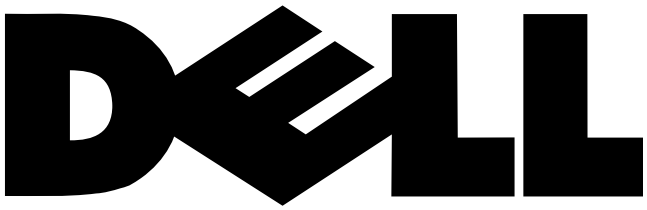


TPC Benchmark™ C
Full Disclosure Report
for
Dell PowerEdge 2800
Using
Microsoft SQL Server 2005 Standard (x64) Edition and
Microsoft Windows Server 2003, Standard (x64) Edition

Third Edition
Submitted for Review
Updated to meet TPC-C Version 5.6 specification and updated pricing
Updates to text include corrections required by TAB ruling.

April 14, 2006

Third Printing, April 14, 2006

Dell believes that the information included in this document is accurate as of the publication date. The information in this document is subject to change without notice. Furthermore, Dell is not responsible for any errors contained within this document.

The pricing information given in this FDR is accurate as of the first publication date, September 26, 05 and is generally available.

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 this report were obtained in a rigorously controlled environment. Actual performance experienced by a particular customer may vary due to differences in system layout and configuration, hardware and/or software revision levels, and background system activity. The content of this document is for informational purposes only.

Abstract

Overview

This report documents the methodology and results of the TPC Benchmark™ C test conducted on Dell PowerEdge 2800. The tests were run in a client/server configuration using one PowerEdge SC1420 as client. The operating system used for the benchmark was Microsoft Windows Server 2003, Standard (x64) Edition on the database server and Microsoft Windows Server 2003, Standard Edition on the client. The database was Microsoft SQL Server 2005 Standard (x64) Edition. Microsoft COM+ provided the database connection queues. All tests were done in compliance with Revision 5.6 of the Transaction Processing Council's TPC Benchmark™ C Standard Specification. Two standard TPC Benchmark™ 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
Dell PowerEdge 2800	Microsoft Windows Server 2003, Standard (x64) Edition with SQL Server 2005 Standard (x64) Edition	$38,028	38,622	$.99	November 8, 2005

Auditor

The results of the benchmark and test methodology used to produce the results were audited by Lorna Livingtree of Performance Metrics and have fully met the TPC-C rev 5.6 specifications.

Additional copies of this Full Disclosure Report can be obtained from either the Transaction Processing Performance Council or Dell at the following address:

Transaction Processing Performance Council (TPC)
c/o Adminstrator, TPC
Presidio of San Francisco
Bldg 572B Ruger St.
San Francisco, CA 94129-0920
Phone: (415) 561-6272, fax 415-561 6120
www.tpc.org

or

Dell
1 Dell Way
Round Rock, TX 78682
Attention: Mike Molloy, Ph.D.

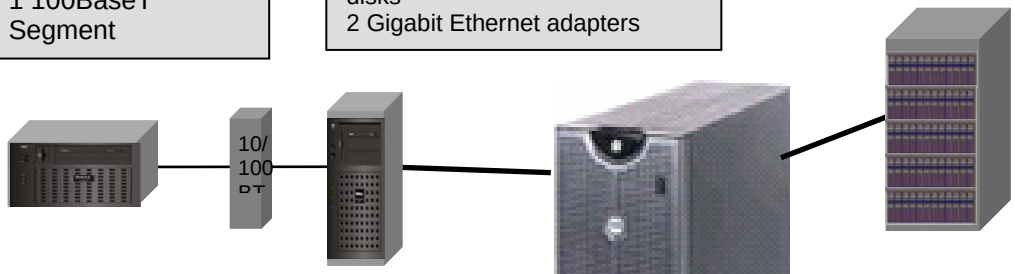
	PowerEdge 2800 Client/Server w/1 PE SC 1420 Front End		TPC-C Rev 5.6 Original Report Date **September 26, 2005** **Revised April 14, 2006**
Total System Cost	TPC-C Throughput	Price/Performance	Availability Date
$38,028	**38,622 tpmC**	**$.99 / tpmC**	November 8, 2005

Processors	Database Manager	OS	Other Software	Number of Users
1 Dual-Core Intel® Xeon™, 2 Core, 4 Thread processor 2.80 GHz 2+2M	Microsoft SQL Server 2005 Standard (x64) Edition	Microsoft Windows Server 2003, Standard (x64) Edition	Windows Server 2003 Std Ed w/ COM+ Internet Information Server 6.0 Microsoft Visual C++	30,800

30,800 Emulated Users
Running on 1 PE6350 RTE Machines
Connected Through 1 100BaseT Segment

PowerEdge 2800
w/ 1 Dual-Core Intel® Xeon™ 2 Core, 4 Thread processor 2.80 GHz, 8GB RAM
2 Dell PERC4eDC RAID Controllers, 1 Integrated PERC4eiDC Raid Controller.
8 73GB 10K RPM U320 SCSI disks
2 Gigabit Ethernet adapters

4 PowerVault 220R Disk Pods
56 36GB 15K RPM U320 SCSI Disks



1 PE SC1420 Client
2 Intel Xeon 2 Core, 4 Thread @3.0GHz w/ 1MB L2
1024 MB RAM
1 80 GB Disk
2 Intel Pro100+ Ethernet NICs

System Component	Server		Each Client	
Processors Cache	1	Dual-Core Intel® Xeon™ 2 Core, 4 Thread processor 2.80 GHz	2	Intel Xeon™ 2 Core, 4 Thread w/ 1MB L2 Client @ 3.0 GHz
Memory		8 GB DDR2		1024 MB
Disk Controllers	2 1	Dell PERC4eDC RAID Controllers Integrated PERC4eiDC Raid Controller.	1	Onboard SATA
Disk Drives	56 8	36 GB 15k SCSI 73 GB 10k SCSI	1	80 GB SATA
Total Storage		2600 GB	1	80 GB Disk
Other	2 1	2GB NIC CD-ROM	2 1	10/100MB BT NIC CD-ROM

Dell	PowerEdge 2800				TPC-C REV 5.6 EXECUTIVE SUMMARY PAGE 2 OF 3		
		Client/Server	Report Date: 26-September-05 Revised: April 14 -06				
Description	**Part Number**	**Third Party**		**Unit Price**	**Qty**	**Extended Price**	**3 yr. Maint. Price**
Server Hardware		**Brand**	**Pricing**				
Dell PE 2800 Dual-Core Intel® Xeon™ processor 2.80 GHz	222-0210			$2,748.00	1	$2,748.00	$300.00
800MHZ FSB, 2 onboard Gigabit NICs							
8GB DDR2 400MHz(4X2GB),1R	311-3605			$3,738.00	1	$3,738.00	
PERC4eDC,128MB,2-EXT CHN	341-1642			$799.00	2	$1,598.00	
73GB U320M SCSI 10K RPM Hard Drive (OS+LOG)	341-1287			$319.00	8	$2,552.00	
Dell E773,17 in Gray (16.0 VIS)	320-2907			$135.00	1	$135.00	
					Subtotal	$10,771.00	$300.00
PowerVault Disk Subsystem							
PV220R, U3, PS, Rack	220-4476			$1,155.00	4	$4,620.00	$1,604.00
ZEMM,U320,PV22XS,SINGLE	340-9324			$399.00	4	$1,596.00	
600W,PWR SPLY,PV22XS	310-0677			$0.00	4	$0.00	
600W,PWR SPLY,PV22XS	310-0683			$89.00	4	$356.00	
36GB U320M SCSI 15K RPM Hard Drive	340-9472			$249.00	56	$13,944.00	
RACK-111/24U/Dell	A0213544			$479	1	$479.00	
					Subtotal	$20,995.00	$1,604.00
Server Software							
SQL Standard 64Bit, Per processor licensing **	A5K-00206	Microsoft	1	$5,999.00	1	$5,999.00	
Windows 2003 Standard Server 64 Bit **	P73-00295	Microsoft	1	$719.00	1	$719.00	
Professional Support (1 Incident)		Microsoft	1	$245.00	1		$245.00
					Subtotal	$6,718.00	$245.00
Client Hardware							
Dell PowerEdge SC 1420, 3.0 GHz / 1MB L2 / 800 FSB	221-5680			$629.00	1	$629.00	$300.00
Additional processor , 3.0 GHz / 1MB	311-3803			$599.00	1	$599.00	
1.0GB DDR2, 400, 2X512 Dimms	311-3811			$448.00	1	$448.00	
40GB SATA Hard Drive,7.2K	341-1024			$149.00	1	$149.00	
IntelPro 100S	430-0369			$59.00	1	$59.00	
Dell E773,17 in Gray (16.0 VIS)	320-2907			$135.00	1	$135.00	
					Subtotal	$2,019.00	$300.00
Client Software							
Windows 2003 STD Server **	P73-00295	Microsoft	1	$719.00	1	$719.00	
Visual C++ ** .NET	254-00170	Microsoft	1	$109.00	1	$109.00	
					Subtotal	$828.00	
User Connectivity							
7ft Crossover cable	CBLC5C7	LanAdapter	2	$1.60	3	$4.80	
					Subtotal	$4.80	
All Hardware and maintence components from Dell are discounted 16% based on total dollar value of this configuration.					**Other Discounts**	$5,758.24	
					Total USD:	**$35,578**	**$2,449**
Notes: * Maint. included in PowerVault 220R disk pod or PV650F/630F fibre channel disk pod				**Three-Year Cost of Ownership USD:**			**$38,027**
** All Microsoft maintenance is covered by the maintenance costs of Microsoft SQL Server							
Pricing: 1 - Microsoft 2 - LanAdapter						**tpmC Rating:**	**38622**
Pricing may be verified by calling 1-800-BUY-DELL and referencing quote # 246302344 as a complex quote.							
Audited by Lorna Livingtree, Performance Metrics Inc.						**USD$ / tpmC:**	**0.99**

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

MQTh, computed Maximum Qualified Throughput 38,622 tpmC

Response Times (in seconds)	Average	90th	Max
- Neworder	0.38	0.59	5.95
- Payment	0.20	0.30	5.16
- Delivery (interactive portion)	0.12	0.12	1.34
- Stock-Level	0.46	0.71	5.18
- Order Status	0.30	0.46	8.41
- Delivery (deferred portion)	0.58	1.15	5.23
- Menu	0.38	0.59	5.95

Response time delay added for emulated components Menu 0.1
Resp 0.1

Transaction Mix, in percent of total transactions

- New-Order	44.84%
- Payment	43.03%
- Delivery	4.06%
- Stock-Level	4.05%
- Order-Status	4.03%

Keying/Think Times (in seconds),	Min		Average		Max	
- New-Order	18.02	0.0	18.03	12.06	18.48	120.43
- Payment	3.02	0.0	3.03	12.05	3.48	120.42
- Delivery	2.02	0.0	2.03	5.07	2.45	50.42
- Stock-Level	2.02	0.0	2.03	5.06	2.48	50.44
- Order-Status	2.02	0.0	2.03	10.07	2.46	100.42

Test Duration

- Ramp-up time	10 minutes
- Measurement interval	120 minutes
- Number of checkpoints	4
- Checkpoint interval	30 minutes
- Number of transactions (all types)	10,756,433

Table of Contents

Document Structure

The TPC Benchmark C Standard Specification Revision 5.6, written and approved by the Transaction Processing Performance Council (TPC), determines the contents of this report. The format of this report is based on this specification. Most sections of this report begin with the specification requirements printed in italic type, immediately followed by the detail in plain type of how Dell 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

The hardware configuration used in this TPC-C test is a Dell PowerEdge 2800 server driven by one Dell PowerEdge SC1420 client. The client and server are networked together via cross-over cables. One remote terminal emulator (RTE) system (PowerEdge 6350) emulate users executing the standard TPC-C workload. The RTE are connected to the client through a 10/100 BaseT switch. The switch connects to the client machine at 100 BaseT and to the RTE machine at 100Mbit/sec, full duplex. Microsoft Windows Server 2003, Standard (x64) Edition was the operating system used on the server. Microsoft Windows Server 2003, Standard (x64) Edition was used on the client. Microsoft SQL Server 2005 Standard (x64) Edition was the database on the server machine.

The PowerEdge 2800 motherboard uses the Intel E7520 (Lindenhurst) chipset and can hold up to two Pentium® 4 Xeon Single or Dual Core processors (3.6 GHz with 2 MB L2 cache each) and 64-bit Extensions. The system has 4 PCI-X 64-bit/100MHz I/O slots, 1 PCI 2.2 32-bit/33MHz I/O slots, and 2 PCI-Express slots. The measured configuration used 8 Gbytes of DDR2 RAM, which was achieved by using four 2 GB DIMMs.

The PowerEdge 2800 has an integrated 7 slot riser board to which was attached 8 73GB hard disks in RAID 10 configuration containing the database log and OS via an internal channel on a Dell embedded PERC4ei RAID controller. In addition, two Dell PERC4e Dual Channel PCI Express RAID controllers were installed in PCI Express slots for the data volumes. The two Dell PERC4eDC-PCI Express RAID controllers were connected to 4 PV220 disk pods enclosing a total of 56 36GB 15K RPM SCSI disks.

The client has dual 3.0GHz Intel Xeon processors with 1MB of L2 cache. The client has 1024 Mbytes of RAM, one 80 GB hard disk, one integrated Intel Ether Express Pro100+ PCI Ethernet adapter and one Intel Pro 100 Network Interface Card. The client's Intel Ethernet adapter was connected to the RTE machine through a 10/100 BaseT switch and the Intel Pro NIC was connected to the Database Server through a cross-over cable. The client was driven through two network segments to run a total of 30,800 emulated users.

Test Sponsor

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

Dell 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 consists of the Microsoft Benchcraft Remote Terminal Emulator (RTE) program emulating a set of users entering TPC-C transactions through web browsers, and communicating with Client machines running the Microsoft Internet Information Server (IIS) web server. The Client machines use the COM+ transaction monitor to communicate with the database server machine.

On each Client machine IIS loads a custom Microsoft Internet Information Server Application Programming Interface dynamic link library (ISAPI DLL) application program that communicates with the emulated web browsers through the HTTP protocol and with the database server through the COM+ transaction monitor and the Microsoft DBLIB interface. The application supplies fill-in screens to the user for each transaction, then parses the data in each request, and makes a call on SQL Server through the COM+ layer, which manages a set of DBLIB connections to the database server. The resulting data is passed back to the application where it is formatted into HTML and sent back to the user's browser. The Delivery transaction is handled directly from the application to the database without the use of COM+.

The web Client code is listed in Appendix A.

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, Windows 2003 Server, and Internet Information Service parameters used in this benchmark.

Appendix D contains the 60 day space calculations.

Configuration Diagrams

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

Figures 1 and 2 respectively show the measured and priced full client/server configurations. The system under test (SUT) in the measured system was identical to what was priced.

Figure 1: Measured Configuration

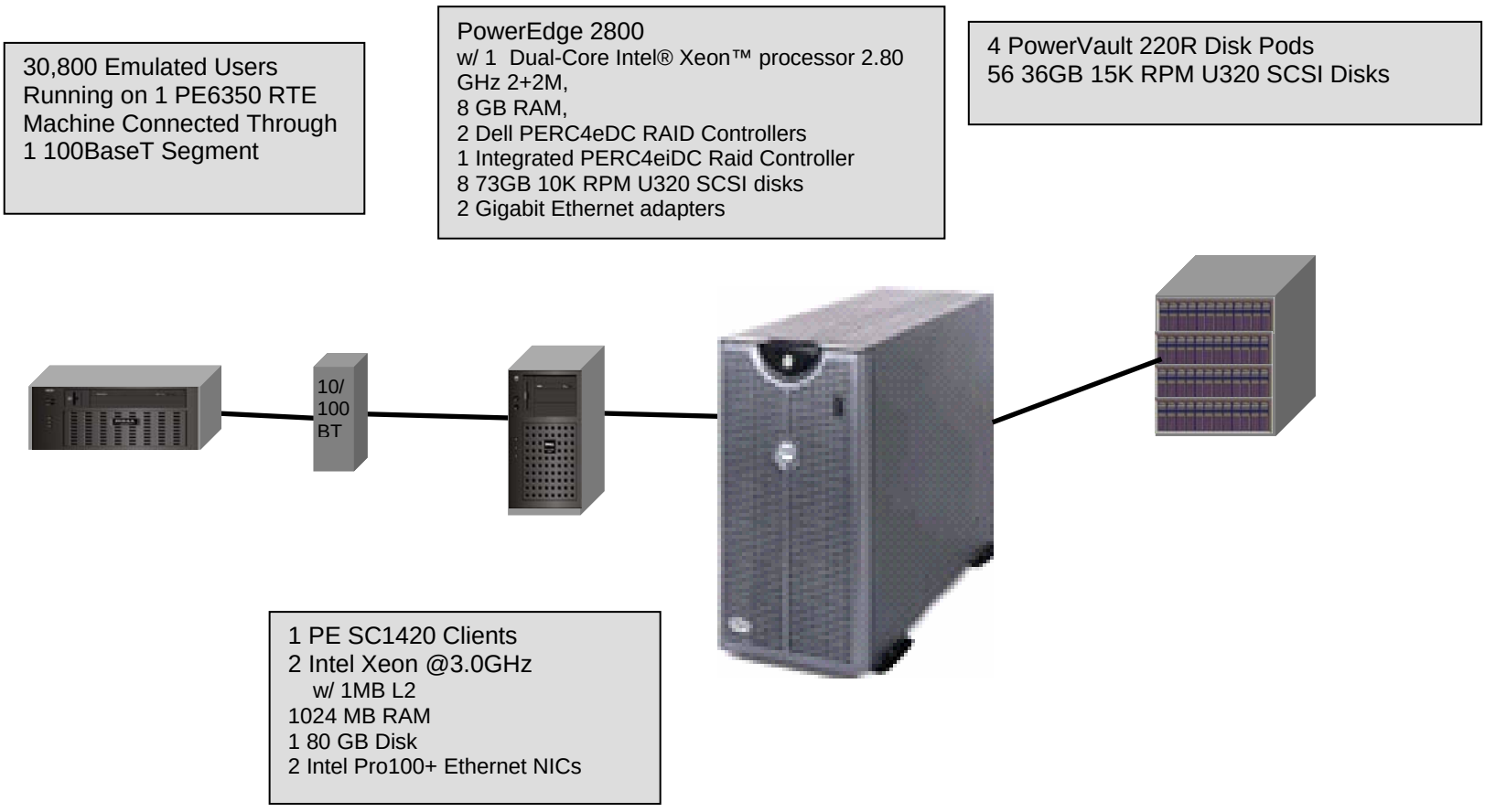
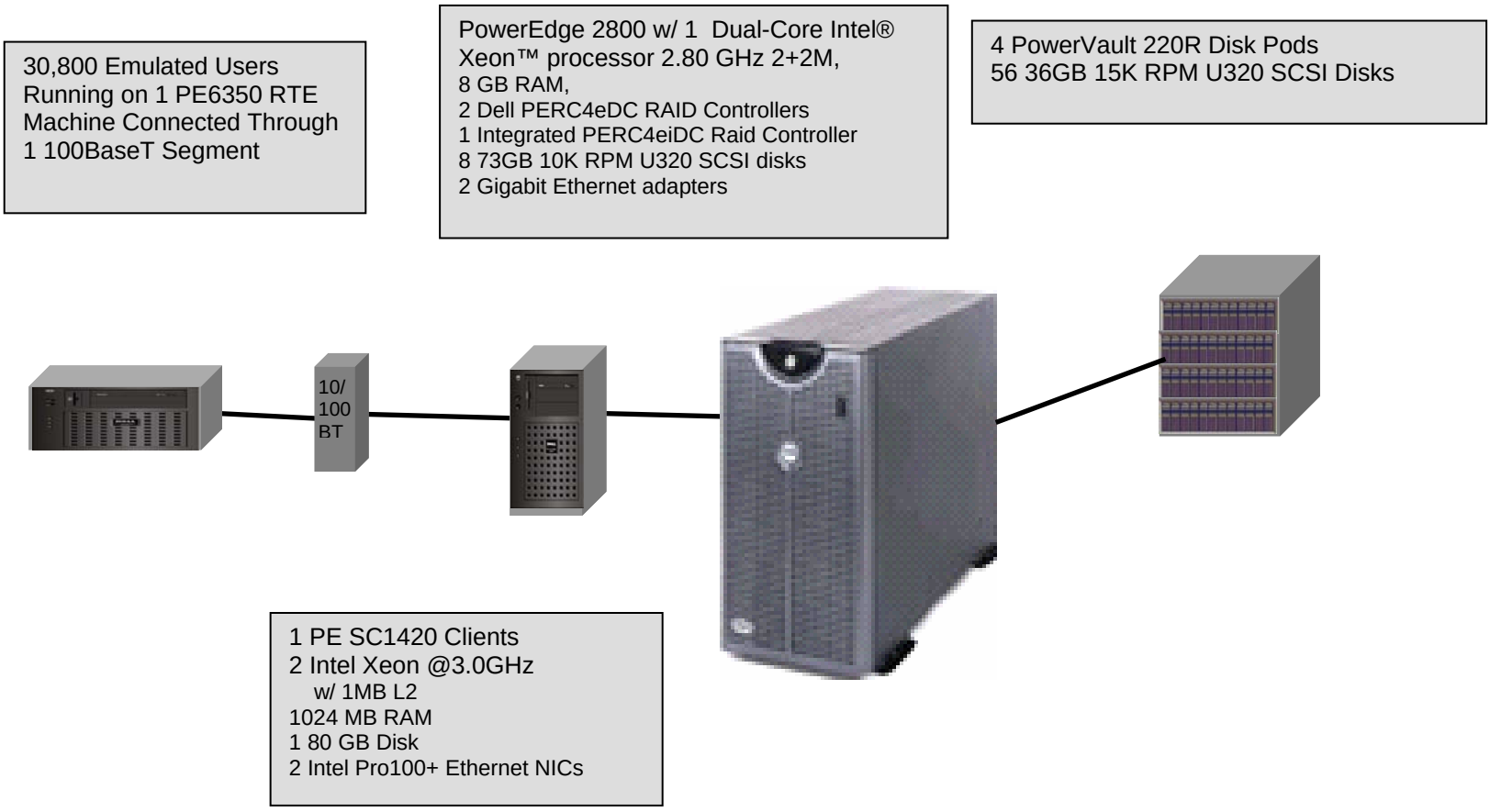


Figure 2: Priced Configuration



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 65 disk drives. The organization is shown in Table 5: Data Distribution.

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)

The random number generation was done internal to the Microsoft BenchCraft RTE program, which was audited independently.

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 very minor 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 in the form of HTML 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	84.98%
	Remote Warehouse	0.15%
	Non-Primary Key Access	60.04%
Order Status	Non-Primary Key Access	60.07%
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	44.84%
Payment	43.03%
Order Status	4.06%
Delivery	4.05%
Stock Level	4.03%

Deferred Delivery Mechanism

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

The application creates a semaphore-base thread pool consisting of a user-specified number of threads, which open DBLIB connections on the database. When a Delivery transaction is posted one of these threads makes the database call while the transaction's original thread returns control to the user. Upon completion the Delivery thread writes an entry in the Delivery log and returns to the thread pool.

The source code is listed in Appendix A.

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 transactions 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 the 310 warehouse database. The standard driving mechanism was used to generate the transaction load of 3100 users for the Loss of Data.

Loss of Data/ Loss of Log

Loss of data was demonstrated on the 310 warehouse database. The standard driving mechanism was used to generate the transaction load of 3100 users for the test. To demonstrate recovery from a permanent failure of durable media containing TPC-C tables, the following steps were executed:

1. The 310 warehouse database was used for this test.
2. The database was backed up using SQL Server backup facilities.
3. A sum of D_NEXT_O_ID was taken.
4. 3100 users were logged in to the database and ran transactions.
5. The system was run at steady state for 5 minutes.
6. One disk drive in the transaction log array was removed with no effect on Windows 2003 or SQL Server.
7. One disk drive in the data array was removed causing SQL Server errors.
8. The RTE was allowed to continue running. Completed transactions enroute from the clients were recorded. Error messages began appearing on the RTE screen.
9. The RTE was stopped.
10. SQL Server was stopped and restarted and a dump of the transaction log was taken.
11. SQL Server was stopped, Windows 2003 was shutdown and the machine powered off.
12. The failed disks were replaced.
13. The machine was powered up, Windows 2003 and SQL Server were started.
14. The TPC-C database was dropped and restored from backup.
15. The transaction log was restored and transactions rolled forward.
16. A new count of D_NEXT_O_ID was taken.
15. This number was compared with the number of new orders reported by the RTE. The difference was valid per the spec.

Instantaneous Interruption and Loss of Memory

Instantaneous Interruption and Loss of Memory were demonstrated on the database with 3080 warehouses in a single test. The standard driving mechanism was used to generate the transaction load of 30800 users for the test. To demonstrate recovery an instantaneous system interruption caused by powering off the Server, the following steps were executed:

1. The full database was used.
2. A sum of D_NEXT_O_ID was taken.
3. 30800 users were logged in to the database and ran transactions.
4. The system was run is steady state for 5 minutes
5. A checkpoint was executed and allowed to finish.
6. The system ran for an additional 30 seconds.
7. The Server was powered off by normal means, causing instantaneous interruption. No battery or UPS was providing power for the server.

8. The RTE was allowed to continue running. Completed transactions enroute from the clients were recorded. Error messages began appearing on the RTE screen.
9. The RTE was stopped.
10. The server was powered on again and rebooted.
11. SQL Server was restarted and automatically recovered.
12. A new count of D_NEXT_O_ID was taken.
13. This number was compared with the number of new orders reported by the RTE. The difference was valid per the spec.

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)

The database was originally built with 3100 warehouses.

Table 3: Table Cardinality

Table	Cardinality as Benchmarked
Warehouse	3100
District	31000
Customer	93000000
History	93000000
NewOrder	27900000
Orders	93000000
OrderLine	930,005,291
Item	100000
Stock	310000000
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)	208

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)

The Database was built using a total of 64 disks: 56 36GB for data, 8 73GB for log and OS and application software. The data drives were configured as hardware RAID 0. Logs and OS were configured as hardware RAID 10. 2 Dell PERC4eDC were configured with 1 logical drive each. Each logical drive spanned 28 disk drives. 1 Embedded PERC4eI RAID Controller 0 was configured with 1 logical drive spanning 8 73GB SCSI drives. Each Windows 2003 data drive contained 3 partitions: partition 1 for customer/stock, partition 2 for miscellaneous, and partition 3 for backup. Partitions 1 and 2 were RAW file systems and partition 3 was formatted NTFS. The details are shown in Table 5.

Table 5: Data Distribution

W2K Disk Administration			Dell Perc4ei					
Disk 0 272.96GB				Controller # 0				
Partition			Slot# **1**		Channels			
1	2	3		SCSI ID	A	B	C	D
C:	**E:**			0	**A1-1**			
OS	**MS1**			1	**A1-2**			
NTFS	**RAW**			2	**A1-3**			
10.0GB	**119.14GB**			3	**A1-4**			
				4	**A1-5**			
				5	**A1-6**			
				8	**A1-7**			
				9	**A1-8**			
				10				
				11				
				12				
				13				
				14				
				15				

W2K Disk Administration			Dell Perc4eDC RAID Controller					
Disk 1 946.8GB				Controller # **1**				
Partition			Slot# **1**		Channels			
1	2	3		SCSI ID	A	B	C	D
F:	**M:**	**Z:**		0	**A1-1**	**B1-1**		
MS1	**CS1**	**Backup1**		1	**A1-2**	**B1-2**		
RAW	**RAW**	**NTFS**		2	**A1-3**	**B1-3**		
48.62GB	**93.19GB**	**807.78GB**		3	**A1-4**	**B1-4**		
				4	**A1-5**	**B1-5**		
				5	**A1-6**	**B1-6**		
				8	**A1-7**	**B1-7**		
				9	**A1-8**	**B1-8**		
				10	**A1-9**	**B1-9**		
				11	**A1-10**	**B1-10**		
				12	**A1-11**	**B1-11**		
				13	**A1-12**	**B1-12**		
				14	**A1-13**	**B1-13**		
				15	**A1-14**	**B1-14**		

W2K Disk Administration			Dell Perc4eDC RAID Controller					
Disk 2 944.7GB				Controller # **2**				
Partition			Slot# **2**		Channels			
1	2	3		SCSI ID	A	B	C	D
Channel A:				0	**A1-1**	**B1-1**		
G:	**N:**			1	**A1-2**	**B1-2**		
MS2	**CS2**			2	**A1-3**	**B1-3**		
RAW	**RAW**			3	**A1-4**	**B1-4**		
48.14GB	**92.26GB**			4	**A1-5**	**B1-5**		
				5	**A1-6**	**B1-6**		
					A1-7	**B1-7**		
				7	**A1-8**	**B1-8**		
				8	**A1-9**	**B1-9**		
				9	**A1-10**	**B1-10**		
				10	**A1-11**	**B1-11**		
				11	**A1-12**	**B1-12**		
				12	**A1-13**	**B1-13**		
				13	**A1-14**	**B1-14**		

***Comment**: Detailed diagrams for layout of database files on disks can widely vary, and it is difficult to provide exact guideline suitable for all implementations. The intent is to provide sufficient detail to allow independent reconstruction of the test database. The two figures below are examples of database layout descriptions and are not intended to depict or imply any optimal layout for the TPC-C database.*
8.1.5.3 A statement must be provided that describes:

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

Microsoft SQL Server Enterprise Edition is a relational DBMS.

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

Partition Mapping

The mapping of database partitions/replications must be explicitly described.
***Comment**: The intent is to provide sufficient detail about partitioning and replication to allow independent reconstruction of the test database. (8.1.5.3)*
An description of a database partitioning scheme is presented below as an example. The nomenclature of this example was outlined using the CUSTOMER table (in Clause 8.1.2.1), and has been extended to use the ORDER and ORDER_LINE tables as well.

The database was not replicated.

60 day Space Calculation

Details of the 60 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)

To calculate the space required to sustain the database log for 8 hours of growth at steady state, the following steps were followed:

1. The current log space usage was determined by running *dbcc sqlperf(logspace)*
2. Transactions were run against the database with a full load of users.
3. The final log space usage was determined by running *dbcc sqlperf(logspace)*
4. The space used was calculated as the difference between the first and second query.
5. The number of NEW-ORDERS was verified from an RTE report covering the entire run.
6. The space used was divided by the number of NEW-ORDERS giving a spaceused per NEW-ORDER transaction.
7. The space used per transaction was multiplied by the measured tpmC rate times 480 minutes.

The results of the above steps yielded a requirement 64.59 GB (including mirror) to sustain the log for 8 hours. Space available on the transaction log volume was 262.96 GB (including mirror), indicating that enough storage was configured to sustain 8 hours of growth.

