)                                    Stopped   (Disabled)
   System32\DRIVERS\qv.sys
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
Rdr (Network)                                 Running   (Manual)
   C:\WINNT\System32\drivers\rdr.sys
   Error Severity: Normal
   Service Flags: File System Driver, Shared Process
Rp32Spin                                      Stopped   (Disabled)
   C:\WINNT\system32\drivers\Rp32Spin.sys
   Error Severity: Ignore
```

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   Service Flags: Kernel Driver, Shared Process
Rp32Wire                                        Stopped   (Disabled)
   C:\WINNT\system32\drivers\Rp32Wire.sys
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
s3 (Video)                                      Running   (System)
   System32\DRIVERS\s3.sys
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
S3ViRGE (Video)                                 Stopped   (Disabled)
   System32\DRIVERS\S3ViRGE.sys
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
Scsiprnt (Extended base)                        Stopped   (Automatic)
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
   Group Dependencies:
      SCSI miniport
Scsiscan (SCSI Class)                           Stopped   (System)
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
   Group Dependencies:
      SCSI miniport
Serial (Extended base)                          Running   (Automatic)
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
Serial Mouse Driver (Pointer Port)              Running   (System)
   System32\DRIVERS\sermouse.sys
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
Sfloppy (Primary disk)                          Stopped   (System)
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
   Group Dependencies:
      SCSI miniport
Simbad (Filter)                                 Stopped   (Disabled)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
slcd32 (SCSI miniport)                          Stopped   (Disabled)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
Sparrow (SCSI miniport)                         Stopped   (Disabled)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
Spock (SCSI miniport)                           Stopped   (Disabled)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
Srv (Network)                                   Running   (Manual)
   C:\WINNT\System32\drivers\srv.sys
   Error Severity: Normal
   Service Flags: File System Driver, Shared Process
symarray (Symarray Class)                       Running   (Boot)
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
   Group Dependencies:
      SCSI miniport
symc810 (SCSI miniport)                         Stopped   (Disabled)
   C:\WINNT\System32\DRIVERS\symc810.sys
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
symc8XX (SCSI miniport)                         Running   (Boot)
   C:\WINNT\System32\drivers\\Scsi\Symc8XX.sys
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
T128 (SCSI miniport)                            Stopped   (Disabled)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
T13B (SCSI miniport)                            Stopped   (Disabled)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
TCP/IP Service (PNP_TDI)                        Running   (Automatic)
   C:\WINNT\System32\drivers\tcpip.sys
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
tga (Video)                                     Stopped   (Disabled)
   Error Severity: Ignore
```

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   Service Flags: Kernel Driver, Shared Process
tmv1 (SCSI miniport)                            Stopped   (Disabled)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
Ultra124 (SCSI miniport)                        Stopped   (Disabled)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
Ultra14f (SCSI miniport)                        Stopped   (Disabled)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
Ultra24f (SCSI miniport)                        Stopped   (Disabled)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
v7vram (Video)                                  Stopped   (Disabled)
   System32\DRIVERS\v7vram.sys
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
vga (Video)                                     Stopped   (Disabled)
   System32\DRIVERS\vga.sys
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
VgaSave (Video Save)                            Running   (System)
   C:\WINNT\System32\drivers\vga.sys
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
VgaStart (Video Init)                           Stopped   (System)
   C:\WINNT\System32\drivers\vga.sys
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
Wd33c93 (SCSI miniport)                         Stopped   (Disabled)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
wd90c24a (Video)                                Stopped   (Disabled)
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
wdvga (Video)                                   Stopped   (Disabled)
   System32\DRIVERS\wdvga.sys
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
weitekp9 (Video)                                Stopped   (Disabled)
   System32\DRIVERS\weitekp9.sys
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
Xga (Video)                                     Stopped   (Disabled)
   System32\DRIVERS\xga.sys
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
AxilAmx                                         Running   (Manual)
   \??\C:\WINNT\System32\drivers\axilamx.sys
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process


IRQ and Port Report
-------------------------------------------------------------------------
Devices                        Vector Level  Affinity
-------------------------------------------------------------------------
MPS 1.4 - APIC platform             8     8 0x000000ff
MPS 1.4 - APIC platform             0     0 0x000000ff
MPS 1.4 - APIC platform             1     1 0x000000ff
MPS 1.4 - APIC platform             2     2 0x000000ff
MPS 1.4 - APIC platform             3     3 0x000000ff
MPS 1.4 - APIC platform             4     4 0x000000ff
MPS 1.4 - APIC platform             5     5 0x000000ff
MPS 1.4 - APIC platform             6     6 0x000000ff
MPS 1.4 - APIC platform             7     7 0x000000ff
MPS 1.4 - APIC platform             8     8 0x000000ff
MPS 1.4 - APIC platform             9     9 0x000000ff
MPS 1.4 - APIC platform            10    10 0x000000ff
MPS 1.4 - APIC platform            11    11 0x000000ff
MPS 1.4 - APIC platform            12    12 0x000000ff
MPS 1.4 - APIC platform            13    13 0x000000ff
MPS 1.4 - APIC platform            14    14 0x000000ff
MPS 1.4 - APIC platform            15    15 0x000000ff
MPS 1.4 - APIC platform            16    16 0x000000ff
```

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MPS 1.4 - APIC platform          17    17 0x000000ff
MPS 1.4 - APIC platform          18    18 0x000000ff
MPS 1.4 - APIC platform          19    19 0x000000ff
MPS 1.4 - APIC platform          20    20 0x000000ff
MPS 1.4 - APIC platform          21    21 0x000000ff
MPS 1.4 - APIC platform          22    22 0x000000ff
MPS 1.4 - APIC platform          23    23 0x000000ff
MPS 1.4 - APIC platform          24    24 0x000000ff
MPS 1.4 - APIC platform          25    25 0x000000ff
MPS 1.4 - APIC platform          26    26 0x000000ff
MPS 1.4 - APIC platform          27    27 0x000000ff
MPS 1.4 - APIC platform          28    28 0x000000ff
MPS 1.4 - APIC platform          29    29 0x000000ff
MPS 1.4 - APIC platform          30    30 0x000000ff
MPS 1.4 - APIC platform          31    31 0x000000ff
MPS 1.4 - APIC platform          32    32 0x000000ff
MPS 1.4 - APIC platform          33    33 0x000000ff
MPS 1.4 - APIC platform          34    34 0x000000ff
MPS 1.4 - APIC platform          35    35 0x000000ff
MPS 1.4 - APIC platform          36    36 0x000000ff
MPS 1.4 - APIC platform          37    37 0x000000ff
MPS 1.4 - APIC platform          38    38 0x000000ff
MPS 1.4 - APIC platform          39    39 0x000000ff
MPS 1.4 - APIC platform          40    40 0x000000ff
MPS 1.4 - APIC platform          41    41 0x000000ff
MPS 1.4 - APIC platform          42    42 0x000000ff
MPS 1.4 - APIC platform          43    43 0x000000ff
MPS 1.4 - APIC platform          44    44 0x000000ff
MPS 1.4 - APIC platform          45    45 0x000000ff
MPS 1.4 - APIC platform          46    46 0x000000ff
MPS 1.4 - APIC platform          47    47 0x000000ff
MPS 1.4 - APIC platform          61    61 0x000000ff
MPS 1.4 - APIC platform          65    65 0x000000ff
MPS 1.4 - APIC platform          80    80 0x000000ff
MPS 1.4 - APIC platform         193   193 0x000000ff
MPS 1.4 - APIC platform         225   225 0x000000ff
MPS 1.4 - APIC platform         253   253 0x000000ff
MPS 1.4 - APIC platform         254   254 0x000000ff
MPS 1.4 - APIC platform         255   255 0x000000ff
i8042prt                          1     1 0xffffffff
Serial                            3     3 0x00000000
E100B                            12    12 0xe57d00ec
E100B                            20    20 0x3f3f3f3f
Floppy                            6     6 0x00000000
Sermouse                          4     4 0xffffffff
symc8XX                          16    16 0x00000000
symc8XX                          17    17 0x00000000
symc8XX                          12    12 0x00000000
symc8XX                          16    16 0x00000000
symc8XX                          20    20 0x00000000
symc8XX                          24    24 0x00000000
symc8XX                          16    16 0x00000000
symc8XX                          17    17 0x00000000
symc8XX                          12    12 0x00000000
symc8XX                          16    16 0x00000000
symc8XX                          20    20 0x00000000
------------------------------------------------------------------------
Devices                       Physical Address  Length
------------------------------------------------------------------------
MPS 1.4 - APIC platform         0x00000000  0x0000000010
MPS 1.4 - APIC platform         0x00000020  0x0000000002
MPS 1.4 - APIC platform         0x00000040  0x0000000004
MPS 1.4 - APIC platform         0x00000048  0x0000000004
MPS 1.4 - APIC platform         0x00000061  0x0000000001
MPS 1.4 - APIC platform         0x00000070  0x0000000002
MPS 1.4 - APIC platform         0x00000080  0x0000000010
MPS 1.4 - APIC platform         0x00000092  0x0000000001
MPS 1.4 - APIC platform         0x000000a0  0x0000000002
MPS 1.4 - APIC platform         0x000000c0  0x0000000010
MPS 1.4 - APIC platform         0x000000d0  0x0000000010
MPS 1.4 - APIC platform         0x000000f0  0x0000000010
MPS 1.4 - APIC platform         0x00000400  0x0000000010
MPS 1.4 - APIC platform         0x00000461  0x0000000002
MPS 1.4 - APIC platform         0x00000464  0x0000000002
MPS 1.4 - APIC platform         0x00000480  0x0000000010
MPS 1.4 - APIC platform         0x000004c2  0x000000000e
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MPS 1.4 - APIC platform         0x000004d0  0x0000000002
MPS 1.4 - APIC platform         0x000004d4  0x000000002c
MPS 1.4 - APIC platform         0x00000c84  0x0000000001
i8042prt                        0x00000060  0x0000000001
i8042prt                        0x00000064  0x0000000001
Parport                         0x00000278  0x0000000003
Serial                          0x000002f8  0x0000000007
E100B                           0x0000dcc0  0x0000000014
E100B                           0x0000dce0  0x0000000014
Floppy                          0x000003f0  0x0000000006
Floppy                          0x000003f7  0x0000000001
Sermouse                        0x000003f8  0x0000000007
symc8XX                         0x0000f800  0x0000000100
symc8XX                         0x0000f400  0x0000000100
symc8XX                         0x0000e400  0x0000000100
symc8XX                         0x0000e000  0x0000000100
symc8XX                         0x0000f000  0x0000000100
symc8XX                         0x0000e800  0x0000000100
symc8XX                         0x0000d800  0x0000000100
symc8XX                         0x0000d400  0x0000000100
symc8XX                         0x0000d000  0x0000000100
symc8XX                         0x0000c800  0x0000000100
symc8XX                         0x0000c400  0x0000000100
s3                              0x000003c0  0x0000000010
s3                              0x000003d4  0x0000000008
s3                              0x000042e8  0x0000000002
s3                              0x00004ae8  0x0000000002
s3                              0x000082e8  0x0000000004
s3                              0x000086e8  0x0000000004
s3                              0x00008ae8  0x0000000004
s3                              0x00008ee8  0x0000000004
s3                              0x000092e8  0x0000000004
s3                              0x000096e8  0x0000000004
s3                              0x00009ae8  0x0000000004
s3                              0x00009ee8  0x0000000004
s3                              0x0000a2e8  0x0000000004
s3                              0x0000a6e8  0x0000000004
s3                              0x0000aae8  0x0000000004
s3                              0x0000aee8  0x0000000004
s3                              0x0000b6e8  0x0000000004
s3                              0x0000bae8  0x0000000004
s3                              0x0000bee8  0x0000000004
s3                              0x0000e2e8  0x0000000004
s3                              0x0000c2e8  0x0000000004
s3                              0x0000c6e8  0x0000000004
s3                              0x0000cae8  0x0000000004
s3                              0x0000cee8  0x0000000004
s3                              0x0000d2e8  0x0000000004
s3                              0x0000d6e8  0x0000000004
s3                              0x0000dae8  0x0000000004
s3                              0x0000dee8  0x0000000004
s3                              0x0000e6e8  0x0000000004
s3                              0x0000eae8  0x0000000004
s3                              0x0000eee8  0x0000000004
s3                              0x0000f6e8  0x0000000004
s3                              0x0000fae8  0x0000000004
s3                              0x0000fee8  0x0000000004
VgaSave                         0x000003b0  0x000000000c
VgaSave                         0x000003c0  0x0000000020
VgaSave                         0x000001ce  0x0000000002


DMA and Memory Report
-------------------------------------------------------------------------
Devices                         Channel    Port
-------------------------------------------------------------------------
Floppy                             2     0
-------------------------------------------------------------------------
Devices                         Physical Address  Length
-------------------------------------------------------------------------
MPS 1.4 - APIC platform         0xfec00000  0x00000400
MPS 1.4 - APIC platform         0xfec01000  0x00000400
MPS 1.4 - APIC platform         0xfee00000  0x00000400
E100B                           0xf7afe000  0x00000014
E100B                           0xf7afe000  0x00000014
```

Appendix C – Tunable Parameters

```
E100B                           0xf7afd000  0x00000014
E100B                           0xf7afd000  0x00000014
symc8XX                         0xfeafec00  0x00000100
symc8XX                         0xfeaff000  0x00001000
symc8XX                         0xfeafe800  0x00000100
symc8XX                         0xfeafd000  0x00001000
symc8XX                         0xf7eff800  0x00000100
symc8XX                         0xf7efe000  0x00001000
symc8XX                         0xf7eff400  0x00000100
symc8XX                         0xf7efd000  0x00001000
symc8XX                         0xf7eff000  0x00000100
symc8XX                         0xf7efc000  0x00001000
symc8XX                         0xf7efac00  0x00000100
symc8XX                         0xf7efb000  0x00001000
symc8XX                         0xf7dff800  0x00000100
symc8XX                         0xf7dfe000  0x00001000
symc8XX                         0xf7dff400  0x00000100
symc8XX                         0xf7dfd000  0x00001000
symc8XX                         0xf79ff800  0x00000100
symc8XX                         0xf79fe000  0x00001000
symc8XX                         0xf79ff400  0x00000100
symc8XX                         0xf79fd000  0x00001000
symc8XX                         0xf79ff000  0x00000100
symc8XX                         0xf79fc000  0x00001000
s3                              0x000a0000  0x00010000
s3                              0xf8000000  0x04000000
s3                              0x000c0000  0x00008000
VgaSave                         0x000a0000  0x00020000


Environment Report
------------------------------------------------------------------------



System Environment Variables
   ComSpec=C:\WINNT\system32\cmd.exe
   ND_HOME=C:\SYMSM\
   ND_PATH=C:\SYMSM\
   NUMBER_OF_PROCESSORS=8
   OS=Windows_NT
   Os2LibPath=C:\WINNT\system32\os2\dll;
   Path=C:\WINNT\system32;C:\WINNT;;C:\MSSQL\BINN
   PROCESSOR_ARCHITECTURE=x86
   PROCESSOR_IDENTIFIER=x86 Family 6 Model 1 Stepping 9, GenuineIntel
   PROCESSOR_LEVEL=6
   PROCESSOR_REVISION=0109
   windir=C:\WINNT



Environment Variables for Current User
   HOME=c:\
   path=C:/bin
   TEMP=C:\TEMP
   TMP=C:\TEMP



Network Report
------------------------------------------------------------------------
Your Access Level: Admin & Local
Workgroup or Domain: GREENHOUSE
Network Version: 4.0
LanRoot: GREENHOUSE
Logged On Users: 1
Current User (1): Administrator
  Logon Domain: CORIANDER
  Logon Server: CORIANDER

Transport: NetBT_E100B1, 00-A0-C9-0F-31-BE, VC's: 2, Wan: Wan
Transport: Nbf_E100B1, 00-A0-C9-0F-31-BE, VC's: 0, Wan: Wan
Transport: NetBT_E100B2, 00-A0-C9-5C-58-AE, VC's: 0, Wan: Wan
Transport: Nbf_E100B2, 00-A0-C9-5C-58-AE, VC's: 0, Wan: Wan
```