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

The details of the 60-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	38,622
Price per TpmC	$.99

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 6: Transaction Response Times

Transaction	Average	90%	Maximum
New Order	0.38	0.59	5.95
Payment	0.20	0.30	5.16
Interactive Delivery	0.12	0.12	1.34
Stock Level	0.46	0.71	5.18
Order Status	0.30	0.46	8.41
Deferred Delivery	0.58	1.15	5.23
Menu	0.38	0.59	5.95

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 7: Transaction Key Times

Transaction	Minimum	Average	Maximum
New Order	18.02	18.03	18.48
Payment	3.02	3.03	3.48
Delivery	2.02	2.03	2.45
Stock Level	2.02	2.03	2.48
Order Status	2.02	2.03	2.46

Table 8: Transaction Think Times

Transaction	Minimum	Average	Maximum
New Order	0.00	12.06	120.43
Payment	0.00	12.05	120.42
Delivery	0.00	5.07	50.42
Stock Level	0.00	5.06	50.44
Order Status	0.00	10.07	100.42

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 3: New Order Response Time Distribution

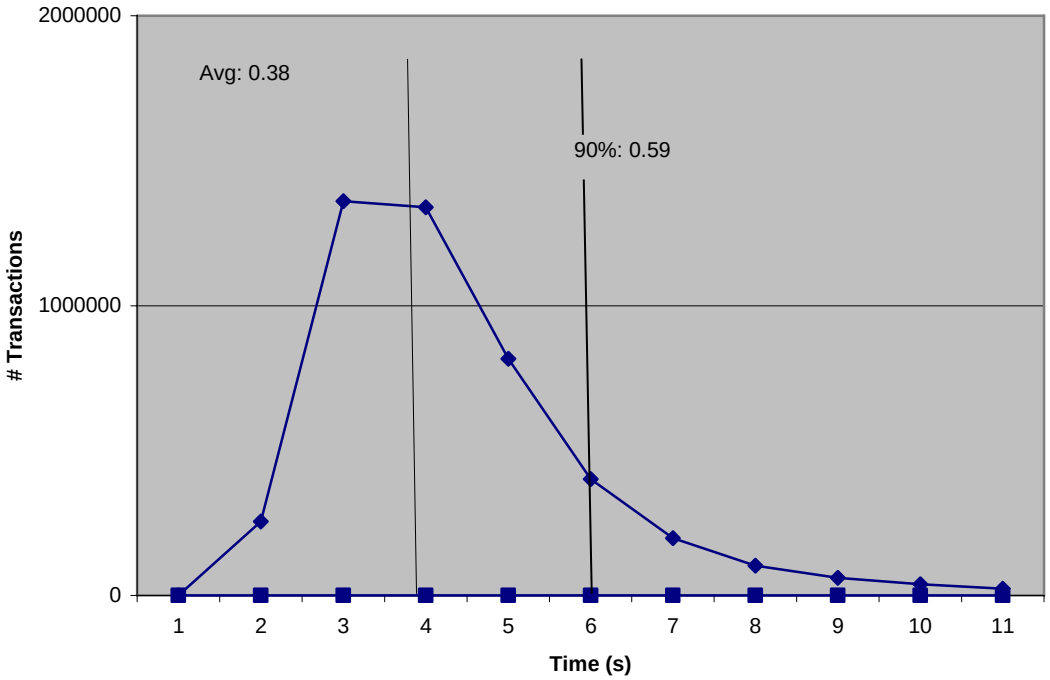


Figure 4: Payment Response Time Distribution

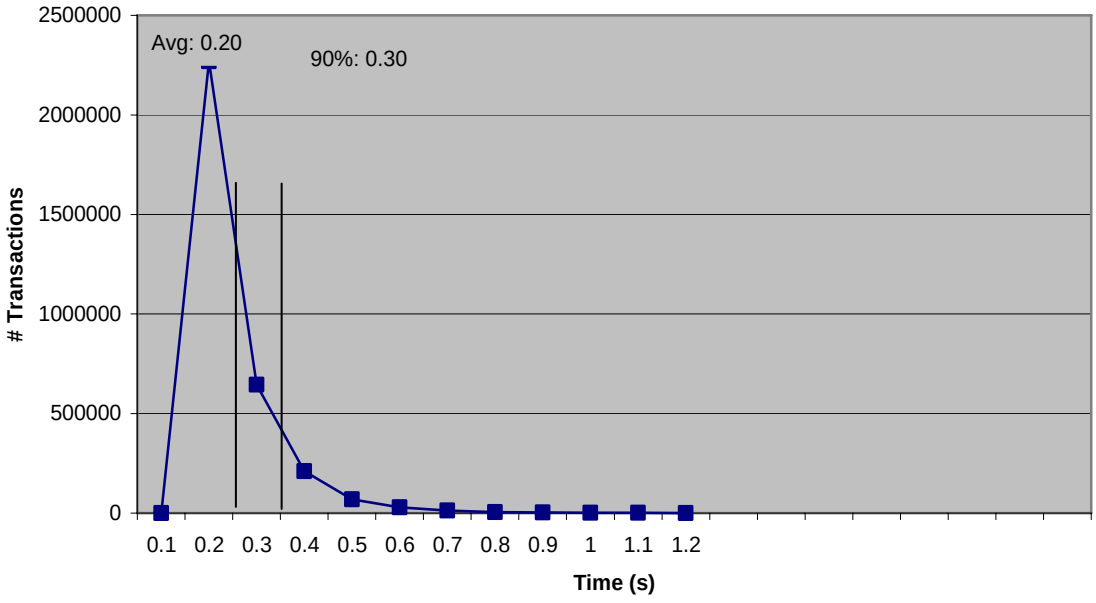


Figure 5: Order Status Response Time Distribution

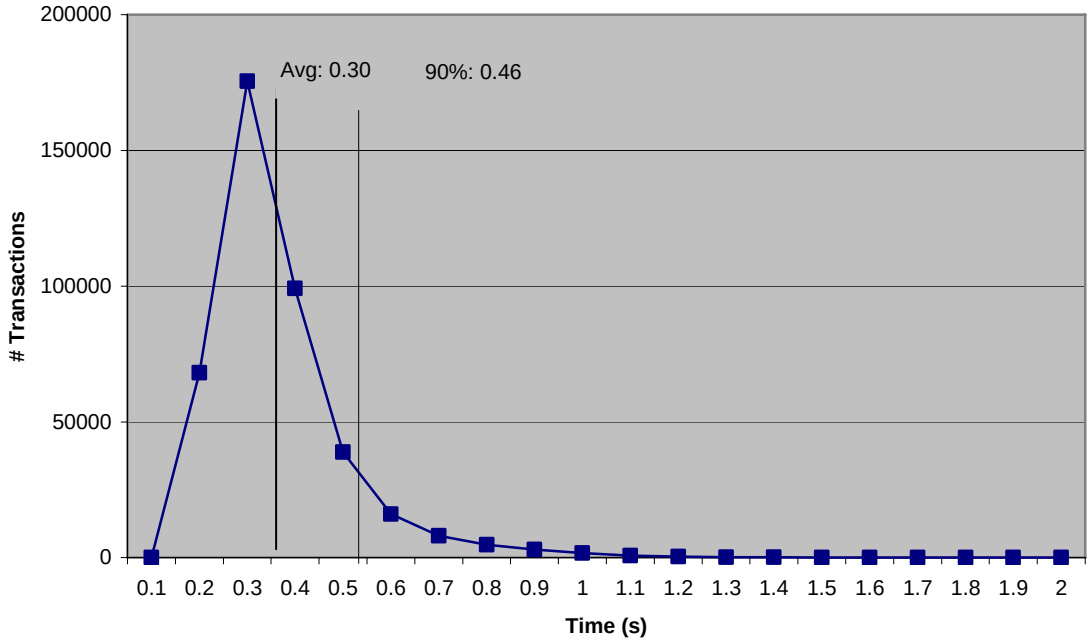


Figure 6: Delivery Response Time Distribution

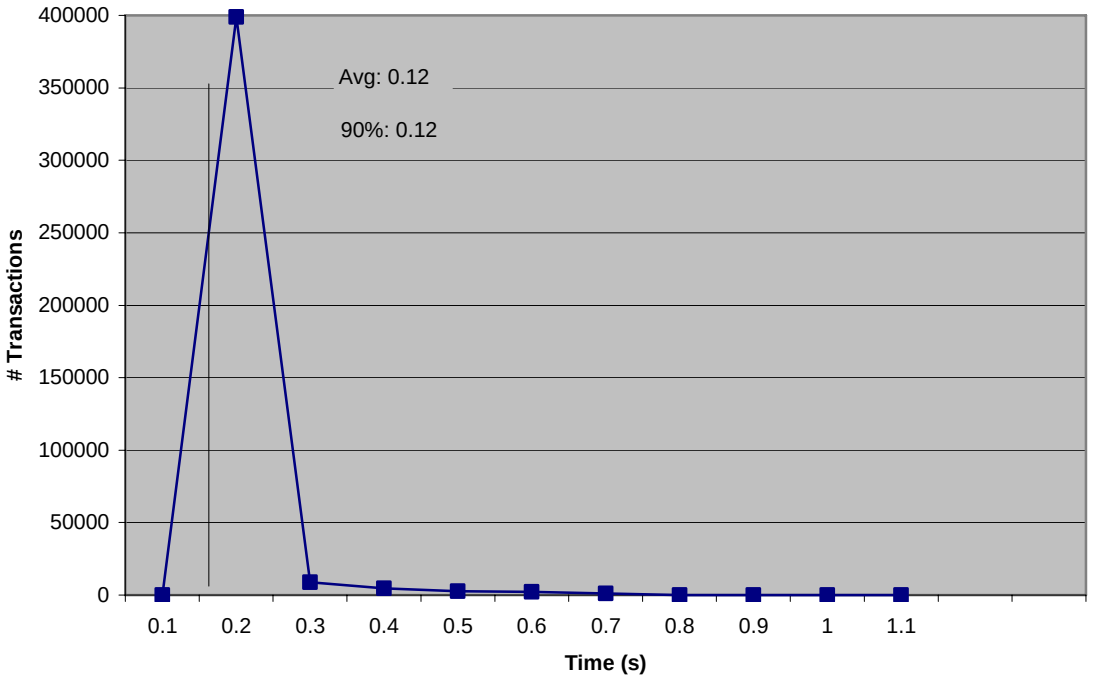
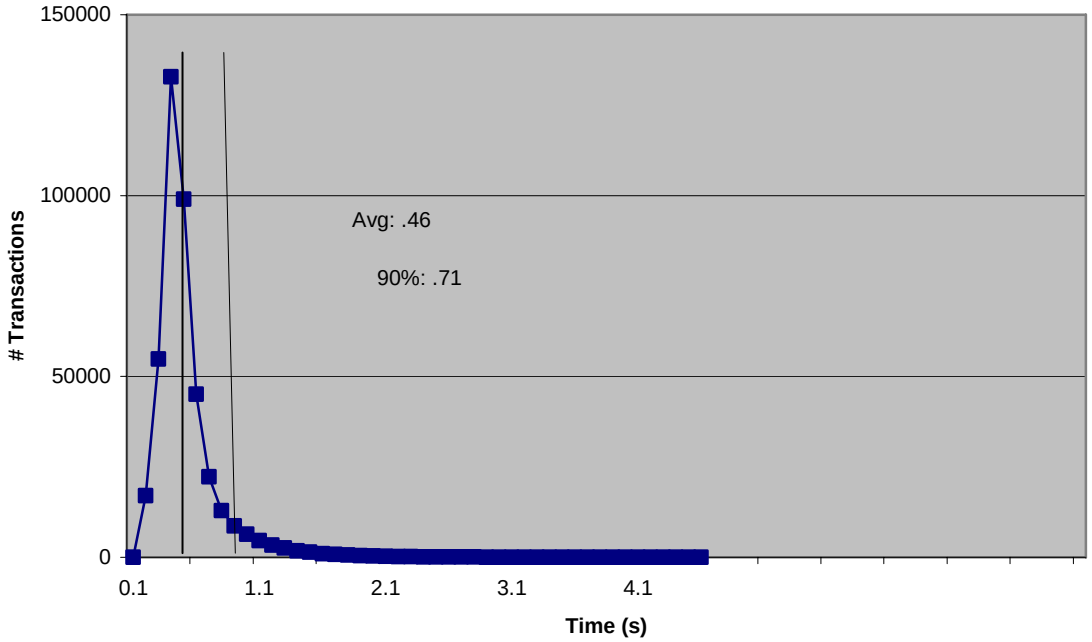


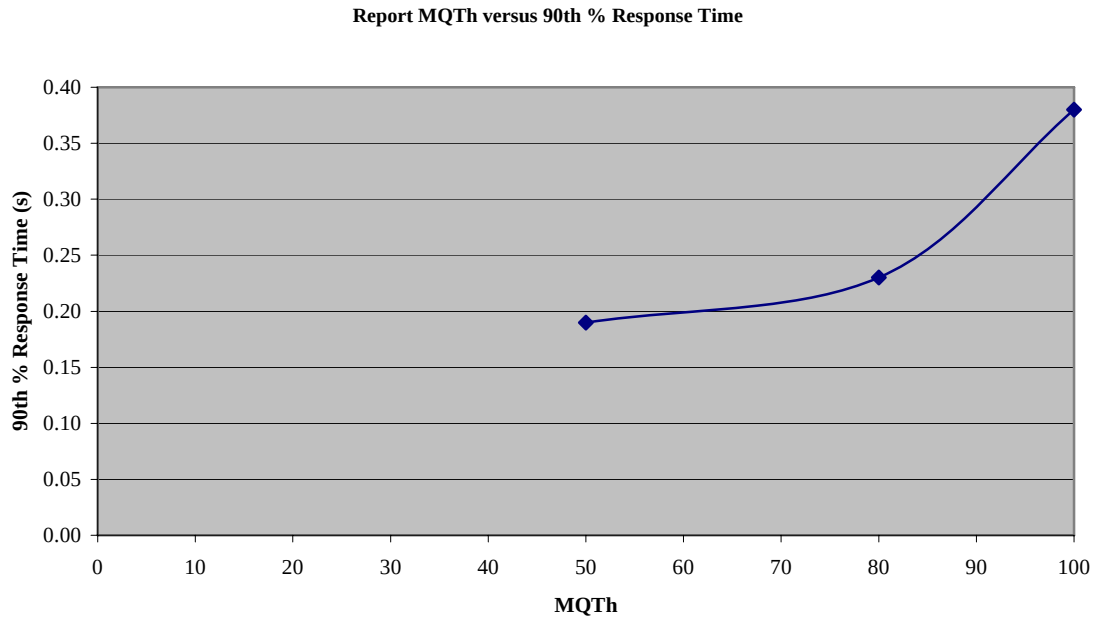
Figure 7: Stock Level Response Time Distribution



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)

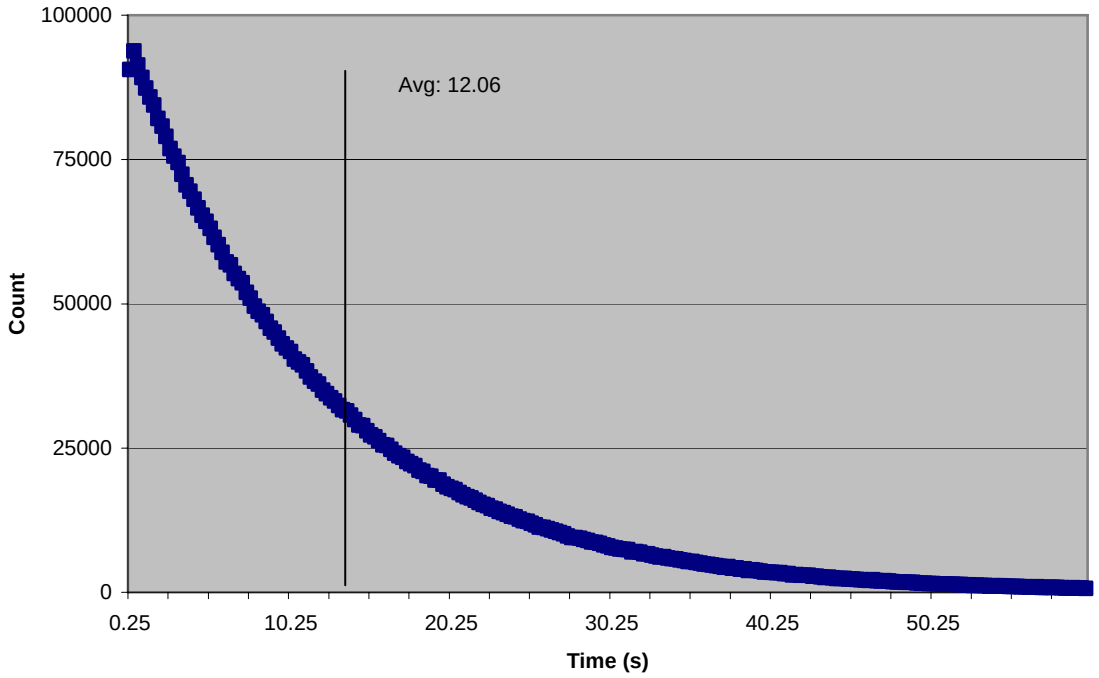
Figure 8: New Order Response Time vs. Throughput



New-Order Think Time Distribution Graph

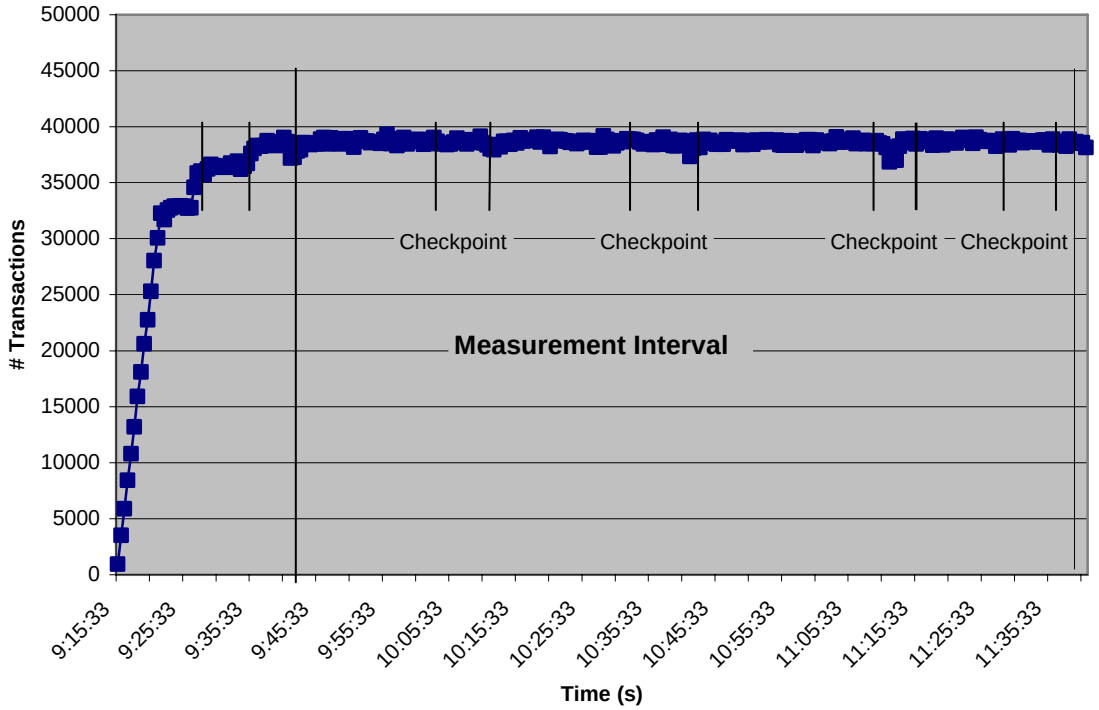
Think Time frequency distribution curves (see Clause 5.6.3) must be reported for the New-Order transaction (8.1.6.6)

Figure 9: 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 10: 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 10.

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 menu 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 HTTP request to the client. 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 the web-based application program running on the client machines through Ethernet LANs. These web clients managed the emulated web browser interface as well as all requests to the database on the server. The applications communicated with the database server over another Ethernet LAN using the COM+ transaction monitor and 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.

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 7200 minutes.

Measurement Period Duration and Checkpoint Duration

The start time and duration in seconds of at least the four (4) longest checkpoints during the measurement interval must be disclosed (see clause 5.5.2.2(2)) (8.1.6.11)
A statement of the duration of the measurement interval for the reported Maximum Qualified Throughput (tpmC) must be included. (8.1.6.12)

	Start	**End**	**Duration**
Measurement Interval	09:51:30	11:51:30	7,200
1st Checkpoint	10:11:22.09	10:21:21.01	599
2nd Checkpoint	10:41:15.89	10:51:13.92	598
3rd Checkpoint	11:11:10.92	11:21:04.40	594
4th Checkpoint	11:41:05.95	11:51:06.03	601

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 that was not adjusted during the run.

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

Table 9: Transaction Mix

Transaction	Percentage
New Order	44.84%
Payment	43.03%
Delivery	4.06%
Stock Level	4.04%
Order Status	4.04%

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 10: Transaction Statistics

Transaction	Function	Value
New Order	Home Warehouse Items	99.85%
	Remote Warehouse Items	0.15%
	Rolled Back Transactions	1.00%
	Average Lines Per Order	10.00
Payment	Home Warehouse	85.00%
	Remote Warehouse	15.00%
	Non-Primary Key Access	60.00%
Order Status	Non-Primary Key Access	60.14%
Delivery	Skipped Transactions	0

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 input parameters are listed in Appendix C - Tunable Parameters.

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 transaction data generation and communication to the client through the standard web browser (HTTP) protocol. It also captured and timestamped the SUT output data for post-processing of the reported metrics. No other functionality was included on the driver system.

Figures 1 & 2 of this report contain detailed diagrams of both the benchmark configuration and the priced configuration.

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 network configurations of the benchmarked and priced configurations were identical.

Network Bandwidth

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

The bandwidth of the tested and priced networks were as follows:

- 100 BaseT (100 Mbit/sec) network segments between the RTE/Emulated Users and the switch.
- 100 BaseT (100 Mbit/sec) between the Clients and Server.

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)

Hardware Availability Date: September 28, 2005
Software Availability Date: November 8, 2005

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: 38,622 tpmC
Price Performance Metric: $.99

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:

- 1 Microsoft Windows Server 2003, Standard (x64) Edition License.
- 1 Microsoft Windows Server 2003, Standard Edition License.
- 1 Microsoft SQL Server 2005 Standard (x64) Edition License (1 processor).
- 1 Microsoft Visual C++ Standard Edition.
- 3 Year Support for Hardware Components.

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)

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 Lorna Livingtree of Performance Metrics.

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 Adminstrator, TPC
Presidio of San Francisco
Bldg 572B Ruger St.
San Francisco, CA 94129-0920
Phone: (415) 561-6272, fax 415-561 6120
www.tpc.org

or:

Dell
One Dell Way
Round Rock, TX 78682
Attention: Mike Molloy, Ph.D.

September 28, 2005

Mr. Dan Hambrick
Dell Computer Corporation
One Dell Way
Round Rock, TX 78682

I have verified by remote the TPC Benchmark™ C for the following configuration:

Platform:	Dell PowerEdge 2800
Database Manager:	Microsoft SQL Server 2003 (x64)
Operating System:	Microsoft Windows 2003 Standard Server (x64)
Transaction Monitor:	COM+

System Under Test: Dell PowerEdge 2800 with:				
CPU's	Memory	Disks (total)	90% Response	TpmC
1 dual core Intel Xeon @ 2.8 Ghz	Main: 8 GB	56 @36GB 8 @ 73GB	0.59	38,622

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

- The transactions were correctly implemented.
- The database files were properly sized.
- The database was properly scaled with 3,100 warehouses, of which 3,080 were active during the measured interval.
- The ACID properties were successfully demonstrated.
- Data loss durability was demonstrated on a subset of the SUT configured with a database properly populated for 310 warehouses.
- Input data was generated according to the specified percentages.
- Eight hours of mirrored log space was present on the tested system.
- Eight hours of growth space for the dynamic tables was present on the tested system.
- The data for the 60 days space calculation was verified.
- The controller cache for the log disks was disabled.
- The steady state portion of the test was 120 minutes.
- One checkpoint was taken in steady state before the measured interval opened.
- Four checkpoints were completed inside the measured interval.
- The system pricing was checked for major components and maintenance.
- Third party quotes were verified for compliance.

Auditor Notes:

The front end system tested was a Dell PowerEdge 1600SC which is no longer orderable. The Dell PowerEdge SC 1420 prices meets all the substitution requirements.

Sincerely,

Lorna Livingtree
Auditor

Appendix A - Application Source Code

tpcc.dll ISAPI DLL Source Code

isapi_dll/src/tpcc.def

```
LIBRARY TPCC.DLL

EXPORTS

         GetExtensionVersion @1
         HttpExtensionProc   @2
         TerminateExtension  @3
```

Isapi_dll/src/tpcc.h

```
/*        FILE:               TPCC.H
 *                                    Microsoft TPC-C Kit Ver. 4.20.000
 *                                    Copyright Microsoft, 1999
 *             All Rights Reserved
 *
 *                                    Version 4.10.000 audited by Richard Gimarc,
Performance Metrics, 3/17/99
 *
 *        PURPOSE:  Header file for ISAPI TPCC.DLL, defines structures and functions used
in the isapi tpcc.dll.
 *
 */

//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


//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)


//This structure defines the data necessary to keep distinct for each terminal or client
connection.
typedef struct _CLIENTDATA
{
         int                            iNextFree;
         //index of next free element or -1 if this entry in use.
         int                            w_id;
         //warehouse id assigned at welcome form
         int                            d_id;
         //district id assigned at welcome form

         int                            iSyncId;
         //syncronization id
         int                            iTickCount;
         //time of last access;

         CTPCC_BASE          *pTxn;

} CLIENTDATA, *PCLIENTDATA;


//This structure is used to define the operational interface for terminal id support
typedef struct _TERM
{
         int                            iNumEntries;
         //total allocated terminal array entries
         int                            iFreeList;
                  //next available terminal array element or -1 if none
         int                            iMasterSyncId;
         //syncronization id
         CLIENTDATA          *pClientData;
         //pointer to allocated client data
} TERM;

typedef TERM *PTERM;
         //pointer to terminal structure type


         enum WEBERROR
         {
                  NO_ERR,
                  ERR_COMMAND_UNDEFINED,
                  ERR_D_ID_INVALID,
                  ERR_DELIVERY_CARRIER_ID_RANGE,
                  ERR_DELIVERY_CARRIER_INVALID,
                  ERR_DELIVERY_MISSING_OCD_KEY,
                  ERR_DELIVERY_THREAD_FAILED,
                  ERR_GETPROCADDR_FAILED,
```

```
                ERR_HTML_ILL_FORMED,
                ERR_INVALID_SYNC_CONNECTION,
                ERR_INVALID_TERMID,
                ERR_LOADDLL_FAILED,
                ERR_MAX_CONNECTIONS_EXCEEDED,
                ERR_MEM_ALLOC_FAILED,
                ERR_MISSING_REGISTRY_ENTRIES,
                ERR_NEWORDER_CUSTOMER_INVALID,
                ERR_NEWORDER_CUSTOMER_KEY,
                ERR_NEWORDER_DISTRICT_INVALID,
                ERR_NEWORDER_FORM_MISSING_DID,
                ERR_NEWORDER_ITEMID_INVALID,
                ERR_NEWORDER_ITEMID_RANGE,
                ERR_NEWORDER_ITEMID_WITHOUT_SUPPW,
                ERR_NEWORDER_MISSING_IID_KEY,
                ERR_NEWORDER_MISSING_QTY_KEY,
                ERR_NEWORDER_MISSING_SUPPW_KEY,
                ERR_NEWORDER_NOITEMS_ENTERED,
                ERR_NEWORDER_QTY_INVALID,
                ERR_NEWORDER_QTY_RANGE,
                ERR_NEWORDER_QTY_WITHOUT_SUPPW,
                ERR_NEWORDER_SUPPW_INVALID,
                ERR_NO_SERVER_SPECIFIED,
                ERR_ORDERSTATUS_CID_AND_CLT,
                ERR_ORDERSTATUS_CID_INVALID,
                ERR_ORDERSTATUS_CLT_RANGE,
                ERR_ORDERSTATUS_DID_INVALID,
                ERR_ORDERSTATUS_MISSING_CID_CLT,
                ERR_ORDERSTATUS_MISSING_CID_KEY,
                ERR_ORDERSTATUS_MISSING_CLT_KEY,
                ERR_ORDERSTATUS_MISSING_DID_KEY,
                ERR_PAYMENT_CDI_INVALID,
                ERR_PAYMENT_CID_AND_CLT,
                ERR_PAYMENT_CUSTOMER_INVALID,
                ERR_PAYMENT_CWI_INVALID,
                ERR_PAYMENT_DISTRICT_INVALID,
                ERR_PAYMENT_HAM_INVALID,
                ERR_PAYMENT_HAM_RANGE,
                ERR_PAYMENT_LAST_NAME_TO_LONG,
                ERR_PAYMENT_MISSING_CDI_KEY,
                ERR_PAYMENT_MISSING_CID_CLT,
                ERR_PAYMENT_MISSING_CID_KEY,
                ERR_PAYMENT_MISSING_CLT,
                ERR_PAYMENT_MISSING_CLT_KEY,
                ERR_PAYMENT_MISSING_CWI_KEY,
                ERR_PAYMENT_MISSING_DID_KEY,
                ERR_PAYMENT_MISSING_HAM_KEY,
                ERR_STOCKLEVEL_MISSING_THRESHOLD_KEY,
                ERR_STOCKLEVEL_THRESHOLD_INVALID,
                ERR_STOCKLEVEL_THRESHOLD_RANGE,
                ERR_VERSION_MISMATCH,
                ERR_W_ID_INVALID
        };

class CWEBCLNT_ERR : public CBaseErr
{
        public:

                CWEBCLNT_ERR(WEBERROR Err)
                {
                        m_Error = Err;
                        m_szTextDetail = NULL;
                        m_SystemErr = 0;
                        m_szErrorText = NULL;
                };

                CWEBCLNT_ERR(WEBERROR Err, char *szTextDetail, DWORD dwSystemErr)
                {
                        m_Error = Err;
                        m_szTextDetail = new char[strlen(szTextDetail)+1];
                        strcpy( m_szTextDetail, szTextDetail );
                        m_SystemErr = dwSystemErr;
                        m_szErrorText = NULL;
                };

                ~CWEBCLNT_ERR()
                {
                        if (m_szTextDetail != NULL)
                                delete [] m_szTextDetail;
                        if (m_szErrorText != NULL)
                                delete [] m_szErrorText;
                };

                WEBERROR  m_Error;
                char                *m_szTextDetail;    //
                char                *m_szErrorText;
                DWORD               m_SystemErr;

                int ErrorType() {return ERR_TYPE_WEBDLL;};
                int ErrorNum() {return m_Error;};
                char *ErrorText();

};

//These constants have already been defined in engstut.h, but since we do
//not want to include it in the delisrv executable
#define   TXN_EVENT_START               2
#define   TXN_EVENT_STOP                4
#define TXN_EVENT_WARNING     6                   //used to record a warning into the log

//function prototypes

BOOL APIENTRY DllMain(HANDLE hModule, DWORD ul_reason_for_call, LPVOID lpReserved);
void WriteMessageToEventLog(LPTSTR lpszMsg);
void ProcessQueryString(EXTENSION_CONTROL_BLOCK *pECB, int *pCmd, int *pFormId, int
*pTermId, int *pSyncId);
void WelcomeForm(EXTENSION_CONTROL_BLOCK *pECB, char *szBuffer);
void SubmitCmd(EXTENSION_CONTROL_BLOCK *pECB, char *szBuffer);
void BeginCmd(EXTENSION_CONTROL_BLOCK *pECB, int iFormId, int iTermId);
void ProcessCmd(EXTENSION_CONTROL_BLOCK *pECB, int iFormId, int iTermId);
void StatsCmd(EXTENSION_CONTROL_BLOCK *pECB, char *szBuffer);
void ErrorMessage(EXTENSION_CONTROL_BLOCK *pECB, int iError, int iErrorType, char *szMsg,
int iTermId);
void GetKeyValue(char **pQueryString, char *pKey, char *pValue, int iMax, WEBERROR err);
int  GetIntKeyValue(char **pQueryString, char *pKey, WEBERROR NoKeyErr, WEBERROR
NotIntErr);
void TermInit(void);
void TermDeleteAll(void);
int  TermAdd(void);
void TermDelete(int id);
void ErrorForm(EXTENSION_CONTROL_BLOCK *pECB, int iType, int iErrorNum, int iTermId, int
iSyncId, char *szErrorText, char *szBuffer );
void MakeMainMenuForm(int iTermId, int iSyncId, char *szForm);
void MakeStockLevelForm(int iTermId, STOCK_LEVEL_DATA *pStockLevelData, BOOL bInput, char
*szForm);
```

```
void MakeNewOrderForm(int iTermId, NEW_ORDER_DATA *pNewOrderData, BOOL bInput, char
*szForm);
void MakePaymentForm(int iTermId, PAYMENT_DATA *pPaymentData, BOOL bInput, char *szForm);
void MakeOrderStatusForm(int iTermId, ORDER_STATUS_DATA *pOrderStatusData, BOOL bInput,
char *szForm);
void MakeDeliveryForm(int iTermId, DELIVERY_DATA *pDeliveryData, BOOL bInput, char
*szForm);
void ProcessNewOrderForm(EXTENSION_CONTROL_BLOCK  *pECB, int iTermId, char *szBuffer);
void ProcessPaymentForm(EXTENSION_CONTROL_BLOCK *pECB, int iTermId, char *szBuffer);
void ProcessOrderStatusForm(EXTENSION_CONTROL_BLOCK *pECB, int iTermId, char *szBuffer);
void ProcessDeliveryForm(EXTENSION_CONTROL_BLOCK *pECB, int iTermId, char *szBuffer);
void ProcessStockLevelForm(EXTENSION_CONTROL_BLOCK *pECB, int iTermId, char *szBuffer);
void GetNewOrderData(LPSTR lpszQueryString, NEW_ORDER_DATA *pNewOrderData);
void GetPaymentData(LPSTR lpszQueryString, PAYMENT_DATA *pPaymentData);
void GetOrderStatusData(LPSTR lpszQueryString, ORDER_STATUS_DATA *pOrderStatusData);
BOOL PostDeliveryInfo(long w_id, short o_carrier_id);
BOOL IsNumeric(char *ptr);
BOOL IsDecimal(char *ptr);
void DeliveryWorkerThread(void *ptr);
```

isapi_dll/src/tpcc.rc

```
//Microsoft Developer Studio generated resource script.
//
#include "resource.h"

#define APSTUDIO_READONLY_SYMBOLS
////////////////////////////////////////////////////////////////////////////
//
// Generated from the TEXTINCLUDE 2 resource.
//
#include "afxres.h"

////////////////////////////////////////////////////////////////////////////
#undef APSTUDIO_READONLY_SYMBOLS

////////////////////////////////////////////////////////////////////////////
// English (U.S.) resources

#if !defined(AFX_RESOURCE_DLL) || defined(AFX_TARG_ENU)
#ifdef _WIN32
LANGUAGE LANG_ENGLISH, SUBLANG_ENGLISH_US
#pragma code_page(1252)
#endif //_WIN32

#ifndef _MAC
////////////////////////////////////////////////////////////////////////////
//
// Version
//

VS_VERSION_INFO VERSIONINFO
 FILEVERSION 0,4,0,0
 PRODUCTVERSION 0,4,0,0
 FILEFLAGSMASK 0x3fL
#ifdef _DEBUG
 FILEFLAGS 0x1L
#else
 FILEFLAGS 0x0L
#endif
 FILEOS 0x40004L
 FILETYPE 0x2L
 FILESUBTYPE 0x0L
BEGIN
    BLOCK "StringFileInfo"
    BEGIN
        BLOCK "040904b0"
        BEGIN
            VALUE "Comments", "TPC-C HTML DLL Server (DBLIB)\0"
            VALUE "CompanyName", "Microsoft\0"
            VALUE "FileDescription", "TPC-C HTML DLL Server (DBLIB)\0"
            VALUE "FileVersion", "0, 4, 0, 0\0"
            VALUE "InternalName", "tpcc\0"
            VALUE "LegalCopyright", "Copyright © 1997\0"
            VALUE "OriginalFilename", "tpcc.dll\0"
            VALUE "ProductName", "Microsoft tpcc\0"
            VALUE "ProductVersion", "0, 4, 0, 0\0"
        END
    END
    BLOCK "VarFileInfo"
    BEGIN
        VALUE "Translation", 0x409, 1200
    END
END

#endif    // !_MAC


#ifdef APSTUDIO_INVOKED
////////////////////////////////////////////////////////////////////////////
//
// TEXTINCLUDE
//

1 TEXTINCLUDE DISCARDABLE
BEGIN
    "resource.h\0"
END

2 TEXTINCLUDE DISCARDABLE
BEGIN
    "#include ""afxres.h""\r\n"
    "\0"
END

3 TEXTINCLUDE DISCARDABLE
BEGIN
    "\r\n"
    "\0"
END

#endif    // APSTUDIO_INVOKED


////////////////////////////////////////////////////////////////////////////
//
// Dialog
//

IDD_DIALOG1 DIALOG DISCARDABLE  0, 0, 186, 95
STYLE DS_MODALFRAME | WS_POPUP | WS_CAPTION | WS_SYSMENU
CAPTION "Dialog"
```

```
FONT 8, "MS Sans Serif"
BEGIN
    DEFPUSHBUTTON   "OK",IDOK,129,7,50,14
    PUSHBUTTON      "Cancel",IDCANCEL,129,24,50,14
END


/////////////////////////////////////////////////////////////////////////////
//
// DESIGNINFO
//

#ifdef APSTUDIO_INVOKED
GUIDELINES DESIGNINFO DISCARDABLE
BEGIN
    IDD_DIALOG1, DIALOG
    BEGIN
        LEFTMARGIN, 7
        RIGHTMARGIN, 179
        TOPMARGIN, 7
        BOTTOMMARGIN, 88
    END
END
#endif    // APSTUDIO_INVOKED

#endif    // English (U.S.) resources
/////////////////////////////////////////////////////////////////////////////



#ifndef APSTUDIO_INVOKED
/////////////////////////////////////////////////////////////////////////////
//
// Generated from the TEXTINCLUDE 3 resource.
//


/////////////////////////////////////////////////////////////////////////////
#endif    // not APSTUDIO_INVOKED
```

isapi_dll/src/tpcc.cpp

```
/*        FILE:               TPCC.C
 *                                      Microsoft TPC-C Kit Ver. 4.20.000
 *                                      Copyright Microsoft, 1999
 *              All Rights Reserved
 *
 *                                      Version 4.10.000 audited by Richard Gimarc,
Performance Metrics, 3/17/99
 *
 *        PURPOSE:  Main module for TPCC.DLL which is an ISAPI service dll.
 *        Contact:  Charles Levine (clevine@microsoft.com)
 *
 *  Change history:
 *                  4.20.000 - reworked error handling; added options for COM and Encina
txn monitors
 */
```

```
#include <windows.h>
#include <process.h>
#include <tchar.h>
#include <stdio.h>
#include <stdarg.h>
#include <malloc.h>
#include <stdlib.h>
#include <string.h>
#include <time.h>
#include <sys\timeb.h>
#include <io.h>
#include <assert.h>

#include <sqltypes.h>

#ifdef ICECAP
#include <icapexp.h>
#endif

#include "..\..\common\src\trans.h"              //tpckit transaction header contains
definations of structures specific to TPC-C
#include "..\..\common\src\error.h"
#include "..\..\common\src\txn_base.h"
#include "..\..\common\src\ReadRegistry.h"

#include "..\..\common\txnlog\include\rtetime.h"
#include "..\..\common\txnlog\include\spinlock.h"
#include "..\..\common\txnlog\include\txnlog.h"

// Database layer includes
#include "..\..\db_dblib_dll\src\tpcc_dblib.h"              // DBLIB implementation of
TPC-C txns
#include "..\..\db_odbc_dll\src\tpcc_odbc.h"                // ODBC implementation of
TPC-C txns

// Txn monitor layer includes
#include "..\..\tm_com_dll\src\tpcc_com.h"                          // COM Services
implementation on TPC-C txns
#include "..\..\tm_tuxedo_dll\src\tpcc_tux.h"               // interface to Tuxedo
libraries
#include "..\..\tm_encina_dll\src\tpcc_enc.h"               // interface to Encina
libraries

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


#define   LEN_ERR_STRING      256

// defines for Make<Txn>Form calls to distinguish input and output flavors
#define   OUTPUT_FORM         0
#define INPUT_FORM  1

char                szMyComputerName[MAX_COMPUTERNAME_LENGTH+1];

//Terminal client id structure
TERM      Term = { 0, 0, 0, NULL };

// The WEBCLIENT_VERSION string specifies the version level of this web client interface.
// The RTE must be synchronized with the interface level on login, otherwise the login
```

```
// will fail.  This is a sanity check to catch problems resulting from mismatched
versions
// of the RTE and web client.
#define WEBCLIENT_VERSION "410"

static    CRITICAL_SECTION              TermCriticalSection;

static  HINSTANCE hLibInstanceTm = NULL;
static  HINSTANCE hLibInstanceDb = NULL;

TYPE_CTPCC_DBLIB    *pCTPCC_DBLIB_new;
TYPE_CTPCC_ODBC             *pCTPCC_ODBC_new;
TYPE_CTPCC_TUXEDO   *pCTPCC_TUXEDO_new;
TYPE_CTPCC_ENCINA   *pCTPCC_ENCINA_new;
TYPE_CTPCC_ENCINA   *pCTPCC_ENCINA_post_init;
TYPE_CTPCC_COM              *pCTPCC_COM_new;

// For deferred Delivery txns:

CTxnLog                                         *txnDelilog = NULL;
         //used to log delivery transaction information

HANDLE                                          hWorkerSemaphore    =
INVALID_HANDLE_VALUE;
HANDLE                                          hDoneEvent
         = INVALID_HANDLE_VALUE;
HANDLE                                          *pDeliHandles                = NULL;

// configuration settings from registry
TPCCREGISTRYDATA            Reg;


DWORD                                           dwNumDeliveryThreads = 4;
CRITICAL_SECTION            DelBuffCriticalSection;                 //critical section
for delivery transactions cache
DELIVERY_TRANSACTION        *pDelBuff                   = NULL;
DWORD                                           dwDelBuffSize                = 100;
         // size of circular buffer for delivery txns
DWORD                                           dwDelBuffFreeCount;
         // number of buffers free
DWORD                                           dwDelBuffBusyIndex  = 0;
         // index position of entry waiting to be delivered
DWORD                                           dwDelBuffFreeIndex  = 0;
         // index position of unused entry

#include "..\..\common\src\ReadRegistry.cpp"

/* FUNCTION: DllMain
 *
 * PURPOSE:         This function is the entry point for the DLL.  This implementation is
based on the
 *                          fact that DLL_PROCESS_ATTACH is only called from the inet
service once.
 *
 * 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
 */

BOOL APIENTRY DllMain(HANDLE hModule, DWORD ul_reason_for_call, LPVOID lpReserved)
{
         DWORD  i;
         char szEvent[LEN_ERR_STRING] = "\0";
         char szLogFile[128];
         char szDllName[128];

// debugging....
// DebugBreak();

         try
         {
                  switch( ul_reason_for_call )
                  {
                           case DLL_PROCESS_ATTACH:
                                    {
                                             DWORD dwSize =
MAX_COMPUTERNAME_LENGTH+1;
                                             GetComputerName(szMyComputerName,
&dwSize);
                                             szMyComputerName[dwSize] = 0;
                                    }

                                    DisableThreadLibraryCalls((HMODULE)hModule);
                                    InitializeCriticalSection(&TermCriticalSection);

                                    if ( ReadTPCCRegistrySettings( &Reg ) )
                                             throw new CWEBCLNT_ERR(
ERR_MISSING_REGISTRY_ENTRIES );

                                    dwDelBuffSize = min( Reg.dwMaxPendingDeliveries,
10000 );  // min with 10000 as a sanity constraint
                                    dwNumDeliveryThreads = min(
Reg.dwNumberOfDeliveryThreads, 100 );  // min with 100 as a sanity constraint

                                    TermInit();

                                    // load DLL for txn monitor
                                    if (Reg.eTxnMon == TUXEDO)
                                    {
                                             strcpy( szDllName, Reg.szPath );
                                             strcat( szDllName, "tpcc_tuxedo.dll");
                                             hLibInstanceTm = LoadLibrary( szDllName
);
                                             if (hLibInstanceTm == NULL)
                                                      throw new CWEBCLNT_ERR(
ERR_LOADDLL_FAILED, szDllName, GetLastError() );

                                             // get function pointer to wrapper for
class constructor
                                             pCTPCC_TUXEDO_new =
(TYPE_CTPCC_TUXEDO*) GetProcAddress(hLibInstanceTm,"CTPCC_TUXEDO_new");
                                             if (pCTPCC_TUXEDO_new == NULL)
                                                      throw new CWEBCLNT_ERR(
ERR_GETPROCADDR_FAILED, szDllName, GetLastError() );
                                    }
                                    else if (Reg.eTxnMon == ENCINA)
                                    {
                                             strcpy( szDllName, Reg.szPath );
                                             strcat( szDllName, "tpcc_encina.dll");
```

```
                                                hLibInstanceTm = LoadLibrary( szDllName
);
                                                if (hLibInstanceTm == NULL)
                                                        throw new CWEBCLNT_ERR(
ERR_LOADDLL_FAILED, szDllName, GetLastError() );
                                                // get function pointer to wrapper for
class constructor
                                                pCTPCC_ENCINA_new =
(TYPE_CTPCC_ENCINA*) GetProcAddress(hLibInstanceTm,"CTPCC_ENCINA_new");
                                                pCTPCC_ENCINA_post_init =
(TYPE_CTPCC_ENCINA*) GetProcAddress(hLibInstanceTm,"CTPCC_ENCINA_post_init");
                                                if (pCTPCC_ENCINA_new == NULL)
                                                        throw new CWEBCLNT_ERR(
ERR_GETPROCADDR_FAILED, szDllName, GetLastError() );
                                        }
                                        else if (Reg.eTxnMon == COM)
                                        {
                                                strcpy( szDllName, Reg.szPath );
                                                strcat( szDllName, "tpcc_com.dll");
                                                hLibInstanceTm = LoadLibrary( szDllName
);
                                                if (hLibInstanceTm == NULL)
                                                        throw new CWEBCLNT_ERR(
ERR_LOADDLL_FAILED, szDllName, GetLastError() );

                                                // get function pointer to wrapper for
class constructor
                                                pCTPCC_COM_new = (TYPE_CTPCC_COM*)
GetProcAddress(hLibInstanceTm,"CTPCC_COM_new");
                                                if (pCTPCC_COM_new == NULL)
                                                        throw new CWEBCLNT_ERR(
ERR_GETPROCADDR_FAILED, szDllName, GetLastError() );
                                        }

                                        // load DLL for database connection
                                        if ((Reg.eTxnMon == None) ||
(dwNumDeliveryThreads > 0))
                                        {
                                                if (Reg.eDB_Protocol == DBLIB)
                                                {
                                                        strcpy( szDllName, Reg.szPath
);
                                                        strcat( szDllName,
"tpcc_dblib.dll");
                                                        hLibInstanceDb = LoadLibrary(
szDllName );
                                                        if (hLibInstanceDb == NULL)
                                                                throw new
CWEBCLNT_ERR( ERR_LOADDLL_FAILED, szDllName, GetLastError() );

                                                        // get function pointer to
wrapper for class constructor
                                                        pCTPCC_DBLIB_new =
(TYPE_CTPCC_DBLIB*) GetProcAddress(hLibInstanceDb,"CTPCC_DBLIB_new");
                                                        if (pCTPCC_DBLIB_new == NULL)
                                                                throw new
CWEBCLNT_ERR( ERR_GETPROCADDR_FAILED, szDllName, GetLastError() );
                                                }
                                                else if (Reg.eDB_Protocol == ODBC)
                                                {
                                                        strcpy( szDllName, Reg.szPath
);
                                                        strcat( szDllName,
"tpcc_odbc.dll");
                                                        hLibInstanceDb = LoadLibrary(
szDllName );
                                                        if (hLibInstanceDb == NULL)
                                                                throw new
CWEBCLNT_ERR( ERR_LOADDLL_FAILED, szDllName, GetLastError() );

                                                        // get function pointer to
wrapper for class constructor
                                                        pCTPCC_ODBC_new =
(TYPE_CTPCC_ODBC*) GetProcAddress(hLibInstanceDb,"CTPCC_ODBC_new");
                                                        if (pCTPCC_ODBC_new == NULL)
                                                                throw new
CWEBCLNT_ERR( ERR_GETPROCADDR_FAILED, szDllName, GetLastError() );
                                                }
                                        }

                                        if (dwNumDeliveryThreads)
                                        {
                                                // for deferred delivery txns:
                                                hDoneEvent = CreateEvent( NULL, TRUE /*
manual reset */, FALSE /* initially not signalled */, NULL );

                InitializeCriticalSection(&DelBuffCriticalSection);
                                                hWorkerSemaphore = CreateSemaphore(
NULL, 0, dwDelBuffSize, NULL );
                                                dwDelBuffFreeCount = dwDelBuffSize;

                                                InitJulianTime(NULL);

                                                // create unique log file name based on
delilog-yymmdd-hhmm.log
                                                SYSTEMTIME Time;
                                                GetLocalTime( &Time );
                                                wsprintf( szLogFile, "%sdelivery-
%2.2d%2.2d%2.2d-%2.2d%2.2d.log",
                                                                        Reg.szPath,
Time.wYear % 100, Time.wMonth, Time.wDay, Time.wHour, Time.wMinute );
                                                txnDelilog = new CTxnLog(szLogFile,
TXN_LOG_WRITE);

                                                //write event into txn log for START
                                                txnDelilog-
>WriteCtrlRecToLog(TXN_EVENT_START, szMyComputerName, sizeof(szMyComputerName));

                                                // allocate structures for delivery
buffers and thread mgmt
                                                pDeliHandles = new
HANDLE[dwNumDeliveryThreads];
                                                pDelBuff = new
DELIVERY_TRANSACTION[dwDelBuffSize];
                                                // launch DeliveryWorkerThread to
perform actual delivery txns
                                                for(i=0; i<dwNumDeliveryThreads; i++)
                                                {
                                                        pDeliHandles[i] = (HANDLE)
_beginthread( DeliveryWorkerThread, 0, NULL );
                                                        if (pDeliHandles[i] ==
INVALID_HANDLE_VALUE)
                                                                throw new
CWEBCLNT_ERR( ERR_DELIVERY_THREAD_FAILED );
                                                }
```

```
                                        }

                                        break;

                                case DLL_PROCESS_DETACH:
                                        if (dwNumDeliveryThreads)
                                        {
                                                if (txnDelilog != NULL)
                                                {
                                                        //write event into txn log
for STOP
                                                        txnDelilog-
>WriteCtrlRecToLog(TXN_EVENT_STOP, szMyComputerName, sizeof(szMyComputerName));

                                                        // This will do a clean
shutdown of the delivery log file
                                                        CTxnLog   *txnDelilogLocal =
txnDelilog;
                                                        txnDelilog= NULL;
                                                        delete txnDelilogLocal;
                                                }

                                                delete [] pDeliHandles;
                                                delete [] pDelBuff;

                                                CloseHandle( hWorkerSemaphore );
                                                CloseHandle( hDoneEvent );

        DeleteCriticalSection(&DelBuffCriticalSection);
                                        }

                                        DeleteCriticalSection(&TermCriticalSection);

                                        if (hLibInstanceTm != NULL)
                                                FreeLibrary( hLibInstanceTm );
                                        hLibInstanceTm = NULL;

                                        if (hLibInstanceDb != NULL)
                                                FreeLibrary( hLibInstanceDb );
                                        hLibInstanceDb = NULL;

                                        Sleep(500);
                                        break;

                                default:
                                        /* nothing */;
                        }
                }
                catch (CBaseErr *e)
                {
                        WriteMessageToEventLog( e->ErrorText() );
                        delete e;
                        TerminateExtension(0);
                        return FALSE;
                }
                catch (...)
                {
                        WriteMessageToEventLog(TEXT("Unhandled exception.  DLL could not
load."));
                        TerminateExtension(0);
                        return FALSE;
                }

                return TRUE;
        }


        /* FUNCTION: GetExtensionVersion
         *
         * 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.
         */

        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);

                // TODO: why do we need this here instead of in the DLL attach?
                if (Reg.eTxnMon == ENCINA)
                        pCTPCC_ENCINA_post_init();

                return TRUE;
        }

        /* FUNCTION: TerminateExtension
         *
         * PURPOSE:         This function is called by the inet service when the DLL is about to
        be unloaded.
         *                           Release all resources in anticipation of being unloaded.
         *
         * RETURNS:                   TRUE      inet service expected return value.
         */

        BOOL WINAPI TerminateExtension( DWORD dwFlags )
        {
                if (pDeliHandles)
                {
                        SetEvent( hDoneEvent );
                        for(DWORD i=0; i<dwNumDeliveryThreads; i++)
                                WaitForSingleObject( pDeliHandles[i], INFINITE );
                }

                TermDeleteAll();
                return TRUE;
        }


        /* FUNCTION: HttpExtensionProc
         *
         * 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;
        char                szBuffer[4096];

        int                             lpbSize;
        static char         szHeader[] = "200 Ok";
        DWORD               dwSize = 6;                  // initial value is
strlen(szHeader)
        char                szHeader1[4096];


#ifdef ICECAP
        StartCAP();
#endif

        try
        {
                //process http query
                ProcessQueryString(pECB, &iCmd, &FormId, &TermId, &iSyncId);

                if (TermId != 0)
                {
                        if ( TermId < 0 || TermId >= Term.iNumEntries ||
Term.pClientData[TermId].iNextFree != -1 )
                        {
                                // debugging...
                                char szTmp[128];
                                wsprintf( szTmp, "Invalid term ID; TermId = %d",
TermId );
                                WriteMessageToEventLog( szTmp );

                                throw new CWEBCLNT_ERR( ERR_INVALID_TERMID );
                        }

                        //must have a valid syncid here since termid is valid
                        if (iSyncId != Term.pClientData[TermId].iSyncId)
                                throw new CWEBCLNT_ERR(
ERR_INVALID_SYNC_CONNECTION );

                        //set use time
                        Term.pClientData[TermId].iTickCount = GetTickCount();
                }


                switch(iCmd)
                {
                case 0:
                        WelcomeForm(pECB, szBuffer);
                        break;
                case 1:
                        switch( FormId )
                        {
                                case WELCOME_FORM:
                                case MAIN_MENU_FORM:
                                        break;
                                case NEW_ORDER_FORM:
                                        ProcessNewOrderForm(pECB, TermId,
szBuffer);
                                        break;
                                case PAYMENT_FORM:
                                        ProcessPaymentForm(pECB, TermId,
szBuffer);
                                        break;
                                case DELIVERY_FORM:
                                        ProcessDeliveryForm(pECB, TermId,
szBuffer);
                                        break;
                                case ORDER_STATUS_FORM:
                                        ProcessOrderStatusForm(pECB, TermId,
szBuffer);
                                        break;
                                case STOCK_LEVEL_FORM:
                                        ProcessStockLevelForm(pECB, TermId,
szBuffer);
                                        break;
                        }
                        break;
                case 2:
                        // new-order selected from menu; display new-order input
form
                        MakeNewOrderForm(TermId, NULL, INPUT_FORM, szBuffer);
                        break;
                case 3:
                        // payment selected from menu; display payment input form
                        MakePaymentForm(TermId, NULL, INPUT_FORM, szBuffer);
                        break;
                case 4:
                        // delivery selected from menu; display delivery input form
                        MakeDeliveryForm(TermId, NULL, INPUT_FORM, szBuffer);
                        break;
                case 5:
                        // order-status selected from menu; display order-status
input form
                        MakeOrderStatusForm(TermId, NULL, INPUT_FORM, szBuffer);
                        break;
                case 6:
                        // stock-level selected from menu; display stock-level
input form
                        MakeStockLevelForm(TermId, NULL, INPUT_FORM, szBuffer);
                        break;
                case 7:
                        // ExitCmd
                        TermDelete(TermId);
                        WelcomeForm(pECB, szBuffer);
                        break;
                case 8:
                        SubmitCmd(pECB, szBuffer);
                        break;
                case 9:
                        // menu
                        MakeMainMenuForm(TermId, Term.pClientData[TermId].iSyncId,
szBuffer);
                        break;
                case 10:
                        // CMD=Clear
                        // resets all connections; should only be used when no
other connections are active
                        TermDeleteAll();
```

```
                        TermInit();
                        WelcomeForm(pECB, szBuffer);
                        break;
                case 11:  // CMD=Stats
                        StatsCmd(pECB, szBuffer);
                        break;
                }
        }
        catch (CBaseErr *e)
        {
                ErrorForm( pECB, e->ErrorType(), e->ErrorNum(), TermId, iSyncId, e-
>ErrorText(), szBuffer );
                delete e;
        }
        catch (...)
        {
                ErrorForm( pECB, ERR_TYPE_WEBDLL, 0, TermId, iSyncId, "Error:
Unhandled exception in Web Client.", szBuffer );
        }

#ifdef ICECAP
        StopCAP();
#endif


        lpbSize = strlen(szBuffer);
        wsprintf(szHeader1,
                        "Content-Type: text/html\r\n"
                        "Content-Length: %d\r\n"
                        "Connection: Keep-Alive\r\n\r\n" , lpbSize);
        strcat( szHeader1, szBuffer );

        (*pECB->ServerSupportFunction)(pECB->ConnID, HSE_REQ_SEND_RESPONSE_HEADER,
szHeader, (LPDWORD) &dwSize, (LPDWORD)szHeader1);

        //finish up and keep connection
        pECB->dwHttpStatusCode = 200;
        return HSE_STATUS_SUCCESS_AND_KEEP_CONN;
}


void WriteMessageToEventLog(LPTSTR lpszMsg)
{
    TCHAR   szMsg[256];
    HANDLE  hEventSource;
    LPTSTR  lpszStrings[2];

    // Use event logging to log the error.
    //
    hEventSource = RegisterEventSource(NULL, TEXT("TPCC.DLL"));

    _stprintf(szMsg, TEXT("Error in TPCC.DLL: "));
    lpszStrings[0] = szMsg;
    lpszStrings[1] = lpszMsg;

    if (hEventSource != NULL)
          {
         ReportEvent(hEventSource, // handle of event source
            EVENTLOG_ERROR_TYPE,  // event type
            0,                    // event category
            0,                    // event ID
            NULL,                 // current user's SID
            2,                    // strings in lpszStrings
            0,                    // no bytes of raw data
            (LPCTSTR *)lpszStrings,    // array of error strings
            NULL);                // no raw data

        (VOID) DeregisterEventSource(hEventSource);
    }
}


/* FUNCTION: DeliveryWorkerThread
 *
 * PURPOSE:         This function processes deferred delivery txns.  There are typically
several
 *                          threads running this routine.  The number of threads is
determined by an entry
 *                          read from the registry.  The thread waits for work by
waiting on semaphore.
 *                          When a delivery txn is posted, the semaphore is released.
After processing
 *                          the delivery txn, information is logged to record the txn
status and execution
 *                          time.
 */

/*static*/ void DeliveryWorkerThread(void *ptr)
{
          CTPCC_BASE                    *pTxn = NULL;

          DELIVERY_TRANSACTION                    delivery;
          PDELIVERY_DATA                          pDeliveryData;
          TXN_RECORD_TPCC_DELIV_DEF     txnDeliRec;

          DWORD                                   index;
          HANDLE                                  handles[2];

          SYSTEMTIME                    trans_end;                  //delivery
transaction finished time
          SYSTEMTIME                    trans_start;        //delivery transaction start
time

          assert(txnDelilog != NULL);

          try
          {
                if (Reg.eDB_Protocol == ODBC)
                        pTxn = pCTPCC_ODBC_new( Reg.szDbServer, Reg.szDbUser,
Reg.szDbPassword, szMyComputerName, Reg.szDbName, Reg.szSPPrefix );
                else if (Reg.eDB_Protocol == DBLIB)
                        pTxn = pCTPCC_DBLIB_new( Reg.szDbServer, Reg.szDbUser,
Reg.szDbPassword, szMyComputerName, Reg.szDbName );
                pDeliveryData = pTxn->BuffAddr_Delivery();
          }
          catch (CBaseErr *e)
          {
                char szTmp[1024];
                wsprintf( szTmp, "Error in Delivery Txn thread.  Could not connect to
database.  "
                                        "%s.  Server=%s, User=%s, Password=%s,
Database=%s",
                                        e->ErrorText(), Reg.szDbServer, Reg.szDbUser,
Reg.szDbPassword, Reg.szDbName );
                WriteMessageToEventLog( szTmp );
                delete e;
```

```
                goto ErrorExit;
        }
        catch (...)
        {
                WriteMessageToEventLog(TEXT("Unhandled exception caught in
DeliveryWorkerThread."));
                goto ErrorExit;
        }

        while (TRUE)
        {
                try
                {
                        //while delivery thread running, i.e. user has not
requested termination
                        while (TRUE)
                        {
                                // need to wait for multiple objects: program
exit or worker semaphore;
                                handles[0] = hDoneEvent;
                                handles[1] = hWorkerSemaphore;
                                index = WaitForMultipleObjects( 2, &handles[0],
FALSE, INFINITE );
                                if (index == WAIT_OBJECT_0)
                                        goto ErrorExit;

                                ZeroMemory(&txnDeliRec, sizeof(txnDeliRec));
                                txnDeliRec.TxnType = TXN_REC_TYPE_TPCC_DELIV_DEF;

                                // make a local copy of current entry from
delivery buffer and increment buffer index
                                EnterCriticalSection(&DelBuffCriticalSection);
                                delivery = *(pDelBuff+dwDelBuffBusyIndex);
                                dwDelBuffFreeCount++;
                                dwDelBuffBusyIndex++;
                                if (dwDelBuffBusyIndex == dwDelBuffSize)
        // wrap-around if at end of buffer
                                        dwDelBuffBusyIndex = 0;

                                LeaveCriticalSection(&DelBuffCriticalSection);

                                pDeliveryData->w_id = delivery.w_id;
                                pDeliveryData->o_carrier_id =
delivery.o_carrier_id;


                                txnDeliRec.w_id = pDeliveryData->w_id;
                                txnDeliRec.o_carrier_id = pDeliveryData-
>o_carrier_id;
                                txnDeliRec.TxnStartT0 =
Get(x64)Time(&delivery.queue);

                                GetLocalTime( &trans_start );
                                pTxn->Delivery();
                                GetLocalTime( &trans_end );

                                //log txn
                                txnDeliRec.TxnStatus = ERR_SUCCESS;
                                for (int i=0; i<10; i++)
                                        txnDeliRec.o_id[i] = pDeliveryData-
>o_id[i];
                                txnDeliRec.DeltaT4 =
(int)(Get(x64)Time(&trans_end) - txnDeliRec.TxnStartT0);
                                txnDeliRec.DeltaTxnExec =
(int)(Get(x64)Time(&trans_end) - Get(x64)Time(&trans_start));

                                if (txnDelilog != NULL)
                                        txnDelilog->WriteToLog(&txnDeliRec);
                        }
                }
                catch (CBaseErr *e)
                {
                        char szTmp[1024];
                        wsprintf( szTmp, "Error in Delivery Txn thread.  %s", e-
>ErrorText() );
                        WriteMessageToEventLog( szTmp );

                        // log the error txn
                        txnDeliRec.TxnStatus = e->ErrorType();
                        if (txnDelilog != NULL)
                                txnDelilog->WriteToLog(&txnDeliRec);

                        delete e;
                }
                catch (...)
                {
                        // unhandled exception; shouldn't happen; not much we can
do...
                        WriteMessageToEventLog(TEXT("Unhandled exception caught in
DeliveryWorkerThread."));
                }
        }

ErrorExit:
        delete pTxn;
        _endthread();
}

/* FUNCTION: PostDeliveryInfo
 *
 * PURPOSE:         This function enters the delivery txn into the deferred delivery
buffer.
 *
 * RETURNS:                 BOOL      FALSE     delivery information posted
successfully
 *                                                    TRUE      error cannot post
delivery info
 */

BOOL PostDeliveryInfo(long w_id, short o_carrier_id)
{
        BOOL bError;

        EnterCriticalSection(&DelBuffCriticalSection);
        if (dwDelBuffFreeCount > 0)
        {
                bError = FALSE;
                (pDelBuff+dwDelBuffFreeIndex)->w_id                        = w_id;
                (pDelBuff+dwDelBuffFreeIndex)->o_carrier_id       = o_carrier_id;
                GetLocalTime(&(pDelBuff+dwDelBuffFreeIndex)->queue);

                dwDelBuffFreeCount--;
                dwDelBuffFreeIndex++;
                if (dwDelBuffFreeIndex == dwDelBuffSize)
                        dwDelBuffFreeIndex = 0;                // wrap-around if
at end of buffer
```

```
        }
        else
                // No free buffers.  Return an error, which indicates that the
delivery buffer is full.
                // Most likely, the number of delivery worker threads needs to be
increased to keep up
                // with the txn rate.
                bError = TRUE;
        LeaveCriticalSection(&DelBuffCriticalSection);

        if (!bError)
                // increment worker semaphore to wake up a worker thread
                ReleaseSemaphore( hWorkerSemaphore, 1, NULL );

        return bError;
}

/* FUNCTION: ProcessQueryString
 *
 * PURPOSE:         This function extracts the relevent information out of the http
command passed in from
 *                          the browser.
 *
 * 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.
 */

void ProcessQueryString(EXTENSION_CONTROL_BLOCK *pECB, int *pCmd, int *pFormId, int
*pTermId, int *pSyncId)
{
        char *ptr = pECB->lpszQueryString;
        char szBuffer[25];
        int i;

        //allowable client command strings i.e. CMD=command
        static char *szCmds[] =
        {
                "Process", "..NewOrder..", "..Payment..", "..Delivery..", "..Order-
Status..", "..Stock-Level..",
                "..Exit..", "Submit", "Menu", "Clear", "Stats", ""
        };

        *pCmd      = 0;              // default is the login screen
        *pTermId = 0;

        // if no params (i.e., empty query string), then return login screen
        if (strlen(pECB->lpszQueryString) == 0)
                return;

        // parse FORMID, TERMID, and SYNCID
        *pFormId = GetIntKeyValue(&ptr, "FORMID", NO_ERR, NO_ERR);
        *pTermId = GetIntKeyValue(&ptr, "TERMID", NO_ERR, NO_ERR);
        *pSyncId = GetIntKeyValue(&ptr, "SYNCID", NO_ERR, NO_ERR);

        // parse CMD
        GetKeyValue(&ptr, "CMD", szBuffer, sizeof(szBuffer), ERR_COMMAND_UNDEFINED);

        // see which command it matches
        for(i=0; ; i++)
        {
                if (szCmds[i][0] == 0)
                        // no more; no match; return error
                        throw new CWEBCLNT_ERR( ERR_COMMAND_UNDEFINED );
                if ( !strcmp(szCmds[i], szBuffer) )
                {
                        *pCmd = i+1;
                        break;
                }
        }
}

/* FUNCTION: void WelcomeForm
 *
 */

void WelcomeForm(EXTENSION_CONTROL_BLOCK *pECB, char *szBuffer)
{
        char szTmp[1024];

        //welcome to tpc-c html form buffer, this is first form client sees.
        strcpy( szBuffer,   "<HTML><HEAD><TITLE>TPC-C Web Client</TITLE></HEAD><BODY>"
                                                        "<B><BIG>Microsoft TPC-C Web
Client (ver 4.20)</BIG></B> <BR> <BR>"
                                                        "<font face=\"Courier
New\"><PRE>"
                                                        "Compiled: "__DATE__",
"__TIME__" <BR>"
                                                        "Source:   "__FILE__"
("__TIMESTAMP__") <BR>"
                                                        "</PRE></font>"
                                                        "<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=\"0\">"
                                                        "<INPUT TYPE=\"hidden\"
NAME=\"SYNCID\" VALUE=\"0\">"
                                                        "<INPUT TYPE=\"hidden\"
NAME=\"VERSION\" VALUE=\"" WEBCLIENT_VERSION "\">"
                                );

        sprintf( szTmp,     "Configuration Settings: <BR><font face=\"Courier New\"
color=\"blue\"><PRE>"
                                                "Txn Monitor            =
<B>%s</B><BR>"
                                                "Database protocol      =
<B>%s</B><BR>"
                                                "Max Connections        =
<B>%d</B><BR>"
                                                "# of Delivery Threads  =
<B>%d</B><BR>"
                                                "Max Pending Deliveries =
<B>%d</B><BR>"
                                , szTxnMonNames[Reg.eTxnMon], szDBNames[Reg.eDB_Protocol],
                                Reg.dwMaxConnections, dwNumDeliveryThreads, dwDelBuffSize
);
        strcat( szBuffer, szTmp);
```

```
        if (Reg.eTxnMon == COM)
        {
                sprintf( szTmp,     "COM Single Pool        = <B>%s</B><BR>",
                         Reg.bCOM_SinglePool ? "YES" : "NO" );
                strcat( szBuffer, szTmp);
        }
        strcat( szBuffer, "</PRE></font>");

        if (Reg.eTxnMon == None)
                // connection options may be specified when not using a txn monitor
                sprintf( szTmp,     "Please enter your database options for this
connection:<BR>"
                                                        "<font face=\"Courier New\"
color=\"blue\"><PRE>"
                                                        "DB Server    = <INPUT
NAME=\"db_server\" SIZE=20 VALUE=\"%s\"><BR>"
                                                        "DB User ID   = <INPUT
NAME=\"db_user\" SIZE=20 VALUE=\"%s\"><BR>"
                                                        "DB Password  = <INPUT
NAME=\"db_passwd\" SIZE=20 VALUE=\"%s\"><BR>"
                                                        "DB Name      = <INPUT
NAME=\"db_name\" SIZE=20 VALUE=\"%s\"><BR>"
                                                        "</PRE></font>"
                                        , Reg.szDbServer, Reg.szDbUser,
Reg.szDbPassword, Reg.szDbName );
        else
                // if using a txn monitor, connection options are determined from
registry; can't
                // set per user.  show options fyi
                sprintf( szTmp,     "Database options which will be used by the
transaction monitor:<BR>"
                                                        "<font face=\"Courier New\"
color=\"blue\"><PRE>"
                                                        "DB Server              =
<B>%s</B><BR>"
                                                        "DB User ID             =
<B>%s</B><BR>"
                                                        "DB Password            =
<B>%s</B><BR>"
                                                        "DB Name                =
<B>%s</B><BR>"
                                                        "</PRE></font>"
                                        , Reg.szDbServer, Reg.szDbUser,
Reg.szDbPassword, Reg.szDbName );
        strcat( szBuffer, szTmp);

        sprintf( szTmp,     "Please enter your Warehouse and District for this
session:<BR>"
                                                "<font face=\"Courier New\"
color=\"blue\"><PRE>" );
        strcat( szBuffer, szTmp);
        strcat( szBuffer,   "Warehouse ID = <INPUT NAME=\"w_id\" SIZE=6><BR>"
                                                        "District ID  = <INPUT
NAME=\"d_id\" SIZE=2><BR>"
                                                        "</PRE></font><HR>"
                                                        "<INPUT TYPE=\"submit\"
NAME=\"CMD\" VALUE=\"Submit\">"
                                                        "</FORM></BODY></HTML>");
}

/* FUNCTION: SubmitCmd
 *
 * PURPOSE:         This function allocated a new terminal id in the Term structure
array.
 *
 */

void SubmitCmd(EXTENSION_CONTROL_BLOCK *pECB, char *szBuffer)
{
        int                 iNewTerm;
        char      *ptr = pECB->lpszQueryString;

        char      szVersion[32]       = { 0 };
        char      szServer[32]        = { 0 };
        char      szUser[32]                  = "sa";
        char      szPassword[32]      = { 0 };
        char      szDatabase[32]      = "tpcc";

        // validate version field; the version field ensures that the RTE is
synchronized with the web client
        GetKeyValue(&ptr, "VERSION", szVersion, sizeof(szVersion),
ERR_VERSION_MISMATCH);
        if ( strcmp( szVersion, WEBCLIENT_VERSION ) )
                throw new CWEBCLNT_ERR( ERR_VERSION_MISMATCH );

        if (Reg.eTxnMon == None)
        {
                // parse Server name
                GetKeyValue(&ptr, "db_server", szServer, sizeof(szServer),
ERR_NO_SERVER_SPECIFIED);
                // parse User name
                GetKeyValue(&ptr, "db_user", szUser, sizeof(szUser), NO_ERR);
                // parse Password
                GetKeyValue(&ptr, "db_passwd", szPassword, sizeof(szPassword),
NO_ERR);
                // parse Database name
                GetKeyValue(&ptr, "db_name", szDatabase, sizeof(szDatabase), NO_ERR);
        }

        // parse warehouse ID
        int w_id = GetIntKeyValue(&ptr, "w_id", ERR_HTML_ILL_FORMED, ERR_W_ID_INVALID);
        if ( w_id < 1 )
                throw new CWEBCLNT_ERR( ERR_W_ID_INVALID );

        // parse district ID
        int d_id = GetIntKeyValue(&ptr, "d_id", ERR_HTML_ILL_FORMED, ERR_D_ID_INVALID);
        if ( d_id < 1 || d_id > 10 )
                throw new CWEBCLNT_ERR( ERR_D_ID_INVALID );


        iNewTerm = TermAdd();

        Term.pClientData[iNewTerm].w_id = w_id;
        Term.pClientData[iNewTerm].d_id = d_id;

        try
        {
                if (Reg.eTxnMon == TUXEDO)
                        Term.pClientData[iNewTerm].pTxn = pCTPCC_TUXEDO_new();
                else if (Reg.eTxnMon == ENCINA)
                        Term.pClientData[iNewTerm].pTxn = pCTPCC_ENCINA_new();
                else if (Reg.eTxnMon == COM)
                        Term.pClientData[iNewTerm].pTxn = pCTPCC_COM_new(
Reg.bCOM_SinglePool );
                else if (Reg.eDB_Protocol == ODBC)
```

```
                        Term.pClientData[iNewTerm].pTxn = pCTPCC_ODBC_new(
szServer, szUser, szPassword, szMyComputerName, szDatabase, Reg.szSPPrefix );
                else if (Reg.eDB_Protocol == DBLIB)
                        Term.pClientData[iNewTerm].pTxn = pCTPCC_DBLIB_new(
szServer, szUser, szPassword, szMyComputerName, szDatabase );
        }
        catch (...)
        {
                TermDelete(iNewTerm);
                throw;              // pass exception upward
        }

        MakeMainMenuForm(iNewTerm, Term.pClientData[iNewTerm].iSyncId, szBuffer);
}

/* FUNCTION: StatsCmd
 *
 * PURPOSE:         This function returns to the browser the total number of active
terminal ids.
 *                          This routine is for development/debugging purposes.
 *
 */

void StatsCmd(EXTENSION_CONTROL_BLOCK *pECB, char *szBuffer)
{
        int i;
        int       iTotal;

        EnterCriticalSection(&TermCriticalSection);

        iTotal = 0;
        for(i=0; i<Term.iNumEntries; i++)
        {
                if (Term.pClientData[i].iNextFree == -1)
                        iTotal++;
        }

        LeaveCriticalSection(&TermCriticalSection);

        wsprintf( szBuffer,
                        "<HTML><HEAD><TITLE>TPC-C Web Client Stats</TITLE></HEAD>"
                        "<BODY><B><BIG> Total Active Connections: %d
</BIG></B><BR></BODY></HTML>"
                        , iTotal );
}

char *CWEBCLNT_ERR::ErrorText()
{
        static SERRORMSG errorMsgs[] =
        {
                {       ERR_COMMAND_UNDEFINED,
        "Command undefined."                                            },
                {       ERR_D_ID_INVALID,
        "Invalid District ID Must be 1 to 10."
                        },
                {       ERR_DELIVERY_CARRIER_ID_RANGE,
        "Delivery Carrier ID out of range must be 1 - 10."
                },
                {       ERR_DELIVERY_CARRIER_INVALID,                   "Delivery
Carrier ID invalid must be numeric 1 - 10."                             },
                {       ERR_DELIVERY_MISSING_OCD_KEY,                   "Delivery
missing Carrier ID key \"OCD*\"."
        },
                {       ERR_DELIVERY_THREAD_FAILED,
        "Could not start delivery worker thread."
                        },
                {       ERR_GETPROCADDR_FAILED,
        "Could not map proc in DLL.  GetProcAddr error.  DLL="
        },
                {       ERR_HTML_ILL_FORMED,
        "Required key field is missing from HTML string."
        },
                {       ERR_INVALID_SYNC_CONNECTION,                    "Invalid
Terminal Sync ID."
                        },
                {       ERR_INVALID_TERMID,
        "Invalid Terminal ID."
                                                                },
                {       ERR_LOADDLL_FAILED,
        "Load of DLL failed.  DLL="
                                                        },
                {       ERR_MAX_CONNECTIONS_EXCEEDED,                   "No
connections available.  Max Connections is probably too low."   },
                {       ERR_MISSING_REGISTRY_ENTRIES,                   "Required
registry entries are missing.  Rerun INSTALL to correct."   },
                {       ERR_NEWORDER_CUSTOMER_INVALID,
        "New Order customer id invalid data type, range = 1 to 3000."
        },
                {       ERR_NEWORDER_CUSTOMER_KEY,
        "New Order missing Customer key \"CID*\"."
                        },
                {       ERR_NEWORDER_DISTRICT_INVALID,
        "New Order District ID Invalid range 1 - 10."
                        },
                {       ERR_NEWORDER_FORM_MISSING_DID,
        "New Order missing District key \"DID*\"."
                        },
                {       ERR_NEWORDER_ITEMID_INVALID,                    "New
Order Item Id is wrong data type, must be numeric."                     },
                {       ERR_NEWORDER_ITEMID_RANGE,
        "New Order Item Id is out of range. Range = 1 to 999999."
        },
                {       ERR_NEWORDER_ITEMID_WITHOUT_SUPPW,              "New
Order Item_Id field entered without a corresponding Supp_W."          },
                {       ERR_NEWORDER_MISSING_IID_KEY,                   "New
Order missing Item Id key \"IID*\"."
        },
                {       ERR_NEWORDER_MISSING_QTY_KEY,                   "New
Order Missing Qty key \"Qty##*\"."
                        },
                {       ERR_NEWORDER_MISSING_SUPPW_KEY,
        "New Order missing Supp_W key \"SP##*\"."
                        },
                {       ERR_NEWORDER_NOITEMS_ENTERED,                   "New
Order No order lines entered."
                        },
                {       ERR_NEWORDER_QTY_INVALID,
        "New Order Qty invalid must be numeric range 1 - 99."
        },
                {       ERR_NEWORDER_QTY_RANGE,
        "New Order Qty is out of range. Range = 1 to 99."
        },
```

```
                {       ERR_NEWORDER_QTY_WITHOUT_SUPPW,
        "New Order Qty field entered without a corresponding Supp_W."