Appendix C – Tunable Parameters

```
Character Wait: 3,600
Collection Time: 250
Maximum Collection Count: 16
Keep Connection: 600
Maximum Commands: 5
Session Time Out: 45
Character Buffer Size: 512
Maximum Threads: 50
Lock Quota: 6,144
Lock Increment: 10
Maximum Locks: 500
Pipe Increment: 10
Maximum Pipes: 500
Cache Time Out: 40
Dormant File Limit: 45
Read Ahead Throughput: 4,294,967,295
Mailslot Buffers: 3
Server Announce Buffers: 20
Illegal Datagrams: 5
Datagram Reset Frequency: 60
Log Election Packets: False
Use Opportunistic Locking: True
Use Unlock Behind: True
Use Close Behind: True
Buffer Pipes: True
Use Lock, Read, Unlock: True
Use NT Caching: True
Use Raw Read: True
Use Raw Write: True
Use Write Raw Data: True
Use Encryption: True
Buffer Deny Write Files: True
Buffer Read Only Files: True
Force Core Creation: True
512 Byte Max Transfer: False
Bytes Received: 98,000,713,197
SMB's Received: 46,635,472
Paged Read Bytes Requested: 0
Non Paged Read Bytes Requested: 191,011,472,384
Cache Read Bytes Requested: 0
Network Read Bytes Requested: 95,505,736,192
Bytes Transmitted: 98,373,896,189
SMB's Transmitted: 46,635,472
Paged Read Bytes Requested: 0
Non Paged Read Bytes Requested: 191,011,448,504
Cache Read Bytes Requested: 0
Network Read Bytes Requested: 95,505,723,392
Initally Failed Operations: 0
Failed Completion Operations: 0
Read Operations: 23,311,677
Random Read Operations: 23,225,438
Read SMB's: 23,316,192
Large Read SMB's: 0
Small Read SMB's: 1
Write Operations: 23,315,922
Random Write Operations: 23,224,966
Write SMB's: 23,316,255
Large Write SMB's: 0
Small Write SMB's: 0
Raw Reads Denied: 0
Raw Writes Denied: 0
Network Errors: 0
Sessions: 15
Failed Sessions: 0
Reconnects: 0
Core Connects: 0
LM 2.0 Connects: 0
LM 2.x Connects: 0
Windows NT Connects: 14
Server Disconnects: 0
Hung Sessions: 0
Use Count: 0
Failed Use Count: 0
Current Commands: 0
Server File Opens: 41,425
Server Device Opens: 0
```

```
Server Jobs Queued: 0
Server Session Opens: 3
Server Sessions Timed Out: 16
Server Sessions Errored Out: 18
Server Password Errors: 2
Server Permission Errors: 4
Server System Errors: 0
Server Bytes Sent: 16,135,162,096
Server Bytes Received: 48,750,248
Server Average Response Time: 0
Server Request Buffers Needed: 0
Server Big Buffers Needed: 0
```

Disk Array Configuration Parameters

```
Profile for CORIANDER_001

Host: CORIANDER

Controllers:

  Name          Serial Number    Mode           Logical Units
  A (Drive0)    1T71524207       Active         2

  Number of Drives = 20

  Detailed Controller Information for CORIANDER_001

  Parameters               Controller A (Drive0)

  Board Name:              Series 3
  Board ID:                3622
  Board Serial Number:     1T71524207
  Product ID:              INF-01-00
  Product Serial Number:   1T71524207
  Vendor ID:               SYMBIOS
  Date of Manufacture:     04/10/97
  SCSI ID:                 5
  Boot Level:              02.04.03.00
  Firmware Level:          02.04.03.01
  Fibre Channel Level:         -
  Cache/Processor Size:    64/16 MB


Drives:

  Detailed Drive Information for CORIANDER_001

  Location   Capacity (MB)   Status         Vendor   Product ID

  [1,0]      8682            Optimal        SEAGATE  ST19171W
  [2,0]      8682            Optimal        SEAGATE  ST19171W
  [3,0]      8682            Optimal        SEAGATE  ST19171W
  [4,0]      8682            Optimal        SEAGATE  ST19171W
  [5,0]      8682            Optimal        SEAGATE  ST19171W
  [1,1]      8682            Optimal        SEAGATE  ST19171W
  [2,1]      8682            Optimal        SEAGATE  ST19171W
  [3,1]      8682            Optimal        SEAGATE  ST19171W
  [4,1]      8682            Optimal        SEAGATE  ST19171W
  [5,1]      8682            Optimal        SEAGATE  ST19171W
  [1,2]      8682            Optimal        SEAGATE  ST19171W
  [2,2]      8682            Optimal        SEAGATE  ST19171W
  [3,2]      8682            Optimal        SEAGATE  ST19171W
  [4,2]      8682            Optimal        SEAGATE  ST19171W
  [5,2]      8682            Optimal        SEAGATE  ST19171W
  [1,3]      8682            Optimal        SEAGATE  ST19171W
  [2,3]      8682            Optimal        SEAGATE  ST19171W
  [3,3]      8682            Optimal        SEAGATE  ST19171W
  [4,3]      8682            Optimal        SEAGATE  ST19171W
  [5,3]      8682            Optimal        SEAGATE  ST19171W

  Detailed Drive Information for CORIANDER_001 (continued)

  Location   Firmware Version   Serial Number   Date Code
```

```
  [1,0]      8603              LA776502        303432
  [2,0]      8603              LA668612        303333
  [3,0]      8603              LA609787        303333
  [4,0]      8603              LA773932        303432
  [5,0]      8603              LA776224        303432
  [1,1]      8603              LA741613        303431
  [2,1]      8603              LA776372        303432
  [3,1]      8603              LA779410        303432
  [4,1]      8603              LA728719        303431
  [5,1]      8603              LA774298        303432
  [1,2]      8603              LA654323        303333
  [2,2]      8603              LA775876        303432
  [3,2]      8603              LA774494        303432
  [4,2]      8603              LA747778        303431
  [5,2]      8603              LA753860        303432
  [1,3]      8603              LA719593        303431
  [2,3]      8603              LA779634        303432
  [3,3]      8603              LA774159        303432
  [4,3]      8603              LA429659        303333
  [5,3]      8603              LA718717        303431

Logical Units (LUNs):

  Detailed LUN Information for CORIANDER_001

                        Capacity
  LUN   Controller      (MB)      RAID Level

  0     Drive0          64000     0
  1     Drive1          64000     0


  Detailed LUN Information for CORIANDER_001 (continued)

  LUN   Associated Drives

  0     [1,0]
        [2,0] [3,0] [4,0] [5,0] [1,1] [2,1] [3,1] [4,1] [5,1] [1,2]
        [2,2] [3,2] [4,2] [5,2] [1,3] [2,3] [3,3] [4,3] [5,3]
  1     [1,0] [2,0] [3,0] [4,0] [5,0] [1,1] [2,1] [3,1] [4,1] [5,1]
        [1,2] [2,2] [3,2] [4,2] [5,2] [1,3] [2,3] [3,3] [4,3] [5,3]


Drive Group Information for CORIANDER_001

              No.         No.     Total      Remaining
              of   RAID   of      Capacity   Capacity
  Group       LUNS Level  Drives  (MB)       (MB)

  1           2    0      20      173607     45607


Logical Unit Information for CORIANDER_001

               Device  RAID  Cap.
  LUN   Group  Name    Level (MB) Status

  0     1    Drive0    0   64000  Optimal
  1     1    Drive1    0   64000  Optimal


Profile for CORIANDER_002

Host: CORIANDER

Controllers:

  Name          Serial Number    Mode           Logical Units
  A (Drive8)    1T72431048       Active         1

  Number of Drives = 20

  Detailed Controller Information for CORIANDER_002
```