        },
                {       ERR_NEWORDER_SUPPW_INVALID,
        "New Order Supp_W invalid data type must be numeric."
        },
                {       ERR_NO_SERVER_SPECIFIED,
        "No Server name specified."
                                },
                {       ERR_ORDERSTATUS_CID_AND_CLT,                    "Order
Status Only Customer ID or Last Name may be entered, not both."       },
                {       ERR_ORDERSTATUS_CID_INVALID,                    "Order
Status Customer ID invalid, range must be numeric 1 - 3000."          },
                {       ERR_ORDERSTATUS_CLT_RANGE,
        "Order Status Customer last name longer than 16 characters."
        },
                {       ERR_ORDERSTATUS_DID_INVALID,                    "Order
Status District invalid, value must be numeric 1 - 10."               },
                {       ERR_ORDERSTATUS_MISSING_CID_CLT,                "Order
Status Either Customer ID or Last Name must be entered."              },
                {       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_MISSING_DID_KEY,                "Order
Status missing District key \"DID*\"."
        },
                {       ERR_PAYMENT_CDI_INVALID,
        "Payment Customer district invalid must be numeric."
        },
                {       ERR_PAYMENT_CID_AND_CLT,
        "Payment Only Customer ID or Last Name may be entered, not both."     },
                {       ERR_PAYMENT_CUSTOMER_INVALID,                   "Payment
Customer data type invalid, must be numeric."                         },
                {       ERR_PAYMENT_CWI_INVALID,
        "Payment Customer Warehouse invalid, must be numeric."
        },
                {       ERR_PAYMENT_DISTRICT_INVALID,                   "Payment
District ID is invalid, must be 1 - 10."
        },
                {       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_PAYMENT_LAST_NAME_TO_LONG,
        "Payment Customer last name longer than 16 characters."
        },
                {       ERR_PAYMENT_MISSING_CDI_KEY,                    "Payment
missing Customer district key \"CDI*\"."
        },
                {       ERR_PAYMENT_MISSING_CID_CLT,                    "Payment
Either Customer ID or Last Name must be entered."                     },
                {       ERR_PAYMENT_MISSING_CID_KEY,                    "Payment
missing Customer Key \"CID*\"."
        },
                {       ERR_PAYMENT_MISSING_CLT_KEY,                    "Payment
missing Customer Last Name key \"CLT*\"."
        },
                {       ERR_PAYMENT_MISSING_CWI_KEY,                    "Payment
missing Customer Warehouse key \"CWI*\"."
        },
                {       ERR_PAYMENT_MISSING_DID_KEY,                    "Payment
missing District Key \"DID*\"."
        },
                {       ERR_PAYMENT_MISSING_HAM_KEY,                    "Payment
missing Amount key \"HAM*\"."
        },
                {       ERR_STOCKLEVEL_MISSING_THRESHOLD_KEY,   "Stock Level;
missing Threshold key \"TT*\"."
        },
                {       ERR_STOCKLEVEL_THRESHOLD_INVALID,               "Stock
Level; Threshold value must be in the range = 1 - 99."                },
                {       ERR_STOCKLEVEL_THRESHOLD_RANGE,
        "Stock Level Threshold out of range, range must be 1 - 99."
        },
                {       ERR_VERSION_MISMATCH,
        "Invalid version field.  RTE and Web Client are probably out of sync." },
                {       ERR_W_ID_INVALID,
        "Invalid Warehouse ID."
                                                        },
                {       0,
                                ""


                        }
        };

        char szTmp[256];
        int i = 0;
        while (TRUE)
        {
                if (errorMsgs[i].szMsg[0] == 0)
                {
                        strcpy( szTmp, "Unknown error number." );
                        break;
                }
                if (m_Error == errorMsgs[i].iError)
                {
                        strcpy( szTmp, errorMsgs[i].szMsg );
                        break;
                }
                i++;
        }

        if (m_szTextDetail)
                strcat( szTmp, m_szTextDetail );
        if (m_SystemErr)
                wsprintf( szTmp+strlen(szTmp), "  Error=%d", m_SystemErr );

        m_szErrorText = new char[strlen(szTmp)+1];
        strcpy( m_szErrorText, szTmp );
        return m_szErrorText;

}

/* FUNCTION: GetKeyValue
 *
 * 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.
 *                                    WEBERROR            err
          error value to throw
 *
 * RETURNS:                   nothing.
 *
 * ERROR:           if (the pKey value is not found) then
 *                                              if (err == 0)
 *                                                        return (empty string)
 *                                              else
 *                                                        throw CWEBCLNT_ERR(err)
 *
 * 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.
 */

void GetKeyValue(char **pQueryString, char *pKey, char *pValue, int iMax, WEBERROR err)
{
          char *ptr;

          if ( !(ptr=strstr(*pQueryString, pKey)) )
                   goto ErrorExit;
          ptr += strlen(pKey);
          if ( *ptr != '=' )
                   goto ErrorExit;
          ptr++;

          iMax--;  // one position is for terminating null
          while( *ptr && *ptr != '&' && iMax)
          {
                   *pValue++ = *ptr++;
                   iMax--;
          }
          *pValue = 0;  // terminating null

          *pQueryString = ptr;
          return;

ErrorExit:
          if (err != NO_ERR)
                   throw new CWEBCLNT_ERR( err );
          *pValue = 0;  // return empty result string
}

/* FUNCTION: GetIntKeyValue
 *
 * PURPOSE:         This function parses a http formatted string for a specific key
value.
 *
 * ARGUMENTS:       char                          *pQueryString       http string from
client browser
 *                                    char                          *pKey
          key value to look for
 *                                    WEBERROR            NoKeyErr            error
value to throw if key not found
 *                                    WEBERROR            NotIntErr           error
value to throw if value not numeric
 *
 * RETURNS:                   integer
 *
 * ERROR:           if (the pKey value is not found) then
 *                                              if (NoKeyErr != NO_ERR)
 *                                                        throw CWEBCLNT_ERR(err)
 *                                              else
 *                                                        return 0
 *                                    else if (non-numeric char found) then
 *                                              if (NotIntErr != NO_ERR) then
 *                                                        throw CWEBCLNT_ERR(err)
 *                                              else
 *                                                        return 0
 *
 * 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.
 */

int GetIntKeyValue(char **pQueryString, char *pKey, WEBERROR NoKeyErr, WEBERROR
NotIntErr)
{
          char *ptr0;
          char *ptr;

          if ( !(ptr=strstr(*pQueryString, pKey)) )
                   goto ErrorNoKey;
          ptr += strlen(pKey);
          if ( *ptr != '=' )
                   goto ErrorNoKey;
          ptr++;

          ptr0 = ptr;                   // remember starting point
          // scan string until a terminator (null or &) or a non-digit
          while( *ptr && *ptr != '&' && isdigit(*ptr) )
                   ptr++;

          // make sure we stopped scanning for the right reason
          if ((ptr0 == ptr) || (*ptr && *ptr != '&'))
          {
                   if (NotIntErr != NO_ERR)
                            throw new CWEBCLNT_ERR( NoKeyErr );
                   return 0;
          }

          *pQueryString = ptr;
          return atoi(ptr0);

ErrorNoKey:
          if (NoKeyErr != NO_ERR)
                   throw new CWEBCLNT_ERR( NoKeyErr );
          return 0;
}

/* FUNCTION: TermInit
 *
 * PURPOSE:         This function initializes the client terminal structure; it is called
when the TPCC.DLL
 *                                    is first loaded by the inet service.
```

```
 *
 */

void TermInit(void)
{
          EnterCriticalSection(&TermCriticalSection);

          Term.iMasterSyncId  = 1;
          Term.iNumEntries    = Reg.dwMaxConnections+1;

          Term.pClientData    = NULL;
          Term.pClientData    = (PCLIENTDATA)malloc(Term.iNumEntries *
sizeof(CLIENTDATA));
          if (Term.pClientData == NULL)
          {
                    LeaveCriticalSection(&TermCriticalSection);
                    throw new CWEBCLNT_ERR( ERR_MEM_ALLOC_FAILED );
          }

          ZeroMemory( Term.pClientData, Term.iNumEntries * sizeof(CLIENTDATA) );

          Term.iFreeList                = Term.iNumEntries-1;
          // build free list
          // note: Term.pClientData[0].iNextFree gets set to -1, which marks it as "in
use".
          //       This is intentional, as the zero entry is used as an anchor and never
          //                  allocated as an actual terminal.
          for(int i=0; i<Term.iNumEntries; i++)
                    Term.pClientData[i].iNextFree = i-1;

          LeaveCriticalSection(&TermCriticalSection);
}

/* FUNCTION: TermDeleteAll
 *
 * PURPOSE:         This function frees allocated resources associated with the terminal
structure.
 *
 * ARGUMENTS:       none
 *
 * RETURNS:                   None
 *
 * COMMENTS:        This function is called only when the inet service unloads the
TPCC.DLL
 *
 */

void TermDeleteAll(void)
{
          EnterCriticalSection(&TermCriticalSection);

          for(int i=1; i<Term.iNumEntries; i++)
          {
                    if (Term.pClientData[i].iNextFree == -1)
                              delete Term.pClientData[i].pTxn;
          }

          Term.iFreeList                = 0;
          Term.iNumEntries    = 0;
          if ( Term.pClientData )
                    free(Term.pClientData);
          Term.pClientData    = NULL;
          LeaveCriticalSection(&TermCriticalSection);
}

/* FUNCTION: TermAdd
 *
 * PURPOSE:         This function assigns a terminal id which is used to identify a
client browser.
 *
 * RETURNS:                   int                 assigned terminal id
 *
 */

int TermAdd(void)
{
          DWORD     i;
          int                 iNewTerm, iTickCount;

          if (Term.iNumEntries == 0)
                    return -1;

          EnterCriticalSection(&TermCriticalSection);
          if (Term.iFreeList != 0)
          {         // position is available
                    iNewTerm = Term.iFreeList;
                    Term.iFreeList = Term.pClientData[iNewTerm].iNextFree;
                    Term.pClientData[iNewTerm].iNextFree = -1;  // indicates this
position is in use
          }
          else
          {         // no open slots, so find the slot that hasn't been used in the
longest time and reuse it
                    for(iNewTerm=1, i=1, iTickCount=0x7FFFFFFF; i<Reg.dwMaxConnections;
i++)
                    {
                              if (iTickCount > Term.pClientData[i].iTickCount)
                              {
                                        iTickCount = Term.pClientData[i].iTickCount;
                                        iNewTerm = i;
                              }
                    }
                    // if oldest term is less than one minute old, it probably means that
more connections
                    // are being attempted than were specified as "Max Connections" at
install.  In this case,
                    // do not bump existing connection; instead, return error to
requestor.
                    if ((GetTickCount() - iTickCount) < 60000)
                    {
                              LeaveCriticalSection(&TermCriticalSection);
                              throw new CWEBCLNT_ERR( ERR_MAX_CONNECTIONS_EXCEEDED );
                    }
          }

          Term.pClientData[iNewTerm].iTickCount = GetTickCount();
          Term.pClientData[iNewTerm].iSyncId = Term.iMasterSyncId++;
          Term.pClientData[iNewTerm].pTxn = NULL;

          LeaveCriticalSection(&TermCriticalSection);
          return iNewTerm;
}

/* FUNCTION: TermDelete
 *
```

```
 * PURPOSE:         This function makes a terminal entry in the Term array available for
reuse.
 *
 * ARGUMENTS:       int                                                     id
          Terminal id of client exiting
 *
 */

void TermDelete(int id)
{
          if ( id > 0 && id < Term.iNumEntries )
          {
                    delete Term.pClientData[id].pTxn;

                    // put onto free list
                    EnterCriticalSection(&TermCriticalSection);

                    Term.pClientData[id].iNextFree = Term.iFreeList;
                    Term.iFreeList = id;

                    LeaveCriticalSection(&TermCriticalSection);
          }
}


/* FUNCTION: MakeErrorForm
 */

void ErrorForm(EXTENSION_CONTROL_BLOCK *pECB, int iType, int iErrorNum, int iTermId, int
iSyncId, char *szErrorText, char *szBuffer )
{
          wsprintf(szBuffer,
                    "<HTML><HEAD><TITLE>TPC-C Error</TITLE></HEAD><BODY>"
                    "<FORM ACTION=\"tpcc.dll\" METHOD=\"GET\">"
                    "<INPUT TYPE=\"hidden\" NAME=\"STATUSID\" VALUE=\"%d\">"
                    "<INPUT TYPE=\"hidden\" NAME=\"ERROR\" VALUE=\"%d\">"
                    "<INPUT TYPE=\"hidden\" NAME=\"FORMID\" VALUE=\"%d\">"
                    "<INPUT TYPE=\"hidden\" NAME=\"TERMID\" VALUE=\"%d\">"
                    "<INPUT TYPE=\"hidden\" NAME=\"SYNCID\" VALUE=\"%d\">"
                    "<BOLD>An Error Occurred</BOLD><BR><BR>"
                    "%s"
                    "<BR><BR><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..\">"
                    "</FORM></BODY></HTML>"
                    , iType, iErrorNum, MAIN_MENU_FORM, iTermId, iSyncId, szErrorText );
}

/* FUNCTION: MakeMainMenuForm
 */

void MakeMainMenuForm(int iTermId, int iSyncId, char *szForm)
{
          wsprintf(szForm,
                    "<HTML><HEAD><TITLE>TPC-C Main Menu</TITLE></HEAD><BODY>"
                    "Select Desired Transaction.<BR><HR>"
                    "<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=\"%d\">"
                    "<INPUT TYPE=\"hidden\" NAME=\"TERMID\" VALUE=\"%d\">"
                    "<INPUT TYPE=\"hidden\" NAME=\"SYNCID\" VALUE=\"%d\">"
                    "<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></BODY></HTML>"
                    , MAIN_MENU_FORM, iTermId, iSyncId);
}

/* FUNCTION: MakeStockLevelForm
 *
 * PURPOSE:         This function constructs the Stock Level HTML page.
 *
 * 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.
 */

void MakeStockLevelForm(int iTermId, STOCK_LEVEL_DATA *pStockLevelData, BOOL bInput, char
*szForm)
{
          int       c;

          c = wsprintf(szForm,
                    "<HTML><HEAD><TITLE>TPC-C Stock Level</TITLE></HEAD><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=\"%d\">"
                    "<INPUT TYPE=\"hidden\" NAME=\"TERMID\" VALUE=\"%d\">"
                    "<INPUT TYPE=\"hidden\" NAME=\"SYNCID\" VALUE=\"%d\">"
                    "<PRE><font face=\"Courier\">                                   Stock-
Level<BR>"
                    "Warehouse: %6.6d   District: %2.2d<BR> <BR>",
                    STOCK_LEVEL_FORM, iTermId, Term.pClientData[iTermId].iSyncId,
                    Term.pClientData[iTermId].w_id, Term.pClientData[iTermId].d_id);

          if ( bInput )
          {
                    strcpy(szForm+c,
                              "Stock Level Threshold: <INPUT NAME=\"TT*\" SIZE=2><BR>
<BR>"
                              "low stock:    </font><BR> <BR> <BR> <BR> <BR> <BR> <BR>
<BR> <BR> <BR>"
                              " <BR> <BR> <BR> <BR> <BR> <BR> <BR></PRE><HR>"
                              "<INPUT TYPE=\"submit\" NAME=\"CMD\" VALUE=\"Process\">"
                              "<INPUT TYPE=\"submit\" NAME=\"CMD\" VALUE=\"Menu\">"
                              "</FORM></HTML>" );
          }
          else
          {
                    wsprintf(szForm+c,
                              "Stock Level Threshold: %2.2d<BR> <BR>"
                              "low stock: %3.3d</font> <BR> <BR> <BR> <BR> <BR> <BR> <BR>
<BR> <BR>"
                              " <BR> <BR> <BR> <BR> <BR> <BR> <BR> <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..\">"
                                "</FORM></HTML>"
                                , pStockLevelData->threshold, pStockLevelData->low_stock);
        }
}

/* FUNCTION: MakeNewOrderForm
 *
 * 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.
 */

void MakeNewOrderForm(int iTermId, NEW_ORDER_DATA *pNewOrderData, BOOL bInput, char
*szForm)
{
        int             i, c;
        BOOL    bValid;
        static  char szBR[] = " <BR> <BR> <BR> <BR> <BR> <BR> <BR> <BR> <BR> <BR>
<BR> <BR> <BR> <BR> <BR>";

        if (!bInput)
                assert( pNewOrderData->exec_status_code == eOK || pNewOrderData-
>exec_status_code == eInvalidItem );

        bValid = (bInput || (pNewOrderData->exec_status_code == eOK));

        c = wsprintf(szForm,
                "<HTML><HEAD><TITLE>TPC-C New Order</TITLE></HEAD><BODY>"
                "<FORM ACTION=\"tpcc.dll\" METHOD=\"GET\">"
                "<INPUT TYPE=\"hidden\" NAME=\"STATUSID\" VALUE=\"%d\">"
                "<INPUT TYPE=\"hidden\" NAME=\"ERROR\" VALUE=\"0\">"
                "<INPUT TYPE=\"hidden\" NAME=\"FORMID\" VALUE=\"%d\">"
                "<INPUT TYPE=\"hidden\" NAME=\"TERMID\" VALUE=\"%d\">"
                "<INPUT TYPE=\"hidden\" NAME=\"SYNCID\" VALUE=\"%d\">"
                "<PRE><font face=\"Courier\">                                    New
Order<BR>"
                , bValid ? 0 : ERR_BAD_ITEM_ID, NEW_ORDER_FORM, iTermId,
Term.pClientData[iTermId].iSyncId);

        if ( bInput )
        {
                c += wsprintf(szForm+c, "Warehouse: %6.6d   ",
Term.pClientData[iTermId].w_id );

                strcpy( szForm+c,
                        "District: <INPUT NAME=\"DID*\" SIZE=1>
Date:<BR>"
                        "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>"
                        "</font></PRE><HR>"
                        "<INPUT TYPE=\"submit\" NAME=\"CMD\" VALUE=\"Process\">"
                        "<INPUT TYPE=\"submit\" NAME=\"CMD\" VALUE=\"Menu\">"
                        "</FORM></HTML>"
                        );
        }
        else
        {
                c += wsprintf(szForm+c, "Warehouse: %6.6d   District: %2.2d
Date: ",
                        pNewOrderData->w_id,
                        pNewOrderData->d_id);

                if ( bValid )
                {
                        c += wsprintf(szForm+c, "%2.2d-%2.2d-%4.4d
%2.2d:%2.2d:%2.2d",
                                pNewOrderData->o_entry_d.day,
                                pNewOrderData->o_entry_d.month,
                                pNewOrderData->o_entry_d.year,
                                pNewOrderData->o_entry_d.hour,
                                pNewOrderData->o_entry_d.minute,
                                pNewOrderData->o_entry_d.second);
                }

                c += wsprintf(szForm+c, "<BR>Customer:  %4.4d   Name: %-16s   Credit:
%-2s   ",
                        pNewOrderData->c_id, pNewOrderData->c_last, pNewOrderData-
>c_credit);

                if ( bValid )
```

```
                    {
                              c += sprintf(szForm+c,
                                                        "%%Disc: %5.2f
<BR>"
                                                        "Order Number: %8.8d  Number
of Lines: %2.2d        W_tax: %5.2f   D_tax: %5.2f  <BR> <BR>"
                                                        " Supp_W  Item_Id  Item Name
Qty  Stock  B/G  Price    Amount<BR>",
                                        100.0*pNewOrderData->c_discount,
                                        pNewOrderData->o_id,
                                        pNewOrderData->o_ol_cnt,
                                        100.0 * pNewOrderData->w_tax,
                                        100.0 * pNewOrderData->d_tax);

                              for(i=0; i<pNewOrderData->o_ol_cnt; i++)
                              {
                                        c += sprintf(szForm+c, "%6.6d   %6.6d   %-24s
%2.2d    %3.3d    %1.1s   $%6.2f  $%7.2f  <BR>",
                                                  pNewOrderData->OL[i].ol_supply_w_id,
                                                  pNewOrderData->OL[i].ol_i_id,
                                                  pNewOrderData->OL[i].ol_i_name,
                                                  pNewOrderData->OL[i].ol_quantity,
                                                  pNewOrderData->OL[i].ol_stock,
                                                  pNewOrderData->OL[i].ol_brand_generic,
                                                  pNewOrderData->OL[i].ol_i_price,
                                                  pNewOrderData->OL[i].ol_amount );
                              }
                    }
                    else
                    {
                              c += wsprintf(szForm+c,
                                        "%Disc:<BR>"
                                        "Order Number: %8.8d  Number of Lines:
W_tax:         D_tax:<BR> <BR>"
                                        " Supp_W  Item_Id  Item Name                 Qty
Stock  B/G  Price    Amount<BR>"
                                        , pNewOrderData->o_id);

                              i = 0;
                    }

                    strncpy( szForm+c, szBR, (15-i)*5 );
                    c += (15-i)*5;

                    if ( bValid )
                              c += sprintf(szForm+c, "Execution Status: Transaction
commited.                      Total:  $%8.2f  ",
                                        pNewOrderData->total_amount);
                    else
                              c += wsprintf(szForm+c, "Execution Status: Item number is
not valid.                 Total:");

                    strcpy(szForm+c,
                              " <BR></font></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..\">"
                              "</FORM></HTML>"
                              );
          }
}

/* FUNCTION: MakePaymentForm
 *
 * 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.
 */

void MakePaymentForm(int iTermId, PAYMENT_DATA *pPaymentData, BOOL bInput, char *szForm)
{
          int c;

          c = wsprintf(szForm,
                    "<HTML><HEAD><TITLE>TPC-C Payment</TITLE></HEAD><BODY>"
                    "<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=\"%d\">"
                    "<INPUT TYPE=\"hidden\" NAME=\"TERMID\" VALUE=\"%d\">"
                    "<INPUT TYPE=\"hidden\" NAME=\"SYNCID\" VALUE=\"%d\">"
                    "<PRE><font face=\"Courier\">
Payment<BR>"
                    "Date: "
                    , PAYMENT_FORM, iTermId, Term.pClientData[iTermId].iSyncId);

          if ( !bInput )
          {
                    c += wsprintf(szForm+c, "%2.2d-%2.2d-%4.4d %2.2d:%2.2d:%2.2d",
                              pPaymentData->h_date.day,
                              pPaymentData->h_date.month,
                              pPaymentData->h_date.year,
                              pPaymentData->h_date.hour,
                              pPaymentData->h_date.minute,
                              pPaymentData->h_date.second);
          }

          if ( bInput )
          {
                    c += wsprintf(szForm+c,
                              "<BR> <BR>Warehouse: %6.6d"
                              "                              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>
<BR></font></PRE><HR>"
                        "<INPUT TYPE=\"submit\" NAME=\"CMD\"
VALUE=\"Process\"><INPUT TYPE=\"submit\" NAME=\"CMD\" VALUE=\"Menu\">"
                        "</BODY></FORM></HTML>"
                        , Term.pClientData[iTermId].w_id);
        }
        else
        {
                c += wsprintf(szForm+c,
                        "<BR> <BR>Warehouse: %6.6d                      District:
%2.2d<BR>"
                        "%-20s                  %-20s<BR>"
                        "%-20s                  %-20s<BR>"
                        "%-20s %-2s %5.5s-%4.4s      %-20s %-2s %5.5s-%4.4s<BR>
<BR>"
                        "Customer: %4.4d  Cust-Warehouse: %6.6d  Cust-District:
%2.2d<BR>"
                        "Name:   %-16s %-2s %-16s     Since:  %2.2d-%2.2d-
%4.4d<BR>"
                        "        %-20s                  Credit: %-2s<BR>"

                        , Term.pClientData[iTermId].w_id, pPaymentData->d_id
                        , pPaymentData->w_street_1, pPaymentData->d_street_1
                        , pPaymentData->w_street_2, pPaymentData->d_street_2
                        , pPaymentData->w_city, pPaymentData->w_state,
pPaymentData->w_zip, pPaymentData->w_zip+5
                        , pPaymentData->d_city, pPaymentData->d_state,
pPaymentData->d_zip, pPaymentData->d_zip+5
                        , pPaymentData->c_id, pPaymentData->c_w_id,
        pPaymentData->c_d_id
                        , pPaymentData->c_first, pPaymentData->c_middle,
pPaymentData->c_last
                        , pPaymentData->c_since.day, pPaymentData->c_since.month,
        pPaymentData->c_since.year
                        , pPaymentData->c_street_1, pPaymentData->c_credit
                        );

       c += sprintf(szForm+c,
                        "        %-20s                  %%Disc:  %5.2f<BR>",
                        pPaymentData->c_street_2, 100.0*pPaymentData->c_discount);

                c += wsprintf(szForm+c,
                        "        %-20s %-2s %5.5s-%4.4s       Phone:  %6.6s-%3.3s-
%3.3s-%4.4s<BR> <BR>",
                        pPaymentData->c_city, pPaymentData->c_state, pPaymentData-
>c_zip, pPaymentData->c_zip+5,
                        pPaymentData->c_phone, pPaymentData->c_phone+6,
pPaymentData->c_phone+9, pPaymentData->c_phone+12 );

                c += sprintf(szForm+c,
                        "Amount Paid:          $%7.2f      New Cust-Balance:
$%14.2f<BR>"
                        "Credit Limit:   $%13.2f<BR> <BR>"
                        , pPaymentData->h_amount, pPaymentData->c_balance
                        , pPaymentData->c_credit_lim
                        );

                if ( pPaymentData->c_credit[0] == 'B' && pPaymentData->c_credit[1] ==
'C' )
                        c += wsprintf(szForm+c,
                                        "Cust-Data: %-50.50s<BR>          %-
50.50s<BR>          %-50.50s<BR>          %-50.50s<BR>",
                                                pPaymentData->c_data, pPaymentData-
>c_data+50, pPaymentData->c_data+100, pPaymentData->c_data+150 );
                else
                        strcpy(szForm+c, "Cust-Data: <BR> <BR> <BR> <BR>");

                strcat(szForm,      " <BR></font></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>");
        }

}

/* FUNCTION: MakeOrderStatusForm
 *
 * 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.
 */

void MakeOrderStatusForm(int iTermId, ORDER_STATUS_DATA *pOrderStatusData, BOOL bInput,
char *szForm)
{
        int                 i, c;
        static char szBR[] = " <BR> <BR> <BR> <BR> <BR> <BR> <BR> <BR> <BR> <BR> <BR>
<BR> <BR> <BR> <BR>";

        c = wsprintf(szForm,
                "<HTML><HEAD><TITLE>TPC-C Order-Status</TITLE></HEAD><BODY>"
                "<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=\"%d\">"
                "<INPUT TYPE=\"hidden\" NAME=\"TERMID\" VALUE=\"%d\">"
                "<INPUT TYPE=\"hidden\" NAME=\"SYNCID\" VALUE=\"%d\">"
                "<PRE><font face=\"Courier\">                                   Order-
Status<BR>"
                "Warehouse: %6.6d   ",
                ORDER_STATUS_FORM, iTermId, Term.pClientData[iTermId].iSyncId,
Term.pClientData[iTermId].w_id);

        if ( bInput )
        {
                strcpy(szForm+c,
                        "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> <BR> <BR> <BR> <BR>"
```

```
                        " <BR> <BR> <BR> <BR> <BR> <BR> <BR> <BR> <BR> <BR>
<BR></font></PRE>"
                        "<HR><INPUT TYPE=\"submit\" NAME=\"CMD\"
VALUE=\"Process\"><INPUT TYPE=\"submit\" NAME=\"CMD\" VALUE=\"Menu\">"
                        "</BODY></FORM></HTML>" );
        }
        else
        {
                c += wsprintf(szForm+c,
                        "District: %2.2d<BR>"
                        "Customer: %4.4d   Name: %-16s %-2s %-16s<BR>",
                        pOrderStatusData->d_id, pOrderStatusData->c_id,
                        pOrderStatusData->c_first, pOrderStatusData->c_middle,
pOrderStatusData->c_last);

                c += sprintf(szForm+c, "Cust-Balance: $%9.2f<BR> <BR>",
                        pOrderStatusData->c_balance);

                c += wsprintf(szForm+c,
                        "Order-Number: %8.8d   Entry-Date: %2.2d-%2.2d-%4.4d
%2.2d:%2.2d:%2.2d   Carrier-Number: %2.2d<BR>"
                        "Supply-W     Item-Id    Qty     Amount      Delivery-
Date<BR>",
                        pOrderStatusData->o_id,
                        pOrderStatusData->o_entry_d.day,
                        pOrderStatusData->o_entry_d.month,
                        pOrderStatusData->o_entry_d.year,
                        pOrderStatusData->o_entry_d.hour,
                        pOrderStatusData->o_entry_d.minute,
                        pOrderStatusData->o_entry_d.second,
                        pOrderStatusData->o_carrier_id);

                for(i=0; i< pOrderStatusData->o_ol_cnt; i++)
                {
                        c += sprintf(szForm+c, "  %6.6d     %6.6d     %2.2d
$%8.2f      %2.2d-%2.2d-%4.4d<BR>",
                                pOrderStatusData->OL[i].ol_supply_w_id,
                                pOrderStatusData->OL[i].ol_i_id,
                                pOrderStatusData->OL[i].ol_quantity,
                                pOrderStatusData->OL[i].ol_amount,
                                pOrderStatusData->OL[i].ol_delivery_d.day,
                                pOrderStatusData->OL[i].ol_delivery_d.month,
                                pOrderStatusData->OL[i].ol_delivery_d.year);
                }

                strncpy( szForm+c, szBR, (15-i)*5 );
                c += (15-i)*5;

                strcpy(szForm+c,
                        "</font></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>" );
        }
}
```

```
/* FUNCTION: MakeDeliveryForm
 *
 * 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.
 */

void MakeDeliveryForm(int iTermId, DELIVERY_DATA *pDeliveryData, BOOL bInput, char
*szForm)
{
        int       c;

        c = wsprintf(szForm,
                "<HTML><HEAD><TITLE>TPC-C Delivery</TITLE></HEAD><BODY>"
                "<FORM ACTION=\"tpcc.dll\" METHOD=\"GET\">"
                "<INPUT TYPE=\"hidden\" NAME=\"STATUSID\" VALUE=\"%d\">"
                "<INPUT TYPE=\"hidden\" NAME=\"ERROR\" VALUE=\"0\">"
                "<INPUT TYPE=\"hidden\" NAME=\"FORMID\" VALUE=\"%d\">"
                "<INPUT TYPE=\"hidden\" NAME=\"TERMID\" VALUE=\"%d\">"
                "<INPUT TYPE=\"hidden\" NAME=\"SYNCID\" VALUE=\"%d\">"
                "<PRE><font face=\"Courier\">
Delivery<BR>"
                "Warehouse: %6.6d<BR> <BR>",
                (!bInput && (pDeliveryData->exec_status_code != eOK)) ?
ERR_TYPE_DELIVERY_POST : 0,
                DELIVERY_FORM, iTermId, Term.pClientData[iTermId].iSyncId,
Term.pClientData[iTermId].w_id);

        if ( bInput )
        {
                strcpy( szForm+c,
                        "Carrier Number: <INPUT NAME=\"OCD*\" SIZE=1><BR> <BR>"
                        "Execution Status: <BR> <BR> <BR> <BR> <BR> <BR> <BR> <BR>"
                        " <BR> <BR> <BR> <BR> <BR> <BR> <BR> <BR>
</font></PRE><HR>"
                        "<INPUT TYPE=\"submit\" NAME=\"CMD\" VALUE=\"Process\">"
                        "<INPUT TYPE=\"submit\" NAME=\"CMD\" VALUE=\"Menu\">"
                        "</BODY></FORM></HTML>" );
        }
        else
        {
                wsprintf( szForm+c,
                        "Carrier Number: %2.2d<BR> <BR>"
                        "Execution Status: %s <BR> <BR> <BR> <BR> <BR> <BR> <BR>
<BR>"
                        " <BR> <BR> <BR> <BR> <BR> <BR> <BR> <BR> </font></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>"

                        , pDeliveryData->o_carrier_id,
```

```
                          (pDeliveryData->exec_status_code == eOK) ? "Delivery has
been queued." : "Delivery Post Failed     "
                          );
          }
}

/* FUNCTION: ProcessNewOrderForm
 *
 * 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.
 */

void ProcessNewOrderForm(EXTENSION_CONTROL_BLOCK  *pECB, int iTermId, char *szBuffer)
{
          PNEW_ORDER_DATA               pNewOrder;

          pNewOrder = Term.pClientData[iTermId].pTxn->BuffAddr_NewOrder();

          ZeroMemory(pNewOrder, sizeof(NEW_ORDER_DATA));
          pNewOrder->w_id = Term.pClientData[iTermId].w_id;
          GetNewOrderData(pECB->lpszQueryString, pNewOrder);

          Term.pClientData[iTermId].pTxn->NewOrder();

          pNewOrder = Term.pClientData[iTermId].pTxn->BuffAddr_NewOrder();
          MakeNewOrderForm(iTermId, pNewOrder, OUTPUT_FORM, szBuffer );
}

/* FUNCTION: void ProcessPaymentForm
 *
 * 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
 *
 */

void ProcessPaymentForm(EXTENSION_CONTROL_BLOCK *pECB, int iTermId, char *szBuffer)
{
          PPAYMENT_DATA       pPayment;

          pPayment = Term.pClientData[iTermId].pTxn->BuffAddr_Payment();
          ZeroMemory(pPayment, sizeof(PAYMENT_DATA));
          pPayment->w_id = Term.pClientData[iTermId].w_id;
          GetPaymentData(pECB->lpszQueryString, pPayment);

          Term.pClientData[iTermId].pTxn->Payment();

          pPayment = Term.pClientData[iTermId].pTxn->BuffAddr_Payment();
          MakePaymentForm(iTermId, pPayment, OUTPUT_FORM, szBuffer);
}
```

```
/* FUNCTION: ProcessOrderStatusForm
 *
 * 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
 *
 */

void ProcessOrderStatusForm(EXTENSION_CONTROL_BLOCK *pECB, int iTermId, char *szBuffer)
{
          PORDER_STATUS_DATA  pOrderStatus;

          pOrderStatus = Term.pClientData[iTermId].pTxn->BuffAddr_OrderStatus();
          ZeroMemory(pOrderStatus, sizeof(ORDER_STATUS_DATA));
          pOrderStatus->w_id = Term.pClientData[iTermId].w_id;
          GetOrderStatusData(pECB->lpszQueryString, pOrderStatus);

          Term.pClientData[iTermId].pTxn->OrderStatus();

          pOrderStatus = Term.pClientData[iTermId].pTxn->BuffAddr_OrderStatus();
          MakeOrderStatusForm(iTermId, pOrderStatus, OUTPUT_FORM, szBuffer);
}

/* FUNCTION: ProcessDeliveryForm
 *
 * 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
 *
 */

void ProcessDeliveryForm(EXTENSION_CONTROL_BLOCK *pECB, int iTermId, char *szBuffer)
{
          char      *ptr = pECB->lpszQueryString;

          PDELIVERY_DATA      pDelivery;

          pDelivery = Term.pClientData[iTermId].pTxn->BuffAddr_Delivery();
          ZeroMemory(pDelivery, sizeof(DELIVERY_DATA));
          pDelivery->w_id = Term.pClientData[iTermId].w_id;

          pDelivery->o_carrier_id       = GetIntKeyValue(&ptr, "OCD*",
ERR_DELIVERY_MISSING_OCD_KEY, ERR_DELIVERY_CARRIER_INVALID);
          if ( pDelivery->o_carrier_id > 10 || pDelivery->o_carrier_id < 1 )
                    throw new CWEBCLNT_ERR( ERR_DELIVERY_CARRIER_ID_RANGE );
```

```
        if (dwNumDeliveryThreads)
        {
                //post delivery info
                if ( PostDeliveryInfo(pDelivery->w_id, pDelivery->o_carrier_id) )
                        pDelivery->exec_status_code = eDeliveryFailed;
                else
                        pDelivery->exec_status_code = eOK;
        }
        else // delivery is done synchronously if no delivery threads configured
                Term.pClientData[iTermId].pTxn->Delivery();

        pDelivery = Term.pClientData[iTermId].pTxn->BuffAddr_Delivery();
        MakeDeliveryForm(iTermId, pDelivery, OUTPUT_FORM, szBuffer);
}

/* FUNCTION: ProcessStockLevelForm
 *
 * 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
 *
 */

void ProcessStockLevelForm(EXTENSION_CONTROL_BLOCK *pECB, int iTermId, char *szBuffer)
{
        char                *ptr = pECB->lpszQueryString;

        PSTOCK_LEVEL_DATA   pStockLevel;

        pStockLevel = Term.pClientData[iTermId].pTxn->BuffAddr_StockLevel();
        ZeroMemory( pStockLevel, sizeof(STOCK_LEVEL_DATA) );

        pStockLevel->w_id = Term.pClientData[iTermId].w_id;
        pStockLevel->d_id = Term.pClientData[iTermId].d_id;

        pStockLevel->threshold = GetIntKeyValue(&ptr, "TT*",
ERR_STOCKLEVEL_MISSING_THRESHOLD_KEY, ERR_STOCKLEVEL_THRESHOLD_INVALID);
        if ( pStockLevel->threshold >= 100 || pStockLevel->threshold < 0 )
                throw new CWEBCLNT_ERR( ERR_STOCKLEVEL_THRESHOLD_RANGE );

        Term.pClientData[iTermId].pTxn->StockLevel();

        pStockLevel = Term.pClientData[iTermId].pTxn->BuffAddr_StockLevel();
        MakeStockLevelForm(iTermId, pStockLevel, OUTPUT_FORM, szBuffer);
}

/* FUNCTION: GetNewOrderData
 *
 * 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
 *
 */

void GetNewOrderData(LPSTR lpszQueryString, NEW_ORDER_DATA *pNewOrderData)
{
        char      szTmp[26];
        int                 i;
        short     items;
        int                 ol_i_id, ol_quantity;
        char      *ptr = lpszQueryString;

        static char szSP[MAX_OL_NEW_ORDER_ITEMS][6] =
                { "SP00*", "SP01*", "SP02*", "SP03*", "SP04*",
                  "SP05*", "SP06*", "SP07*", "SP08*", "SP09*",
                  "SP10*", "SP11*", "SP12*", "SP13*", "SP14*" };
        static char szIID[MAX_OL_NEW_ORDER_ITEMS][7] =
                { "IID00*", "IID01*", "IID02*", "IID03*", "IID04*",
                  "IID05*", "IID06*", "IID07*", "IID08*", "IID09*",
                  "IID10*", "IID11*", "IID12*", "IID13*", "IID14*" };
        static char szQty[MAX_OL_NEW_ORDER_ITEMS][7] =
                { "Qty00*", "Qty01*", "Qty02*", "Qty03*", "Qty04*",
                  "Qty05*", "Qty06*", "Qty07*", "Qty08*", "Qty09*",
                  "Qty10*", "Qty11*", "Qty12*", "Qty13*", "Qty14*" };

        pNewOrderData->d_id = GetIntKeyValue(&ptr, "DID*",
ERR_NEWORDER_FORM_MISSING_DID, ERR_NEWORDER_DISTRICT_INVALID);
        pNewOrderData->c_id = GetIntKeyValue(&ptr, "CID*", ERR_NEWORDER_CUSTOMER_KEY,
ERR_NEWORDER_CUSTOMER_INVALID);

        for(i=0, items=0; i<MAX_OL_NEW_ORDER_ITEMS; i++)
        {
                GetKeyValue(&ptr, szSP[i], szTmp, sizeof(szTmp),
ERR_NEWORDER_MISSING_SUPPW_KEY);
                if ( szTmp[0] )
                {
                        if ( !IsNumeric(szTmp) )
                                throw new CWEBCLNT_ERR(
ERR_NEWORDER_SUPPW_INVALID );
                        pNewOrderData->OL[items].ol_supply_w_id = atoi(szTmp);

                        ol_i_id = pNewOrderData->OL[items].ol_i_id =
                                GetIntKeyValue(&ptr, szIID[i],
ERR_NEWORDER_MISSING_IID_KEY, ERR_NEWORDER_ITEMID_INVALID);
                        if ( ol_i_id > 999999 || ol_i_id < 1 )
                                throw new CWEBCLNT_ERR( ERR_NEWORDER_ITEMID_RANGE
);

                        ol_quantity = pNewOrderData->OL[items].ol_quantity =
                                GetIntKeyValue(&ptr, szQty[i],
ERR_NEWORDER_MISSING_QTY_KEY, ERR_NEWORDER_QTY_INVALID);
                        if ( ol_quantity > 99 || ol_quantity < 1 )
                                throw new CWEBCLNT_ERR( ERR_NEWORDER_QTY_RANGE );

                        items++;
                }
                else
                {       // nothing entered for supply warehouse, so item id and qty
must also be blank
                        GetKeyValue(&ptr, szIID[i], szTmp, sizeof(szTmp),
ERR_NEWORDER_MISSING_IID_KEY);
                        if ( szTmp[0] )
                                throw new CWEBCLNT_ERR(
ERR_NEWORDER_ITEMID_WITHOUT_SUPPW );
```

```
                        GetKeyValue(&ptr, szQty[i], szTmp, sizeof(szTmp),
ERR_NEWORDER_MISSING_QTY_KEY);
                        if ( szTmp[0] )
                                throw new CWEBCLNT_ERR(
ERR_NEWORDER_QTY_WITHOUT_SUPPW );
                }
        }
        if ( items == 0 )
                throw new CWEBCLNT_ERR( ERR_NEWORDER_NOITEMS_ENTERED );

        pNewOrderData->o_ol_cnt = items;
}

/* FUNCTION: GetPaymentData
 *
 * 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
 */

void GetPaymentData(LPSTR lpszQueryString, PAYMENT_DATA *pPaymentData)
{
        char    szTmp[26];
        char    *ptr = lpszQueryString;
        BOOL    bCustIdBlank;

        pPaymentData->d_id = GetIntKeyValue(&ptr, "DID*", ERR_PAYMENT_MISSING_DID_KEY,
ERR_PAYMENT_DISTRICT_INVALID);

        GetKeyValue(&ptr, "CID*", szTmp, sizeof(szTmp), ERR_PAYMENT_MISSING_CID_KEY);
        if ( szTmp[0] == 0 )
        {
                bCustIdBlank = TRUE;
                pPaymentData->c_id = 0;
        }
        else
        {       // parse customer id and verify that last name was NOT entered
                bCustIdBlank = FALSE;
                if ( !IsNumeric(szTmp) )
                        throw new CWEBCLNT_ERR( ERR_PAYMENT_CUSTOMER_INVALID );
                pPaymentData->c_id = atoi(szTmp);
        }

        pPaymentData->c_w_id = GetIntKeyValue(&ptr, "CWI*",
ERR_PAYMENT_MISSING_CWI_KEY, ERR_PAYMENT_CWI_INVALID);
        pPaymentData->c_d_id = GetIntKeyValue(&ptr, "CDI*",
ERR_PAYMENT_MISSING_CDI_KEY, ERR_PAYMENT_CDI_INVALID);

        if ( bCustIdBlank )
        {       // customer id is blank, so last name must be entered
                GetKeyValue(&ptr, "CLT*", szTmp, sizeof(szTmp),
ERR_PAYMENT_MISSING_CLT_KEY);
                if ( szTmp[0] == 0 )
                        throw new CWEBCLNT_ERR( ERR_PAYMENT_MISSING_CID_CLT );

                _strupr( szTmp );
                if ( strlen(pPaymentData->c_last) > LAST_NAME_LEN )
                        throw new CWEBCLNT_ERR( ERR_PAYMENT_LAST_NAME_TO_LONG );
                strcpy(pPaymentData->c_last, szTmp);
        }
        else
        {       // parse customer id and verify that last name was NOT entered
                GetKeyValue(&ptr, "CLT*", szTmp, sizeof(szTmp),
ERR_PAYMENT_MISSING_CLT_KEY);
                if ( szTmp[0] != 0 )
                        throw new CWEBCLNT_ERR( ERR_PAYMENT_CID_AND_CLT );
        }

        GetKeyValue(&ptr, "HAM*", szTmp, sizeof(szTmp), ERR_PAYMENT_MISSING_HAM_KEY);
        if (!IsDecimal(szTmp))
                throw new CWEBCLNT_ERR( ERR_PAYMENT_HAM_INVALID );
        pPaymentData->h_amount = atof(szTmp);
        if ( pPaymentData->h_amount >= 10000.00 || pPaymentData->h_amount < 0 )
                throw new CWEBCLNT_ERR( ERR_PAYMENT_HAM_RANGE );
}

/* FUNCTION: GetOrderStatusData
 *
 * PURPOSE:         This function extracts and validates the payment form data from an
http command string.
 *
 */
void GetOrderStatusData(LPSTR lpszQueryString, ORDER_STATUS_DATA *pOrderStatusData)
{
        char    szTmp[26];
        char    *ptr = lpszQueryString;

        pOrderStatusData->d_id = GetIntKeyValue(&ptr, "DID*",
ERR_ORDERSTATUS_MISSING_DID_KEY, ERR_ORDERSTATUS_DID_INVALID);

        GetKeyValue(&ptr, "CID*", szTmp, sizeof(szTmp),
ERR_ORDERSTATUS_MISSING_CID_KEY);
        if ( szTmp[0] == 0 )
        {       // customer id is blank, so last name must be entered
                pOrderStatusData->c_id = 0;
                GetKeyValue(&ptr, "CLT*", szTmp, sizeof(szTmp),
ERR_ORDERSTATUS_MISSING_CLT_KEY);
                if ( szTmp[0] == 0 )
                        throw new CWEBCLNT_ERR( ERR_ORDERSTATUS_MISSING_CID_CLT );

                _strupr( szTmp );
                if ( strlen(pOrderStatusData->c_last) > LAST_NAME_LEN )
                        throw new CWEBCLNT_ERR( ERR_ORDERSTATUS_CLT_RANGE );
                strcpy(pOrderStatusData->c_last, szTmp);
        }
        else
        {       // parse customer id and verify that last name was NOT entered
                if ( !IsNumeric(szTmp) )
                        throw new CWEBCLNT_ERR( ERR_ORDERSTATUS_CID_INVALID );
                pOrderStatusData->c_id = atoi(szTmp);
                GetKeyValue(&ptr, "CLT*", szTmp, sizeof(szTmp),
ERR_ORDERSTATUS_MISSING_CLT_KEY);
                if ( szTmp[0] != 0 )
                        throw new CWEBCLNT_ERR( ERR_ORDERSTATUS_CID_AND_CLT );
        }

}

/* 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'
 */

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

          while( *ptr && isdigit(*ptr) )
                    ptr++;
          return ( !*ptr );
}

/* FUNCTION: BOOL IsDecimal(char *ptr)
 *
 * PURPOSE:         This function determines if a string is a non-negative decimal value.
 *          It fails if any characters other than a series of numbers followed by
 *                          a decimal point, another series of numbers, and a null
terminator are present.
 *
 * ARGUMENTS:       char                        *ptr      pointer to string to check.
 *
 * RETURNS:                  BOOL      FALSE     if string is not a valid non-negative
decimal value
 *                                                       TRUE      if string is OK
 */

BOOL IsDecimal(char *ptr)
{
          char *dotptr;
          BOOL  bValid;

          if ( *ptr == 0 )
                    return FALSE;

          // find decimal point
          dotptr = strchr( ptr, '.' );
          if (dotptr == NULL)
                    // no decimal point, so just check for numeric
                    return IsNumeric(ptr);
          *dotptr = 0;  // temporarily replace decimal with a terminator

          if ( *ptr != 0 )
                    bValid = IsNumeric(ptr);
          // string starts with decimal point
          else if (*(dotptr+1) == 0)
                    return FALSE;  // nothing but a decimal point is bad
          else
                    bValid = TRUE;

          if (*(dotptr+1) != 0)
                    // check text after decimal point
                    bValid &= IsNumeric(dotptr+1);

          *dotptr = '.';  // replace decimal point

          return bValid;
}
```

isapi_dll/src/resource.h

```
//{{NO_DEPENDENCIES}}
// Microsoft Developer Studio generated include file.
// Used by tpcc.rc
//
#define IDD_DIALOG1                     101

// Next default values for new objects
//
#ifdef APSTUDIO_INVOKED
#ifndef APSTUDIO_READONLY_SYMBOLS
#define _APS_NEXT_RESOURCE_VALUE        102
#define _APS_NEXT_COMMAND_VALUE         40001
#define _APS_NEXT_CONTROL_VALUE         1000
#define _APS_NEXT_SYMED_VALUE           101
#endif
#endif
```

common/src/ReadRegistry.cpp

```
/*        FILE:               READREGISTRY.CPP
 *                                    Microsoft TPC-C Kit Ver. 4.20.000
 *                                    Copyright Microsoft, 1999
 *             All Rights Reserved
 *
 *                                    not yet audited
 *
 *        PURPOSE:  Implementation for TPC-C Tuxedo class.
 *        Contact:  Charles Levine (clevine@microsoft.com)
 *
 *  Change history:
 *                  4.20.000 - first version
 */


/* FUNCTION: ReadTPCCRegistrySettings
 *
 * PURPOSE:         This function reads the NT registry for startup parameters. There
parameters are
 *                          under the TPCC key.
 *
 * RETURNS          FALSE = no errors
 *                          TRUE  = error reading registry
 */
BOOL ReadTPCCRegistrySettings( TPCCREGISTRYDATA *pReg )
{
          HKEY      hKey;
          DWORD     size;
          DWORD     type;
          DWORD     dwTmp;
          char      szTmp[256];
```

```
        if ( RegOpenKeyEx(HKEY_LOCAL_MACHINE, "SOFTWARE\\Microsoft\\TPCC", 0, KEY_READ,
&hKey) != ERROR_SUCCESS )
                return TRUE;

        // determine database protocol to use; may be either ODBC or DBLIB
        pReg->eDB_Protocol = Unspecified;
        size = sizeof(szTmp);
        if ( RegQueryValueEx(hKey, "DB_Protocol", 0, &type, (BYTE *)&szTmp, &size) ==
ERROR_SUCCESS )
        {
                if ( !stricmp(szTmp, szDBNames[ODBC]) )
                        pReg->eDB_Protocol = ODBC;
                else if ( !stricmp(szTmp, szDBNames[DBLIB]) )
                        pReg->eDB_Protocol = DBLIB;
        }

        pReg->eTxnMon = None;
        // determine txn monitor to use; may be either TUXEDO, or blank
        size = sizeof(szTmp);
        if ( RegQueryValueEx(hKey, "TxnMonitor", 0, &type, (BYTE *)&szTmp, &size) ==
ERROR_SUCCESS )
        {
                if ( !stricmp(szTmp, szTxnMonNames[TUXEDO]) )
                        pReg->eTxnMon = TUXEDO;
                else if ( !stricmp(szTmp, szTxnMonNames[ENCINA]) )
                        pReg->eTxnMon = ENCINA;
                else if ( !stricmp(szTmp, szTxnMonNames[COM]) )
                        pReg->eTxnMon = COM;
        }

        pReg->bCOM_SinglePool = FALSE;
        size = sizeof(szTmp);
        if ( RegQueryValueEx(hKey, "COM_SinglePool", 0, &type, (BYTE *)&szTmp, &size)
== ERROR_SUCCESS )
        {
                if ( !stricmp(szTmp, "YES") )
                        pReg->bCOM_SinglePool = TRUE;
        }

        pReg->dwMaxConnections = 0;
        size = sizeof(dwTmp);
        if ( ( RegQueryValueEx(hKey, "MaxConnections", 0, &type, (LPBYTE)&dwTmp, &size)
== ERROR_SUCCESS )
                && (type == REG_DWORD) )
                pReg->dwMaxConnections = dwTmp;

        pReg->dwMaxPendingDeliveries = 0;
        size = sizeof(dwTmp);
        if ( ( RegQueryValueEx(hKey, "MaxPendingDeliveries", 0, &type, (LPBYTE)&dwTmp,
&size) == ERROR_SUCCESS )
                && (type == REG_DWORD) )
                pReg->dwMaxPendingDeliveries = dwTmp;

        pReg->dwNumberOfDeliveryThreads = 0;
        size = sizeof(dwTmp);
        if ( ( RegQueryValueEx(hKey, "NumberOfDeliveryThreads", 0, &type,
(LPBYTE)&dwTmp, &size) == ERROR_SUCCESS )
                && (type == REG_DWORD) )
                pReg->dwNumberOfDeliveryThreads = dwTmp;

        size = sizeof( pReg->szPath );
        if ( RegQueryValueEx(hKey, "Path", 0, &type, (BYTE *)&pReg->szPath, &size) !=
ERROR_SUCCESS )
                pReg->szPath[0] = 0;

        size = sizeof( pReg->szDbServer );
        if ( RegQueryValueEx(hKey, "DbServer", 0, &type, (BYTE *)&pReg->szDbServer,
&size) != ERROR_SUCCESS )
                pReg->szDbServer[0] = 0;

        size = sizeof( pReg->szDbName );
        if ( RegQueryValueEx(hKey, "DbName", 0, &type, (BYTE *)&pReg->szDbName, &size)
!= ERROR_SUCCESS )
                pReg->szDbName[0] = 0;

        size = sizeof( pReg->szDbUser );
        if ( RegQueryValueEx(hKey, "DbUser", 0, &type, (BYTE *)&pReg->szDbUser, &size)
!= ERROR_SUCCESS )
                pReg->szDbUser[0] = 0;

        size = sizeof( pReg->szDbPassword );
        if ( RegQueryValueEx(hKey, "DbPassword", 0, &type, (BYTE *)&pReg->szDbPassword,
&size) != ERROR_SUCCESS )
                pReg->szDbPassword[0] = 0;

        size = sizeof( pReg->szSPPrefix );
        if ( RegQueryValueExW(hKey, L"SPPrefix", 0, &type, (BYTE *)&pReg->szSPPrefix,
&size) != ERROR_SUCCESS )
                pReg->szSPPrefix[0] = L'\0';

        RegCloseKey(hKey);

        return FALSE;
}
```

common/src/ReadRegistry.h

```
/*      FILE:           ReadRegistry.h
 *                              Microsoft TPC-C Kit Ver. 4.20.000
 *                              Copyright Microsoft, 1999
 *            All Rights Reserved
 *
 *                              not audited
 *
 *      PURPOSE:  Header for registry related code.
 *
 *  Change history:
 *              4.20.000 - first version
 */

enum DBPROTOCOL { Unspecified, ODBC, DBLIB };
const char *szDBNames[] = { "Unspecified", "ODBC", "DBLIB" };

enum TXNMON { None, TUXEDO, ENCINA, COM };
const char *szTxnMonNames[] = { "NONE", "TUXEDO", "ENCINA", "COM" };

//This structure defines the data necessary to keep distinct for each terminal or client
connection.
typedef struct _TPCCREGISTRYDATA
{
        enum DBPROTOCOL eDB_Protocol;
        enum TXNMON eTxnMon;
        BOOL bCOM_SinglePool;
```

```
        DWORD dwMaxConnections;
        DWORD dwMaxPendingDeliveries;
        DWORD dwNumberOfDeliveryThreads;
        char szPath[128];
        char szDbServer[32];
        char szDbName[32];
        char szDbUser[32];
        char szDbPassword[32];
        wchar_t szSPPrefix[32];       //tpcc_odbc.dll stored procedures prefix
} TPCCREGISTRYDATA, *PTPCCREGISTRYDATA;

BOOL ReadTPCCRegistrySettings( TPCCREGISTRYDATA *pReg );
```

common/src/error.h

```
/*      FILE:               ERROR.H
 *                                  Microsoft TPC-C Kit Ver. 4.20.000
 *                                  Copyright Microsoft, 1999
 *            All Rights Reserved
 *
 *                                  Version 4.10.000 audited by Richard Gimarc,
Performance Metrics, 3/17/99
 *
 *      PURPOSE:  Header file for error exception classes.
 *
 *  Change history:
 *                4.20.000 - updated rev number to match kit
 *                4.21.000 - fixed bug: ~CBaseErr needed to be declared virtual
 */

#pragma once

#ifndef _INC_STRING
        #include <string.h>
#endif

const int m_szMsg_size = 512;
const int m_szApp_size = 64;
const int m_szLoc_size = 64;

//error message structure used in ErrorText routines
typedef struct _SERRORMSG
{
        int             iError;                         //error id of
message
        char    szMsg[256];                     //message to sent to browser
} SERRORMSG;

typedef enum _ErrorLevel
{
        ERR_FATAL_LEVEL                 = 1,
        ERR_WARNING_LEVEL       = 2,
        ERR_INFORMATION_LEVEL   = 3
} ErrorLevel;


#define ERR_TYPE_LOGIC
        -1              //logic error in program; internal error
#define ERR_SUCCESS
          0             //success (a non-error error)
#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_COM
          9             //error from COM call
#define ERR_TYPE_TUXEDO
          10            //tuxedo error
#define ERR_TYPE_OS
          11            //operating system error
#define ERR_TYPE_MEMORY
          12            //memory allocation error
#define ERR_TYPE_TPCC_ODBC                                              13
          //error from tpcc odbc txn module
#define ERR_TYPE_TPCC_DBLIB                                             14
          //error from tpcc dblib txn module
#define ERR_TYPE_DELISRV                                                15
          //delivery server error
#define ERR_TYPE_TXNLOG
          16            //txn log error
#define ERR_TYPE_BCCONN
          17            //Benchcraft connection class
#define ERR_TYPE_TPCC_CONN                                              18
          //Benchcraft connection class
#define ERR_TYPE_ENCINA
          19            //Encina error
#define ERR_TYPE_COMPONENT                                              20
          //error from COM component
#define ERR_TYPE_RTE
          21            //Benchcraft rte
#define ERR_TYPE_AUTOMATION                                             22
          //Benchcraft automation errors
#define ERR_TYPE_DRIVER
          23            //Driver engine errors
#define ERR_TYPE_RTE_BASE                                               24
          //Framework errors
#define   ERR_BUF_OVERFLOW                                              25
          //Buffer overflow during receive
#define ERR_TYPE_SOAP_HTTP                                              26
          //HTTP/SOAP dll generated error
// TPC-W error types
#define ERR_TYPE_TPCW_CONN                                              50
          //Benchcraft connection class
#define ERR_TYPE_TPCW_HTML                                              51
          //error from TpcwHtml dll
#define ERR_TYPE_TPCW_USER                                              52
          //error from TPC-W user class
#define ERR_TYPE_TPCW_ENG_BASE                                          53
#define ERR_TYPE_TPCW_ENG_OS                                    54
```

```
#define ERR_TYPE_HTML_RESP                                              55
#define ERR_TYPE_TPCW_ODBC                                              56
#define ERR_TYPE_SCHANNEL                                               57
#define ERR_TYPE_THINK_LIST                                             58

#define ERR_INS_MEMORY                          "Insufficient Memory to continue."
#define ERR_UNKNOWN                             "Unknown error."
#define ERR_MSG_BUF_SIZE                512
#define INV_ERROR_CODE                  -1
#define ERR_INS_BUF_OVERFLOW    "Insufficient Buffer size to receive HTML pages."



class CBaseErr
{
public:

          CBaseErr(LPCTSTR szLoc = NULL)
          {
                    m_idMsg             = GetLastError();   //take the error code
immediatelly before it is reset by other functions


                    if (szLoc)
                    {
                              m_szLoc = new char[strlen(szLoc)+1/*m_szLoc_size*/];
                              strcpy(m_szLoc, szLoc);
                    }
                    else
                              m_szLoc   = NULL;

                    m_szApp             = new char[m_szApp_size];
                    GetModuleFileName(GetModuleHandle(NULL), m_szApp, m_szApp_size);
          }



          CBaseErr(int idMsg, LPCTSTR szLoc = NULL)
          {
                    m_idMsg             = idMsg;


                    if (szLoc)
                    {
                              m_szLoc = new char[strlen(szLoc)+1/*m_szLoc_size*/];
                              strcpy(m_szLoc, szLoc);
                    }
                    else
                              m_szLoc   = NULL;

                    m_szApp             = new char[m_szApp_size];
                    GetModuleFileName(GetModuleHandle(NULL), m_szApp, m_szApp_size);
          }

          virtual ~CBaseErr(void)
          {
                    if (m_szApp)
                              delete [] m_szApp;
                    if (m_szLoc)
                              delete [] m_szLoc;
          };

          virtual void Draw(HWND hwnd, LPCTSTR szStr = NULL)
          {
                    int                 j = 0;
                    char      szTmp[512];

                    if (szStr)
                              j = wsprintf(szTmp, "%s\n",szStr);
                    if (ErrorNum() != INV_ERROR_CODE)
                              j += wsprintf(szTmp+j, "Error = %d\n", ErrorNum());
                    if (m_szLoc)
                              j += wsprintf(szTmp+j, "Location = %s\n", GetLocation());

                    j += wsprintf(szTmp+j, "%s\n", ErrorText());

                    ::MessageBox(hwnd, szTmp, m_szApp, MB_OK);
          }

          char *GetApp(void) { return m_szApp; }
          char *GetLocation(void) { return m_szLoc; }
          virtual int ErrorNum() { return m_idMsg; }



          virtual int ErrorType() = 0;  // a value which distinguishes the kind of error
that occurred
          virtual char *ErrorText() = 0; // a string (i.e., human readable)
representation of the error


protected:
          char      *m_szApp;
          char      *m_szLoc; // code location where the error occurred
          int                 m_idMsg;

          //short   m_errType;
};

class CSocketErr : public CBaseErr
{
public:
          enum Action
          {
                    eNone = 0,
                    eSend,
                    eSocket,
                    eBind,
                    eConnect,
                    eListen,
                    eHost,
                    eRecv,
                    eGetHostByName,
                    eWSACreateEvent,
                    eWSASend,
                    eWSAGetOverlappedResult,
                    eWSARecv,
                    eWSAWaitForMultipleEvents,
                    eWSAStartup,
                    eWSAResetEvent,
                    eNonRetryable,
          };

          CSocketErr(Action eAction, LPCTSTR szLocation = NULL);
```

```
        ~CSocketErr()
        {
                if (m_szErrorText != NULL)
                        delete [] m_szErrorText;
        };

        Action    m_eAction;
        char      *m_szErrorText;

        int ErrorType() { return ERR_TYPE_SOCKET;};
        char *ErrorText(void);

};

class CSystemErr : public CBaseErr
{
public:
        enum Action
        {
                eNone = 0,
                eTransactNamedPipe,
                eWaitNamedPipe,
                eSetNamedPipeHandleState,
                eCreateFile,
                eCreateProcess,
                eCallNamedPipe,
                eCreateEvent,
                eCreateThread,
                eVirtualAlloc,
                eReadFile = 10,
                eWriteFile,
                eMapViewOfFile,
                eCreateFileMapping,
                eInitializeSecurityDescriptor,
                eSetSecurityDescriptorDacl,
                eCreateNamedPipe,
                eConnectNamedPipe,
                eWaitForSingleObject,
                eRegOpenKeyEx,
                eRegQueryValueEx = 20,
                ebeginthread,
                eRegEnumValue,
                eRegSetValueEx,
                eRegCreateKeyEx,
                eWaitForMultipleObjects,
                eRegisterClassEx,
                eCreateWindow,
                eCreateSemaphore,
                eReleaseSemaphore,
                eFSeek,
                eFRead,
                eFWrite,
                eTmpFile,
                eSetFilePointer,
                eNew,
                eCloseHandle,
        };

                        CSystemErr(Action eAction, LPCTSTR szLocation);
                        CSystemErr(int iError, Action eAction, LPCTSTR szLocation);
        int             ErrorType() { return ERR_TYPE_OS;};
        char      *ErrorText(void);
        void      Draw(HWND hwnd, LPCTSTR szStr = NULL);
        Action    m_eAction;

private:
        char m_szMsg[ERR_MSG_BUF_SIZE];
};

class CMemoryErr : public CBaseErr
{
public:
        CMemoryErr();

        int ErrorType() {return ERR_TYPE_MEMORY;}
        char *ErrorText() {return ERR_INS_MEMORY;}
};


class CBufferOverflowErr : public CBaseErr
{
        public:
        CBufferOverflowErr(int,LPTSTR);

        int ErrorType() {return ERR_BUF_OVERFLOW;}

        char *ErrorText() {return ERR_INS_BUF_OVERFLOW;}
};
```