Appendix C – Tunable Parameters

```
  Parameters                Controller A (Drive8)

  Board Name:               Series 3
  Board ID:                 3622
  Board Serial Number:      1T72431048
  Product ID:               INF-01-00
  Product Serial Number:    1T72431048
  Vendor ID:                SYMBIOS
  Date of Manufacture:      06/12/97
  SCSI ID:                  5
  Boot Level:               02.04.03.00
  Firmware Level:           02.04.03.01
  Fibre Channel Level:          -
  Cache/Processor Size:     64/16 MB


Drives:

  Detailed Drive Information for CORIANDER_002

  Location   Capacity (MB)   Status         Vendor   Product ID

  [1,0]      8682            Optimal        SEAGATE  ST19171W
  [2,0]      8682            Optimal        SEAGATE  ST19171W
  [3,0]      8682            Optimal        SEAGATE  ST19171W
  [4,0]      8682            Optimal        SEAGATE  ST19171W
  [5,0]      8682            Optimal        SEAGATE  ST19171W
  [1,1]      8682            Optimal        SEAGATE  ST19171W
  [2,1]      8682            Optimal        SEAGATE  ST19171W
  [3,1]      8682            Optimal        SEAGATE  ST19171W
  [4,1]      8682            Optimal        SEAGATE  ST19171W
  [5,1]      8682            Optimal        SEAGATE  ST19171W
  [1,2]      8682            Optimal        SEAGATE  ST19171W
  [2,2]      8682            Optimal        SEAGATE  ST19171W
  [3,2]      8682            Optimal        SEAGATE  ST19171W
  [4,2]      8682            Optimal        SEAGATE  ST19171W
  [5,2]      8682            Optimal        SEAGATE  ST19171W
  [1,3]      8682            Optimal        SEAGATE  ST19171W
  [2,3]      8682            Optimal        SEAGATE  ST19171W
  [3,3]      8682            Optimal        SEAGATE  ST19171W
  [4,3]      8682            Optimal        SEAGATE  ST19171W
  [5,3]      8682            Optimal        SEAGATE  ST19171W

  Detailed Drive Information for CORIANDER_002 (continued)

  Location   Firmware Version   Serial Number   Date Code

  [1,0]      8603               LA773965        303432
  [2,0]      8603               LA776405        303432
  [3,0]      8603               LA774487        303432
  [4,0]      8603               LAA10336        303532
  [5,0]      8603               LA776542        303432
  [1,1]      8603               LA731135        303431
  [2,1]      8603               LA672328        303430
  [3,1]      8603               LAA08488        303532
  [4,1]      8603               LA776062        303432
  [5,1]      8603               LA776451        303432
  [1,2]      8603               LA480033        303333
  [2,2]      8603               LA616053        303431
  [3,2]      8603               LA667619        303333
  [4,2]      8603               LA776280        303432
  [5,2]      8603               LA937949        303532
  [1,3]      8603               LA776329        303432
  [2,3]      8603               LA776513        303432
  [3,3]      8603               LA633319        303333
  [4,3]      8603               LA776087        303432
  [5,3]      8603               LA133298        313132

Logical Units (LUNs):

  Detailed LUN Information for CORIANDER_002

                          Capacity
  LUN   Controller        (MB)       RAID Level

  0     Drive8            64000      0
```

```
  Detailed LUN Information for CORIANDER_002 (continued)

  LUN   Associated Drives

  0     [1,0]
        [2,0] [3,0] [4,0] [5,0] [1,1] [2,1] [3,1] [4,1] [5,1] [1,2]
        [2,2] [3,2] [4,2] [5,2] [1,3] [2,3] [3,3] [4,3] [5,3]


Drive Group Information for CORIANDER_002

              No.        No.     Total      Remaining
              of   RAID  of      Capacity   Capacity
  Group       LUNS Level Drives  (MB)       (MB)

  1           1    0    20     173607     109607


Logical Unit Information for CORIANDER_002

               Device  RAID  Cap.
  LUN   Group  Name    Level (MB) Status

  0     1    Drive8    0   64000  Optimal


Profile for CORIANDER_003

Host: CORIANDER

Controllers:

  Name          Serial Number    Mode           Logical Units
  A (Drive16)   1T72229308       Active         1

  Number of Drives = 20

  Detailed Controller Information for CORIANDER_003

  Parameters               Controller A (Drive16)

  Board Name:              Series 3
  Board ID:                3622
  Board Serial Number:     1T72229308
  Product ID:              INF-01-00
  Product Serial Number:   1T72229308
  Vendor ID:               SYMBIOS
  Date of Manufacture:     05/29/97
  SCSI ID:                 5
  Boot Level:              02.04.03.00
  Firmware Level:          02.04.03.01
  Fibre Channel Level:         -
  Cache/Processor Size:    64/16 MB


Drives:

  Detailed Drive Information for CORIANDER_003

  Location   Capacity (MB)   Status         Vendor   Product ID

  [1,0]      8682            Optimal        SEAGATE  ST19171W
  [2,0]      8682            Optimal        SEAGATE  ST19171W
  [3,0]      8682            Optimal        SEAGATE  ST19171W
  [4,0]      8682            Optimal        SEAGATE  ST19171W
  [5,0]      8682            Optimal        SEAGATE  ST19171W
  [1,1]      8682            Optimal        SEAGATE  ST19171W
  [2,1]      8682            Optimal        SEAGATE  ST19171W
  [3,1]      8682            Optimal        SEAGATE  ST19171W
  [4,1]      8682            Optimal        SEAGATE  ST19171W
  [5,1]      8682            Optimal        SEAGATE  ST19171W
  [1,2]      8682            Optimal        SEAGATE  ST19171W
  [2,2]      8682            Optimal        SEAGATE  ST19171W
```

```
  [3,2]      8682            Optimal        SEAGATE  ST19171W
  [4,2]      8682            Optimal        SEAGATE  ST19171W
  [5,2]      8682            Optimal        SEAGATE  ST19171W
  [1,3]      8682            Optimal        SEAGATE  ST19171W
  [2,3]      8682            Optimal        SEAGATE  ST19171W
  [3,3]      8682            Optimal        SEAGATE  ST19171W
  [4,3]      8682            Optimal        SEAGATE  ST19171W
  [5,3]      8682            Optimal        SEAGATE  ST19171W

  Detailed Drive Information for CORIANDER_003 (continued)

  Location   Firmware Version   Serial Number   Date Code

  [1,0]      8603               LA103403        313132
  [2,0]      8603               LA804407        303532
  [3,0]      8603               LAA09824        303532
  [4,0]      8603               LAA38802        303630
  [5,0]      8603               LA776450        303432
  [1,1]      8603               LA690001        303431
  [2,1]      8603               LA776065        303432
  [3,1]      8603               LA728158        303431
  [4,1]      8603               LA747601        303431
  [5,1]      8603               LA702106        303431
  [1,2]      8603               LA776114        303432
  [2,2]      8603               LA653314        303430
  [3,2]      8603               LA937701        303532
  [4,2]      8603               LA669248        303333
  [5,2]      8603               LA776284        303432
  [1,3]      8603               LAA23974        303532
  [2,3]      8603               LA774291        303432
  [3,3]      8603               LA520537        303333
  [4,3]      8603               LA708719        303431
  [5,3]      8603               LA096031        313132

Logical Units (LUNs):

  Detailed LUN Information for CORIANDER_003

                       Capacity
  LUN   Controller     (MB)      RAID Level

  0     Drive16        64000     0


  Detailed LUN Information for CORIANDER_003 (continued)

  LUN   Associated Drives

  0     [1,0] [2,0] [3,0] [4,0] [5,0] [1,1] [2,1] [3,1] [4,1] [5,1]
        [1,2] [2,2] [3,2] [4,2] [5,2] [1,3] [2,3] [3,3] [4,3] [5,3]

Drive Group Information for CORIANDER_003

             No.        No.     Total      Remaining
             of   RAID  of      Capacity   Capacity
  Group      LUNS Level Drives  (MB)       (MB)

  1          1    0     20     173607     109607


Logical Unit Information for CORIANDER_003

              Device  RAID  Cap.
  LUN   Group Name    Level (MB) Status

  0     1     Drive16   0   64000  Optimal


Profile for CORIANDER_004

Host: CORIANDER

Controllers:

  Name          Serial Number    Mode           Logical Units
```

```
  A (Drive24)   1T72431152       Active         1

  Number of Drives = 20

  Detailed Controller Information for CORIANDER_004

  Parameters               Controller A (Drive24)

  Board Name:              Series 3
  Board ID:                3622
  Board Serial Number:     1T72431152
  Product ID:              INF-01-00
  Product Serial Number:   1T72431152
  Vendor ID:               SYMBIOS
  Date of Manufacture:     06/12/97
  SCSI ID:                 5
  Boot Level:              02.04.03.00
  Firmware Level:          02.04.03.01
  Fibre Channel Level:         -
  Cache/Processor Size:    64/16 MB


Drives:

  Detailed Drive Information for CORIANDER_004

  Location   Capacity (MB)   Status         Vendor   Product ID

  [1,0]      8682            Optimal        SEAGATE  ST19171W
  [2,0]      8682            Optimal        SEAGATE  ST19171W
  [3,0]      8682            Optimal        SEAGATE  ST19171W
  [4,0]      8682            Optimal        SEAGATE  ST19171W
  [5,0]      8682            Optimal        SEAGATE  ST19171W
  [1,1]      8682            Optimal        SEAGATE  ST19171W
  [2,1]      8682            Optimal        SEAGATE  ST19171W
  [3,1]      8682            Optimal        SEAGATE  ST19171W
  [4,1]      8682            Optimal        SEAGATE  ST19171W
  [5,1]      8682            Optimal        SEAGATE  ST19171W
  [1,2]      8682            Optimal        SEAGATE  ST19171W
  [2,2]      8682            Optimal        SEAGATE  ST19171W
  [3,2]      8682            Optimal        SEAGATE  ST19171W
  [4,2]      8682            Optimal        SEAGATE  ST19171W
  [5,2]      8682            Optimal        SEAGATE  ST19171W
  [1,3]      8682            Optimal        SEAGATE  ST19171W
  [2,3]      8682            Optimal        SEAGATE  ST19171W
  [3,3]      8682            Optimal        SEAGATE  ST19171W
  [4,3]      8682            Optimal        SEAGATE  ST19171W
  [5,3]      8682            Optimal        SEAGATE  ST19171W

  Detailed Drive Information for CORIANDER_004 (continued)

  Location   Firmware Version   Serial Number   Date Code

  [1,0]      8603               LA645082        303333
  [2,0]      8603               LA739325        303431
  [3,0]      8603               LA718244        303431
  [4,0]      8603               LA606928        303333
  [5,0]      8603               LA501622        303330
  [1,1]      8603               LA722014        303431
  [2,1]      8603               LAA28386        303630
  [3,1]      8603               LA776486        303432
  [4,1]      8603               LA667521        303333
  [5,1]      8603               LA776315        303432
  [1,2]      8603               LA666450        303333
  [2,2]      8603               LA720560        303431
  [3,2]      8603               LA747467        303431
  [4,2]      8603               LA121835        313132
  [5,2]      8603               LA776361        303432
  [1,3]      8603               LA133378        313132
  [2,3]      8603               LA775926        303432
  [3,3]      8603               LA775980        303432
  [4,3]      8603               LA720561        303431
  [5,3]      8603               LA721275        303431

Logical Units (LUNs):
```

```
  Detailed LUN Information for CORIANDER_004

                        Capacity
  LUN   Controller      (MB)      RAID Level

  0     Drive24         64000     0


  Detailed LUN Information for CORIANDER_004 (continued)

  LUN   Associated Drives

  0     [1,0] [2,0] [3,0] [4,0] [5,0] [1,1] [2,1] [3,1] [4,1] [5,1]
        [1,2] [2,2] [3,2] [4,2] [5,2] [1,3] [2,3] [3,3] [4,3] [5,3]


Drive Group Information for CORIANDER_004

              No.         No.     Total      Remaining
              of   RAID   of      Capacity   Capacity
  Group       LUNS Level  Drives  (MB)       (MB)

  1           1    0      20      173607     109607


Logical Unit Information for CORIANDER_004

               Device  RAID  Cap.
  LUN   Group  Name    Level (MB) Status

  0     1    Drive24   0   64000  Optimal


Profile for CORIANDER_005

Host: CORIANDER

Controllers:

  Name          Serial Number    Mode           Logical Units
  A (Drive32)   1T72431112       Active         2

  Number of Drives = 20

  Detailed Controller Information for CORIANDER_005

  Parameters               Controller A (Drive32)

  Board Name:              Series 3
  Board ID:                3622
  Board Serial Number:     1T72431112
  Product ID:              INF-01-00
  Product Serial Number:   1T72431112
  Vendor ID:               SYMBIOS
  Date of Manufacture:     06/12/97
  SCSI ID:                 5
  Boot Level:              02.04.03.00
  Firmware Level:          02.04.03.01
  Fibre Channel Level:          -
  Cache/Processor Size:    64/16 MB


Drives:

  Detailed Drive Information for CORIANDER_005

  Location   Capacity (MB)   Status         Vendor   Product ID

  [1,0]      8682            Optimal        SEAGATE  ST19171W
  [2,0]      8682            Optimal        SEAGATE  ST19171W
  [3,0]      8682            Optimal        SEAGATE  ST19171W
  [4,0]      8682            Optimal        SEAGATE  ST19171W
  [5,0]      8682            Optimal        SEAGATE  ST19171W
  [1,1]      8682            Optimal        SEAGATE  ST19171W
  [2,1]      8682            Optimal        SEAGATE  ST19171W
```

```
  [3,1]      8682            Optimal        SEAGATE  ST19171W
  [4,1]      8682            Optimal        SEAGATE  ST19171W
  [5,1]      8682            Optimal        SEAGATE  ST19171W
  [1,2]      8682            Optimal        SEAGATE  ST19171W
  [2,2]      8682            Optimal        SEAGATE  ST19171W
  [3,2]      8682            Optimal        SEAGATE  ST19171W
  [4,2]      8682            Optimal        SEAGATE  ST19171W
  [5,2]      8682            Optimal        SEAGATE  ST19171W
  [1,3]      8682            Optimal        SEAGATE  ST19171W
  [2,3]      8682            Optimal        SEAGATE  ST19171W
  [3,3]      8682            Optimal        SEAGATE  ST19171W
  [4,3]      8682            Optimal        SEAGATE  ST19171W
  [5,3]      8683            Optimal        SEAGATE  ST19171W

  Detailed Drive Information for CORIANDER_005 (continued)

  Location   Firmware Version   Serial Number   Date Code

  [1,0]      8603               LA776733        303432
  [2,0]      8603               LA665124        303333
  [3,0]      8603               LA995924        303532
  [4,0]      8603               LA769965        303432
  [5,0]      8603               LA652916        303333
  [1,1]      8603               LA381230        303432
  [2,1]      8603               LA965373        303532
  [3,1]      8603               LAA02847        303532
  [4,1]      8603               LA776510        303432
  [5,1]      8603               LA776483        303432
  [1,2]      8603               LA668222        303333
  [2,2]      8603               LA778747        303432
  [3,2]      8603               LA325935        303432
  [4,2]      8603               LA777969        303432
  [5,2]      8603               LA776438        303432
  [1,3]      8603               LA776095        303432
  [2,3]      8603               LAA00838        303532
  [3,3]      8603               LA776498        303432
  [4,3]      8603               LA776362        303432
  [5,3]      0023               LA774604        303432

Logical Units (LUNs):

  Detailed LUN Information for CORIANDER_005

                        Capacity
  LUN   Controller      (MB)      RAID Level

  0     Drive32         64000     0
  1     Drive33         64000     0


  Detailed LUN Information for CORIANDER_005 (continued)

  LUN   Associated Drives

  0     [1,0] [2,0] [3,0] [4,0] [5,0] [1,1] [2,1] [3,1] [4,1] [5,1]
        [1,2] [2,2] [3,2] [4,2] [5,2] [1,3] [2,3] [3,3] [4,3] [5,3]
  1     [1,0] [2,0] [3,0] [4,0] [5,0] [1,1] [2,1] [3,1] [4,1] [5,1]
        [1,2] [2,2] [3,2] [4,2] [5,2] [1,3] [2,3] [3,3] [4,3] [5,3]



Drive Group Information for CORIANDER_005

              No.         No.      Total       Remaining
              of    RAID  of       Capacity    Capacity
  Group       LUNS  Level Drives   (MB)        (MB)

  1           2     0     20      173607       45607


Logical Unit Information for CORIANDER_005

               Device  RAID  Cap.
  LUN   Group  Name    Level (MB) Status

  0     1    Drive32   0   64000  Optimal
```

```
  1     1    Drive33   0   64000  Optimal


Profile for CORIANDER_006

Host: CORIANDER

Controllers:

  Name          Serial Number    Mode          Logical Units
  A (Drive40)   1T72431133       Active        2

  Number of Drives = 20

  Detailed Controller Information for CORIANDER_006

  Parameters               Controller A (Drive40)

  Board Name:              Series 3
  Board ID:                3622
  Board Serial Number:     1T72431133
  Product ID:              INF-01-00
  Product Serial Number:   1T72431133
  Vendor ID:               SYMBIOS
  Date of Manufacture:     06/16/97
  SCSI ID:                 5
  Boot Level:              02.04.03.00
  Firmware Level:          02.04.03.01
  Fibre Channel Level:         -
  Cache/Processor Size:    64/16 MB


Drives:

  Detailed Drive Information for CORIANDER_006

  Location   Capacity (MB)   Status         Vendor   Product ID

  [1,0]      8682            Optimal        SEAGATE  ST19171W
  [2,0]      8682            Optimal        SEAGATE  ST19171W
  [3,0]      8682            Optimal        SEAGATE  ST19171W
  [4,0]      8682            Optimal        SEAGATE  ST19171W
  [5,0]      8682            Optimal        SEAGATE  ST19171W
  [1,1]      8682            Optimal        SEAGATE  ST19171W
  [2,1]      8682            Optimal        SEAGATE  ST19171W
  [3,1]      8682            Optimal        SEAGATE  ST19171W
  [4,1]      8682            Optimal        SEAGATE  ST19171W
  [5,1]      8682            Optimal        SEAGATE  ST19171W
  [1,2]      8682            Optimal        SEAGATE  ST19171W
  [2,2]      8682            Optimal        SEAGATE  ST19171W
  [3,2]      8682            Optimal        SEAGATE  ST19171W
  [4,2]      8682            Optimal        SEAGATE  ST19171W
  [5,2]      8682            Optimal        SEAGATE  ST19171W
  [1,3]      8682            Optimal        SEAGATE  ST19171W
  [2,3]      8682            Optimal        SEAGATE  ST19171W
  [3,3]      8682            Optimal        SEAGATE  ST19171W
  [4,3]      8682            Optimal        SEAGATE  ST19171W
  [5,3]      8682            Optimal        SEAGATE  ST19171W

  Detailed Drive Information for CORIANDER_006 (continued)

  Location   Firmware Version   Serial Number   Date Code

  [1,0]      8603               LA559361        303431
  [2,0]      8603               LA776300        303432
  [3,0]      8603               LA768857        303432
  [4,0]      8603               LA695011        303431
  [5,0]      8603               LA774037        303432
  [1,1]      8603               LAA01037        303630
  [2,1]      8603               LAA26704        303533
  [3,1]      8603               LA776060        303432
  [4,1]      8603               LA775866        303432
  [5,1]      8603               LA561834        303431
  [1,2]      8603               LAA25966        303533
  [2,2]      8603               LA774497        303432
```

```
  [3,2]      8603              LA667861        303333
  [4,2]      8603              LA684999        303431
  [5,2]      8603              LA719432        303431
  [1,3]      8603              LAA11320        303630
  [2,3]      8603              LA746752        303431
  [3,3]      8603              LA711748        303431
  [4,3]      8603              LA776327        303432
  [5,3]      8603              LA620727        303431

Logical Units (LUNs):

  Detailed LUN Information for CORIANDER_006

                        Capacity
  LUN   Controller      (MB)      RAID Level

  0     Drive40         64000     0
  1     Drive41         64000     0


  Detailed LUN Information for CORIANDER_006 (continued)

  LUN   Associated Drives

  0     [1,0] [2,0] [3,0] [4,0] [5,0] [1,1] [2,1] [3,1] [4,1] [5,1]
        [1,2] [2,2] [3,2] [4,2] [5,2] [1,3] [2,3] [3,3] [4,3] [5,3]
  1     [1,0] [2,0] [3,0] [4,0] [5,0] [1,1] [2,1] [3,1] [4,1] [5,1]
        [1,2] [2,2] [3,2] [4,2] [5,2] [1,3] [2,3] [3,3] [4,3] [5,3]


Drive Group Information for CORIANDER_006

              No.        No.     Total      Remaining
              of   RAID  of      Capacity   Capacity
  Group       LUNS Level Drives  (MB)       (MB)

  1           2    0     20     173607      45607


Logical Unit Information for CORIANDER_006

               Device  RAID  Cap.
  LUN   Group  Name    Level (MB) Status

  0     1    Drive40   0   64000  Optimal
  1     1    Drive41   0   64000  Optimal


Profile for CORIANDER_007

Host: CORIANDER

Controllers:

  Name          Serial Number    Mode          Logical Units
  A (Drive48)   1T72431108       Active        1

  Number of Drives = 20

  Detailed Controller Information for CORIANDER_007

  Parameters              Controller A (Drive48)

  Board Name:             Series 3
  Board ID:               3622
  Board Serial Number:    1T72431108
  Product ID:             INF-01-00
  Product Serial Number:  1T72431108
  Vendor ID:              SYMBIOS
  Date of Manufacture:    06/12/97
  SCSI ID:                5
  Boot Level:             02.04.03.00
  Firmware Level:         02.04.03.01
  Fibre Channel Level:        -
  Cache/Processor Size:   64/16 MB
```