common/src/trans.h

```
/*        FILE:               TRANS.H
 *                                    Microsoft TPC-C Kit Ver. 4.42.000
 *                                    Copyright Microsoft, 2002
 *              All Rights Reserved
 *
 *                                    Version 4.10.000 audited by Richard Gimarc,
Performance Metrics, 3/17/99
 *
 *        PURPOSE:  Header file for TPC-C structure templates.
 *
 *  Change history:
 *                  4.42.000 - changed w_id fields from short to long to support >32K
warehouses
 *                  4.20.000 - updated rev number to match kit
 */
#pragma once

// 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

// TIMESTAMP_STRUCT is provided by the ODBC header file sqltypes.h, but is not available
// when compiling with dblib, so redefined here.  Note: we are using the symbol
"__SQLTYPES"
// (declared in sqltypes.h) as a way to determine if TIMESTAMP_STRUCT has been declared.
#ifndef __SQLTYPES
          typedef struct
          {
                              short                         /* SQLSMALLINT */   year;
                              unsigned short      /* SQLUSMALLINT */  month;
                              unsigned short      /* SQLUSMALLINT */  day;
                              unsigned short      /* SQLUSMALLINT */  hour;
                              unsigned short      /* SQLUSMALLINT */  minute;
                              unsigned short      /* SQLUSMALLINT */  second;
                              unsigned long       /* SQLUINTEGER */   fraction;
          } TIMESTAMP_STRUCT;
#endif

// possible values for exec_status_code after transaction completes
enum EXEC_STATUS
{
          eOK,                          // 0      "Transaction commited."
          eInvalidItem,       // 1      "Item number is not valid."
          eDeliveryFailed     // 2      "Delivery Post Failed."
};

// transaction structures
typedef struct
{
          // input params
          long                                  ol_supply_w_id;
          long                                  ol_i_id;
          short                                 ol_quantity;

          // output params
          char                                  ol_i_name[I_NAME_LEN+1];
          char                                  ol_brand_generic[BRAND_LEN+1];
          double                                ol_i_price;
          double                                ol_amount;
          short                                 ol_stock;
} OL_NEW_ORDER_DATA;

typedef struct
{
          // input params
          long                w_id;
          short               d_id;
          long                c_id;
          short               o_ol_cnt;

          // output params
          EXEC_STATUS                                   exec_status_code;
          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;
          TIMESTAMP_STRUCT    o_entry_d;
          short               o_all_local;
          double              total_amount;
          OL_NEW_ORDER_DATA   OL[MAX_OL_NEW_ORDER_ITEMS];
} NEW_ORDER_DATA, *PNEW_ORDER_DATA;

typedef struct
{         // input params
          long                                          w_id;
          short                                         d_id;
          long                                          c_id;
          short                                         c_d_id;
          long                                          c_w_id;
          double                                        h_amount;
          char                                c_last[LAST_NAME_LEN+1];

          // output params
          EXEC_STATUS                                   exec_status_code;
          TIMESTAMP_STRUCT     h_date;
          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_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];
          TIMESTAMP_STRUCT     c_since;
          char                                          c_credit[CREDIT_LEN+1];
          double                                        c_credit_lim;
          double                                        c_discount;
          double                                        c_balance;
          char                                          c_data[200+1];
} PAYMENT_DATA, *PPAYMENT_DATA;

typedef struct
{
          long                                  ol_i_id;
          long                            ol_supply_w_id;
          short                                 ol_quantity;
          double                                ol_amount;
```

```
        TIMESTAMP_STRUCT    ol_delivery_d;
} OL_ORDER_STATUS_DATA;

typedef struct
{       // input params
        long                w_id;
        short               d_id;
        long                c_id;
        char                c_last[LAST_NAME_LEN+1];

        // output params
        EXEC_STATUS                             exec_status_code;
        char                c_first[FIRST_NAME_LEN+1];
        char                c_middle[MIDDLE_NAME_LEN+1];
        double              c_balance;
        long                o_id;
        TIMESTAMP_STRUCT    o_entry_d;
        short               o_carrier_id;
        OL_ORDER_STATUS_DATA OL[MAX_OL_ORDER_STATUS_ITEMS];
        short               o_ol_cnt;
} ORDER_STATUS_DATA, *PORDER_STATUS_DATA;


typedef struct
{       // input params
        long                        w_id;
        short                       o_carrier_id;

        // output params
        EXEC_STATUS                         exec_status_code;
        SYSTEMTIME                  queue_time;
        long                                o_id[10];           // id's of
delivered orders for districts 1 to 10
} DELIVERY_DATA, *PDELIVERY_DATA;

//This structure is used for posting delivery transactions and for writing them to the
delivery server.
typedef struct _DELIVERY_TRANSACTION
{
        SYSTEMTIME          queue;                      //time delivery transaction
queued
        long                w_id;                       //delivery warehouse
        short               o_carrier_id;       //carrier id
} DELIVERY_TRANSACTION;

typedef struct
{       // input params
        long                                w_id;
        short                               d_id;
        short                               threshold;

        // output params
        EXEC_STATUS                         exec_status_code;
        long                                low_stock;
} STOCK_LEVEL_DATA, *PSTOCK_LEVEL_DATA;
```

common/src/txn_base.h

```
/*      FILE:               TXN_BASE.H
 *                                      Microsoft TPC-C Kit Ver. 4.20.000
 *                                      Copyright Microsoft, 1999
 *              All Rights Reserved
 *
 *                                      Version 4.10.000 audited by Richard Gimarc,
Performance Metrics, 3/17/99
 *
 *       PURPOSE:  Header file for TPC-C txn class implementation.
 *
 *  Change history:
 *                  4.20.000 - updated rev number to match kit
 */

#pragma once

// need to declare functions for import, unless define has already been created
// by the DLL's .cpp module for export.
#ifndef DllDecl
#define DllDecl  __declspec( dllimport )
#endif

class DllDecl CTPCC_BASE
{
        public:
                CTPCC_BASE(void) {};
                virtual ~CTPCC_BASE(void) {};

                virtual PNEW_ORDER_DATA             BuffAddr_NewOrder()
        = 0;
                virtual PPAYMENT_DATA               BuffAddr_Payment()
        = 0;
                virtual PDELIVERY_DATA              BuffAddr_Delivery()
        = 0;
                virtual PSTOCK_LEVEL_DATA     BuffAddr_StockLevel()         = 0;
                virtual PORDER_STATUS_DATA    BuffAddr_OrderStatus()        = 0;

                virtual void NewOrder                   () = 0;
                virtual void Payment                    () = 0;
                virtual void Delivery                   () = 0;
                virtual void StockLevel                 () = 0;
                virtual void OrderStatus      () = 0;
};
```

install\src\install.c

```
/*      FILE:               INSTALL.C
 *                                      Microsoft TPC-C Kit Ver. 4.51.000
 *                                      Copyright Microsoft, 2003
 *              All Rights Reserved
 *
 *                                      not audited
 *
 *       PURPOSE:  Automated installation application for TPC-C Web Kit
 *       Contact:  Charles Levine (clevine@microsoft.com)
 *
 *  Change history:
 *                  4.20.000 - added COM installation steps
 *      4.50.000 - added IIS6 configuration options
```

```
 *                 4.51.000 - added routines to copy Visual Studio runtime module
(MSVCR70.DLL)
 *                                      to SystemRoot\System32
 */

#include <windows.h>
#include <direct.h>
#include <io.h>
#include <stdlib.h>
#include <stdio.h>
#include <commctrl.h>
#include "..\..\common\src\ReadRegistry.h"
#include <process.h>

#include "resource.h"

#define   WM_INITTEXT                   WM_USER+100

HICON               hIcon;
HINSTANCE hInst;

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

// TPC-C registry settings
TPCCREGISTRYDATA    Reg;

static    int                   iPoolThreadLimit;
static    int                   iMaxPoolThreads;
static    int                   iThreadTimeout;
static    int                   iListenBackLog;
static    int                   iAcceptExOutstanding;
static    int                   iUriEnableCache;
static    int                   iUriScavengerPeriod;
static    int                   iMaxConnections;

static    int                   iIISMajorVersion;
static    int                   iNumberOfProcessors;

static    int                   iMaxPhysicalMemory;           //max physical memory in MB
static    char      szLastFileName[64];           // last file we worked on (for error
reporting)


BOOL      CALLBACK  LicenseDlgProc(HWND hwnd, UINT uMsg, WPARAM wParam, LPARAM lParam);
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                  ProcessOK(HWND hwnd, char *szDllPath, char *szWindowsPath);
static    void                  ReadRegistrySettings(void);
static    void                  WriteRegistrySettings(char *szDllPath);
static    BOOL                  RegisterDLL(char *szFileName);
static    int                             CopyFiles(HWND hDlg, char *szDllPath, char
*szWindowsPath);
static    BOOL                  GetInstallPath(char *szDllPath);
static    BOOL                  GetWindowsInstallPath(char *szWindowsPath);
static    void                  GetVersionInfo(char *szDLLPath, char *szExePath);
static    BOOL                  CheckWWWebService(void);
static    BOOL                  StartWWWebService(void);
static    BOOL                  StopWWWebService(void);
static    void                  UpdateDialog(HWND hDlg);
static    void                  ConfigureIIS6(HWND hwnd, HWND hDlg);

SYSTEM_INFO siSysInfo;

BOOL install_com(char *szDllPath);

#include "..\..\common\src\ReadRegistry.cpp"

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_DIALOG4), GetDesktopWindow(),
LicenseDlgProc);
          if ( iRc )
          {
                    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 LicenseDlgProc(HWND hwnd, UINT uMsg, WPARAM wParam, LPARAM lParam)
{
          HGLOBAL                       hRes;
          HRSRC                         hResInfo;
          BYTE                          *pSrc, *pDst;
          DWORD                         dwSize;
          static HFONT        hFont;

          switch(uMsg)
          {
                    case WM_INITDIALOG:
                              hFont = CreateFont(-12, 0, 0, 0, 400, 0, 0, 0, 0, 0, 0, 0,
0, "Arial");
                              SendMessage( GetDlgItem(hwnd, IDR_LICENSE1), WM_SETFONT,
(WPARAM)hFont, MAKELPARAM(0, 0) );
                              PostMessage(hwnd, WM_INITTEXT, (WPARAM)0, (LPARAM)0);
                              return TRUE;
                    case WM_INITTEXT:
                              hResInfo = FindResource(hInst,
MAKEINTRESOURCE(IDR_LICENSE1), "LICENSE");
                              dwSize = SizeofResource(hInst, hResInfo);
                              hRes = LoadResource(hInst, hResInfo );
                              pSrc = (BYTE *)LockResource(hRes);
                              pDst = (unsigned char *)malloc(dwSize+1);
                              if ( pDst )
                              {
```

```
                                        memcpy(pDst, pSrc, dwSize);
                                        pDst[dwSize] = 0;
                                        SetDlgItemText(hwnd, IDC_LICENSE, (const char
*)pDst);
                                        free(pDst);
                                }
                                else
                                        SetDlgItemText(hwnd, IDC_LICENSE, (const char
*)pSrc);
                                return TRUE;
                        case WM_DESTROY:
                                DeleteObject(hFont);
                                return TRUE;
                        case WM_COMMAND:
                                if ( wParam == IDOK )
                                        EndDialog(hwnd, TRUE);
                                if ( wParam == IDCANCEL )
                                        EndDialog(hwnd, FALSE);
                        default:
                                break;
        }
        return FALSE;
}

BOOL CALLBACK UpdatedDlgProc(HWND hwnd, UINT uMsg, WPARAM wParam, LPARAM lParam)
{
        switch(uMsg)
        {
                case WM_INITDIALOG:
                        switch(lParam)
                        {
                                case 1:
                                case 2:
                                        SetDlgItemText(hwnd, IDC_RESULTS, "TPC-
C Web Client Installed");
                                        break;
                        }
                        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;
        OSVERSIONINFO       VI;
        char                        szTmp[256];
        static char                 szDllPath[256];
        static char                 szWindowsPath[256];
        static char                 szExePath[256];

        switch(uMsg)
        {
                case WM_INITDIALOG:
                        GlobalMemoryStatus(&memoryStatus);
                        iMaxPhysicalMemory  = (memoryStatus.dwTotalPhys/ 1048576);

                        if ( GetWindowsInstallPath(szWindowsPath) )
                        {
                                MessageBox(hwnd, "Error: Cannot determine Windows
System Root.", NULL, MB_ICONSTOP | MB_OK);
                                EndDialog(hwnd, FALSE);
                                return TRUE;
                        }

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

                        // set default values
                        ZeroMemory( &Reg, sizeof(Reg) );
                        Reg.dwNumberOfDeliveryThreads = 4;
                        Reg.dwMaxConnections = 100;
                        Reg.dwMaxPendingDeliveries    = 100;
                        Reg.eDB_Protocol = DBLIB;
                        Reg.eTxnMon = None;
                        strcpy(Reg.szDbServer,                  "");
                        strcpy(Reg.szDbName,                    "tpcc");
                        strcpy(Reg.szDbUser,                    "sa");
                        strcpy(Reg.szDbPassword,      "");

                        iPoolThreadLimit =  iMaxPhysicalMemory * 2;
                        iThreadTimeout = 86400;
                        iListenBackLog = 15;
                        iAcceptExOutstanding = 40;

                        ReadTPCCRegistrySettings( &Reg );
                        ReadRegistrySettings();

                        // copy the hardware information to the SYSTEM_INFO
structure
                        GetSystemInfo(&siSysInfo);
                        // store the number of processors on this system
                        iNumberOfProcessors = siSysInfo.dwNumberOfProcessors;

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

                        wsprintf(szTmp, "Version %d.%2.2d.%3.3d", versionExeMS,
versionExeMM, versionExeLS);
                        SetDlgItemText(hwnd, IDC_VERSION, szTmp);

                        SetDlgItemText(hwnd, IDC_PATH, szDllPath);

                        SetDlgItemText(hwnd, ED_DB_SERVER, Reg.szDbServer);
                        SetDlgItemText(hwnd, ED_DB_USER_ID, Reg.szDbUser);
                        SetDlgItemText(hwnd, ED_DB_PASSWORD, Reg.szDbPassword);
                        SetDlgItemText(hwnd, ED_DB_NAME, Reg.szDbName);

                        SetDlgItemInt(hwnd, ED_THREADS,
Reg.dwNumberOfDeliveryThreads, FALSE);
                        SetDlgItemInt(hwnd, ED_MAXCONNECTION, Reg.dwMaxConnections,
FALSE);
                        SetDlgItemInt(hwnd, ED_MAXDELIVERIES,
Reg.dwMaxPendingDeliveries, FALSE);
```

```
                        SetDlgItemInt(hwnd, ED_IIS_MAX_THEAD_POOL_LIMIT,
iPoolThreadLimit, 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);

                        CheckDlgButton(hwnd, IDC_DBLIB, 0);
                        CheckDlgButton(hwnd, IDC_ODBC,  0);
                        if ( Reg.eDB_Protocol == DBLIB )
                                CheckDlgButton(hwnd, IDC_DBLIB, 1);
                        else
                                CheckDlgButton(hwnd, IDC_ODBC,  1);

                        // check OS version level for COM.  Must be at least
Windows 2000
                        VI.dwOSVersionInfoSize = sizeof(VI);
                        GetVersionEx( &VI );
                        if (VI.dwMajorVersion < 5)
                        {
                                HWND hDlg = GetDlgItem( hwnd, IDC_TM_MTS );
                                EnableWindow( hDlg, 0 );      // disable COM
option
                                if (Reg.eTxnMon == COM)
                                        Reg.eTxnMon = None;
                        }

                        CheckDlgButton(hwnd, IDC_TM_NONE,   0);
                        CheckDlgButton(hwnd, IDC_TM_TUXEDO, 0);
                        CheckDlgButton(hwnd, IDC_TM_MTS,    0);
                        CheckDlgButton(hwnd, IDC_TM_ENCINA,     0);
                        switch (Reg.eTxnMon)
                        {
                        case None:
                                CheckDlgButton(hwnd, IDC_TM_NONE,   1);
                                break;
                        case TUXEDO:
                                CheckDlgButton(hwnd, IDC_TM_TUXEDO, 1);
                                break;
                        case ENCINA:
                                CheckDlgButton(hwnd, IDC_TM_ENCINA, 1);
                                break;
                        case COM:
                                CheckDlgButton(hwnd, IDC_TM_MTS,        1);
                                break;
                        }

                        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 ( HIWORD(wParam) == BN_CLICKED )
                        {
                                switch( LOWORD(wParam) )
                                {
                                        case IDC_DBLIB:
                                                return TRUE;
                                        case IDC_ODBC:
                                                return TRUE;
                                        case IDOK:
                                                ProcessOK(hwnd, szDllPath,
szWindowsPath);
                                                return TRUE;
                                        case IDCANCEL:
                                                EndDialog(hwnd, FALSE);
                                                return TRUE;
                                        default:
                                                return FALSE;
                                }
                        }
                        break;
                default:
                        break;
        }
        return FALSE;
}

static void ProcessOK(HWND hwnd, char *szDllPath, char *szWindowsPath)
{
        int             d;
        HWND    hDlg;
        int             rc;
        BOOL    bSvcRunning;

        char    szFullName[256];
        char    szErrTxt[128];

        // read settings from dialog
        Reg.dwNumberOfDeliveryThreads  = GetDlgItemInt(hwnd, ED_THREADS, &d, FALSE);
        Reg.dwMaxConnections = GetDlgItemInt(hwnd, ED_MAXCONNECTION, &d, FALSE);
        Reg.dwMaxPendingDeliveries = GetDlgItemInt(hwnd, ED_MAXDELIVERIES, &d, FALSE);

        GetDlgItemText(hwnd, ED_DB_SERVER, Reg.szDbServer, sizeof(Reg.szDbServer));
        GetDlgItemText(hwnd, ED_DB_USER_ID, Reg.szDbUser, sizeof(Reg.szDbUser));
        GetDlgItemText(hwnd, ED_DB_PASSWORD, Reg.szDbPassword,
sizeof(Reg.szDbPassword));
        GetDlgItemText(hwnd, ED_DB_NAME, Reg.szDbName, sizeof(Reg.szDbName));

        if ( IsDlgButtonChecked(hwnd, IDC_DBLIB) )
        {
                Reg.eDB_Protocol = DBLIB;
                rc = 1;
        }
        else if ( IsDlgButtonChecked(hwnd, IDC_ODBC) )
        {
                Reg.eDB_Protocol = ODBC;
                rc = 2;
        }

        if ( IsDlgButtonChecked(hwnd, IDC_TM_NONE) )
                Reg.eTxnMon = None;
        else if ( IsDlgButtonChecked(hwnd, IDC_TM_TUXEDO) )
                Reg.eTxnMon = TUXEDO;
        else if ( IsDlgButtonChecked(hwnd, IDC_TM_MTS) )
                Reg.eTxnMon = COM;
        else if ( IsDlgButtonChecked(hwnd, IDC_TM_ENCINA) )
                Reg.eTxnMon = ENCINA;
```

```
        iPoolThreadLimit = 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);

        // check to see if the web services are running
        bSvcRunning = CheckWWWebService();
        if ( bSvcRunning )
        {
                SetDlgItemText(hDlg, IDC_STATUS, "Stopping Web Service.");
                SendDlgItemMessage(hDlg, IDC_PROGRESS1, PBM_STEPIT, 0, 0);
                UpdateDialog(hDlg);

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

        // write binaries to inetpub\wwwroot
        rc = CopyFiles(hDlg, szDllPath, szWindowsPath);
        if ( !rc )
        {
                ShowWindow(hwnd, SW_SHOWNA);
                DestroyWindow(hDlg);
                strcpy( szErrTxt, "Error(s) occured when creating " );
                strcat( szErrTxt, szLastFileName );
                MessageBox(hwnd, szErrTxt, NULL, MB_ICONSTOP | MB_OK);
                EndDialog(hwnd, 0);
                return;
        }

        // while we have the web services shutdown, check to see if this
        // is IIS6.  If it is, then call ConfigureIIS6
        if ( iIISMajorVersion == 6)
        {
                ConfigureIIS6(hwnd, 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();
        }

        // update registry
        SetDlgItemText(hDlg, IDC_STATUS, "Updating Registry.");
        SendDlgItemMessage(hDlg, IDC_PROGRESS1, PBM_STEPIT, 0, 0);
        UpdateDialog(hDlg);
        WriteRegistrySettings(szDllPath);

        // register com proxy stub
        strcpy(szFullName, szDllPath);
        strcat(szFullName, "tpcc_com_ps.dll");
        if (!RegisterDLL(szFullName))
        {
                ShowWindow(hwnd, SW_SHOWNA);
                DestroyWindow(hDlg);
                strcpy( szErrTxt, "Error occured when registering " );
                strcat( szErrTxt, szFullName );
                MessageBox(hwnd, szErrTxt, NULL, MB_ICONSTOP | MB_OK);
                EndDialog(hwnd, 0);
                return;
        }

        // if using COM
        if (Reg.eTxnMon == COM)
        {
                SetDlgItemText(hDlg, IDC_STATUS, "Configuring COM.");
                SendDlgItemMessage(hDlg, IDC_PROGRESS1, PBM_STEPIT, 0, 0);
                UpdateDialog(hDlg);

                if (install_com(szDllPath))
                {
                        ShowWindow(hwnd, SW_SHOWNA);
                        DestroyWindow(hDlg);
                        strcpy( szErrTxt, "Error occured when configuring COM
settings." );
                        MessageBox(hwnd, szErrTxt, NULL, MB_ICONSTOP | MB_OK);
                        EndDialog(hwnd, 0);
                        return;
                }
        }

        Sleep(100);

        ShowWindow(hwnd, SW_SHOWNA);
        DestroyWindow(hDlg);

        EndDialog(hwnd, rc);
        return;
}

static void ReadRegistrySettings(void)
{
        HKEY    hKey;
        DWORD   size;
        DWORD   type;

        if ( RegOpenKeyEx(HKEY_LOCAL_MACHINE, "SOFTWARE\\Microsoft\\InetStp", 0,
KEY_READ, &hKey) == ERROR_SUCCESS )
        {
                size = sizeof(iIISMajorVersion);
                if ( RegQueryValueEx(hKey, "MajorVersion", 0, &type, (char
*)&iIISMajorVersion, &size) == ERROR_SUCCESS )
                        if ( !iIISMajorVersion )
                                iIISMajorVersion = 5;
        }

        if ( RegOpenKeyEx(HKEY_LOCAL_MACHINE,
"SYSTEM\\CurrentControlSet\\Services\\Inetinfo\\Parameters", 0, KEY_READ, &hKey) ==
ERROR_SUCCESS )
        {
                if ( iIISMajorVersion == 6)
                {
```

```
                        // since IIS6 handles the pool thread parameters
differently, we need to fill in the dialog
                        // with the MaxPoolThreads rather thatn PoolThreadLimit
                        // for ease of coding, we are just going to stuff the value
into iPoolThreadLimit
            size = sizeof(iPoolThreadLimit);
                        if ( RegQueryValueEx(hKey, "MaxPoolThreads", 0, &type,
(char *)&iPoolThreadLimit, &size) == ERROR_SUCCESS )
                        if ( !iPoolThreadLimit )
                                iPoolThreadLimit =  iMaxPhysicalMemory * 2;
                }
                else
                {
                        size = sizeof(iPoolThreadLimit);
                        if ( RegQueryValueEx(hKey, "MaxPoolThreads", 0, &type,
(char *)&iPoolThreadLimit, &size) == ERROR_SUCCESS )
                        if ( !iPoolThreadLimit )
                                iPoolThreadLimit =  iMaxPhysicalMemory * 2;
                }

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

                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 )
        {
                size = sizeof(iAcceptExOutstanding);
                if ( RegQueryValueEx(hKey, "AcceptExOutstanding", 0, &type, (char
*)&iAcceptExOutstanding, &size) == ERROR_SUCCESS )
                        if ( !iAcceptExOutstanding )
                                iAcceptExOutstanding = 40;

                RegCloseKey(hKey);
        }
        if ( RegOpenKeyEx(HKEY_LOCAL_MACHINE,
"SYSTEM\\CurrentControlSet\\Services\\HTTP\\Parameters", 0, KEY_READ, &hKey) ==
ERROR_SUCCESS )
        {
                size = sizeof(iUriEnableCache);
                if ( RegQueryValueEx(hKey, "UriEnableCache", 0, &type, (char
*)&iUriEnableCache, &size) == ERROR_SUCCESS )
                        if ( !iUriEnableCache )
                                iUriEnableCache = 0;

                size = sizeof(iUriScavengerPeriod);
                if ( RegQueryValueEx(hKey, "UriScavengerPeriod", 0, &type, (char
*)&iUriScavengerPeriod, &size) == ERROR_SUCCESS )
                        if ( !iUriScavengerPeriod )
                                iUriScavengerPeriod = 10800;
                size = sizeof(iMaxConnections);
                if ( RegQueryValueEx(hKey, "MaxConnections", 0, &type, (char
*)&iMaxConnections, &size) == ERROR_SUCCESS )
                        if ( !iMaxConnections )
                                iMaxConnections = 100000;

                RegCloseKey(hKey);
        }
}


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)+1);

                RegSetValueEx(hKey, "NumberOfDeliveryThreads", 0, REG_DWORD, (char
*)&Reg.dwNumberOfDeliveryThreads, sizeof(Reg.dwNumberOfDeliveryThreads));
                RegSetValueEx(hKey, "MaxConnections", 0, REG_DWORD, (char
*)&Reg.dwMaxConnections, sizeof(Reg.dwMaxConnections));
                RegSetValueEx(hKey, "MaxPendingDeliveries", 0, REG_DWORD, (char
*)&Reg.dwMaxPendingDeliveries, sizeof(Reg.dwMaxPendingDeliveries));

                RegSetValueEx(hKey, "DB_Protocol", 0, REG_SZ,
szDBNames[Reg.eDB_Protocol], strlen(szDBNames[Reg.eDB_Protocol])+1);
                RegSetValueEx(hKey, "TxnMonitor", 0, REG_SZ,
szTxnMonNames[Reg.eTxnMon], strlen(szTxnMonNames[Reg.eTxnMon])+1);

                RegSetValueEx(hKey, "DbServer", 0, REG_SZ, Reg.szDbServer,
strlen(Reg.szDbServer)+1);
                RegSetValueEx(hKey, "DbName", 0, REG_SZ, Reg.szDbName,
strlen(Reg.szDbName)+1);
                RegSetValueEx(hKey, "DbUser", 0, REG_SZ, Reg.szDbUser,
strlen(Reg.szDbUser)+1);
                RegSetValueEx(hKey, "DbPassword", 0, REG_SZ, Reg.szDbPassword,
strlen(Reg.szDbPassword)+1);

                strcpy(szTmp, "YES");
                RegSetValueEx(hKey, "COM_SinglePool", 0, REG_SZ, szTmp,
strlen(szTmp)+1);

                RegFlushKey(hKey);
                RegCloseKey(hKey);
        }

        if ( (iRc=RegCreateKeyEx(HKEY_LOCAL_MACHINE,
"SYSTEM\\CurrentControlSet\\Services\\Inetinfo\\Parameters", 0, NULL,
REG_OPTION_NON_VOLATILE, KEY_ALL_ACCESS, NULL, &hKey, &dwDisposition)) == ERROR_SUCCESS )
        {
```

```
                    // if this is IIS6, then we need to treat the PoolThreadLimit
differently
                    // if IIS6, then PoolThreadLimit is the maximum number of threads for
the entire system.
                    // IIS6 added MaxPoolThreads which controls the number of threads per
processor.  For IIS6
                    // we will set MaxPoolThreads to the value the user proivided in the
dialog and then set
                    // PoolThreadLimit to MaxPoolThreads * number of processors on this
system
                    if ( iIISMajorVersion == 6 )
                    {
                              iMaxPoolThreads = iPoolThreadLimit;
                              iPoolThreadLimit = iMaxPoolThreads * iNumberOfProcessors;
                              RegSetValueEx(hKey, "PoolThreadLimit", 0, REG_DWORD, (char
*)&iPoolThreadLimit, sizeof(iPoolThreadLimit));
                              RegSetValueEx(hKey, "MaxPoolThreads", 0, REG_DWORD, (char
*)&iMaxPoolThreads, sizeof(iMaxPoolThreads));
                    }
                    else
                    {
                              RegSetValueEx(hKey, "PoolThreadLimit", 0, REG_DWORD, (char
*)&iPoolThreadLimit, sizeof(iPoolThreadLimit));
                    }

                    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, 16));
                    SendDlgItemMessage(hwnd, IDC_PROGRESS1, PBM_SETSTEP, (WPARAM)1, 0);
                    return TRUE;
          }
          return FALSE;
}

BOOL RegisterDLL(char *szFileName)
{
          HINSTANCE hLib;
          FARPROC             lpDllEntryPoint;

          hLib = LoadLibrary(szFileName);
          if ( hLib == NULL )
                    return FALSE;
          // Find the entry point.
          lpDllEntryPoint = GetProcAddress(hLib, "DllRegisterServer");
          if (lpDllEntryPoint != NULL)
          {
                    return ((*lpDllEntryPoint)() == S_OK);
          }
          else
                    return FALSE;       //unable to locate entry point
}

BOOL FileFromResource( char *szResourceName, int iResourceId, char *szDllPath, char
*szFileName )
{
          HGLOBAL                       hDLL;
          HRSRC                         hResInfo;
          HANDLE                        hFile;
          DWORD                         dwSize;
          BYTE                          *pSrc;
          DWORD                         d;
          char                          szFullName[256];

          hResInfo = FindResource(hInst, MAKEINTRESOURCE(iResourceId), szResourceName);

          strcpy(szFullName, szDllPath);
          strcat(szFullName, szFileName);

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

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

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

          CloseHandle(hFile);

          UnlockResource(hDLL);
          FreeResource(hDLL);
          return TRUE;
}

static int CopyFiles(HWND hDlg, char *szDllPath, char *szWindowsPath)
{
          SetDlgItemText(hDlg, IDC_STATUS, "Copying Files...");
          SendDlgItemMessage(hDlg, IDC_PROGRESS1, PBM_STEPIT, 0, 0);
          UpdateDialog(hDlg);

          // install TPCC.DLL
          strcpy( szLastFileName, "tpcc.dll" );
          if (!FileFromResource( "TPCCDLL", IDR_TPCCDLL, szDllPath, szLastFileName ))
                    return 0;
          SendDlgItemMessage(hDlg, IDC_PROGRESS1, PBM_STEPIT, 0, 0);
          UpdateDialog(hDlg);
```

```
        // install MSVCR70.DLL
        strcpy( szLastFileName, "msvcr70.dll" );
        if (!FileFromResource( "MSVCRT70", IDR_MSVCRT701, szWindowsPath, szLastFileName
))
                return 0;
        SendDlgItemMessage(hDlg, IDC_PROGRESS1, PBM_STEPIT, 0, 0);
        UpdateDialog(hDlg);

        // install tpcc_dblib.dll
        strcpy( szLastFileName, "tpcc_dblib.dll" );
        if (!FileFromResource( "DBLIB_DLL", IDR_DBLIB_DLL, szDllPath, szLastFileName ))
                return 0;
        SendDlgItemMessage(hDlg, IDC_PROGRESS1, PBM_STEPIT, 0, 0);
        UpdateDialog(hDlg);

        // install tpcc_odbc.dll
        strcpy( szLastFileName, "tpcc_odbc.dll" );
        if (!FileFromResource( "ODBC_DLL", IDR_ODBC_DLL, szDllPath, szLastFileName ))
                return 0;
        SendDlgItemMessage(hDlg, IDC_PROGRESS1, PBM_STEPIT, 0, 0);
        UpdateDialog(hDlg);

        // install tuxapp.exe
        strcpy( szLastFileName, "tuxapp.exe" );
        if (!FileFromResource( "TUXEDO_APP", IDR_TUXEDO_APP, szDllPath, szLastFileName
))
                return 0;
        //SendDlgItemMessage(hDlg, IDC_PROGRESS1, PBM_STEPIT, 0, 0);
        //UpdateDialog(hDlg);

        // install tpcc_tuxedo.dll
        strcpy( szLastFileName, "tpcc_tuxedo.dll" );
        if (!FileFromResource( "TUXEDO_DLL", IDR_TUXEDO_DLL, szDllPath, szLastFileName
))
                return 0;
        //SendDlgItemMessage(hDlg, IDC_PROGRESS1, PBM_STEPIT, 0, 0);
        //UpdateDialog(hDlg);

        // install tpcc_com.dll
        strcpy( szLastFileName, "tpcc_com.dll" );
        if (!FileFromResource( "COM_DLL", IDR_COM_DLL, szDllPath, szLastFileName ))
                return 0;
        SendDlgItemMessage(hDlg, IDC_PROGRESS1, PBM_STEPIT, 0, 0);
        UpdateDialog(hDlg);

        // install tpcc_com_all.tlb
        strcpy( szLastFileName, "tpcc_com_all.tlb" );
        if (!FileFromResource( "COM_TYPLIB", IDR_COMTYPLIB_DLL, szDllPath,
szLastFileName ))
                return 0;
        SendDlgItemMessage(hDlg, IDC_PROGRESS1, PBM_STEPIT, 0, 0);
        UpdateDialog(hDlg);

        // install tpcc_com_ps.dll
        strcpy( szLastFileName, "tpcc_com_ps.dll" );
        if (!FileFromResource( "COM_PS_DLL", IDR_COMPS_DLL, szDllPath, szLastFileName
))
                return 0;
        SendDlgItemMessage(hDlg, IDC_PROGRESS1, PBM_STEPIT, 0, 0);
        UpdateDialog(hDlg);

        // install tpcc_com_all.dll
        strcpy( szLastFileName, "tpcc_com_all.dll" );
        if (!FileFromResource( "COM_ALL_DLL", IDR_COMALL_DLL, szDllPath, szLastFileName
))
                return 0;
        SendDlgItemMessage(hDlg, IDC_PROGRESS1, PBM_STEPIT, 0, 0);
        UpdateDialog(hDlg);

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

        return 1;
}

static BOOL GetInstallPath(char *szDllPath)
{
    HKEY  hKey;
        BYTE      szData[256];
        DWORD     sv;
        BOOL      bRc;
        int                 len;
        int                 iRc;


        // Registry key HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft\InetStp\PathWWWRoot is
used to find the
        // IIS default web site directory and determine that IIS is installed.

        szDllPath[0] =  0;
        bRc = TRUE;
        if ( RegOpenKeyEx(HKEY_LOCAL_MACHINE, "SOFTWARE\\Microsoft\\InetStp", 0,
KEY_ALL_ACCESS, &hKey) == ERROR_SUCCESS )
        {
                sv = sizeof(szData);
                iRc = RegQueryValueEx( hKey, "PathWWWRoot", NULL, NULL, szData, &sv
);  // used by IIS 5.0 & 6.0
                if (iRc == ERROR_SUCCESS)
                {
                        bRc = FALSE;
                        strcpy(szDllPath, szData);
                        len = strlen(szDllPath);
                        if ( szDllPath[len-1] != '\\' )
                        {
                                szDllPath[len] = '\\';
                                szDllPath[len+1] = 0;
                        }
                }

                RegCloseKey(hKey);
        }

        return bRc;
}

static BOOL GetWindowsInstallPath(char *szWindowsPath)
{
    HKEY  hKey;
        BYTE      szData[256];
        DWORD     sv;
        BOOL      bRc;
        int                 len;
        int                 iRc;
```

```
        // Registry key HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft\Windows
NT\CurrentVersion\SystemRoot is used to find the
        // system root to install the VC70 DLL.

        szWindowsPath[0] =  0;
        bRc = TRUE;
        if ( RegOpenKeyEx(HKEY_LOCAL_MACHINE, "SOFTWARE\\Microsoft\\Windows
NT\\CurrentVersion", 0, KEY_ALL_ACCESS, &hKey) == ERROR_SUCCESS )
        {
                sv = sizeof(szData);
                iRc = RegQueryValueEx( hKey, "SystemRoot", NULL, NULL, szData, &sv );
                if (iRc == ERROR_SUCCESS)
                {
                        bRc = FALSE;
                        strcpy(szWindowsPath, szData);
                        len = strlen(szWindowsPath);
                        if ( szWindowsPath[len-1] != '\\' )
                        {
                                szWindowsPath[len] = '\\';
                                szWindowsPath[len+1] = 0;
                        }
                        // now append the path to SYSTEM32
                        strcat(szWindowsPath, "SYSTEM32\\");
                }

                RegCloseKey(hKey);
        }

        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 = LOWORD(vs->dwProductVersionLS);
                versionExeMM = HIWORD(vs->dwProductVersionLS);
                free(ptr);
        }
        return;
}

static BOOL CheckWWWebService(void)
{
        SC_HANDLE           schSCManager;
        SC_HANDLE           schService;
        SERVICE_STATUS      ssStatus;

        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 ServiceNotRunning;

        if ( !ControlService(schService, SERVICE_CONTROL_STOP, &ssStatus) )
                goto ServiceNotRunning;
        //start Service pending, Check the status until the service is running.
        if (! QueryServiceStatus(schService, &ssStatus) )
                goto ServiceNotRunning;

        CloseServiceHandle(schService);
        return TRUE;

ServiceNotRunning:

        CloseServiceHandle(schService);
        return FALSE;
}

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);
          schService = OpenService(schSCManager, TEXT("IISADMIN"), 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;
}

static void ConfigureIIS6(HWND hwnd, HWND hDlg)
{
          int                 irc;
          char      szErrTxt[128];
          FILE      *fErrorFile;

          SetDlgItemText(hDlg, IDC_STATUS, "Configuring IIS6...");
          //SendDlgItemMessage(hDlg, IDC_PROGRESS1, PBM_STEPIT, 0, 0);
          UpdateDialog(hDlg);

          irc = system("IIS6_CONFIG.CMD");

          // since the return code from the command file is always 1,
          // check to see if the file iis6_config.err exists
          // if it does, then something hosed
          fErrorFile = fopen("IIS6_CONFIG.err","r");
          if ( fErrorFile != NULL )
          {
                    ShowWindow(hwnd, SW_SHOWNA);
                    DestroyWindow(hDlg);
                    strcpy( szErrTxt, "IIS6 configuration error." );
                    strcat( szErrTxt, "Check iis6_config.err" );
                    MessageBox(hwnd, szErrTxt, NULL, MB_ICONSTOP | MB_OK);
                    EndDialog(hwnd, 0);
                    return;
          }
}
```

install\src\install_com.cpp

```
/*        FILE:               INSTALL_COM.CPP
 *                                    Microsoft TPC-C Kit Ver. 4.51.000
 *                                    Copyright Microsoft, 1999
 *              All Rights Reserved
 *
 *                                    not audited
 *
 *        PURPOSE:  installation code for COM application for TPC-C Web Kit
 *        Contact:  Charles Levine (clevine@microsoft.com)
 *
 *  Change history:
 *                  4.20.000 - first version
 */
```

```
#define _WIN32_WINNT 0x0500

#include <comdef.h>
#include <comadmin.h>
#include <stdio.h>
#include <tchar.h>

extern "C"
{
          BOOL install_com(char *szDllPath);
}

BOOL install_com(char *szDllPath)
{
          ICOMAdminCatalog*   pCOMAdminCat = NULL;
          ICatalogCollection* pCatalogCollectionApp    = NULL;
          ICatalogCollection* pCatalogCollectionCo     = NULL;
          ICatalogCollection* pCatalogCollectionItf    = NULL;
          ICatalogCollection* pCatalogCollectionMethod = NULL;

          ICatalogObject*               pCatalogObjectApp    = NULL;
          ICatalogObject*               pCatalogObjectCo     = NULL;
          ICatalogObject*               pCatalogObjectItf    = NULL;
          ICatalogObject*               pCatalogObjectMethod = NULL;

          _bstr_t                                 bstrTemp, bstrTemp2, bstrTemp3,
bstrTemp4;
          _bstr_t                                 bstrDllPath = szDllPath;
          _variant_t                              vTmp, vKey;
          long                                    lActProp, lCount, lCountCo, lCountItf,
lCountMethod;
          bool                                    bTmp;


          CoInitializeEx(NULL, COINIT_MULTITHREADED);

          HRESULT hr = CoCreateInstance(CLSID_COMAdminCatalog,

          NULL,

          CLSCTX_INPROC_SERVER,

          IID_ICOMAdminCatalog,

          (void**) &pCOMAdminCat);

          if (!SUCCEEDED(hr)) goto Error;

          bstrTemp = "Applications";

          // Attempt to connect to "Applications" in the Catalog
          hr = pCOMAdminCat->GetCollection(bstrTemp,

          (IDispatch**) &pCatalogCollectionApp);
          if (!SUCCEEDED(hr)) goto Error;

          // Attempt to load the "Applications" collection
          hr = pCatalogCollectionApp->Populate();
          if (!SUCCEEDED(hr)) goto Error;

          hr = pCatalogCollectionApp->get_Count(&lCount);
          if (!SUCCEEDED(hr)) goto Error;

          // iterate through applications to delete existing "TPC-C" application (if any)
          while (lCount > 0)
          {
                    hr = pCatalogCollectionApp->get_Item(lCount - 1, (IDispatch**)
&pCatalogObjectApp);
                    if (!SUCCEEDED(hr)) goto Error;

                    hr = pCatalogObjectApp->get_Name(&vTmp);
                    if (!SUCCEEDED(hr)) goto Error;

                    if (wcscmp(vTmp.bstrVal, L"TPC-C"))
                    {
                              lCount--;
                              continue;
                    }
                    else
                    {
                              hr = pCatalogCollectionApp->Remove(lCount - 1);
                              if (!SUCCEEDED(hr)) goto Error;
                              break;
                    }
          }

          hr = pCatalogCollectionApp->SaveChanges(&lActProp);
          if (!SUCCEEDED(hr)) goto Error;

          // add the new application
          hr = pCatalogCollectionApp->Add((IDispatch**) &pCatalogObjectApp);
          if (!SUCCEEDED(hr)) goto Error;

          // set properties
          bstrTemp = "Name";
          vTmp = "TPC-C";
          hr = pCatalogObjectApp->put_Value(bstrTemp, vTmp);
          if (!SUCCEEDED(hr)) goto Error;

          // set as a library (in process) application
          bstrTemp = "Activation";
          lActProp = COMAdminActivationInproc;
          vTmp = lActProp;
          hr = pCatalogObjectApp->put_Value(bstrTemp, vTmp);
          if (!SUCCEEDED(hr)) goto Error;

          // set security level to process
          bstrTemp = "AccessChecksLevel";
          lActProp = COMAdminAccessChecksApplicationLevel;
          vTmp = lActProp;
          hr = pCatalogObjectApp->put_Value(bstrTemp, vTmp);
          if (!SUCCEEDED(hr)) goto Error;

          // save key to get the Components collection later
          hr = pCatalogObjectApp->get_Key(&vKey);
          if (!SUCCEEDED(hr)) goto Error;

          // save changes (app creation) so component installation will work
          hr = pCatalogCollectionApp->SaveChanges(&lActProp);
          if (!SUCCEEDED(hr)) goto Error;

          pCatalogObjectApp->Release();
          pCatalogObjectApp = NULL;

          bstrTemp  = "TPC-C";                                        // app name
```

```
		bstrTemp2 =		bstrDllPath + "tpcc_com_all.dll";		// DLL
		bstrTemp3 =		bstrDllPath + "tpcc_com_all.tlb";		// type
library (TLB)
		bstrTemp4 =		bstrDllPath + "tpcc_com_ps.dll";		//
proxy/stub dll

		hr = pCOMAdminCat->InstallComponent(bstrTemp,

				bstrTemp2,

				bstrTemp3,

				bstrTemp4);
		if (!SUCCEEDED(hr)) goto Error;


		bstrTemp = "Components";
		hr = pCatalogCollectionApp->GetCollection(bstrTemp, vKey, (IDispatch**)
&pCatalogCollectionCo);
		if (!SUCCEEDED(hr)) goto Error;

		hr = pCatalogCollectionCo->Populate();
		if (!SUCCEEDED(hr)) goto Error;

		hr = pCatalogCollectionCo->get_Count(&lCountCo);
		if (!SUCCEEDED(hr)) goto Error;

		// iterate through components in application and set the properties
		while (lCountCo > 0)
		{
				hr = pCatalogCollectionCo->get_Item(lCountCo - 1, (IDispatch**)
&pCatalogObjectCo);
				if (!SUCCEEDED(hr)) goto Error;

				// used for debugging (view the name)
				hr = pCatalogObjectCo->get_Name(&vTmp);
				if (!SUCCEEDED(hr)) goto Error;

				bstrTemp = "ConstructionEnabled";
				bTmp = TRUE;
				vTmp = bTmp;
				hr = pCatalogObjectCo->put_Value(bstrTemp, vTmp);
				if (!SUCCEEDED(hr)) goto Error;

				bstrTemp = "ConstructorString";
				bstrTemp2 = "dummy string (do not remove)";
				vTmp = bstrTemp2;
				hr = pCatalogObjectCo->put_Value(bstrTemp, vTmp);
				if (!SUCCEEDED(hr)) goto Error;

				bstrTemp = "JustInTimeActivation";
				bTmp = TRUE;
				vTmp = bTmp;
				hr = pCatalogObjectCo->put_Value(bstrTemp, vTmp);
				if (!SUCCEEDED(hr)) goto Error;

				bstrTemp = "MaxPoolSize";
				vTmp.Clear();		// clear variant so it isn't stored as a bool
(_variant_t feature)
				vTmp = (long)30;
				hr = pCatalogObjectCo->put_Value(bstrTemp, vTmp);
				if (!SUCCEEDED(hr)) goto Error;

				bstrTemp = "ObjectPoolingEnabled";
				bTmp = TRUE;
				vTmp = bTmp;
				hr = pCatalogObjectCo->put_Value(bstrTemp, vTmp);
				if (!SUCCEEDED(hr)) goto Error;



				// save key to get the InterfacesForComponent collection
				hr = pCatalogObjectCo->get_Key(&vKey);
				if (!SUCCEEDED(hr)) goto Error;

				bstrTemp = "InterfacesForComponent";
				hr = pCatalogCollectionCo->GetCollection(bstrTemp, vKey,
(IDispatch**) &pCatalogCollectionItf);
				if (!SUCCEEDED(hr)) goto Error;

				hr = pCatalogCollectionItf->Populate();
				if (!SUCCEEDED(hr)) goto Error;

				hr = pCatalogCollectionItf->get_Count(&lCountItf);
				if (!SUCCEEDED(hr)) goto Error;

				// iterate through interfaces in component
				while (lCountItf > 0)
				{
						hr = pCatalogCollectionItf->get_Item(lCountItf - 1,
(IDispatch**) &pCatalogObjectItf);
						if (!SUCCEEDED(hr)) goto Error;

						// save key to get the MethodsForInterface collection
						hr = pCatalogObjectItf->get_Key(&vKey);
						if (!SUCCEEDED(hr)) goto Error;

						bstrTemp = "MethodsForInterface";
						hr = pCatalogCollectionItf->GetCollection(bstrTemp, vKey,
(IDispatch**) &pCatalogCollectionMethod);
						if (!SUCCEEDED(hr)) goto Error;

						hr = pCatalogCollectionMethod->Populate();
						if (!SUCCEEDED(hr)) goto Error;

						hr = pCatalogCollectionMethod->get_Count(&lCountMethod);
						if (!SUCCEEDED(hr)) goto Error;

						// iterate through methods of interface
						while (lCountMethod > 0)
						{
								hr = pCatalogCollectionMethod-
>get_Item(lCountMethod - 1, (IDispatch**) &pCatalogObjectMethod);
								if (!SUCCEEDED(hr)) goto Error;

								bstrTemp = "AutoComplete";
								bTmp = TRUE;
								vTmp = bTmp;
								hr = pCatalogObjectMethod->put_Value(bstrTemp,
vTmp);
								if (!SUCCEEDED(hr)) goto Error;

								pCatalogObjectMethod->Release();
								pCatalogObjectMethod = NULL;

								lCountMethod--;
```

```
                        }

                        // save changes
                        hr = pCatalogCollectionMethod->SaveChanges(&lActProp);
                        if (!SUCCEEDED(hr)) goto Error;

                        pCatalogObjectItf->Release();
                        pCatalogObjectItf = NULL;

                        lCountItf--;

                }


                pCatalogObjectCo->Release();
                pCatalogObjectCo = NULL;

                lCountCo--;
        }


        // save changes
        hr = pCatalogCollectionCo->SaveChanges(&lActProp);
        if (!SUCCEEDED(hr)) goto Error;

        pCatalogCollectionApp->Release();
        pCatalogCollectionApp = NULL;

        pCatalogCollectionCo->Release();
        pCatalogCollectionCo = NULL;

        pCatalogCollectionItf->Release();
        pCatalogCollectionItf = NULL;

        pCatalogCollectionMethod->Release();
        pCatalogCollectionMethod = NULL;


Error:
        CoUninitialize();

        if (!SUCCEEDED(hr))
        {
                LPTSTR lpBuf;
                DWORD dwRes = FormatMessage(FORMAT_MESSAGE_ALLOCATE_BUFFER |
FORMAT_MESSAGE_FROM_SYSTEM,

        NULL,

        hr,

        MAKELANGID(LANG_NEUTRAL, SUBLANG_DEFAULT),

        (LPTSTR) &lpBuf,

        0,

        NULL);
//              _tprintf(__T("Error adding components.  HRESULT: 0x%x\n%s"), hr,
lpBuf);
                return TRUE;
        }
        else
                return FALSE;
}
```