Appendix C – Tunable Parameters

```
Drives:

  Detailed Drive Information for CORIANDER_007

  Location   Capacity (MB)   Status         Vendor   Product ID

  [1,0]      8682            Optimal        SEAGATE  ST19171W
  [2,0]      8682            Optimal        SEAGATE  ST19171W
  [3,0]      8682            Optimal        SEAGATE  ST19171W
  [4,0]      8682            Optimal        SEAGATE  ST19171W
  [5,0]      8682            Optimal        SEAGATE  ST19171W
  [1,1]      8682            Optimal        SEAGATE  ST19171W
  [2,1]      8682            Optimal        SEAGATE  ST19171W
  [3,1]      8682            Optimal        SEAGATE  ST19171W
  [4,1]      8682            Optimal        SEAGATE  ST19171W
  [5,1]      8682            Optimal        SEAGATE  ST19171W
  [1,2]      8682            Optimal        SEAGATE  ST19171W
  [2,2]      8682            Optimal        SEAGATE  ST19171W
  [3,2]      8682            Optimal        SEAGATE  ST19171W
  [4,2]      8682            Optimal        SEAGATE  ST19171W
  [5,2]      8682            Optimal        SEAGATE  ST19171W
  [1,3]      8682            Optimal        SEAGATE  ST19171W
  [2,3]      8682            Optimal        SEAGATE  ST19171W
  [3,3]      8682            Optimal        SEAGATE  ST19171W
  [4,3]      8682            Optimal        SEAGATE  ST19171W
  [5,3]      8682            Optimal        SEAGATE  ST19171W

  Detailed Drive Information for CORIANDER_007 (continued)

  Location   Firmware Version   Serial Number   Date Code

  [1,0]      8603               LA747192        303431
  [2,0]      8603               LA685845        303431
  [3,0]      8603               LA707148        303431
  [4,0]      8603               LAA38318        303630
  [5,0]      8603               LAA23982        303630
  [1,1]      8603               LA776603        303432
  [2,1]      8603               LA775863        303432
  [3,1]      8603               LA620475        303431
  [4,1]      8603               LA776452        303432
  [5,1]      8603               LA705190        303431
  [1,2]      8603               LA776096        303432
  [2,2]      8603               LAA07285        303630
  [3,2]      8603               LA776508        303432
  [4,2]      8603               LA718726        303431
  [5,2]      8603               LA776247        303432
  [1,3]      8603               LA778795        303432
  [2,3]      8603               LA778944        303432
  [3,3]      8603               LAA15004        303630
  [4,3]      8603               LA776551        303432
  [5,3]      8603               LA763966        303432

Logical Units (LUNs):

  Detailed LUN Information for CORIANDER_007

                         Capacity
  LUN   Controller       (MB)       RAID Level

  0     Drive48          64000      0


  Detailed LUN Information for CORIANDER_007 (continued)

  LUN   Associated Drives

  0     [1,0] [2,0] [3,0] [4,0] [5,0] [1,1] [2,1] [3,1] [4,1] [5,1]
        [1,2] [2,2] [3,2] [4,2] [5,2] [1,3] [2,3] [3,3] [4,3] [5,3]


Drive Group Information for CORIANDER_007

               No.         No.      Total       Remaining
               of    RAID  of       Capacity    Capacity
```

```
  Group       LUNS Level Drives  (MB)       (MB)

  1           1    0    20     173607     109607


Logical Unit Information for CORIANDER_007

               Device  RAID  Cap.
  LUN   Group  Name    Level (MB) Status

  0     1    Drive48   0   64000  Optimal


Profile for CORIANDER_008

Host: CORIANDER

Controllers:

  Name          Serial Number    Mode           Logical Units
  A (Drive56)   1T72431042       Active         2

  Number of Drives = 20

  Detailed Controller Information for CORIANDER_008

  Parameters               Controller A (Drive56)

  Board Name:              Series 3
  Board ID:                3622
  Board Serial Number:     1T72431042
  Product ID:              INF-01-00
  Product Serial Number:   1T72431042
  Vendor ID:               SYMBIOS
  Date of Manufacture:     06/12/97
  SCSI ID:                 5
  Boot Level:              02.04.03.00
  Firmware Level:          02.04.03.01
  Fibre Channel Level:         -
  Cache/Processor Size:    64/16 MB


Drives:

  Detailed Drive Information for CORIANDER_008

  Location   Capacity (MB)   Status         Vendor   Product ID

  [1,0]      8682            Optimal        SEAGATE  ST19171W
  [2,0]      8682            Optimal        SEAGATE  ST19171W
  [3,0]      8682            Optimal        SEAGATE  ST19171W
  [4,0]      8682            Optimal        SEAGATE  ST19171W
  [5,0]      8682            Optimal        SEAGATE  ST19171W
  [1,1]      8682            Optimal        SEAGATE  ST19171W
  [2,1]      8682            Optimal        SEAGATE  ST19171W
  [3,1]      8682            Optimal        SEAGATE  ST19171W
  [4,1]      8682            Optimal        SEAGATE  ST19171W
  [5,1]      8682            Optimal        SEAGATE  ST19171W
  [1,2]      8682            Optimal        SEAGATE  ST19171W
  [2,2]      8682            Optimal        SEAGATE  ST19171W
  [3,2]      8682            Optimal        SEAGATE  ST19171W
  [4,2]      8682            Optimal        SEAGATE  ST19171W
  [5,2]      8682            Optimal        SEAGATE  ST19171W
  [1,3]      8682            Optimal        SEAGATE  ST19171W
  [2,3]      8682            Optimal        SEAGATE  ST19171W
  [3,3]      8682            Optimal        SEAGATE  ST19171W
  [4,3]      8682            Optimal        SEAGATE  ST19171W
  [5,3]      8682            Optimal        SEAGATE  ST19171W

  Detailed Drive Information for CORIANDER_008 (continued)

  Location   Firmware Version   Serial Number   Date Code

  [1,0]      8603               LA710459        303432
  [2,0]      8603               LAA04118        303533
```

```
  [3,0]      8603              LA665210        303333
  [4,0]      8603              LA753297        303432
  [5,0]      8603              LA133765        313132
  [1,1]      8603              LA592424        303331
  [2,1]      8603              LA773563        303432
  [3,1]      8603              LA962612        303532
  [4,1]      8603              LA961763        303532
  [5,1]      8603              LA776516        303432
  [1,2]      8603              LAA03702        303532
  [2,2]      8603              LAA38229        303533
  [3,2]      8603              LA668274        303333
  [4,2]      8603              LA721525        303431
  [5,2]      8603              LAA04122        303532
  [1,3]      8603              LA668854        303333
  [2,3]      8603              LAA09363        303532
  [3,3]      8603              LAA10457        303630
  [4,3]      8603              LA721919        303431
  [5,3]      8603              LA774064        303432

Logical Units (LUNs):

  Detailed LUN Information for CORIANDER_008

                        Capacity
  LUN   Controller      (MB)      RAID Level

  0     Drive56         64000     0
  1     Drive57         64000     0


  Detailed LUN Information for CORIANDER_008 (continued)

  LUN   Associated Drives

  0     [1,0] [2,0] [3,0] [4,0] [5,0] [1,1] [2,1] [3,1] [4,1] [5,1]
        [1,2] [2,2] [3,2] [4,2] [5,2] [1,3] [2,3] [3,3] [4,3] [5,3]
  1     [1,0] [2,0] [3,0] [4,0] [5,0] [1,1] [2,1] [3,1] [4,1] [5,1]
        [1,2] [2,2] [3,2] [4,2] [5,2] [1,3] [2,3] [3,3] [4,3] [5,3]


Drive Group Information for CORIANDER_008

              No.         No.      Total       Remaining
              of    RAID  of       Capacity    Capacity
  Group       LUNS  Level Drives   (MB)        (MB)

  1           2     0     20       173607      45607


Logical Unit Information for CORIANDER_008

               Device  RAID  Cap.
  LUN   Group  Name    Level (MB) Status

  0     1    Drive56   0   64000  Optimal
  1     1    Drive57   0   64000  Optimal


Profile for CORIANDER_009

Host: CORIANDER

Controllers:

  Name          Serial Number    Mode          Logical Units
  A (Drive72)   1T72229347       Active        1
  B (Drive64)   1T72229299       Passive       0

  Number of Drives = 20

  Detailed Controller Information for CORIANDER_009

  Parameters              Controller A (Drive72)       Controller B (Drive64)

  Board Name:             Series 3                     Series 3
```

```
  Board ID:                3622                        3622
  Board Serial Number:     1T72229347                  1T72229299
  Product ID:              INF-01-00                   INF-01-00
  Product Serial Number:   1T72229347                  1T72229299
  Vendor ID:               SYMBIOS                     SYMBIOS
  Date of Manufacture:     06/01/97                    06/03/97
  SCSI ID:                 5                           4
  Boot Level:              02.04.03.00                 02.04.03.00
  Firmware Level:          02.04.03.01                 02.04.03.01
  Fibre Channel Level:        -                           -
  Cache/Processor Size:    64/16 MB                    64/16 MB


Drives:

  Detailed Drive Information for CORIANDER_009

  Location   Capacity (MB)   Status         Vendor   Product ID

  [1,0]      8682            Optimal        SEAGATE  ST19171W
  [2,0]      8682            Optimal        SEAGATE  ST19171W
  [3,0]      8682            Optimal        SEAGATE  ST19171W
  [4,0]      8682            Optimal        SEAGATE  ST19171W
  [5,0]      8682            Optimal        SEAGATE  ST19171W
  [1,1]      8682            Optimal        SEAGATE  ST19171W
  [2,1]      8682            Optimal        SEAGATE  ST19171W
  [3,1]      8682            Optimal        SEAGATE  ST19171W
  [4,1]      8682            Optimal        SEAGATE  ST19171W
  [5,1]      8682            Optimal        SEAGATE  ST19171W
  [1,2]      8682            Optimal        SEAGATE  ST19171W
  [2,2]      8682            Optimal        SEAGATE  ST19171W
  [3,2]      8682            Optimal        SEAGATE  ST19171W
  [4,2]      8682            Optimal        SEAGATE  ST19171W
  [5,2]      8682            Optimal        SEAGATE  ST19171W
  [1,3]      8682            Optimal        SEAGATE  ST19171W
  [2,3]      8682            Optimal        SEAGATE  ST19171W
  [3,3]      8682            Optimal        SEAGATE  ST19171W
  [4,3]      8682            Optimal        SEAGATE  ST19171W
  [5,3]      8682            Optimal        SEAGATE  ST19171W

  Detailed Drive Information for CORIANDER_009 (continued)

  Location   Firmware Version   Serial Number   Date Code

  [1,0]      8603               LA216002        303432
  [2,0]      8603               LA777447        303432
  [3,0]      8603               LA775979        303432
  [4,0]      8603               LA723183        303431
  [5,0]      8603               LA773803        303432
  [1,1]      8603               LA742033        303431
  [2,1]      8603               LA776064        303432
  [3,1]      8603               LA775939        303432
  [4,1]      8603               LA773594        303432
  [5,1]      8603               LA114777        313132
  [1,2]      8603               LA774039        303432
  [2,2]      8603               LA776632        303432
  [3,2]      8603               LA776104        303432
  [4,2]      8603               LAA37732        303630
  [5,2]      8603               LA721608        303431
  [1,3]      8603               LA776272        303432
  [2,3]      8603               LA776444        303432
  [3,3]      8603               LA776416        303432
  [4,3]      8603               LA776415        303432
  [5,3]      8603               LA776063        303432

Logical Units (LUNs):

  Detailed LUN Information for CORIANDER_009

                        Capacity
  LUN   Controller      (MB)      RAID Level

  0     Drive72         64000     1


  Detailed LUN Information for CORIANDER_009 (continued)
```

```
  LUN   Associated Drives

  0     [1,0] [2,0] [3,0] [4,0] [5,0] [1,1] [2,1] [3,1] [4,1] [5,1]
        [1,2] [2,2] [3,2] [4,2] [5,2] [1,3] [2,3] [3,3] [4,3] [5,3]


Drive Group Information for CORIANDER_009

              No.         No.     Total      Remaining
              of    RAID  of      Capacity   Capacity
  Group       LUNS  Level Drives  (MB)       (MB)

  1           1     1     20      86803      22803


Logical Unit Information for CORIANDER_009

               Device  RAID  Cap.
  LUN   Group  Name    Level (MB) Status

  0     1    Drive72   1   64000  Optimal


Profile for CORIANDER_010

Host: CORIANDER

Controllers:

  Name          Serial Number    Mode           Logical Units
  A (Drive80)   1T72431167       Active         1

  Number of Drives = 20

  Detailed Controller Information for CORIANDER_010

  Parameters               Controller A (Drive80)

  Board Name:              Series 3
  Board ID:                3622
  Board Serial Number:     1T72431167
  Product ID:              INF-01-00
  Product Serial Number:   1T72431167
  Vendor ID:               SYMBIOS
  Date of Manufacture:     06/12/97
  SCSI ID:                 5
  Boot Level:              02.04.03.00
  Firmware Level:          02.04.03.01
  Fibre Channel Level:         -
  Cache/Processor Size:    64/16 MB


Drives:

  Detailed Drive Information for CORIANDER_010

  Location   Capacity (MB)   Status         Vendor   Product ID

  [1,0]      8682            Optimal        SEAGATE  ST19171W
  [2,0]      8682            Optimal        SEAGATE  ST19171W
  [3,0]      8682            Optimal        SEAGATE  ST19171W
  [4,0]      8682            Optimal        SEAGATE  ST19171W
  [5,0]      8682            Optimal        SEAGATE  ST19171W
  [1,1]      8682            Optimal        SEAGATE  ST19171W
  [2,1]      8682            Optimal        SEAGATE  ST19171W
  [3,1]      8682            Optimal        SEAGATE  ST19171W
  [4,1]      8682            Optimal        SEAGATE  ST19171W
  [5,1]      8682            Optimal        SEAGATE  ST19171W
  [1,2]      8682            Optimal        SEAGATE  ST19171W
  [2,2]      8682            Optimal        SEAGATE  ST19171W
  [3,2]      8682            Optimal        SEAGATE  ST19171W
  [4,2]      8682            Optimal        SEAGATE  ST19171W
  [5,2]      8682            Optimal        SEAGATE  ST19171W
  [1,3]      8682            Optimal        SEAGATE  ST19171W
```

```
  [2,3]      8682            Optimal        SEAGATE  ST19171W
  [3,3]      8682            Optimal        SEAGATE  ST19171W
  [4,3]      8682            Optimal        SEAGATE  ST19171W
  [5,3]      8682            Optimal        SEAGATE  ST19171W

  Detailed Drive Information for CORIANDER_010 (continued)

  Location   Firmware Version   Serial Number   Date Code

  [1,0]      8603               LA631448        303333
  [2,0]      8603               LA748261        303432
  [3,0]      8603               LA555332        303432
  [4,0]      8603               LA776406        303432
  [5,0]      8603               LA773978        303432
  [1,1]      8603               LA668975        303333
  [2,1]      8603               LA762901        303432
  [3,1]      8603               LA685454        303432
  [4,1]      8603               LA666268        303333
  [5,1]      8603               LA776221        303432
  [1,2]      8603               LA696912        303431
  [2,2]      8603               LA666735        303333
  [3,2]      8603               LA776153        303432
  [4,2]      8603               LA666534        303333
  [5,2]      8603               LA720690        303431
  [1,3]      8603               LA133828        313132
  [2,3]      8603               LA776517        303432
  [3,3]      8603               LA667784        303333
  [4,3]      8603               LA734816        303432
  [5,3]      8603               LA774249        303432

Logical Units (LUNs):

  Detailed LUN Information for CORIANDER_010

                        Capacity
  LUN   Controller      (MB)      RAID Level

  0     Drive80         64000     0


  Detailed LUN Information for CORIANDER_010 (continued)

  LUN   Associated Drives

  0     [1,0] [2,0] [3,0] [4,0] [5,0] [1,1] [2,1] [3,1] [4,1] [5,1]
        [1,2] [2,2] [3,2] [4,2] [5,2] [1,3] [2,3] [3,3] [4,3] [5,3]


Drive Group Information for CORIANDER_010

              No.         No.     Total      Remaining
              of    RAID  of      Capacity   Capacity
  Group       LUNS  Level Drives  (MB)       (MB)

  1           1     0     20      173607     109607


Logical Unit Information for CORIANDER_010

               Device  RAID  Cap.
  LUN   Group  Name    Level (MB) Status

  0     1      Drive80   0   64000  Optimal
```

Client Configuration Parameters

Microsoft Windows NT Server version 4.0 Configuration Parameters

```
Microsoft Diagnostics Report For \\CLIENTA
```

Appendix C – Tunable Parameters

```
------------------------------------------------------------------------

OS Version Report
------------------------------------------------------------------------
Microsoft (R) Windows NT (TM) Server
Version 4.0 (Build 1381: Service Pack 3) x86 Uniprocessor Free
Registered Owner: test 1, axil
Product Number: 26996-OEM-0015645-00164
------------------------------------------------------------------------

System Report
------------------------------------------------------------------------
System: AT/AT COMPATIBLE
Hardware Abstraction Layer: PC Compatible Eisa/Isa HAL
BIOS Date: 05/31/97
BIOS Version: BIOS Version 1.00.02.DZ0P

Processor list:
   0:  x86 Family 6 Model 3 Stepping 3 GenuineIntel ~232 Mhz
------------------------------------------------------------------------

Video Display Report
------------------------------------------------------------------------
BIOS Date: 04/11/97
BIOS Version: S3 86C375/86C385 Video BIOS. Version 2.01.06B-C1.06.11
              S3 86C375/86C385 Video BIOS. Version 2.01.06B-C1.06.11
              S3 86C375/86C385 Video BIOS. Version 2.01.06B-C1.06.11
              S3 86C375/86C385 Video BIOS. Version 2.01.06B-C1.06.11

Adapter:
   Setting: 1024 x 768 x 65536
            60 Hz
   Type: s3mini compatible display adapter
   String: S3 Compatible Display Adapter
   Memory: 2 MB
   Chip Type: S3 ViRGE/DX, /GX
   DAC Type: S3 SDAC
Driver:
   Vendor: S3 Incorporated
   File(s): s3mini.sys, s3disp.dll, s3virge.dll
   Version: 2.00.18, 4.0.0


Drives Report
------------------------------------------------------------------------
C:\  (Local - NTFS)  Total: 0KB, Free: 0KB
   Serial Number: 5857 - 2F1A
   Bytes per cluster: 512
   Sectors per cluster: 1
   Filename length: 255
D:\  (CDROM - CDFS) OFF97SBE Total: 511,484KB, Free: 0KB
   Serial Number: 31A9 - 4B69
   Bytes per cluster: 2048
   Sectors per cluster: 1
   Filename length: 110

Memory Report
------------------------------------------------------------------------
Handles: 14,487
Threads: 183
Processes: 61

Physical Memory (K)
   Total: 261,556
   Available: 149,552
   File Cache: 12,428

Kernel Memory (K)
   Total: 19,512
   Paged: 8,132
   Nonpaged: 11,380

Commit Charge (K)
   Total: 135,212
   Limit: 505,752
   Peak: 145,504
```

```
Pagefile Space (K)
   Total: 262,144
   Total in use: 37,656
   Peak: 37,656

   C:\pagefile.sys
      Total: 262,144
      Total in use: 37,656
      Peak: 37,656


Services Report
-------------------------------------------------------------------------
Alerter                                    Running   (Automatic)
   C:\WINNT\System32\services.exe
   Service Account Name: LocalSystem
   Error Severity: Normal
   Service Flags: Shared Process
   Service Dependencies:
      LanmanWorkstation
Computer Browser                           Stopped   (Manual)
   C:\WINNT\System32\services.exe
   Service Account Name: LocalSystem
   Error Severity: Normal
   Service Flags: Shared Process
   Service Dependencies:
      LanmanWorkstation
      LanmanServer
      LmHosts
ClipBook Server                            Stopped   (Manual)
   C:\WINNT\system32\clipsrv.exe
   Service Account Name: LocalSystem
   Error Severity: Normal
   Service Flags: Own Process
   Service Dependencies:
      NetDDE
DHCP Client (TDI)                          Stopped   (Disabled)
   C:\WINNT\System32\services.exe
   Service Account Name: LocalSystem
   Error Severity: Normal
   Service Flags: Shared Process
   Service Dependencies:
      Tcpip
      Afd
      NetBT
EventLog (Event log)                       Running   (Automatic)
   C:\WINNT\system32\services.exe
   Service Account Name: LocalSystem
   Error Severity: Normal
   Service Flags: Shared Process
Server                                     Running   (Automatic)
   C:\WINNT\System32\services.exe
   Service Account Name: LocalSystem
   Error Severity: Normal
   Service Flags: Shared Process
   Group Dependencies:
      TDI
Workstation (NetworkProvider)              Running   (Automatic)
   C:\WINNT\System32\services.exe
   Service Account Name: LocalSystem
   Error Severity: Normal
   Service Flags: Shared Process
   Group Dependencies:
      TDI
License Logging Service                    Running   (Automatic)
   C:\WINNT\System32\llssrv.exe
   Service Account Name: LocalSystem
   Error Severity: Normal
   Service Flags: Own Process
TCP/IP NetBIOS Helper                      Running   (Automatic)
   C:\WINNT\System32\services.exe
   Service Account Name: LocalSystem
   Error Severity: Normal
   Service Flags: Shared Process
```

```
   Group Dependencies:
      NetworkProvider
Messenger                                   Running   (Automatic)
   C:\WINNT\System32\services.exe
   Service Account Name: LocalSystem
   Error Severity: Normal
   Service Flags: Shared Process
   Service Dependencies:
      LanmanWorkstation
      NetBios
Network DDE (NetDDEGroup)                   Stopped   (Manual)
   C:\WINNT\system32\netdde.exe
   Service Account Name: LocalSystem
   Error Severity: Normal
   Service Flags: Shared Process
   Service Dependencies:
      NetDDEDSDM
Network DDE DSDM                            Stopped   (Manual)
   C:\WINNT\system32\netdde.exe
   Service Account Name: LocalSystem
   Error Severity: Normal
   Service Flags: Shared Process
Net Logon (RemoteValidation)                Stopped   (Manual)
   C:\WINNT\System32\lsass.exe
   Service Account Name: LocalSystem
   Error Severity: Normal
   Service Flags: Shared Process
   Service Dependencies:
      LanmanWorkstation
      LmHosts
NT LM Security Support Provider             Running   (Manual)
   C:\WINNT\System32\SERVICES.EXE
   Service Account Name: LocalSystem
   Error Severity: Normal
   Service Flags: Shared Process
Plug and Play (PlugPlay)                    Running   (Automatic)
   C:\WINNT\system32\services.exe
   Service Account Name: LocalSystem
   Error Severity: Normal
   Service Flags: Shared Process
Directory Replicator                        Stopped   (Manual)
   C:\WINNT\System32\lmrepl.exe
   Service Account Name: LocalSystem
   Error Severity: Normal
   Service Flags: Own Process
   Service Dependencies:
      LanmanWorkstation
      LanmanServer
Remote Procedure Call (RPC) Locator         Stopped   (Manual)
   C:\WINNT\System32\LOCATOR.EXE
   Service Account Name: LocalSystem
   Error Severity: Normal
   Service Flags: Own Process
   Service Dependencies:
      LanmanWorkstation
      Rdr
Remote Procedure Call (RPC) Service         Running   (Automatic)
   C:\WINNT\system32\RpcSs.exe
   Service Account Name: LocalSystem
   Error Severity: Normal
   Service Flags: Own Process
Schedule                                    Stopped   (Manual)
   C:\WINNT\System32\AtSvc.Exe
   Service Account Name: LocalSystem
   Error Severity: Normal
   Service Flags: Own Process
Spooler (SpoolerGroup)                      Stopped   (Manual)
   C:\WINNT\system32\spoolss.exe
   Service Account Name: LocalSystem
   Error Severity: Normal
   Service Flags: Own Process, Interactive
Telephony Service                           Stopped   (Manual)
   C:\WINNT\system32\tapisrv.exe
   Service Account Name: LocalSystem
   Error Severity: Normal
   Service Flags: Own Process
```

```
TUXEDO IPC Helper                               Running   (Automatic)
   C:\TUXEDO\bin\tuxipc.exe
   Service Account Name: LocalSystem
   Error Severity: Normal
   Service Flags: Own Process
TListen (Port: 3050)                            Running   (Automatic)
   C:\TUXEDO\bin\slisten.exe
   Service Account Name: LocalSystem
   Error Severity: Normal
   Service Flags: Own Process
UPS                                             Stopped   (Manual)
   C:\WINNT\System32\ups.exe
   Service Account Name: LocalSystem
   Error Severity: Normal
   Service Flags: Own Process
World Wide Web Publishing Service               Running   (Automatic)
   C:\WINNT\System32\inetsrv\inetinfo.exe
   Service Account Name: LocalSystem
   Error Severity: Ignore
   Service Flags: Shared Process
   Service Dependencies:
      RPCSS
      NTLMSSP



Drivers Report
--------------------------------------------------------------------------
Abiosdsk (Primary disk)                         Stopped   (Disabled)
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
AFD Networking Support Environment (TDI)        Running   (Automatic)
   C:\WINNT\System32\drivers\afd.sys
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
Aha154x (SCSI miniport)                         Stopped   (Disabled)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
Aha174x (SCSI miniport)                         Stopped   (Disabled)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
aic78xx (SCSI miniport)                         Stopped   (Disabled)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
Always (SCSI miniport)                          Stopped   (Disabled)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
ami0nt (SCSI miniport)                          Stopped   (Disabled)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
amsint (SCSI miniport)                          Stopped   (Disabled)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
Arrow (SCSI miniport)                           Stopped   (Disabled)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
atapi (SCSI miniport)                           Running   (Boot)
   C:\WINNT\System32\DRIVERS\atapi.sys
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
Atdisk (Primary disk)                           Stopped   (Disabled)
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
ati (Video)                                     Stopped   (Disabled)
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
Beep (Base)                                     Running   (System)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
BusLogic (SCSI miniport)                        Stopped   (Disabled)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
Busmouse (Pointer Port)                         Stopped   (Disabled)
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
Cdaudio (Filter)                                Stopped   (System)
```

```
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
Cdfs (File system)                              Running   (Disabled)
   Error Severity: Normal
   Service Flags: File System Driver, Shared Process
   Group Dependencies:
      SCSI CDROM Class
Cdrom (SCSI CDROM Class)                        Running   (System)
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
   Group Dependencies:
      SCSI miniport
Changer (Filter)                                Stopped   (System)
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
cirrus (Video)                                  Stopped   (Disabled)
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
Cpqarray (SCSI miniport)                        Stopped   (Disabled)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
cpqfws2e (SCSI miniport)                        Stopped   (Disabled)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
dac960nt (SCSI miniport)                        Stopped   (Disabled)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
dce376nt (SCSI miniport)                        Stopped   (Disabled)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
Delldsa (SCSI miniport)                         Stopped   (Disabled)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
Dell_DGX (Video)                                Stopped   (Disabled)
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
Disk (SCSI Class)                               Running   (Boot)
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
   Group Dependencies:
      SCSI miniport
Diskperf (Filter)                               Stopped   (Disabled)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
DptScsi (SCSI miniport)                         Stopped   (Disabled)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
dtc329x (SCSI miniport)                         Stopped   (Disabled)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
Intel 82557-based PRO Adapter Driver (NDIS)     Running   (Automatic)
   C:\WINNT\System32\drivers\e100b.sys
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
3Com 3C59x Bus Master Adapter Driver (NDIS)     Running   (Automatic)
   C:\WINNT\System32\drivers\el59x.sys
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
et4000 (Video)                                  Stopped   (Disabled)
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
Fastfat (Boot file system)                      Stopped   (Disabled)
   Error Severity: Normal
   Service Flags: File System Driver, Shared Process
Fd16_700 (SCSI miniport)                        Stopped   (Disabled)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
Fd7000ex (SCSI miniport)                        Stopped   (Disabled)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
Fd8xx (SCSI miniport)                           Stopped   (Disabled)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
flashpnt (SCSI miniport)                        Stopped   (Disabled)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
```

```
Floppy (Primary disk)                          Running   (System)
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
Ftdisk (Filter)                                Stopped   (Disabled)
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
i8042 Keyboard and PS/2 Mouse Port Driver (Keyboard Port) Running   (System)
   System32\DRIVERS\i8042prt.sys
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
Inport (Pointer Port)                          Stopped   (Disabled)
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
Jazzg300 (Video)                               Stopped   (Disabled)
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
Jazzg364 (Video)                               Stopped   (Disabled)
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
Jzvxl484 (Video)                               Stopped   (Disabled)
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
Keyboard Class Driver (Keyboard Class)         Running   (System)
   System32\DRIVERS\kbdclass.sys
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
KSecDD (Base)                                  Running   (System)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
mga (Video)                                    Stopped   (Disabled)
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
mga_mil (Video)                                Stopped   (Disabled)
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
mitsumi (SCSI miniport)                        Stopped   (Disabled)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
mkecr5xx (SCSI miniport)                       Stopped   (Disabled)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
Modem (Extended base)                          Stopped   (Manual)
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
Mouse Class Driver (Pointer Class)             Running   (System)
   System32\DRIVERS\mouclass.sys
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
Msfs (File system)                             Running   (System)
   Error Severity: Normal
   Service Flags: File System Driver, Shared Process
Mup (Network)                                  Running   (Manual)
   C:\WINNT\System32\drivers\mup.sys
   Error Severity: Normal
   Service Flags: File System Driver, Shared Process
NetBEUI Protocol (PNP_TDI)                     Running   (Automatic)
   C:\WINNT\System32\drivers\nbf.sys
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
Ncr53c9x (SCSI miniport)                       Stopped   (Disabled)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
ncr77c22 (Video)                               Stopped   (Disabled)
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
Ncrc700 (SCSI miniport)                        Stopped   (Disabled)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
Ncrc710 (SCSI miniport)                        Stopped   (Disabled)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
Microsoft NDIS System Driver (NDIS)            Running   (System)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
NetBIOS Interface (NetBIOSGroup)               Running   (Manual)
   C:\WINNT\System32\drivers\netbios.sys
```

```
   Error Severity: Normal
   Service Flags: File System Driver, Shared Process
   Group Dependencies:
      TDI
WINS Client(TCP/IP) (PNP_TDI)                Running   (Automatic)
   C:\WINNT\System32\drivers\netbt.sys
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
   Service Dependencies:
      Tcpip
NetDetect                                    Stopped   (Manual)
   C:\WINNT\system32\drivers\netdtect.sys
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
Npfs (File system)                           Running   (System)
   Error Severity: Normal
   Service Flags: File System Driver, Shared Process
Ntfs (File system)                           Running   (Disabled)
   Error Severity: Normal
   Service Flags: File System Driver, Shared Process
Null (Base)                                  Running   (System)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
Oliscsi (SCSI miniport)                      Stopped   (Disabled)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
Parallel (Extended base)                     Running   (Automatic)
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
   Service Dependencies:
      Parport
   Group Dependencies:
      Parallel arbitrator
Parport (Parallel arbitrator)                Running   (Automatic)
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
ParVdm (Extended base)                       Running   (Automatic)
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
   Service Dependencies:
      Parport
   Group Dependencies:
      Parallel arbitrator
PCIDump (PCI Configuration)                  Stopped   (System)
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
Pcmcia (System Bus Extender)                 Stopped   (Disabled)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
PnP ISA Enabler Driver (Base)                Stopped   (System)
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
psidisp (Video)                              Stopped   (Disabled)
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
Ql10wnt (SCSI miniport)                      Stopped   (Disabled)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
qv (Video)                                   Stopped   (Disabled)
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
Rdr (Network)                                Running   (Manual)
   C:\WINNT\System32\drivers\rdr.sys
   Error Severity: Normal
   Service Flags: File System Driver, Shared Process
s3 (Video)                                   Stopped   (Disabled)
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
S3Inc (Video)                                Running   (System)
   System32\DRIVERS\s3mini.sys
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
Scsiprnt (Extended base)                     Stopped   (Automatic)
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
   Group Dependencies:
```

```
      SCSI miniport
Scsiscan (SCSI Class)                          Stopped   (System)
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
   Group Dependencies:
      SCSI miniport
Serial (Extended base)                         Running   (Automatic)
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
Sermouse (Pointer Port)                        Stopped   (Disabled)
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
Sfloppy (Primary disk)                         Stopped   (System)
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
   Group Dependencies:
      SCSI miniport
Simbad (Filter)                                Stopped   (Disabled)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
slcd32 (SCSI miniport)                         Stopped   (Disabled)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
Sparrow (SCSI miniport)                        Stopped   (Disabled)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
Spock (SCSI miniport)                          Stopped   (Disabled)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
Srv (Network)                                  Running   (Manual)
   C:\WINNT\System32\drivers\srv.sys
   Error Severity: Normal
   Service Flags: File System Driver, Shared Process
symc810 (SCSI miniport)                        Stopped   (Disabled)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
T128 (SCSI miniport)                           Stopped   (Disabled)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
T13B (SCSI miniport)                           Stopped   (Disabled)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
TCP/IP Service (PNP_TDI)                       Running   (Automatic)
   C:\WINNT\System32\drivers\tcpip.sys
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
tga (Video)                                    Stopped   (Disabled)
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
tmv1 (SCSI miniport)                           Stopped   (Disabled)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
Ultra124 (SCSI miniport)                       Stopped   (Disabled)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
Ultra14f (SCSI miniport)                       Stopped   (Disabled)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
Ultra24f (SCSI miniport)                       Stopped   (Disabled)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
v7vram (Video)                                 Stopped   (Disabled)
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
VgaSave (Video Save)                           Running   (System)
   C:\WINNT\System32\drivers\vga.sys
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
VgaStart (Video Init)                          Stopped   (System)
   C:\WINNT\System32\drivers\vga.sys
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
Wd33c93 (SCSI miniport)                        Stopped   (Disabled)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
wd90c24a (Video)                               Stopped   (Disabled)
```

```
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
wdvga (Video)                                   Stopped   (Disabled)
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
weitekp9 (Video)                                Stopped   (Disabled)
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
Xga (Video)                                     Stopped   (Disabled)
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process


IRQ and Port Report
-------------------------------------------------------------------------
Devices                         Vector Level  Affinity
-------------------------------------------------------------------------
i8042prt                             1     1 0xffffffff
i8042prt                            12    12 0xffffffff
Serial                               4     4 0x00000000
E100B                               11    11 0x00000000
El59x                               10    10 0x00000000
Floppy                               6     6 0x00000000
atapi                                0    14 0x00000000
atapi                                0    15 0x00000000
-------------------------------------------------------------------------
Devices                         Physical Address  Length
-------------------------------------------------------------------------
i8042prt                          0x00000060  0x0000000001
i8042prt                          0x00000064  0x0000000001
Parport                           0x00000378  0x0000000003
Serial                            0x000003f8  0x0000000007
E100B                             0x0000ff40  0x0000000014
El59x                             0x0000ff80  0x0000000020
Floppy                            0x000003f0  0x0000000006
Floppy                            0x000003f7  0x0000000001
atapi                             0x000001f0  0x0000000008
atapi                             0x000003f6  0x0000000001
atapi                             0x00000170  0x0000000008
atapi                             0x00000376  0x0000000001
S3Inc                             0x000003c0  0x0000000010
S3Inc                             0x000003d4  0x0000000008
VgaSave                           0x000003b0  0x000000000c
VgaSave                           0x000003c0  0x0000000020
VgaSave                           0x000001ce  0x0000000002


DMA and Memory Report
-------------------------------------------------------------------------
Devices                         Channel    Port
-------------------------------------------------------------------------
Floppy                             2     0
-------------------------------------------------------------------------
Devices                         Physical Address  Length
-------------------------------------------------------------------------
E100B                             0xfff6f000  0x00000014
E100B                             0xfff6f000  0x00000014
S3Inc                             0x000a0000  0x00010000
S3Inc                             0xf8000000  0x04000000
S3Inc                             0x000c0000  0x00008000
VgaSave                           0x000a0000  0x00020000


Environment Report
-------------------------------------------------------------------------


System Environment Variables
   appdir=c:\inetpub\wwwroot
   ComSpec=C:\WINNT\system32\cmd.exe
   NUMBER_OF_PROCESSORS=1
   OS=Windows_NT
```

```
   Os2LibPath=C:\WINNT\system32\os2\dll;
   Path=C:\WINNT\system32;C:\WINNT;;C:\MSSQL\BINN;C:\TUXEDO\bin
   PROCESSOR_ARCHITECTURE=x86
   PROCESSOR_IDENTIFIER=x86 Family 6 Model 3 Stepping 3, GenuineIntel
   PROCESSOR_LEVEL=6
   PROCESSOR_REVISION=0303
   tmcontexts=1
   tuxconfig=c:\inetpub\wwwroot\tuxconfig
   windir=C:\WINNT


Environment Variables for Current User

include=c:\msdev\include;c:\msdev\mfc\include;c:\msdev\include;c:\msdev\mfc\include;%inclu
de%
   lib=c:\msdev\lib;c:\msdev\mfc\lib;c:\msdev\lib;c:\msdev\mfc\lib;%lib%
   MSDevDir=C:\MSDEV
   path=C:\MSDEV\BIN
   TEMP=C:\TEMP
   TMP=C:\TEMP



Network Report
------------------------------------------------------------------------
Your Access Level: Admin & Local
Workgroup or Domain: BENCHMARK
Network Version: 4.0
LanRoot: BENCHMARK
Logged On Users: 1
Current User (1): Administrator
  Logon Domain: CLIENTA
  Logon Server: CLIENTA

Transport: NetBT_El59x1, 00-60-97-4F-B1-60, VC's: 0, Wan: Wan
Transport: NetBT_E100B2, 00-A0-C9-5B-D0-33, VC's: 1, Wan: Wan
Transport: Nbf_El59x1, 00-60-97-4F-B1-60, VC's: 0, Wan: Wan
Transport: Nbf_E100B2, 00-A0-C9-5B-D0-33, VC's: 0, Wan: Wan

Character Wait: 3,600
Collection Time: 250
Maximum Collection Count: 16
Keep Connection: 600
Maximum Commands: 5
Session Time Out: 45
Character Buffer Size: 512
Maximum Threads: 17
Lock Quota: 6,144
Lock Increment: 10
Maximum Locks: 500
Pipe Increment: 10
Maximum Pipes: 500
Cache Time Out: 40
Dormant File Limit: 45
Read Ahead Throughput: 4,294,967,295
Mailslot Buffers: 3
Server Announce Buffers: 20
Illegal Datagrams: 5
Datagram Reset Frequency: 60
Log Election Packets: False
Use Opportunistic Locking: True
Use Unlock Behind: True
Use Close Behind: True
Buffer Pipes: True
Use Lock, Read, Unlock: True
Use NT Caching: True
Use Raw Read: True
Use Raw Write: True
Use Write Raw Data: True
Use Encryption: True
Buffer Deny Write Files: True
Buffer Read Only Files: True
Force Core Creation: True
512 Byte Max Transfer: False
Bytes Received: 7,831
```

```
SMB's Received: 44
Paged Read Bytes Requested: 0
Non Paged Read Bytes Requested: 0
Cache Read Bytes Requested: 0
Network Read Bytes Requested: 0
Bytes Transmitted: 4,863
SMB's Transmitted: 44
Paged Read Bytes Requested: 0
Non Paged Read Bytes Requested: 184,324
Cache Read Bytes Requested: 0
Network Read Bytes Requested: 0
Initally Failed Operations: 0
Failed Completion Operations: 0
Read Operations: 0
Random Read Operations: 0
Read SMB's: 0
Large Read SMB's: 0
Small Read SMB's: 0
Write Operations: 3,178
Random Write Operations: 0
Write SMB's: 0
Large Write SMB's: 0
Small Write SMB's: 0
Raw Reads Denied: 0
Raw Writes Denied: 0
Network Errors: 0
Sessions: 3
Failed Sessions: 0
Reconnects: 0
Core Connects: 0
LM 2.0 Connects: 0
LM 2.x Connects: 0
Windows NT Connects: 2
Server Disconnects: 0
Hung Sessions: 0
Use Count: 0
Failed Use Count: 0
Current Commands: 0
Server File Opens: 432
Server Device Opens: 0
Server Jobs Queued: 0
Server Session Opens: 0
Server Sessions Timed Out: 2
Server Sessions Errored Out: 2
Server Password Errors: 0
Server Permission Errors: 41
Server System Errors: 0
Server Bytes Sent: 98,281,530,640
Server Bytes Received: 98,655,048,478
Server Average Response Time: 0
Server Request Buffers Needed: 0
Server Big Buffers Needed: 0
```

Microsoft Internet Information Server Parameters

```
Key Name:
SYSTEM\CurrentControlSet\Services\InetInfo
Class Name:        <NO CLASS>
Last Write Time:   7/18/97 - 7:33 PM

Key Name:
SYSTEM\CurrentControlSet\Services\InetInfo\Parameters
Class Name:        <NO CLASS>
Last Write Time:   10/19/97 - 3:09 PM
Value 0
  Name:            BandwidthLevel
  Type:            REG_DWORD
  Data:            0xffffffff

Value 1
  Name:            ListenBackLog
  Type:            REG_DWORD
  Data:            0xc1c

Value 2
  Name:            PoolThreadLimit
  Type:            REG_DWORD
  Data:            0x190

Value 3
  Name:            ThreadTimeout
  Type:            REG_DWORD
  Data:            0x15180

Key Name:
SYSTEM\CurrentControlSet\Services\InetInfo\Parameters\F
ilter
Class Name:        <NO CLASS>
Last Write Time:   7/18/97 - 7:33 PM
Value 0
  Name:            FilterType
  Type:            REG_DWORD
  Data:            0

Value 1
  Name:            NumDenySites
  Type:            REG_DWORD
  Data:            0

Value 2
  Name:            NumGrantSites
  Type:            REG_DWORD
  Data:            0
```

```
Key Name:
SYSTEM\CurrentControlSet\Services\InetInfo\Parameters\M
imeMap
Class Name:        <NO CLASS>
Last Write Time:   7/18/97 - 7:33 PM
Value 0
  Name:            application/envoy,evy,,5
  Type:            REG_SZ
  Data:

Value 1
  Name:            application/mac-binhex40,hqx,,4
  Type:            REG_SZ
  Data:

Value 2
  Name:            application/msword,doc,,5
  Type:            REG_SZ
  Data:

Value 3
  Name:            application/msword,dot,,5
  Type:            REG_SZ
  Data:

Value 4
  Name:            application/octet-stream,*,,5
  Type:            REG_SZ
  Data:

Value 5
  Name:            application/octet-stream,bin,,5
  Type:            REG_SZ
  Data:

Value 6
  Name:            application/octet-stream,exe,,5
  Type:            REG_SZ
  Data:

Value 7
  Name:            application/oda,oda,,5
  Type:            REG_SZ
  Data:

Value 8
  Name:            application/pdf,pdf,,5
  Type:            REG_SZ
  Data:

Value 9
  Name:            application/postscript,ai,,5
  Type:            REG_SZ
  Data:

Value 10
  Name:            application/postscript,eps,,5
  Type:            REG_SZ
  Data:

Value 11
  Name:            application/postscript,ps,,5
  Type:            REG_SZ
  Data:

Value 12
  Name:            application/rtf,rtf,,5
  Type:            REG_SZ
  Data:

Value 13
  Name:            application/winhlp,hlp,,5
  Type:            REG_SZ
  Data:

Value 14
  Name:            application/x-bcpio,bcpio,,5
  Type:            REG_SZ
  Data:

Value 15
  Name:            application/x-cpio,cpio,,5
  Type:            REG_SZ
  Data:

Value 16
  Name:            application/x-csh,csh,,5
  Type:            REG_SZ
  Data:

Value 17
  Name:            application/x-director,dcr,,5
  Type:            REG_SZ
  Data:

Value 18
  Name:            application/x-director,dir,,5
  Type:            REG_SZ
  Data:

Value 19
  Name:            application/x-director,dxr,,5
  Type:            REG_SZ
  Data:

Value 20
  Name:            application/x-dvi,dvi,,5
  Type:            REG_SZ
  Data:

Value 21
  Name:            application/x-gtar,gtar,,9
  Type:            REG_SZ
  Data:

Value 22
  Name:            application/x-hdf,hdf,,5
  Type:            REG_SZ
  Data:

Value 23
  Name:            application/x-latex,latex,,5
  Type:            REG_SZ
  Data:

Value 24
  Name:            application/x-msaccess,mdb,,5
  Type:            REG_SZ
  Data:

Value 25
  Name:            application/x-mscardfile,crd,,5
  Type:            REG_SZ
  Data:

Value 26
  Name:            application/x-msclip,clp,,5
  Type:            REG_SZ
  Data:

Value 27
  Name:            application/x-msexcel,xla,,5
  Type:            REG_SZ
  Data:

Value 28
  Name:            application/x-msexcel,xlc,,5
  Type:            REG_SZ
  Data:

Value 29
  Name:            application/x-msexcel,xlm,,5
  Type:            REG_SZ
  Data:

Value 30
  Name:            application/x-msexcel,xls,,5
  Type:            REG_SZ
  Data:

Value 31
  Name:            application/x-msexcel,xlt,,5
  Type:            REG_SZ
  Data:

Value 32
  Name:            application/x-msexcel,xlw,,5
  Type:            REG_SZ
  Data:

Value 33
  Name:            application/x-msmediaview,m13,,5
  Type:            REG_SZ
  Data:

Value 34
  Name:            application/x-msmediaview,m14,,5
  Type:            REG_SZ
  Data:

Value 35
  Name:            application/x-msmetafile,wmf,,5
  Type:            REG_SZ
  Data:

Value 36
  Name:            application/x-msmoney,mny,,5
  Type:            REG_SZ
  Data:

Value 37
  Name:            application/x-mspowerpoint,ppt,,5
  Type:            REG_SZ
  Data:

Value 38
  Name:            application/x-msproject,mpp,,5
  Type:            REG_SZ
  Data:

Value 39
```

```
  Name:           application/x-mspublisher,pub,,5
  Type:           REG_SZ
  Data:

Value 40
  Name:           application/x-msterminal,trm,,5
  Type:           REG_SZ
  Data:

Value 41
  Name:           application/x-msworks,wks,,5
  Type:           REG_SZ
  Data:

Value 42
  Name:           application/x-mswrite,wri,,5
  Type:           REG_SZ
  Data:

Value 43
  Name:           application/x-netcdf,cdf,,5
  Type:           REG_SZ
  Data:

Value 44
  Name:           application/x-netcdf,nc,,5
  Type:           REG_SZ
  Data:

Value 45
  Name:           application/x-perfmon,pma,,5
  Type:           REG_SZ
  Data:

Value 46
  Name:           application/x-perfmon,pmc,,5
  Type:           REG_SZ
  Data:

Value 47
  Name:           application/x-perfmon,pml,,5
  Type:           REG_SZ
  Data:

Value 48
  Name:           application/x-perfmon,pmr,,5
  Type:           REG_SZ
  Data:

Value 49
  Name:           application/x-perfmon,pmw,,5
  Type:           REG_SZ
  Data:

Value 50
  Name:           application/x-sh,sh,,5
  Type:           REG_SZ
  Data:

Value 51
  Name:           application/x-shar,shar,,5
  Type:           REG_SZ
  Data:

Value 52
  Name:           application/x-sv4cpio,sv4cpio,,5
  Type:           REG_SZ
  Data:

Value 53
  Name:           application/x-sv4crc,sv4crc,,5
  Type:           REG_SZ
  Data:

Value 54
  Name:           application/x-tar,tar,,5
  Type:           REG_SZ
  Data:

Value 55
  Name:           application/x-tcl,tcl,,5
  Type:           REG_SZ
  Data:

Value 56
  Name:           application/x-tex,tex,,5
  Type:           REG_SZ
  Data:

Value 57
  Name:           application/x-texinfo,texi,,5
  Type:           REG_SZ
  Data:

Value 58
  Name:           application/x-texinfo,texinfo,,5
  Type:           REG_SZ
  Data:

Value 59
  Name:           application/x-troff,roff,,5
  Type:           REG_SZ
  Data:

Value 60
  Name:           application/x-troff,t,,5
  Type:           REG_SZ
  Data:

Value 61
  Name:           application/x-troff,tr,,5
  Type:           REG_SZ
  Data:

Value 62
  Name:           application/x-troff-man,man,,5
  Type:           REG_SZ
  Data:

Value 63
  Name:           application/x-troff-me,me,,5
  Type:           REG_SZ
  Data:

Value 64
  Name:           application/x-troff-ms,ms,,5
  Type:           REG_SZ
  Data:

Value 65
  Name:           application/x-ustar,ustar,,5
  Type:           REG_SZ
  Data:

Value 66
  Name:           application/x-wais-source,src,,7
  Type:           REG_SZ
  Data:

Value 67
  Name:           application/zip,zip,,9
  Type:           REG_SZ
  Data:

Value 68
  Name:           audio/basic,au,,<
  Type:           REG_SZ
  Data:

Value 69
  Name:           audio/basic,snd,,<
  Type:           REG_SZ
  Data:

Value 70
  Name:           audio/x-aiff,aif,,<
  Type:           REG_SZ
  Data:

Value 71
  Name:           audio/x-aiff,aifc,,<
  Type:           REG_SZ
  Data:

Value 72
  Name:           audio/x-aiff,aiff,,<
  Type:           REG_SZ
  Data:

Value 73
  Name:           audio/x-pn-realaudio,ram,,<
  Type:           REG_SZ
  Data:

Value 74
  Name:           audio/x-wav,wav,,<
  Type:           REG_SZ
  Data:

Value 75
  Name:           image/bmp,bmp,,:
  Type:           REG_SZ
  Data:

Value 76
  Name:           image/cis-cod,cod,,5
  Type:           REG_SZ
  Data:

Value 77
  Name:           image/gif,gif,,g
  Type:           REG_SZ
  Data:

Value 78
  Name:           image/ief,ief,,:
  Type:           REG_SZ
  Data:

Value 79
  Name:           image/jpeg,jpe,,:
  Type:           REG_SZ
```

```
  Data:

Value 80
  Name:           image/jpeg,jpeg,,:
  Type:           REG_SZ
  Data:

Value 81
  Name:           image/jpeg,jpg,,:
  Type:           REG_SZ
  Data:

Value 82
  Name:           image/tiff,tif,,:
  Type:           REG_SZ
  Data:

Value 83
  Name:           image/tiff,tiff,,:
  Type:           REG_SZ
  Data:

Value 84
  Name:           image/x-cmu-raster,ras,,:
  Type:           REG_SZ
  Data:

Value 85
  Name:           image/x-cmx,cmx,,5
  Type:           REG_SZ
  Data:

Value 86
  Name:           image/x-portable-anymap,pnm,,:
  Type:           REG_SZ
  Data:

Value 87
  Name:           image/x-portable-bitmap,pbm,,:
  Type:           REG_SZ
  Data:

Value 88
  Name:           image/x-portable-graymap,pgm,,:
  Type:           REG_SZ
  Data:

Value 89
  Name:           image/x-portable-pixmap,ppm,,:
  Type:           REG_SZ
  Data:

Value 90
  Name:           image/x-rgb,rgb,,:
  Type:           REG_SZ
  Data:

Value 91
  Name:           image/x-xbitmap,xbm,,:
  Type:           REG_SZ
  Data:

Value 92
  Name:           image/x-xpixmap,xpm,,:
  Type:           REG_SZ
  Data:

Value 93
  Name:           image/x-xwindowdump,xwd,,:
  Type:           REG_SZ
  Data:

Value 94
  Name:           text/html,htm,,h
  Type:           REG_SZ
  Data:

Value 95
  Name:           text/html,html,,h
  Type:           REG_SZ
  Data:

Value 96
  Name:           text/html,stm,,h
  Type:           REG_SZ
  Data:

Value 97
  Name:           text/plain,bas,,0
  Type:           REG_SZ
  Data:

Value 98
  Name:           text/plain,c,,0
  Type:           REG_SZ
  Data:

Value 99
  Name:           text/plain,h,,0
  Type:           REG_SZ
  Data:

Value 100
  Name:           text/plain,txt,,0
  Type:           REG_SZ
  Data:

Value 101
  Name:           text/richtext,rtx,,0
  Type:           REG_SZ
  Data:

Value 102
  Name:           text/tab-separated-values,tsv,,0
  Type:           REG_SZ
  Data:

Value 103
  Name:           text/x-setext,etx,,0
  Type:           REG_SZ
  Data:

Value 104
  Name:           video/mpeg,mpe,,;
  Type:           REG_SZ
  Data:

Value 105
  Name:           video/mpeg,mpeg,,;
  Type:           REG_SZ
  Data:

Value 106
  Name:           video/mpeg,mpg,,;
  Type:           REG_SZ
  Data:

Value 107
  Name:           video/quicktime,mov,,;
  Type:           REG_SZ
  Data:

Value 108
  Name:           video/quicktime,qt,,;
  Type:           REG_SZ
  Data:

Value 109
  Name:           video/x-msvideo,avi,,<
  Type:           REG_SZ
  Data:

Value 110
  Name:           video/x-sgi-movie,movie,,<
  Type:           REG_SZ
  Data:

Value 111
  Name:           x-world/x-vrml,flr,,5
  Type:           REG_SZ
  Data:

Value 112
  Name:           x-world/x-vrml,wrl,,5
  Type:           REG_SZ
  Data:

Value 113
  Name:           x-world/x-vrml,wrz,,5
  Type:           REG_SZ
  Data:

Value 114
  Name:           x-world/x-vrml,xaf,,5
  Type:           REG_SZ
  Data:

Value 115
  Name:           x-world/x-vrml,xof,,5
  Type:           REG_SZ
  Data:


Key Name:
SYSTEM\CurrentControlSet\Services\InetInfo\Performance
Class Name:       <NO CLASS>
Last Write Time:  7/18/97 - 7:33 PM
Value 0
  Name:           Close
  Type:           REG_SZ
  Data:           CloseINFOPerformanceData

Value 1
  Name:           Collect
  Type:           REG_SZ
  Data:           CollectINFOPerformanceData

Value 2
  Name:           First Counter
  Type:           REG_DWORD
  Data:           0x738
```

```
Value 3
  Name:            First Help
  Type:            REG_DWORD
  Data:            0x739

Value 4
  Name:            Last Counter
  Type:            REG_DWORD
  Data:            0x756

Value 5
  Name:            Last Help
  Type:            REG_DWORD
  Data:            0x757

Value 6
  Name:            Library
  Type:            REG_SZ
  Data:            infoctrs.DLL

Value 7
  Name:            Open
  Type:            REG_SZ
  Data:            OpenINFOPerformanceData
```

Tuxedo Parameters

```
Key Name:          SOFTWARE\BEA Systems
Class Name:        <NO CLASS>
Last Write Time:   9/23/97 - 10:29 PM

Key Name:          SOFTWARE\BEA Systems\TUXEDO
Class Name:        <NO CLASS>
Last Write Time:   9/23/97 - 10:29 PM

Key Name:          SOFTWARE\BEA Systems\TUXEDO\6.3
Class Name:        <NO CLASS>
Last Write Time:   9/23/97 - 10:29 PM
Value 0
  Name:            Company_Name
  Type:            REG_SZ
  Data:            axil

Value 1
  Name:            Install_Date
  Type:            REG_SZ
  Data:            9-23-1997

Value 2
  Name:            License_Token
  Type:            REG_DWORD
  Data:            0

Value 3
  Name:            Major_Version
  Type:            REG_DWORD
  Data:            0x6

Value 4
  Name:            Minor_Version
  Type:            REG_DWORD
  Data:            0x3

Value 5
  Name:            Serial_Number
  Type:            REG_DWORD
  Data:            0

Value 6
  Name:            User_Name
  Type:            REG_SZ
  Data:            test 1

Value 7
  Name:            Volume_Number
  Type:            REG_DWORD
  Data:            0x1


Key Name:          SOFTWARE\BEA
Systems\TUXEDO\6.3\Developer
Class Name:        <NO CLASS>
Last Write Time:   9/23/97 - 10:30 PM

Key Name:          SOFTWARE\BEA
Systems\TUXEDO\6.3\Developer\Libraries
Class Name:        <NO CLASS>
Last Write Time:   9/23/97 - 10:30 PM

Key Name:          SOFTWARE\BEA
Systems\TUXEDO\6.3\Developer\Libraries\All
Class Name:        <NO CLASS>
Last Write Time:   9/23/97 - 10:30 PM

Key Name:          SOFTWARE\BEA
Systems\TUXEDO\6.3\Developer\Libraries\All\libfml.lib
Class Name:        <NO CLASS>
Last Write Time:   9/23/97 - 10:30 PM

Key Name:          SOFTWARE\BEA
Systems\TUXEDO\6.3\Developer\Libraries\All\libfml32.lib
Class Name:        <NO CLASS>
Last Write Time:   9/23/97 - 10:30 PM

Key Name:          SOFTWARE\BEA
Systems\TUXEDO\6.3\Developer\Libraries\All\libgp.lib
Class Name:        <NO CLASS>
Last Write Time:   9/23/97 - 10:30 PM

Key Name:          SOFTWARE\BEA
Systems\TUXEDO\6.3\Developer\Libraries\Client
Class Name:        <NO CLASS>
Last Write Time:   9/23/97 - 10:30 PM

Key Name:          SOFTWARE\BEA
Systems\TUXEDO\6.3\Developer\Libraries\Client\libbuft.l
ib
Class Name:        <NO CLASS>
Last Write Time:   9/23/97 - 10:30 PM

Key Name:          SOFTWARE\BEA
Systems\TUXEDO\6.3\Developer\Libraries\Client\libtux.li
b
Class Name:        <NO CLASS>
Last Write Time:   9/23/97 - 10:30 PM

Key Name:          SOFTWARE\BEA
Systems\TUXEDO\6.3\Developer\Libraries\Client\libtux2.l
ib
Class Name:        <NO CLASS>
Last Write Time:   9/23/97 - 10:30 PM

Key Name:          SOFTWARE\BEA
Systems\TUXEDO\6.3\Developer\Libraries\Server
Class Name:        <NO CLASS>
Last Write Time:   9/23/97 - 10:30 PM

Key Name:          SOFTWARE\BEA
Systems\TUXEDO\6.3\Developer\Libraries\Server\libbuft.l
ib
Class Name:        <NO CLASS>
Last Write Time:   9/23/97 - 10:30 PM

Key Name:          SOFTWARE\BEA
Systems\TUXEDO\6.3\Developer\Libraries\Server\libtux.li
b
Class Name:        <NO CLASS>
Last Write Time:   9/23/97 - 10:30 PM

Key Name:          SOFTWARE\BEA
Systems\TUXEDO\6.3\Developer\Libraries\Server\libtux2.l
ib
Class Name:        <NO CLASS>
Last Write Time:   9/23/97 - 10:30 PM

Key Name:          SOFTWARE\BEA
Systems\TUXEDO\6.3\Developer\Libraries\Workstation
Class Name:        <NO CLASS>
Last Write Time:   9/23/97 - 10:30 PM

Key Name:          SOFTWARE\BEA
Systems\TUXEDO\6.3\Developer\Libraries\Workstation\libb
uft.lib
Class Name:        <NO CLASS>
Last Write Time:   9/23/97 - 10:30 PM

Key Name:          SOFTWARE\BEA
Systems\TUXEDO\6.3\Developer\Libraries\Workstation\libn
wi.lib
Class Name:        <NO CLASS>
Last Write Time:   9/23/97 - 10:30 PM

Key Name:          SOFTWARE\BEA
Systems\TUXEDO\6.3\Developer\Libraries\Workstation\libn
ws.lib
Class Name:        <NO CLASS>
Last Write Time:   9/23/97 - 10:30 PM

Key Name:          SOFTWARE\BEA
Systems\TUXEDO\6.3\Developer\Libraries\Workstation\libw
sc.lib
Class Name:        <NO CLASS>
Last Write Time:   9/23/97 - 10:30 PM

Key Name:          SOFTWARE\BEA
Systems\TUXEDO\6.3\Environment
Class Name:        <NO CLASS>
Last Write Time:   9/26/97 - 4:50 PM
Value 0
  Name:            NLSPATH
  Type:            REG_SZ
  Data:            C:\TUXEDO\locale\C

Value 1
  Name:            TUXDIR
```

```
  Type:             REG_SZ
  Data:             C:\TUXEDO

Value 2
  Name:             TUXIPC_MSG_BYTES
  Type:             REG_DWORD
  Data:             0x10000

Value 3
  Name:             TUXIPC_MSG_HDRS
  Type:             REG_DWORD
  Data:             0x1fc0

Value 4
  Name:             TUXIPC_MSG_QUEUE_BYTES
  Type:             REG_DWORD
  Data:             0x10000

Value 5
  Name:             TUXIPC_MSG_QUEUES
  Type:             REG_DWORD
  Data:             0x200

Value 6
  Name:             TUXIPC_MSG_SEG_BYTES
  Type:             REG_DWORD
  Data:             0x40

Value 7
  Name:             TUXIPC_MSG_SEGS
  Type:             REG_DWORD
  Data:             0x7fff

Value 8
  Name:             TUXIPC_PROC
  Type:             REG_DWORD
  Data:             0x400

Value 9
  Name:             TUXIPC_SEM
  Type:             REG_DWORD
  Data:             0x800

Value 10
  Name:             TUXIPC_SEM_IDS
  Type:             REG_DWORD
  Data:             0x800

Value 11
  Name:             TUXIPC_SEM_UNDO
  Type:             REG_DWORD
  Data:             0x800

Value 12
  Name:             TUXIPC_SHM_PROCS
  Type:             REG_DWORD
  Data:             0x1f4

Value 13
  Name:             TUXIPC_SHM_SEGS
  Type:             REG_DWORD
  Data:             0x32

Value 14
  Name:             ULOGDIR
  Type:             REG_SZ
  Data:             C:\TUXEDO

Value 15
  Name:             ULOGOUT
  Type:             REG_DWORD
  Data:             0x1

Value 16
  Name:             ULOGPFX
  Type:             REG_SZ
  Data:             C:\TUXEDO\ULOG


Key Name:           SOFTWARE\BEA
Systems\TUXEDO\6.3\Environment\Services
Class Name:         <NO CLASS>
Last Write Time:    9/23/97 - 10:30 PM

Key Name:           SOFTWARE\BEA
Systems\TUXEDO\6.3\Environment\Services\3050
Class Name:         <NO CLASS>
Last Write Time:    9/23/97 - 10:30 PM

Key Name:           SOFTWARE\BEA
Systems\TUXEDO\6.3\IPCResources
Class Name:         <NO CLASS>
Last Write Time:    9/26/97 - 4:50 PM
Value 0
  Name:             LastSelection
  Type:             REG_SZ
  Data:             tpc


Key Name:           SOFTWARE\BEA
Systems\TUXEDO\6.3\IPCResources\tpc
Class Name:         <NO CLASS>
Last Write Time:    9/26/97 - 4:50 PM
Value 0
  Name:             TUXIPC_MSG_BYTES
  Type:             REG_DWORD
  Data:             0x10000

Value 1
  Name:             TUXIPC_MSG_HDRS
  Type:             REG_DWORD
  Data:             0x1fc0

Value 2
  Name:             TUXIPC_MSG_QUEUE_BYTES
  Type:             REG_DWORD
  Data:             0x10000

Value 3
  Name:             TUXIPC_MSG_QUEUES
  Type:             REG_DWORD
  Data:             0x200

Value 4
  Name:             TUXIPC_MSG_SEG_BYTES
  Type:             REG_DWORD
  Data:             0x40

Value 5
  Name:             TUXIPC_MSG_SEGS
  Type:             REG_DWORD
  Data:             0x7fff

Value 6
  Name:             TUXIPC_PROC
  Type:             REG_DWORD
  Data:             0x400

Value 7
  Name:             TUXIPC_SEM
  Type:             REG_DWORD
  Data:             0x800

Value 8
  Name:             TUXIPC_SEM_IDS
  Type:             REG_DWORD
  Data:             0x800

Value 9
  Name:             TUXIPC_SEM_UNDO
  Type:             REG_DWORD
  Data:             0x800

Value 10
  Name:             TUXIPC_SHM_PROCS
  Type:             REG_DWORD
  Data:             0x1f4

Value 11
  Name:             TUXIPC_SHM_SEGS
  Type:             REG_DWORD
  Data:             0x32


Key Name:           SOFTWARE\BEA
Systems\TUXEDO\6.3\SECURITY
Class Name:         <NO CLASS>
Last Write Time:    9/23/97 - 10:30 PM
```

Appendix C – Tunable Parameters

Microsoft Web Service Parameters

```
Key Name:
SYSTEM\CurrentControlSet\Services\W3SVC
Class Name:         <NO CLASS>
Last Write Time:    9/24/97 - 3:22 PM
Value 0
  Name:             DependOnGroup
  Type:             REG_MULTI_SZ
  Data:

Value 1
  Name:             DependOnService
  Type:             REG_MULTI_SZ
  Data:             RPCSS
                    NTLMSSP


Value 2
  Name:             DisplayName
  Type:             REG_SZ
  Data:             World Wide Web Publishing Service

Value 3
  Name:             ErrorControl
  Type:             REG_DWORD
  Data:             0

Value 4
  Name:             ImagePath
  Type:             REG_EXPAND_SZ
  Data:
C:\WINNT\System32\inetsrv\inetinfo.exe

Value 5
  Name:             ObjectName
  Type:             REG_SZ
  Data:             LocalSystem

Value 6
  Name:             Start
  Type:             REG_DWORD
  Data:             0x2

Value 7
  Name:             Type
  Type:             REG_DWORD
  Data:             0x20


Key Name:
SYSTEM\CurrentControlSet\Services\W3SVC\Enum
Class Name:         <NO CLASS>
Last Write Time:    11/9/97 - 8:49 PM
Value 0
  Name:             0
  Type:             REG_SZ
  Data:             Root\LEGACY_W3SVC\0000

Value 1
  Name:             Count
  Type:             REG_DWORD
  Data:             0x1

Value 2
  Name:             NextInstance
  Type:             REG_DWORD
  Data:             0x1


Key Name:
SYSTEM\CurrentControlSet\Services\W3SVC\Parameters
Class Name:         <NO CLASS>
Last Write Time:    9/24/97 - 5:42 PM
Value 0
  Name:             AcceptExOutstanding
  Type:             REG_DWORD
  Data:             0x800

Value 1
  Name:             AccessDeniedMessage
  Type:             REG_SZ
  Data:             Error: Access is Denied.

Value 2
  Name:             AdminEmail
  Type:             REG_SZ
  Data:             Admin@corp.com

Value 3
  Name:             AdminName
  Type:             REG_SZ
  Data:             Administrator

Value 4
  Name:             AnonymousUserName
  Type:             REG_SZ
  Data:             IUSR_CLIENTB

Value 5
  Name:             Authorization
  Type:             REG_DWORD
  Data:             0x5

Value 6
  Name:             CacheExtensions
  Type:             REG_DWORD
  Data:             0x1

Value 7
  Name:             CheckForWAISDB
  Type:             REG_DWORD
  Data:             0

Value 8
  Name:             ConnectionTimeOut
  Type:             REG_DWORD
  Data:             0x2260

Value 9
  Name:             DebugFlags
  Type:             REG_DWORD
  Data:             0x8

Value 10
  Name:             Default Load File
  Type:             REG_SZ
  Data:             Default.htm

Value 11
  Name:             Dir Browse Control
  Type:             REG_DWORD
  Data:             0x4000001e

Value 12
  Name:             Filter DLLs
  Type:             REG_SZ
  Data:
C:\WINNT\System32\inetsrv\sspifilt.dll

Value 13
  Name:             GlobalExpire
  Type:             REG_DWORD
  Data:             0xffffffff

Value 14
  Name:             InstallPath
  Type:             REG_SZ
  Data:             C:\WINNT\System32\inetsrv

Value 15
  Name:             LogFileDirectory
  Type:             REG_EXPAND_SZ
  Data:             %SystemRoot%\System32\LogFiles

Value 16
  Name:             LogFileFormat
  Type:             REG_DWORD
  Data:             0

Value 17
  Name:             LogFilePeriod
  Type:             REG_DWORD
  Data:             0x1

Value 18
  Name:             LogFileTruncateSize
  Type:             REG_DWORD
  Data:             0x1388000

Value 19
  Name:             LogSqlDataSource
  Type:             REG_SZ
  Data:             HTTPLOG

Value 20
  Name:             LogSqlPassword
  Type:             REG_SZ
  Data:             sqllog

Value 21
  Name:             LogSqlTableName
  Type:             REG_SZ
  Data:             Internetlog

Value 22
  Name:             LogSqlUserName
  Type:             REG_SZ
  Data:             InternetAdmin

Value 23
  Name:             LogType
  Type:             REG_DWORD
  Data:             0
```

```
Value 24
  Name:            MajorVersion
  Type:            REG_DWORD
  Data:            0x2

Value 25
  Name:            MaxConnections
  Type:            REG_DWORD
  Data:            0x186a0

Value 26
  Name:            MinorVersion
  Type:            REG_DWORD
  Data:            0

Value 27
  Name:            NTAuthenticationProviders
  Type:            REG_SZ
  Data:            NTLM

Value 28
  Name:            ScriptTimeout
  Type:            REG_DWORD
  Data:            0x384

Value 29
  Name:            SecurePort
  Type:            REG_DWORD
  Data:            0x1bb

Value 30
  Name:            ServerComment
  Type:            REG_SZ
  Data:

Value 31
  Name:            ServerSideIncludesEnabled
  Type:            REG_DWORD
  Data:            0x1

Value 32
  Name:            ServerSideIncludesExtension
  Type:            REG_SZ
  Data:            .stm


Key Name:
SYSTEM\CurrentControlSet\Services\W3SVC\Parameters\Scri
pt Map
Class Name:        <NO CLASS>
Last Write Time:   7/18/97 - 7:33 PM
Value 0
  Name:            .idc
  Type:            REG_SZ
  Data:
C:\WINNT\System32\inetsrv\httpodbc.dll


Key Name:
SYSTEM\CurrentControlSet\Services\W3SVC\Parameters\Virt
ual Roots
Class Name:        <NO CLASS>
Last Write Time:   9/23/97 - 9:46 PM
Value 0
  Name:            /,
  Type:            REG_SZ
  Data:            C:\InetPub\wwwroot,,5

Value 1
  Name:            /iisadmin,
  Type:            REG_SZ
  Data:
C:\WINNT\System32\inetsrv\iisadmin,,1

Value 2
  Name:            /Scripts,
  Type:            REG_SZ
  Data:            C:\InetPub\scripts,,4


Key Name:
SYSTEM\CurrentControlSet\Services\W3SVC\Performance
Class Name:        <NO CLASS>
Last Write Time:   7/18/97 - 7:33 PM
Value 0
  Name:            Close
  Type:            REG_SZ
  Data:            CloseW3PerformanceData

Value 1
  Name:            Collect
  Type:            REG_SZ
  Data:            CollectW3PerformanceData

Value 2
  Name:            First Counter
  Type:            REG_DWORD
  Data:            0x758

Value 3
  Name:            First Help
  Type:            REG_DWORD
  Data:            0x759

Value 4
  Name:            Last Counter
  Type:            REG_DWORD
  Data:            0x790

Value 5
  Name:            Last Help
  Type:            REG_DWORD
  Data:            0x791

Value 6
  Name:            Library
  Type:            REG_SZ
  Data:            w3ctrs.DLL

Value 7
  Name:            Open
  Type:            REG_SZ
  Data:            OpenW3PerformanceData


Key Name:
SYSTEM\CurrentControlSet\Services\W3SVC\Security
Class Name:        <NO CLASS>
Last Write Time:   7/18/97 - 7:33 PM
Value 0
  Name:            Security
  Type:            REG_BINARY
  Data:
00000000   01 00 14 80 c0 00 00 00 - cc 00 00 00 14 00
00 00  ................
00000010   34 00 00 00 02 00 20 00 - 01 00 00 00 02 80
18 00  4..... ........
00000020   ff 01 0f 00 01 01 00 00 - 00 00 00 01 00 00
00 00  ................
00000030   20 02 00 00 02 00 8c 00 - 05 00 00 00 00 00
18 00   ...............
00000040   8d 01 02 00 01 01 00 00 - 00 00 00 01 00 00
00 00  ................
00000050   00 00 14 00 00 00 1c 00 - fd 01 02 00 01 02
00 00  ................
00000060   00 00 00 05 20 00 00 00 - 23 02 00 00 c8 00
14 00  .... ...#.......
00000070   00 00 1c 00 ff 01 0f 00 - 01 02 00 00 00 00
00 05  ................
00000080   20 00 00 00 20 02 00 00 - c8 00 14 00 00 00
1c 00   ... ...........
00000090   ff 01 0f 00 01 02 00 00 - 00 00 00 05 20 00
00 00  ............ ...
000000a0   25 02 00 00 c8 00 14 00 - 00 00 18 00 fd 01
02 00  %...............
000000b0   01 01 00 00 00 00 00 05 - 12 00 00 00 25 02
00 00  ............%...
000000c0   01 01 00 00 00 00 00 05 - 12 00 00 00 01 01
00 00  ................
000000d0   00 00 00 05 12 00 00 00 -
........
```

Tpcc Registry Parameters

```
Key Name:        SOFTWARE\Microsoft\TPCC
Class Name:      <NO CLASS>
Last Write Time: 10/18/97 - 7:47 PM
Value 0
  Name:          BackoffDelay
  Type:          REG_SZ
  Data:          500

Value 1
  Name:          ConnectionPooling
  Type:          REG_SZ
  Data:          OFF

Value 2
  Name:          ConnectionPoolRetryTime
  Type:          REG_SZ
  Data:          0

Value 3
  Name:          DeadlockRetry
  Type:          REG_SZ
  Data:          3

Value 4
  Name:          DEBUG
  Type:          REG_SZ
```

```
 Data:      OFF

Value 5
 Name:      LastInstalledVersion
 Type:      REG_SZ
 Data:      ODBC

Value 6
 Name:      LOG
 Type:      REG_SZ
 Data:      OFF

Value 7
 Name:      MaxConnections
 Type:      REG_SZ
 Data:      3072

Value 8
 Name:      MaximumWarehouses
 Type:      REG_SZ
 Data:      1300

Value 9
 Name:      NumberOfDeliveryThreads
 Type:      REG_SZ
 Data:      7

Value 10
 Name:      PATH
 Type:      REG_SZ
 Data:      C:\InetPub\wwwroot\
```

Tuxedo Configuration file

```
*RESOURCES
IPCKEY 133133

MAXACCESSERS 2000
MAXSERVERS 55
MAXSERVICES 2000
MODEL SHM
MASTER CLIENTB
LDBAL Y
SCANUNIT 15
BLOCKTIME 60
BBLQUERY 60

*MACHINES
DEFAULT:

"CLIENTB" LMID= CLIENTB
          TUXDIR="C:\Tuxedo"
          APPDIR="c:\inetpub\wwwroot"
          TUXCONFIG="c:\inetpub\wwwroot\tuxconfig"
          ULOGPFX="c:\inetpub\wwwroot\ULOG"
          TYPE="WinNT"
          UID= 0
          GID= 0

*GROUPS
GROUPNO
          LMID=CLIENTB GRPNO=1 OPENINFO=NONE

GROUPPAY
          LMID=CLIENTB GRPNO=2 OPENINFO=NONE

GROUPOS
          LMID=CLIENTB GRPNO=3 OPENINFO=NONE

GROUPSL
          LMID=CLIENTB GRPNO=4 OPENINFO=NONE

GROUPDEL
          LMID=CLIENTB GRPNO=5 OPENINFO=NONE

*SERVERS
DEFAULT:

neworder SRVGRP=GROUPNO
          SRVID=100
          MIN=17 MAX=20
          CLOPT="-A -- -Scoriander"
          RQADDR=newq REPLYQ=Y

payment SRVGRP=GROUPPAY
          SRVID=200
          MIN=10 MAX=20
          CLOPT="-A -- -Scoriander"
          RQADDR=payq REPLYQ=Y

orderstatus SRVGRP=GROUPOS
          SRVID=300
          MIN=3 MAX=10
          CLOPT="-A -- -Scoriander"
          RQADDR=ordq REPLYQ=Y

stocklevel SRVGRP=GROUPSL
          SRVID=400
          MIN=13 MAX=20
          CLOPT="-A -- -Scoriander"
          RQADDR=stkq REPLYQ=Y

delivery SRVGRP=GROUPDEL
          SRVID=500
          MIN=4 MAX=10
          CLOPT="-A -- -Scoriander -F"
          RQADDR=delq REPLYQ=N


*SERVICES
```

Appendix D– Disk Storage

Note : Numbers are in KBytes unless otherwise specified							
Warehouses	1200	**tpmC**	14501	**tpmC/W**	12.08		
Table	**Rows**	**Data**	**Index**	**5% Space**	**8H Space**	**Total Space**	
Warehouse	1,200	2,400	14	121		2,535	
District	12,000	24,000	100	1,205		25,305	
Item	100,000	9,100	46	210		9,356	
New-order	10,800,000	120,000	730		24,000	144,730	
History	36,000,000	1,800,002	0		290,028	2,090,030	
Orders	36,000,000	936,000	5,644		151,724	1,093,368	
Customer	36,000,000	24,004,800	1,863,104	594,962		26,462,866	
Order-line	360,002,793	20,011,816	130,802		3,245,506	23,388,124	
Stock	120,000,000	40,008,000	221,046	925,268		41,154,314	
Totals		86,916,118	2,221,486	1,521,766	3,711,257	94,370,627	
Segment	**LogDev Cnt.**	**Seg. Size**	**Needed**	**Overhead**		**Not Needed**	
wdino,ord,hist	1	5,632,000	183,745	1,837		5,446,417	
cust/stk	8	85,504,000	26,727,494	267,275		58,509,231	
order_line	1	28,160,000	23,622,005	236,220		4,301,775	
Totals		119,296,000	50,533,245	505,332		68,257,423	
Dynamic space	22,133,627	Sum of Data for Order, Order-Line and History (excluding free extents)					
Static space	69,031,075	Data + Index + 5% Space + Overhead - Dynamic space					
Free space	(40,126,125)	Total Seg. Size - Dynamic Space - Static Space - Not Needed					
Daily growth	4,279,463	(Dynamic space/W * 62.5)* tpmC					
Daily spread	(46,545,320)	Free space - 1.5 * Daily growth (zero if negative)					
180 day (KB)	839,334,413	Static space + 180 (daily growth + daily spread)					
180 day (GB)	800.45	Excludes OS, Paging and RDBMS Logs					
8 Hour Log (GB)	38.80 GB	(not including mirror)					
Available log	64 GB	(not including mirror)					

Appendix E– Price Quotations

www.netlux.com

NETLUX

14180 Live Oak Ave., Unit E
Baldwin Park, Ca. 91760

1-800-789-1780
Phone #626-851-9737
Fax #626-851-9837

October 31, 1997

AXIL Computer Copr.
Dean Sales

Quotation

Quantity	Part No.	Description	Unit Price	Total
3	NX-H8TX	8-port 100Mbps FAST Ethernet Hub	$299.00	$ 897.00
1500	NX-H9+	9-port 10Mbps Ethernet Hub	$49.00	$73,500.00

Terms and Conditions:
FOB Origin
5 Year Warranty
Prices good for 60 Days

Sincerely,
Martin Parry
NETLUX

SYMBIOS
LOGIC

Symbios Logic Host Adapter Warranty

If you acquired a Symbios Logic Inc ("SYMBIOS") host adapter board product directly from an authorized SYMBIOS distributor, SYMBIOS warrants to you that the SYMBIOS product will conform to SYMBIOS' published specifications for five years from the date you receive the SYMBIOS product from the authorized distributor. This warranty shall not apply to any product which has been misused or abused (including without limitation static discharge, neglect, accident, or modification) or which has been soldered or altered during assembly and which SYMBIOS cannot test under its normal test conditions.

To make a claim under this warranty, you must notify SYMBIOS in writing of the nonconformity before the expiration of the warranty period and fully comply with SYMBIOS' instructions for the disposition of the product. If SYMBIOS determines that the product is nonconforming and that the product is not subject to one of the exclusions listed above, SYMBIOS will, at its sole option, either replace the product without charge to you. or refunding you for the nonconforming product SYMBIOS warrants each replacement product only for the unexpired term of the warranty of the product it replaces. Furnishing a replacement product or refunding you for the nonconforming product are SYMBIOS' sole obligations and your exclusive remedies for nonconforming products.

THE FOREGOING WARRANTY AND REMEDIES ARE EXCLUSIVE. SYMBIOS DISCLAIMS ALL OTHER WARRANTIES, EXPRESS AND IMPLIED, INCLUDING THE IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, AND ANY WARRANTIES ARISING FROM A COURSE OF PERFORMANCE, A COURSE OF DEALING, OR TRADE USAGE. SYMBIOS DOES NOT WARRANT THAT THE OPERATION OF THE PRODUCTS WILL BE UNINTERRUPTED OR ERROR FREE. YOU AGREE TO RELEASE SYMBIOS FROM ALL LIABILITY FOR CONSEQUENTIAL, INCIDENTAL, SPECIAL, AND OTHER INDIRECT DAMAGES, INCLUDING WITHOUT LIMITATION LOST PROFITS.

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4420 ArrowsWest Drive
Colorado Springs, Colorado 80907-3444
719-533-7000

OCT 30 '97 05:09PM ANTHEM P.1

Anthem
Anthem Electronics, Inc.
200 Research Drive
Wilmington, MA 01887
(978)-657-5170
FAX: (978)-657-6008

ATTN: Corea
COMPANY: Axil
DATE: 10/30/97
PGS TO FOLLOW: 8
FAX NUMBER: 1-508-371-8605
FROM: Sue Landry
ANTHEM FAX # (978)-657-6008
COMMENTS: Hi Corea.
Symbios you were looking into.
(4) SYM22802 Dual PCI-
Ultra SCSI 2-4 wks
@ 381.25

IF THIS FAX DID NOT TRANSFER WELL,
OR IF YOU HAVE ANY QUESTIONS,
PLEASE DO NOT HESITATE TO CALL 1-800-359-3511.
Thank You.

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CYPRESS SEMICONDUCTOR
FAIRCHILD
LUCENT TECHNOLOGIES
MICROCHIP TECHNOLOGY
MICRON
NATIONAL SEMICONDUCTOR
PHILIPS
QUICKLOGIC
RADISYS
SYMBIOS LOGIC
TEMIC
TEXAS INSTRUMENTS
VANTIS
VECTRON
ZILOG

SUBSYSTEMS:

ADAPTEC
ADIC
EXABYTE
HEWLETT-PACKARD
IBM
INTEL
LEGATO
MEGADRIVE
METASTOR
MITSUBISHI
MYLEX
PLEXTOR
SANDISK
SEAGATE
TECMAR
WESTERN DIGITAL

COMPLEMENTARY LINES:

FUJITSU (FPD's)
MICROSOFT
PHOENIX TECHNOLOGIES (SOFTWARE)
SYNARIO DESIGN AUTOMATION

fxcov.doc 9/3/97

11/07/97 FRI 11:31 FAX 6179374898 COMPUSA.WOBURN ☑002

COMPUSA OFFERS OVER 100 DIFFERENT CLASSES ON NETWORKING, PC & MAC BASED APPLICATIONS. CALL YOUR REP FOR OUR MOST CURRENT SCHEDULE

PROPOSAL

TO..	CUSTOMER:	AXIL COMPUTER	00069189 Order# C
	CONTACT:	MARIA NICOLAU	130C BAKER AVE
	PHONE:	(508)371-8110	
	FAX #:	(508)670-5637	CONCORD, MA 01742

DATE SUBMITTED: 11/07/97 **QUOTE NO.: 45296** **QUOTE VALID FOR 30 Days**

PRODUCT PRICING AND INFORMATION

PRODUCT CODE	PRODUCT DESCRIPTION	REQ. QTY	UNIT PRICE	EXTENDED PRICE
818075	COMPAQ PRESARIO 256MB	8	3,696.52	29,572.16
159757	CMPQ 4824 PII233 32/6.5	8	1,778.65	
132471	RIC 14" .28NI ANALOG MON	8	132.22	
163671	KING 16MX3260NS TIN-64MB	32	306.67	
138069	3COM ELINK XL PCI 10/100	~~8~~	89.00	
105863	5YEAR ONSITE PARTS & LABOR ESP	8	469.97	
110054	APC SMART UPS V/S 1000VA	1	421.68	421.68

If you have any questions regarding this quote please contact:
SID HALL (WOBURN)
Phone:(617)937-4926 Fax:(617)937-4898

QUOTE TOTAL: $ 29,993.84

Freight Charges will be added at the time of shipment based on the weight of products shipped. Sales Taxes will be added where applicable.

**** THE ABOVE LINE ITEM COMPONENT PRICES ARE VALID FOR THIS QUOTE ONLY ****

THANK YOU FOR THE OPPORTUNITY TO DO BUSINESS WITH YOU!

Appendix E– Price Quotations

NOV 06 '97 10:04AM SYMBIOS LOGIC WHQ 408 453 0309 P.1/1

This quote was prepared for: 10/17/97

Axel Computer, Inc.
Greg Rudy
3151 Coronado Drive
Santa Clara, CA 95054

SYMBIOS LOGIC

An ISO 9001 Registered Company

DS/RM20E Pricing		
RackMount Module	6299-3100-6656	
3622 Controller, Diff, w16/64MB Cache single controller	6299-F232-VMET	
9 GB Disk w/Canister, 16 bit	6299-F308-0000	
Total Storage Capacity = 180GB	20 Disk Drives	
expansion module not needed		
Standard configuration w RAID Mgr.	Raid Manager	
Symbios Logic PCI,Ultra SCSI, Diff. cable(s) included	6299-K954-VMET	
Total Subsystem cost		**$61153**

Prepared by:
George Turajlich
Symbios Logic
1731 Technology Dr. Suite 600
San Jose, CA 95110
Phone number 408-436-5745
Fax number 408-453-0309
Terms are Net 30
Delivery is 2 weeks ARO
F.O.B. Wichita, KS
The cost for 5X12 on-site support for 5 years is $12750 per system. This includes 4 hour response time for all components.

The DS/RM20 includes 4 power supplies and 3 fan canisters with two fans each. The module is available in either single or dual controller configuration. The Module contains five SCSI channels. The unit comes with a 5 year warranty.
The warranty coverage includes advance replacement via next day air of customer replaceable units(CRU's).

1731 Technology Drive, Suite 600
San Jose, CA 95110

Appendix E– Price Quotations

SEP 19 '97 11:24 FR HQ NEWTON 617 928 3699 TO 1*29116691508371 P.03

Tier 1 – PC Servers with 1 or 2 CPUs, entry level RISC Uni-processor workstations and servers (Class 1and Class 2)	Unlimited	$3,000.00	$450.00	$660.00
Tier 2 - PC Servers with 3 or 4 CPUs, Midrange RISC Uni-processor servers and workstations (class 3)	Unlimited	$12,000.00	$1,800.00	$2,640.00
Tier 3 - Midrange Multiprocessors, up to 8 CPUs per system capacity (Class 4 and 5)	Unlimited	$30,000.00	$4,500.00	$6,600.00
Tier 4 - Large (more than 8, less than 32 CPUs) and Mainframe Systems (Class 6)	Unlimited	$100,000.00	$15,000.00	$22,000.00
Tier 5 - Massively Parallel Systems, > 32 processors	Unlimited	$250,000.00	$37,500.00	$55,000.00

LDB

12/08/95 2

** TOTAL PAGE.03 **

Appendix E– Price Quotations

SEP 19 '97 11:23 FR HQ NEWTON 617 928 3699 TO 1*29116691508371 P.02

BEA ENTERPRISE MIDDLEWARE SOLUTIONS

MEMORANDUM

Date: June 18, 1997
To:
CC:
From: Lewis Brentano
Subject: TUX-CFS Approved Pricing

Tuxedo Core Functionality Services (CFS) Program Product Pricing and Description

TUX CFS is a limited function product from BEA that offers a subset of TUXEDO 6.3 capabilities. The following standard 6.3 features ARE NOT AVAILABLE WITH TUX-Core AND CANNOT BE SUPPORTED BY TUX-Core:

1. /WS
2. /Q
3. /COBOL
4. /DCE
5. Transaction
6. Events
7. DOMAINS
8. Admin API
9. ACLs (Access Control List security option)
10. Link Level Encryption
11. Web Browser GUI Admin

TUX-CFS provides a basic level of middleware support for distributed computing, and is best used by organizations with substantial resources and knowledge for advanced distributed computing implementations.

TUX-CFS prices are server only and are based on the overall performance characteristics of the server and uses the same five tier computer classification as TUXEDO 6.3. Prices range from $2,350 for Tier 1 to $250,000 for Tier 5. Under this pricing option EVERY server running TUX-CFS at the user site must have a TUXEDO license installed and pay the appropriate per server license fees.

BEA Tux/CFS Unlimited User License Fees Per Server

Unlimited User License fees per server	Number of Users	Dollar Amount	Maintenance (5 x 8) per year	Maintenance (7 x 24) per year

06/16/97 1

Appendix E– Price Quotations

OCT 17 '97 02:07PM SYMBIOS LOGIC WHQ 408 453-0309 P.1/2

This quote was prepared for: 10/17/97

Axel Computer, Inc.
Greg Rudy
3151 Coronado Drive
Santa Clara, CA 95054

SYMBIOS LOGIC

An LSI Logic Registered Company

DS/RM20E Pricing		
RackMount Module	6299-3100-6656	
3622 Controller, Diff, w16/64MB Cache	6299-F232-VMET	
Pricing includes a second controller	6299-F232-VMET	
9 GB Disk w/Canister, 16 bit	6299-F308-0000	
Total Storage Capacity = 180GB	20 Disk Drives	
expansion module not needed		
Standard configuration w RAID Mgr.	Raid Manager	
Symbios Logic PCI,Ultra SCSI, Diff.	6299-K954-VMET	
cable(s) included		
Total Subsystem cost		**$68441**

Prepared by:
George Turajlich
Symbios Logic
1731 Technology Dr. Suite 600
San Jose, CA 95110
Phone number 408-436-5745
Fax number 408-453-0309
Terms are Net 30
Delivery is 2 weeks ARO
F.O.B. Wichita, KS
The cost for 5X12 on-site support for 5 years is $12750 per system. This includes 4 hour response time for all components.

The DS/RM20 includes 4 power supplies and 3 fan canisters with two fans each. The module is available in either single or dual controller configuration. The Module contains five SCSI channels. The unit comes with a 5 year warranty.
The warranty coverage includes advance replacement via next day air of customer replaceable units(CRU's).

1731 Technology Drive, Suite 600
San Jose, CA 95110

Appendix E– Price Quotations

'16/97 SUN 17:41 FAX 9367329 MICROSOFT RECEP IC OUT 002

Microsoft Corporation
One Microsoft Way
Redmond, WA 98052-6399

Tel 425 882 8080
Fax 425 936 7329
http://www.microsoft.com/

Microsoft

November 16, 1997

Mr. Greg Roody
Axil Computer
130C Baker Avenue Ext.
Concord, MA 01742

via FAX # 508-371-9605

Dear Greg,

Here is the information you requested regarding US pricing of certain Microsoft products:

Microsoft SQL Server, Enterprise Edition 6.5, unlimited user license	$28999
Microsoft Windows NT Server, Enterprise Edition 4.0, incl 25 CALs	$3999
Windows NT Server 4.0, incl 5 CALs	$809
Microsoft SQL Workstation (includes programmers toolkit)	$499
Visual C++ 32-bit edition (subscription)	$499
5-yr maintenance for above software @ $2095/yr	$10475

This quote is valid for the next 60 days. Please let me know if I can be of any further assistance.

Best regards,

Sid Arora
Product Manager, Microsoft SQL Server
Personal and Business Systems Group