db_dblib_dll/src/tpcc_dblib.cpp

```
/*        FILE:               TPCC_DBLIB.CPP
 *                                      Microsoft TPC-C Kit Ver. 4.42.000
 *                                      Copyright Microsoft, 2002
 *              All Rights Reserved
 *
 *                                      Version 4.10.000 audited by Richard Gimarc,
Performance Metrics, 3/17/99
 *
 *        PURPOSE:  Implements dblib calls for TPC-C txns.
 *        Contact:  Charles Levine (clevine@microsoft.com)
 *
 *  Change history:
 *                  4.42.000 - changed w_id fields from short to long to support >32K
warehouses
 *                  4.20.000 - updated rev number to match kit
 *                  4.10.001 - not deleting error class in catch handler on deadlock
retry;
 *                                        not a functional bug, but a memory leak
 *                                      - had to tweak some declarations to compile with
latest SDK; no functional change
 */

#include <windows.h>
#include <stdio.h>
#include <assert.h>

#define DBNTWIN32
#include <sqlfront.h>
#include <sqldb.h>

#ifdef ICECAP
#include <icapexp.h>
#endif

// need to declare functions for export
#define DllDecl  __declspec( dllexport )

#include "..\..\common\src\error.h"
#include "..\..\common\src\trans.h"
#include "..\..\common\src\txn_base.h"
#include "tpcc_dblib.h"

#define   DEFCLPACKSIZE                         4096

// version string; must match return value from tpcc_version stored proc
const char          sVersion[] = "4.10.000";

const                       iMaxRetries = 10;             // how many retries on
deadlock
static    long      iConnectionCount = 0;  // number of current dblib connections
```

```
const int iErrOleDbProvider = 7312;
const char sErrTimeoutExpired[] = "Timeout expired";

BOOL APIENTRY DllMain(HMODULE hModule, DWORD ul_reason_for_call, LPVOID lpReserved)
{
          switch( ul_reason_for_call )
          {
                    case DLL_PROCESS_ATTACH:
                              DisableThreadLibraryCalls(hModule);
                              dbinit();           // initialize dblib
                              break;

                    case DLL_PROCESS_DETACH:
                              dbexit();           // close all dblib
structures/connections
                              break;

                    default:
                              /* nothing */;
          }
          return TRUE;
}


int err_handler(DBPROCESS *dbproc, int severity, int dberr, int oserr, LPCSTR dberrstr,
LPCSTR oserrstr)
{
          CTPCC_DBLIB                         *pConn;

          assert(dbproc != NULL);
          pConn = (CTPCC_DBLIB*)dbgetuserdata(dbproc);

          if (pConn != NULL)
          {
                    pConn->SetDbLibError( severity, dberr, oserr, dberrstr, oserrstr );
          }
          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.
 *
 */
```

```
// typedef INT (SQLAPI *DBMSGHANDLE_PROC)(PDBPROCESS, DBINT, INT, INT, LPCSTR, LPCSTR,
LPCSTR, DBUSMALLINT);

int msg_handler(DBPROCESS *dbproc, DBINT msgno, int msgstate, int severity,
                                        LPCSTR msgtext, LPCSTR srvname, LPCSTR procname,
DBUSMALLINT line)
{
          CTPCC_DBLIB                         *pConn;

          assert(dbproc != NULL);
          pConn = (CTPCC_DBLIB*)dbgetuserdata(dbproc);

          if (pConn != NULL)
          {
                    pConn->SetSqlError( msgno, msgstate, severity, msgtext );
          }

          return 0;
}

/* 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.
 *
 */

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

          return;
}

/* FUNCTION: CTPCC_DBLIB_ERR::ErrorText
 *
 */

char* CTPCC_DBLIB_ERR::ErrorText(void)
{
          int i;

          static SERRORMSG errorMsgs[] =
          {
                    { ERR_WRONG_SP_VERSION,             "Wrong version of stored
procs on database server"     },
                    { ERR_INVALID_CUST,                 "Invalid Customer id,name."
                                                        },
```

```
                { ERR_NO_SUCH_ORDER,                    "No orders found for
customer."                                                      },
                { ERR_RETRIED_TRANS,                    "Retries before transaction
succeeded."                                     },
                { 0,                                                            ""

                        }
        };

        static char szNotFound[] = "Unknown error number.";

        for(i=0; errorMsgs[i].szMsg[0]; i++)
        {
                if ( m_errno == errorMsgs[i].iError )
                        break;
        }
        if ( !errorMsgs[i].szMsg[0] )
                return szNotFound;
        else
                return errorMsgs[i].szMsg;
}

// wrapper routine for class constructor
__declspec(dllexport) CTPCC_DBLIB* CTPCC_DBLIB_new(
        LPCSTR szServer,              // name of SQL server
        LPCSTR szUser,                          // user name for login
        LPCSTR szPassword,            // password for login
        LPCSTR szHost,                          // workstation name; shows up in
sp_who; max 30 chars, only first 10 kept by SQL Server
        LPCSTR szDatabase )           // name of database to use
{
        return new CTPCC_DBLIB( szServer, szUser, szPassword, szHost, szDatabase );
}


CTPCC_DBLIB::CTPCC_DBLIB (
        LPCSTR szServer,              // name of SQL server
        LPCSTR szUser,                          // user name for login
        LPCSTR szPassword,            // password for login
        LPCSTR szHost,                          // workstation name; shows up in
sp_who; max 30 chars, only first 10 kept by SQL Server
        LPCSTR szDatabase )           // name of database to use
{
        LOGINREC  *login;
        const BYTE          *pData;

        // initialization
        m_dbproc = NULL;
        m_DbLibErr = (CDBLIBERR*)NULL;
        m_SqlErr = (CSQLERR*)NULL;

        m_MaxRetries = 10;            // how many retries on deadlock

        // increase max number of connections if getting close
        if ( dbgetmaxprocs() < (iConnectionCount+5) )
        {
                if ( dbsetmaxprocs(iConnectionCount+10) == FAIL )
                        ThrowError(CDBLIBERR::eDbSetMaxProcs);
        }

        // allocate a login structure
        login = dblogin();
        if (login == NULL)
                ThrowError(CDBLIBERR::eLogin);
        InterlockedIncrement( &iConnectionCount );

        // register error and message handler functions
        if (dbprocerrhandle(login, err_handler) == NULL)
                ThrowError(CDBLIBERR::eDbProcHandler);

        if (dbprocmsghandle(login, msg_handler) == NULL)
                ThrowError(CDBLIBERR::eDbProcHandler);


        DBSETLUSER(login, szUser);
        DBSETLPWD(login, szPassword);
        DBSETLHOST(login, szHost);
        DBSETLPACKET(login, (unsigned short)DEFCLPACKSIZE);
        DBSETLVERSION(login, DBVER60);                  // use dblib ver 6.0 client
behavior

        // set time to wait for login
        if (dbsetlogintime(60) == FAIL)
                ThrowError(CDBLIBERR::eDbSet);

        // set time to wait for statement execution
        if (dbsettime(180) == FAIL)
                ThrowError(CDBLIBERR::eDbSet);

        m_dbproc = dbopen(login, szServer);

        // deallocate login structure before checking for success
        dbfreelogin( login );

        if (m_dbproc == NULL)
                ThrowError(CDBLIBERR::eDbOpen);

        // save address of class instance so that the message and error handler
        // can get to data.
        dbsetuserdata(m_dbproc, (LPVOID)this);

        // Use the the right database
        if (dbuse(m_dbproc, szDatabase) == FAIL)
                ThrowError(CDBLIBERR::eDbUse);

        dbcmd(m_dbproc, "set nocount on ");                     // do not return
row counts
        dbcmd(m_dbproc, "set XACT_ABORT ON");           // rollback transaction on
abort

        if (dbsqlexec(m_dbproc) == FAIL)
                ThrowError(CDBLIBERR::eDbSqlExec);

        DiscardNextResults(2);

        // verify that version of stored procs on server is correct
        dbrpcinit(m_dbproc, "tpcc_version", 0);

        if (dbrpcexec(m_dbproc) == FAIL)
                ThrowError(CDBLIBERR::eDbRpcExec);

        if (dbresults(m_dbproc) != SUCCEED)
                ThrowError(CDBLIBERR::eDbResults);

        if (dbnextrow(m_dbproc) != REG_ROW)
                ThrowError(CDBLIBERR::eDbNextRow);
```

```
        char szSrvVersion[16];
        pData=dbdata(m_dbproc, 1);
        if (pData)
                UtilStrCpy(szSrvVersion, pData, dbdatlen(m_dbproc, 1));
        else
                szSrvVersion[0]=0;
        if (strcmp(szSrvVersion,sVersion))
                throw new CTPCC_DBLIB_ERR( CTPCC_DBLIB_ERR::ERR_WRONG_SP_VERSION );


        DiscardNextRows(0);
        DiscardNextResults(0);
}


CTPCC_DBLIB::~CTPCC_DBLIB( void )
{
        // close db connection and deallocate resources
        dbclose(m_dbproc);
        InterlockedDecrement( &iConnectionCount );
        if (m_DbLibErr != NULL)
                delete m_DbLibErr;
        if (m_SqlErr != NULL)
                delete m_SqlErr;
}

void CTPCC_DBLIB::SetDbLibError(int severity, int dberr, int oserr, LPCSTR dberrstr,
LPCSTR oserrstr)
{
        delete m_DbLibErr;
        m_DbLibErr = new CDBLIBERR(CDBLIBERR::eUnknown, severity, dberr, oserr);

        if (dberrstr != NULL)
        {
                m_DbLibErr->m_dberrstr = new char[ strlen(dberrstr)+1 ];
                strcpy( m_DbLibErr->m_dberrstr, dberrstr );
        }

        if (oserrstr != NULL)
        {
                m_DbLibErr->m_oserrstr = new char[ strlen(oserrstr)+1 ];
                strcpy( m_DbLibErr->m_oserrstr, oserrstr );
        }

}

void CTPCC_DBLIB::SetSqlError( int /*DBINT*/ msgno, int msgstate, int severity, LPCSTR
msgtext )
{
        if (m_SqlErr == NULL)
                m_SqlErr = new CSQLERR();

        m_SqlErr->m_msgno = msgno;
        m_SqlErr->m_msgstate = msgstate;
        m_SqlErr->m_severity = severity;

        delete [] m_SqlErr->m_msgtext;
        if (msgtext != NULL)
        {
                m_SqlErr->m_msgtext = new char[ strlen(msgtext)+1 ];
                strcpy( m_SqlErr->m_msgtext, msgtext );
        }
}

void CTPCC_DBLIB::ThrowError( CDBLIBERR::ACTION eAction )
{
        // discard anything still in return buffer
        DiscardNextRows(-1);
        DiscardNextResults(-1);

        // check for SQL Server error first;  if yes, throw it and ignore any DBLib
error.
        if (m_SqlErr != NULL)
        {
                CSQLERR             *pSqlErr;
                pSqlErr = m_SqlErr;
                m_SqlErr = NULL;    // clear our pointer to instance; catch handler
will delete
                throw pSqlErr;
        }

        CDBLIBERR *pDbLibErr;
        if (m_DbLibErr == NULL)
                // this case isn't expected to happen, since it means that an error
was returned
                // but the error handlers were not called.
                pDbLibErr = new CDBLIBERR(eAction);
        else
        {
                pDbLibErr = m_DbLibErr;
                pDbLibErr->m_eAction = eAction;
                m_DbLibErr = NULL;            // clear our pointer to instance; catch
handler will delete
        }

        throw pDbLibErr;
}

// Read and discard rows until no more.  Throw an exception if number of rows read
doesn't
// match number of rows expected.  The row count will be ignored if the expected count
value
// passed in is negative.  A typical use of this routine is to verify that there are no
more
// rows to be read.
void CTPCC_DBLIB::DiscardNextRows(int iExpectedCount)
{
        int                 iRowsRead = 0;
        RETCODE   rc;

        while (TRUE)
        {
                rc = dbnextrow(m_dbproc);
                if (rc == NO_MORE_ROWS)
                        break;
                if (rc == FAIL)
                {
                        if (iExpectedCount >= 0)
                                ThrowError(CDBLIBERR::eDbNextRow);
                        else
                                break;
                }
                iRowsRead++;
        }
```

```
	if ((iExpectedCount >= 0) &&
		(iExpectedCount != iRowsRead))
		ThrowError(CDBLIBERR::eWrongRowCount);
}

// Read and discard results until no more.  Throw an exception if number of result sets
read doesn't
// match number expected.  The result set count will be ignored if the expected count
value
// passed in is negative.  A typical use of this routine is to verify that there are no
more
// result sets to be read.
void CTPCC_DBLIB::DiscardNextResults(int iExpectedCount)
{
	int		iResultsRead = 0;
	RETCODE	rc;

	while (TRUE)
	{
		rc = dbresults(m_dbproc);
		if (rc == NO_MORE_RESULTS)
			break;
		if (rc == FAIL)
		{
			if (iExpectedCount >= 0)
				ThrowError(CDBLIBERR::eDbResults);
			else
				break;
		}

		DiscardNextRows(-1);
		iResultsRead++;
	}

	if ((iExpectedCount >= 0) &&
		(iExpectedCount != iResultsRead))
		ThrowError(CDBLIBERR::eWrongRowCount);
}

void CTPCC_DBLIB::StockLevel()
{
	int			iTryCount = 0;
	const BYTE		*pData;

	ResetError();

	while (TRUE)
	{
		try
		{
			dbrpcinit(m_dbproc, "tpcc_stocklevel", 0);

			dbrpcparam(m_dbproc, NULL, 0, SQLINT4, -1, -1, (BYTE *)
&m_txn.StockLevel.w_id);		// @w_id int
			dbrpcparam(m_dbproc, NULL, 0, SQLINT1, -1, -1, (BYTE *)
&m_txn.StockLevel.d_id);		// @d_id tinyint
			dbrpcparam(m_dbproc, NULL, 0, SQLINT2, -1, -1, (BYTE *)
&m_txn.StockLevel.threshold);	// @threshhold smallint

			if (dbrpcexec(m_dbproc) == FAIL)
				ThrowError(CDBLIBERR::eDbRpcExec);

			if (dbresults(m_dbproc) != SUCCEED)
				ThrowError(CDBLIBERR::eDbResults);

			if (dbnextrow(m_dbproc) != REG_ROW)
				ThrowError(CDBLIBERR::eDbNextRow);

			if (pData=dbdata(m_dbproc, 1))
				m_txn.StockLevel.low_stock = *((long *) pData);

			DiscardNextRows(0);
			DiscardNextResults(0);

			m_txn.StockLevel.exec_status_code = eOK;
			return;
		}
		catch (CSQLERR *e)
		{
			if ((e->m_msgno == 1205 ||
				(e->m_msgno == iErrOleDbProvider &&
				strstr(e->m_msgtext, sErrTimeoutExpired) !=
NULL)) &&
				(++iTryCount <= iMaxRetries))
			{
				// hit deadlock; backoff for increasingly longer
period
				delete e;
				Sleep(10 * iTryCount);
			}
			else
				throw;
		}
	}	// while (TRUE)

	//if (iTryCount)
	//	throw new CTPCC_DBLIB_ERR(CTPCC_DBLIB_ERR::ERR_RETRIED_TRANS,
iTryCount);
}


void CTPCC_DBLIB::NewOrder()
{
	int			i;
	DBINT		commit_flag;
	DBDATETIME	datetime;
	DBDATEREC daterec;

	int			iTryCount = 0;
	const BYTE		*pData;

	ResetError();

	while (TRUE)
	{
		try
		{
			dbrpcinit(m_dbproc, "tpcc_neworder", 0);

			dbrpcparam(m_dbproc, NULL, 0, SQLINT4, -1, -1, (BYTE *)
&m_txn.NewOrder.w_id);
			dbrpcparam(m_dbproc, NULL, 0, SQLINT1, -1, -1, (BYTE *)
&m_txn.NewOrder.d_id);
			dbrpcparam(m_dbproc, NULL, 0, SQLINT4, -1, -1, (BYTE *)
&m_txn.NewOrder.c_id);
```

```
                        dbrpcparam(m_dbproc, NULL, 0, SQLINT1, -1, -1, (BYTE *)
&m_txn.NewOrder.o_ol_cnt);

                        // check whether any order lines are for a remote warehouse
                        m_txn.NewOrder.o_all_local = 1;
                        for (i = 0; i < m_txn.NewOrder.o_ol_cnt; i++)
                        {
                                if (m_txn.NewOrder.OL[i].ol_supply_w_id !=
m_txn.NewOrder.w_id)
                                {
                                        m_txn.NewOrder.o_all_local = 0;  // at
least one remote warehouse
                                        break;
                                }
                        }
                        dbrpcparam(m_dbproc, NULL, 0, SQLINT1, -1, -1, (BYTE *)
&m_txn.NewOrder.o_all_local);

                        for (i = 0; i < m_txn.NewOrder.o_ol_cnt; i++)
                        {
                                dbrpcparam(m_dbproc, NULL, 0, SQLINT4, -1, -1,
(BYTE *) &m_txn.NewOrder.OL[i].ol_i_id);
                                dbrpcparam(m_dbproc, NULL, 0, SQLINT4, -1, -1,
(BYTE *) &m_txn.NewOrder.OL[i].ol_supply_w_id);
                                dbrpcparam(m_dbproc, NULL, 0, SQLINT2, -1, -1,
(BYTE *) &m_txn.NewOrder.OL[i].ol_quantity);
                        }

                        if (dbrpcexec(m_dbproc) == FAIL)
                                ThrowError(CDBLIBERR::eDbRpcExec);


                        // Get order line results
                        m_txn.NewOrder.total_amount = 0;
                        for (i = 0; i<m_txn.NewOrder.o_ol_cnt; i++)
                        {
                                if (dbresults(m_dbproc) != SUCCEED)
                                        ThrowError(CDBLIBERR::eDbResults);

                                if (dbnumcols(m_dbproc) != 5)
                                        ThrowError(CDBLIBERR::eWrongNumCols);

                                if (dbnextrow(m_dbproc) != REG_ROW)
                                        ThrowError(CDBLIBERR::eDbNextRow);

                                if(pData=dbdata(m_dbproc, 1))

        UtilStrCpy(m_txn.NewOrder.OL[i].ol_i_name, pData, dbdatlen(m_dbproc, 1));
                                if(pData=dbdata(m_dbproc, 2))
                                        m_txn.NewOrder.OL[i].ol_stock =
(*(DBSMALLINT *) pData);
                                if(pData=dbdata(m_dbproc, 3))

        UtilStrCpy(m_txn.NewOrder.OL[i].ol_brand_generic, pData, dbdatlen(m_dbproc,
3));
                                if(pData=dbdata(m_dbproc, 4))
                                        dbconvert(m_dbproc, SQLNUMERIC,
(LPCBYTE)pData, dbdatlen(m_dbproc,4),
                                        SQLFLT8, (BYTE
*)&m_txn.NewOrder.OL[i].ol_i_price, 8);
                                if(pData=dbdata(m_dbproc, 5))
                                        dbconvert(m_dbproc, SQLNUMERIC,
(LPCBYTE)pData, dbdatlen(m_dbproc,5),
                                        SQLFLT8, (BYTE
*)&m_txn.NewOrder.OL[i].ol_amount, 8);

                                m_txn.NewOrder.total_amount =
m_txn.NewOrder.total_amount + m_txn.NewOrder.OL[i].ol_amount;

                                DiscardNextRows(0);
                        }


                        // get remaining values for w_tax, d_tax, o_id, c_last,
c_discount, c_credit, o_entry_d, commit_flag
                        if (dbresults(m_dbproc) != SUCCEED)
                                ThrowError(CDBLIBERR::eDbResults);

                        if (dbnextrow(m_dbproc) != REG_ROW)
                                ThrowError(CDBLIBERR::eDbNextRow);

                        if (dbnumcols(m_dbproc) != 8)
                                ThrowError(CDBLIBERR::eWrongNumCols);

                        if (pData=dbdata(m_dbproc, 1))


                                dbconvert(m_dbproc, SQLNUMERIC, (LPCBYTE)pData,
dbdatlen(m_dbproc,1), SQLFLT8, (BYTE *)&m_txn.NewOrder.w_tax, 8);
                        if (pData=dbdata(m_dbproc, 2))

                                dbconvert(m_dbproc, SQLNUMERIC, (LPCBYTE)pData,
dbdatlen(m_dbproc,2), SQLFLT8, (BYTE *)&m_txn.NewOrder.d_tax, 8);
                        if (pData=dbdata(m_dbproc, 3))
                                m_txn.NewOrder.o_id = (*(DBINT *) pData);
                        if (pData=dbdata(m_dbproc, 4))
                                UtilStrCpy(m_txn.NewOrder.c_last, pData,
dbdatlen(m_dbproc, 4));
                        if (pData=dbdata(m_dbproc, 5))
                                dbconvert(m_dbproc, SQLNUMERIC, (LPCBYTE)pData,
dbdatlen(m_dbproc,5), SQLFLT8, (BYTE *)&m_txn.NewOrder.c_discount, 8);
                        if (pData=dbdata(m_dbproc, 6))
                                UtilStrCpy(m_txn.NewOrder.c_credit, pData,
dbdatlen(m_dbproc, 6));
                        if (pData=dbdata(m_dbproc, 7))
                        {
                                datetime = *((DBDATETIME *) pData);
                                dbdatecrack(m_dbproc, &daterec, &datetime);
                                m_txn.NewOrder.o_entry_d.year   = daterec.year;
                                m_txn.NewOrder.o_entry_d.month  = daterec.month;
                                m_txn.NewOrder.o_entry_d.day    = daterec.day;
                                m_txn.NewOrder.o_entry_d.hour   = daterec.hour;
                                m_txn.NewOrder.o_entry_d.minute = daterec.minute;
                                m_txn.NewOrder.o_entry_d.second = daterec.second;
                        }
                        if (pData=dbdata(m_dbproc, 8))
                                commit_flag = (*(DBTINYINT *) pData);

                        DiscardNextRows(0);
                        DiscardNextResults(0);


                        if (commit_flag == 1)
                        {
```

```
                                        m_txn.NewOrder.total_amount *= ((1 +
m_txn.NewOrder.w_tax + m_txn.NewOrder.d_tax) * (1 - m_txn.NewOrder.c_discount));
                                        m_txn.NewOrder.exec_status_code = eOK;
                                }
                                else
                                        m_txn.NewOrder.exec_status_code = eInvalidItem;

                                return;
                        }
                        catch (CSQLERR *e)
                        {
                                if ((e->m_msgno == 1205 ||
                                        (e->m_msgno == iErrOleDbProvider &&
                                        strstr(e->m_msgtext, sErrTimeoutExpired) !=
NULL)) &&
                                        (++iTryCount <= iMaxRetries))
                                {
                                        // hit deadlock; backoff for increasingly longer
period
                                        delete e;
                                        Sleep(10 * iTryCount);
                                }
                                else
                                        throw;
                        }
                }       // while (TRUE)

//      if (iTryCount)
//              throw new CTPCC_DBLIB_ERR(CTPCC_DBLIB_ERR::ERR_RETRIED_TRANS,
iTryCount);
}


void CTPCC_DBLIB::Payment()
{
        DBDATETIME          datetime;
        DBDATEREC daterec;

        int                         iTryCount = 0;
        const BYTE          *pData;

        ResetError();

        while (TRUE)
        {
                try
                {
                        dbrpcinit(m_dbproc, "tpcc_payment", 0);

                        dbrpcparam(m_dbproc, NULL, 0, SQLINT4, -1, -1, (BYTE *)
&m_txn.Payment.w_id);
                        dbrpcparam(m_dbproc, NULL, 0, SQLINT4, -1, -1, (BYTE *)
&m_txn.Payment.c_w_id);
                        dbrpcparam(m_dbproc, NULL, 0, SQLFLT8, -1, -1, (BYTE *)
&m_txn.Payment.h_amount);
                        dbrpcparam(m_dbproc, NULL, 0, SQLINT1, -1, -1, (BYTE *)
&m_txn.Payment.d_id);
                        dbrpcparam(m_dbproc, NULL, 0, SQLINT1, -1, -1, (BYTE *)
&m_txn.Payment.c_d_id);
                        dbrpcparam(m_dbproc, NULL, 0, SQLINT4, -1, -1, (BYTE *)
&m_txn.Payment.c_id);

                        // if customer id is zero, then payment is by name
                        if (m_txn.Payment.c_id == 0)
                                dbrpcparam(m_dbproc, NULL, 0, SQLCHAR, -1,
strlen(m_txn.Payment.c_last), (unsigned char *)m_txn.Payment.c_last);

                        if (dbrpcexec(m_dbproc) == FAIL)
                                ThrowError(CDBLIBERR::eDbRpcExec);

                        if (dbresults(m_dbproc) != SUCCEED)
                                ThrowError(CDBLIBERR::eDbResults);

                        if (dbnextrow(m_dbproc) != REG_ROW)
                                ThrowError(CDBLIBERR::eDbNextRow);

                        if (dbnumcols(m_dbproc) != 27)
                                ThrowError(CDBLIBERR::eWrongNumCols);

                        if (pData=dbdata(m_dbproc, 1))
                                m_txn.Payment.c_id = *((DBINT *) pData);
                        if (pData=dbdata(m_dbproc, 2))
                                UtilStrCpy(m_txn.Payment.c_last, pData,
dbdatlen(m_dbproc, 2));
                        if (pData=dbdata(m_dbproc, 3))
                        {
                                datetime = *((DBDATETIME *) pData);
                                dbdatecrack(m_dbproc, &daterec, &datetime);
                                m_txn.Payment.h_date.year   = daterec.year;
                                m_txn.Payment.h_date.month  = daterec.month;
                                m_txn.Payment.h_date.day    = daterec.day;
                                m_txn.Payment.h_date.hour   = daterec.hour;
                                m_txn.Payment.h_date.minute = daterec.minute;
                                m_txn.Payment.h_date.second = daterec.second;
                        }
                        if (pData=dbdata(m_dbproc, 4))
                                UtilStrCpy(m_txn.Payment.w_street_1, pData,
dbdatlen(m_dbproc, 4));
                        if (pData=dbdata(m_dbproc, 5))
                                UtilStrCpy(m_txn.Payment.w_street_2, pData,
dbdatlen(m_dbproc, 5));
                        if (pData=dbdata(m_dbproc, 6))
                                UtilStrCpy(m_txn.Payment.w_city, pData,
dbdatlen(m_dbproc, 6));
                        if (pData=dbdata(m_dbproc, 7))
                                UtilStrCpy(m_txn.Payment.w_state, pData,
dbdatlen(m_dbproc, 7));
                        if (pData=dbdata(m_dbproc, 8))
                                UtilStrCpy(m_txn.Payment.w_zip, pData,
dbdatlen(m_dbproc, 8));
                        if (pData=dbdata(m_dbproc, 9))
                                UtilStrCpy(m_txn.Payment.d_street_1, pData,
dbdatlen(m_dbproc, 9));
                        if (pData=dbdata(m_dbproc, 10))
                                UtilStrCpy(m_txn.Payment.d_street_2, pData,
dbdatlen(m_dbproc, 10));
                        if (pData=dbdata(m_dbproc, 11))
                                UtilStrCpy(m_txn.Payment.d_city, pData,
dbdatlen(m_dbproc, 11));
                        if (pData=dbdata(m_dbproc, 12))
                                UtilStrCpy(m_txn.Payment.d_state, pData,
dbdatlen(m_dbproc, 12));
                        if (pData=dbdata(m_dbproc, 13))
                                UtilStrCpy(m_txn.Payment.d_zip, pData,
dbdatlen(m_dbproc, 13));
                        if (pData=dbdata(m_dbproc, 14))
```

```
                                        UtilStrCpy(m_txn.Payment.c_first, pData,
dbdatlen(m_dbproc, 14));
                                if (pData=dbdata(m_dbproc, 15))
                                        UtilStrCpy(m_txn.Payment.c_middle, pData,
dbdatlen(m_dbproc, 15));
                                if (pData=dbdata(m_dbproc, 16))
                                        UtilStrCpy(m_txn.Payment.c_street_1, pData,
dbdatlen(m_dbproc, 16));
                                if (pData=dbdata(m_dbproc, 17))
                                        UtilStrCpy(m_txn.Payment.c_street_2, pData,
dbdatlen(m_dbproc, 17));
                                if (pData=dbdata(m_dbproc, 18))
                                        UtilStrCpy(m_txn.Payment.c_city, pData,
dbdatlen(m_dbproc, 18));
                                if (pData=dbdata(m_dbproc, 19))
                                        UtilStrCpy(m_txn.Payment.c_state, pData,
dbdatlen(m_dbproc, 19));
                                if (pData=dbdata(m_dbproc, 20))
                                        UtilStrCpy(m_txn.Payment.c_zip, pData,
dbdatlen(m_dbproc, 20));
                                if (pData=dbdata(m_dbproc, 21))
                                        UtilStrCpy(m_txn.Payment.c_phone, pData,
dbdatlen(m_dbproc, 21));
                                if (pData=dbdata(m_dbproc, 22))
                                {
                                        datetime = *((DBDATETIME *) pData);
                                        dbdatecrack(m_dbproc, &daterec, &datetime);
                                        m_txn.Payment.c_since.year   = daterec.year;
                                        m_txn.Payment.c_since.month  = daterec.month;
                                        m_txn.Payment.c_since.day    = daterec.day;
                                        m_txn.Payment.c_since.hour   = daterec.hour;
                                        m_txn.Payment.c_since.minute = daterec.minute;
                                        m_txn.Payment.c_since.second = daterec.second;
                                }
                                if(pData=dbdata(m_dbproc, 23))
                                        UtilStrCpy(m_txn.Payment.c_credit, pData,
dbdatlen(m_dbproc, 23));
                                if(pData=dbdata(m_dbproc, 24))
                                        dbconvert(m_dbproc, SQLNUMERIC, (LPCBYTE)pData,
dbdatlen(m_dbproc,24), SQLFLT8, (BYTE *)&m_txn.Payment.c_credit_lim, 8);
                                if(pData=dbdata(m_dbproc, 25))
                                        dbconvert(m_dbproc, SQLNUMERIC, (LPCBYTE)pData,
dbdatlen(m_dbproc,25), SQLFLT8, (BYTE *)&m_txn.Payment.c_discount, 8);
                                if(pData=dbdata(m_dbproc, 26))
                                        dbconvert(m_dbproc, SQLNUMERIC, (LPCBYTE)pData,
dbdatlen(m_dbproc,26), SQLFLT8, (BYTE *)&m_txn.Payment.c_balance, 8);
                                if(pData=dbdata(m_dbproc, 27))
                                        UtilStrCpy(m_txn.Payment.c_data, pData,
dbdatlen(m_dbproc, 27));

                                DiscardNextRows(0);
                                DiscardNextResults(0);


                                if (m_txn.Payment.c_id == 0)
                                        throw new CTPCC_DBLIB_ERR(
CTPCC_DBLIB_ERR::ERR_INVALID_CUST );
                                else
                                        m_txn.Payment.exec_status_code = eOK;

                                return;
                        }
                        catch (CSQLERR *e)
                        {
                                if ((e->m_msgno == 1205 ||
                                        (e->m_msgno == iErrOleDbProvider &&
                                        strstr(e->m_msgtext, sErrTimeoutExpired) !=
NULL)) &&
                                        (++iTryCount <= iMaxRetries))
                                {
                                        // hit deadlock; backoff for increasingly longer
period
                                        delete e;
                                        Sleep(10 * iTryCount);
                                }
                                else
                                        throw;
                        }
                }       // while (TRUE)

//      if (iTryCount)
//              throw new CTPCC_DBLIB_ERR(CTPCC_DBLIB_ERR::ERR_RETRIED_TRANS,
iTryCount);
}


void CTPCC_DBLIB::OrderStatus()
{
        int                             i;
        DBDATETIME          datetime;
        DBDATEREC daterec;

        int                             iTryCount = 0;
        RETCODE             rc;
        const BYTE          *pData;

        ResetError();

        while (TRUE)
        {
                try
                {
                        dbrpcinit(m_dbproc, "tpcc_orderstatus", 0);

                        dbrpcparam(m_dbproc, NULL, 0, SQLINT4, -1, -1, (BYTE *)
&m_txn.OrderStatus.w_id);
                        dbrpcparam(m_dbproc, NULL, 0, SQLINT1, -1, -1, (BYTE *)
&m_txn.OrderStatus.d_id);
                        dbrpcparam(m_dbproc, NULL, 0, SQLINT4, -1, -1, (BYTE *)
&m_txn.OrderStatus.c_id);

                        // if customer id is zero, then order status is by name
                        if (m_txn.OrderStatus.c_id == 0)
                                dbrpcparam(m_dbproc, NULL, 0, SQLCHAR, -1,
strlen(m_txn.OrderStatus.c_last), (unsigned char *)m_txn.OrderStatus.c_last);


                        if (dbrpcexec(m_dbproc) == FAIL)
                                ThrowError(CDBLIBERR::eDbRpcExec);

                        // Get order lines
                        if (dbresults(m_dbproc) != SUCCEED)
                        {
                                if ((m_DbLibErr == NULL) && (m_SqlErr == NULL))
```

```
                                        throw new CTPCC_DBLIB_ERR(
CTPCC_DBLIB_ERR::ERR_NO_SUCH_ORDER );
                                else
                                        ThrowError(CDBLIBERR::eDbResults);
                        }

                        if (dbnumcols(m_dbproc) != 5)
                                ThrowError(CDBLIBERR::eWrongNumCols);

                        i = 0;
                        while (TRUE)
                        {
                                rc = dbnextrow(m_dbproc);
                                if (rc == NO_MORE_ROWS)
                                        break;
                                if (rc != REG_ROW)
                                        ThrowError(CDBLIBERR::eDbNextRow);

                                if(pData=dbdata(m_dbproc, 1))
                                        m_txn.OrderStatus.OL[i].ol_supply_w_id
= (*(DBSMALLINT *) pData);
                                if(pData=dbdata(m_dbproc, 2))
                                        m_txn.OrderStatus.OL[i].ol_i_id =
(*(DBINT *) pData);
                                if(pData=dbdata(m_dbproc, 3))
                                        m_txn.OrderStatus.OL[i].ol_quantity =
(*(DBSMALLINT *) pData);
                                if(pData=dbdata(m_dbproc, 4))
                                        dbconvert(m_dbproc, SQLNUMERIC,
(LPCBYTE)pData, dbdatlen(m_dbproc,4),
                                                                SQLFLT8, (BYTE
*)&m_txn.OrderStatus.OL[i].ol_amount, 8);
                                if(pData=dbdata(m_dbproc, 5))
                                {
                                        datetime = *((DBDATETIME *) pData);
                                        dbdatecrack(m_dbproc, &daterec,
&datetime);

          m_txn.OrderStatus.OL[i].ol_delivery_d.year   = daterec.year;

          m_txn.OrderStatus.OL[i].ol_delivery_d.month  = daterec.month;

          m_txn.OrderStatus.OL[i].ol_delivery_d.day    = daterec.day;

          m_txn.OrderStatus.OL[i].ol_delivery_d.hour   = daterec.hour;

          m_txn.OrderStatus.OL[i].ol_delivery_d.minute = daterec.minute;

          m_txn.OrderStatus.OL[i].ol_delivery_d.second = daterec.second;
                                }
                                i++;
                        }
                        m_txn.OrderStatus.o_ol_cnt = i;


                        if (dbresults(m_dbproc) != SUCCEED)
                                ThrowError(CDBLIBERR::eDbResults);

                        if (dbnextrow(m_dbproc) != REG_ROW)
                                ThrowError(CDBLIBERR::eDbNextRow);

                        if (dbnumcols(m_dbproc) != 8)
                                ThrowError(CDBLIBERR::eWrongNumCols);

                        if(pData=dbdata(m_dbproc, 1))
                                m_txn.OrderStatus.c_id = (*(DBINT *) pData);
                        if(pData=dbdata(m_dbproc, 2))
                                UtilStrCpy(m_txn.OrderStatus.c_last, pData,
dbdatlen(m_dbproc,2));
                        if(pData=dbdata(m_dbproc, 3))
                                UtilStrCpy(m_txn.OrderStatus.c_first, pData,
dbdatlen(m_dbproc,3));
                        if(pData=dbdata(m_dbproc, 4))
                                UtilStrCpy(m_txn.OrderStatus.c_middle, pData,
dbdatlen(m_dbproc, 4));
                        if(pData=dbdata(m_dbproc, 5))
                        {
                                datetime = *((DBDATETIME *) pData);
                                dbdatecrack(m_dbproc, &daterec, &datetime);
                                m_txn.OrderStatus.o_entry_d.year   =
daterec.year;
                                m_txn.OrderStatus.o_entry_d.month  =
daterec.month;
                                m_txn.OrderStatus.o_entry_d.day    = daterec.day;
                                m_txn.OrderStatus.o_entry_d.hour   =
daterec.hour;
                                m_txn.OrderStatus.o_entry_d.minute =
daterec.minute;
                                m_txn.OrderStatus.o_entry_d.second =
daterec.second;
                        }
                        if(pData=dbdata(m_dbproc, 6))
                                m_txn.OrderStatus.o_carrier_id = (*(DBSMALLINT *)
pData);
                        if(pData=dbdata(m_dbproc, 7))
                                dbconvert(m_dbproc, SQLNUMERIC, (LPCBYTE)pData,
dbdatlen(m_dbproc,7),
                                                        SQLFLT8, (BYTE
*)&m_txn.OrderStatus.c_balance, 8);
                        if(pData=dbdata(m_dbproc, 8))
                                m_txn.OrderStatus.o_id = (*(DBINT *) pData);

                        DiscardNextRows(0);
                        DiscardNextResults(0);


                        if (m_txn.OrderStatus.o_ol_cnt == 0)
                                throw new CTPCC_DBLIB_ERR(
CTPCC_DBLIB_ERR::ERR_NO_SUCH_ORDER );
                        else if (m_txn.OrderStatus.c_id == 0 &&
m_txn.OrderStatus.c_last[0] == 0)
                                throw new CTPCC_DBLIB_ERR(
CTPCC_DBLIB_ERR::ERR_INVALID_CUST );
                        else
                                m_txn.OrderStatus.exec_status_code = eOK;

                        return;
                }
                catch (CSQLERR *e)
                {
                        if ((e->m_msgno == 1205 ||
                                (e->m_msgno == iErrOleDbProvider &&
                                strstr(e->m_msgtext, sErrTimeoutExpired) !=
NULL)) &&
                                (++iTryCount <= iMaxRetries))
                        {
```

```
                                        // hit deadlock; backoff for increasingly longer
period
                                        delete e;
                                        Sleep(10 * iTryCount);
                                }
                                else
                                        throw;
                        }
                }       // while (TRUE)

//      if (iTryCount)
//              throw new CTPCC_DBLIB_ERR(CTPCC_DBLIB_ERR::ERR_RETRIED_TRANS,
iTryCount);
}


void CTPCC_DBLIB::Delivery()
{
        int                     i;
        int                     iTryCount = 0;
        const BYTE      *pData;

        ResetError();

        while (TRUE)
        {
                try
                {
                        dbrpcinit(m_dbproc, "tpcc_delivery", 0);

                        dbrpcparam(m_dbproc, NULL, 0, SQLINT4, -1, -1, (BYTE *)
&m_txn.Delivery.w_id);
                        dbrpcparam(m_dbproc, NULL, 0, SQLINT1, -1, -1, (BYTE *)
&m_txn.Delivery.o_carrier_id);

                        if (dbrpcexec(m_dbproc) == FAIL)
                                ThrowError(CDBLIBERR::eDbRpcExec);

                        if (dbresults(m_dbproc) != SUCCEED)
                                ThrowError(CDBLIBERR::eDbResults);

                        if (dbnextrow(m_dbproc) != REG_ROW)
                                ThrowError(CDBLIBERR::eDbNextRow);

                        if (dbnumcols(m_dbproc) != 10)
                                ThrowError(CDBLIBERR::eWrongNumCols);

                        for (i=0; i<10; i++)
                        {
                                if (pData = dbdata(m_dbproc, i+1))
                                        m_txn.Delivery.o_id[i] = *((DBINT
*)pData);
                        }

                        DiscardNextRows(0);
                        DiscardNextResults(0);

                        m_txn.Delivery.exec_status_code = eOK;
                        return;
                }
                catch (CSQLERR *e)
                {
                        if ((e->m_msgno == 1205 ||
                                (e->m_msgno == iErrOleDbProvider &&
                                strstr(e->m_msgtext, sErrTimeoutExpired) !=
NULL)) &&
                                (++iTryCount <= iMaxRetries))
                        {
                                // hit deadlock; backoff for increasingly longer
period
                                delete e;
                                Sleep(10 * iTryCount);
                        }
                        else
                                throw;
                }
        }       // while (TRUE)

//      if (iTryCount)
//              throw new CTPCC_DBLIB_ERR(CTPCC_DBLIB_ERR::ERR_RETRIED_TRANS,
iTryCount);
}

void CTPCC_DBLIB::ResetError()
{
        if (m_DbLibErr != NULL)
        {
                delete m_DbLibErr;
                m_DbLibErr = (CDBLIBERR*)NULL;
        }

        if (m_SqlErr != NULL)
        {
                delete m_SqlErr;
                m_SqlErr = (CSQLERR*)NULL;
        }
        return;
}
```

db_dblib_dll/src/tpcc_dblib.h

```
/*      FILE:           TPCC_DBLIB.H
 *                              Microsoft TPC-C Kit Ver. 4.20.000
 *                              Copyright Microsoft, 1999
 *           All Rights Reserved
 *
 *                              Version 4.10.000 audited by Richard Gimarc,
Performance Metrics, 3/17/99
 *
 *      PURPOSE:  Header file for TPC-C txn class implementation.
 *
 *  Change history:
 *              4.20.000 - updated rev number to match kit
 */
#pragma once

#ifndef PDBPROCESS
#define DBPROCESS void   // dbprocess structure type
typedef DBPROCESS * PDBPROCESS;
#endif

// need to declare functions for import, unless define has already been created
```

```
// by the DLL's .cpp module for export.
#ifndef DllDecl
#define DllDecl  __declspec( dllimport )
#endif

class CSQLERR : public CBaseErr
{
          public:

                    CSQLERR(void)
                    {
                              m_msgno = 0;
                              m_msgstate = 0;
                              m_severity = 0;
                              m_msgtext = NULL;
                    };

                    ~CSQLERR()
                    {
                              delete [] m_msgtext;
                    };

                    int                m_msgno;
                    int                m_msgstate;
                    int                m_severity;
                    char   *m_msgtext;

                    int ErrorType() {return ERR_TYPE_SQL;};
                    int ErrorNum() {return m_msgno;};
                    char *ErrorText() {return m_msgtext;};

};

class CDBLIBERR : public CBaseErr
{
          public:
                    enum ACTION
                    {
                              eNone,
                              eUnknown,
                              eLogin,                                   // error from
dblogin
                              eDbOpen,                        // error from dbopen
                              eDbUse,                                   // error from dbuse
                              eDbSqlExec,                               // error from
dbsqlexec
                              eDbSet,                                   // error from one
of the dbset* routines
                              eDbNextRow,                               // error from
dbnextrow
                              eWrongRowCount,                 // more or less rows returned
than expected
                              eWrongNumCols,                  // more or less columns
returned than expected
                              eDbResults,                               // error from
dbresults
                              eDbRpcExec,                               // error from
dbrpcexec
                              eDbSetMaxProcs,                 // error from dbsetmaxprocs
                              eDbProcHandler                  // error from either
dbprocerrhandle or dbprocmsghandle
                    };

                    CDBLIBERR(ACTION eAction, int severity = 0, int dberror = 0, int
oserr = 0)
                    {
                              m_eAction = eAction;
                              m_severity = severity;
                              m_dberror = dberror;
                              m_oserr = oserr;

                              m_dberrstr = NULL;
                              m_oserrstr = NULL;
                    };

                    ~CDBLIBERR()
                    {
                              delete [] m_dberrstr;
                              delete [] m_oserrstr;
                    };

                    ACTION    m_eAction;
                    int                m_severity;
                    int                m_dberror;
                    int                m_oserr;
                    char   *m_dberrstr;
                    char   *m_oserrstr;

                    int ErrorType() {return ERR_TYPE_DBLIB;};
                    int ErrorNum() {return m_dberror;};
                    char *ErrorText() {return m_dberrstr;};

};

class CTPCC_DBLIB_ERR : public CBaseErr
{
          public:
                    enum CTPCC_DBLIB_ERRS
                    {
                              ERR_WRONG_SP_VERSION = 1,     // "Wrong version of stored
procs on database server"
                              ERR_INVALID_CUST,                         // "Invalid
Customer id,name."
                              ERR_NO_SUCH_ORDER                         // "No orders found
for customer."
                    };

                    CTPCC_DBLIB_ERR( int iErr ) { m_errno = iErr; };

                    int                m_errno;

                    int ErrorType() {return ERR_TYPE_TPCC_DBLIB;};
                    int ErrorNum() {return m_errno;};

                    char *ErrorText();
};

class DllDecl CTPCC_DBLIB : public CTPCC_BASE
{
          private:
                    // declare variables and private functions here...
                    PDBPROCESS          m_dbproc;
                    CDBLIBERR *m_DbLibErr;                  // not allocated until needed
(maybe never)
                    CSQLERR             *m_SqlErr;                              // not
allocated until needed (maybe never)
```

```
                    int                         m_MaxRetries;               // retry
count on deadlock

                    void DiscardNextRows(int iExpectedCount);
                    void DiscardNextResults(int iExpectedCount);
                    void ThrowError( CDBLIBERR::ACTION eAction );
                    void ResetError();

                    union
                    {
                              NEW_ORDER_DATA            NewOrder;
                              PAYMENT_DATA              Payment;
                              DELIVERY_DATA             Delivery;
                              STOCK_LEVEL_DATA    StockLevel;
                              ORDER_STATUS_DATA   OrderStatus;
                    }                           m_txn;

          public:
                    CTPCC_DBLIB(LPCSTR szServer, LPCSTR szUser, LPCSTR szPassword, LPCSTR
szHost, LPCSTR szDatabase );
                    ~CTPCC_DBLIB(void);

                    inline PNEW_ORDER_DATA              BuffAddr_NewOrder()
          { return &m_txn.NewOrder;    };
                    inline PPAYMENT_DATA                BuffAddr_Payment()
          { return &m_txn.Payment;     };
                    inline PDELIVERY_DATA               BuffAddr_Delivery()
          { return &m_txn.Delivery;    };
                    inline PSTOCK_LEVEL_DATA      BuffAddr_StockLevel()         { return
&m_txn.StockLevel;  };
                    inline PORDER_STATUS_DATA     BuffAddr_OrderStatus()        { return
&m_txn.OrderStatus; };

                    void NewOrder               ();
                    void Payment                ();
                    void Delivery               ();
                    void StockLevel             ();
                    void OrderStatus    ();


                    // these are public because they must be called from the dblib
err_handler and msg_hangler
                    // outside of the class
                    void SetDbLibError(int severity, int dberr, int oserr, LPCSTR
dberrstr, LPCSTR oserrstr);
                    void SetSqlError( int msgno, int msgstate, int severity, LPCSTR
msgtext );

};

extern "C" DllDecl CTPCC_DBLIB* CTPCC_DBLIB_new
          ( LPCSTR szServer, LPCSTR szUser, LPCSTR szPassword, LPCSTR szHost, LPCSTR
szDatabase );

typedef CTPCC_DBLIB* (TYPE_CTPCC_DBLIB)(LPCSTR, LPCSTR, LPCSTR, LPCSTR, LPCSTR);
```

tm_com_dll/src/tpcc_com.cpp

```
/*       FILE:              TPCC_COM.CPP
 *                                  Microsoft TPC-C Kit Ver. 4.20.000
 *                                  Copyright Microsoft, 1999
 *             All Rights Reserved
 *
 *                                  not yet audited
 *
 *        PURPOSE:  Source file for TPC-C COM+ class implementation.
 *        Contact:  Charles Levine (clevine@microsoft.com)
 *
 *  Change history:
 *                 4.20.000 - first version
 */

// needed for CoinitializeEx
#define _WIN32_WINNT 0x0400

#include <windows.h>

// need to declare functions for export
#define DllDecl  __declspec( dllexport )

#include "..\..\common\src\trans.h"              //tpckit transaction header contains
defination of structures specific to TPC-C
#include "..\..\common\src\error.h"
#include "..\..\common\src\txn_base.h"
#include "tpcc_com.h"

#include "..\..\tpcc_com_ps\src\tpcc_com_ps_i.c"
#include "..\..\tpcc_com_all\src\tpcc_com_all_i.c"

// wrapper routine for class constructor
__declspec(dllexport) CTPCC_COM* CTPCC_COM_new(BOOL bSinglePool)
{
          return new CTPCC_COM(bSinglePool);
}

CTPCC_COM::CTPCC_COM(BOOL bSinglePool)
{
          HRESULT hr = NULL;
          long lRet = 0;
          ULONG ulTmpSize = 0;

          m_pTxn                        = NULL;
          m_pNewOrder                   = NULL;
          m_pPayment                    = NULL;
          m_pStockLevel       = NULL;
          m_pOrderStatus      = NULL;

          m_bSinglePool       = bSinglePool;

          ulTmpSize = (ULONG) sizeof(COM_DATA);
          VariantInit(&m_vTxn);
          m_vTxn.vt = VT_SAFEARRAY;

          m_vTxn.parray = SafeArrayCreateVector(VT_UI1, ulTmpSize, ulTmpSize);
          if (!m_vTxn.parray)
                    throw new CCOMERR( E_FAIL );

          memset((void*)m_vTxn.parray->pvData,0,ulTmpSize);
          m_pTxn = (COM_DATA*)m_vTxn.parray->pvData;

          hr = CoInitializeEx(NULL, COINIT_MULTITHREADED);
          if (FAILED(hr))
```

```
        {
                throw new CCOMERR( hr );
        }

        // create components
        if (m_bSinglePool)
        {
                hr = CoCreateInstance(CLSID_TPCC, NULL, CLSCTX_SERVER, IID_ITPCC,
(void **)&m_pNewOrder);
                if (FAILED(hr))
                        throw new CCOMERR(hr);

                // all txns will use same component
                m_pPayment = m_pNewOrder;
                m_pStockLevel = m_pNewOrder;
                m_pOrderStatus = m_pNewOrder;
        }
        else
        {
                // use different components for each txn

                hr = CoCreateInstance(CLSID_NewOrder, NULL, CLSCTX_SERVER, IID_ITPCC,
(void **)&m_pNewOrder);
                if (FAILED(hr))
                        throw new CCOMERR(hr);

                hr = CoCreateInstance(CLSID_Payment, NULL, CLSCTX_SERVER, IID_ITPCC,
(void **)&m_pPayment);
                if (FAILED(hr))
                        throw new CCOMERR(hr);

                hr = CoCreateInstance(CLSID_StockLevel, NULL, CLSCTX_SERVER,
IID_ITPCC, (void **)&m_pStockLevel);
                if (FAILED(hr))
                        throw new CCOMERR(hr);

                hr = CoCreateInstance(CLSID_OrderStatus, NULL, CLSCTX_SERVER,
IID_ITPCC, (void **)&m_pOrderStatus);
                if (FAILED(hr))
                        throw new CCOMERR(hr);
        }

        // call setcomplete to release each component back into pool
        hr = m_pNewOrder->CallSetComplete();
        if (FAILED(hr))
                throw new CCOMERR(hr);

        if (!m_bSinglePool)
        {
                hr = m_pPayment->CallSetComplete();
                if (FAILED(hr))
                        throw new CCOMERR(hr);

                hr = m_pStockLevel->CallSetComplete();
                if (FAILED(hr))
                        throw new CCOMERR(hr);

                hr = m_pOrderStatus->CallSetComplete();
                if (FAILED(hr))
                        throw new CCOMERR(hr);
        }
}
```

```
CTPCC_COM::~CTPCC_COM()
{
        if (m_pTxn)
                SafeArrayDestroy(m_vTxn.parray);

        ReleaseInterface(m_pNewOrder);
        if (!m_bSinglePool)
        {
                ReleaseInterface(m_pPayment);
                ReleaseInterface(m_pStockLevel);
                ReleaseInterface(m_pOrderStatus);
        }
        CoUninitialize();
}

void CTPCC_COM::NewOrder()
{
        VARIANT   vTxn_out;

        HRESULT hr = m_pNewOrder->NewOrder(m_vTxn, &vTxn_out);
        if (FAILED(hr))
                throw new CCOMERR( hr );
        memcpy(m_pTxn, (void *)vTxn_out.parray->pvData,vTxn_out.parray-
>rgsabound[0].cElements);
        SafeArrayDestroy(vTxn_out.parray);

        if ( m_pTxn->ErrorType != ERR_SUCCESS )
                throw new CCOMERR( m_pTxn->ErrorType, m_pTxn->error );
}

void CTPCC_COM::Payment()
{
        VARIANT   vTxn_out;

        HRESULT hr = m_pPayment->Payment(m_vTxn, &vTxn_out);
        if (FAILED(hr))
                throw new CCOMERR( hr );
        memcpy(m_pTxn, (void *)vTxn_out.parray->pvData,vTxn_out.parray-
>rgsabound[0].cElements);
        SafeArrayDestroy(vTxn_out.parray);

        if ( m_pTxn->ErrorType != ERR_SUCCESS )
                throw new CCOMERR( m_pTxn->ErrorType, m_pTxn->error );
}

void CTPCC_COM::StockLevel()
{
        VARIANT   vTxn_out;

        HRESULT hr = m_pStockLevel->StockLevel(m_vTxn, &vTxn_out);
        if (FAILED(hr))
                throw new CCOMERR( hr );
        memcpy(m_pTxn, (void *)vTxn_out.parray->pvData,vTxn_out.parray-
>rgsabound[0].cElements);
        SafeArrayDestroy(vTxn_out.parray);

        if ( m_pTxn->ErrorType != ERR_SUCCESS )
                throw new CCOMERR( m_pTxn->ErrorType, m_pTxn->error );
}

void CTPCC_COM::OrderStatus()
{
        VARIANT   vTxn_out;
```

```
	HRESULT hr = m_pOrderStatus->OrderStatus(m_vTxn, &vTxn_out);
	if (FAILED(hr))
		throw new CCOMERR( hr );
	memcpy(m_pTxn, (void *)vTxn_out.parray->pvData,vTxn_out.parray-
>rgsabound[0].cElements);
	SafeArrayDestroy(vTxn_out.parray);

	if ( m_pTxn->ErrorType != ERR_SUCCESS )
		throw new CCOMERR( m_pTxn->ErrorType, m_pTxn->error );
}
```

tm_com_dll/src/tpcc_com.h

```
/*	FILE:		TPCC_COM.H
 *					Microsoft TPC-C Kit Ver. 4.20.000
 *					Copyright Microsoft, 1999
 *	     All Rights Reserved
 *
 *					not yet audited
 *
 *	PURPOSE:  Header file for TPC-C COM+ class implementation.
 *
 *  Change history:
 *		4.20.000 - first version
 */

#pragma once

#include <stdio.h>
#include "..\..\tpcc_com_ps\src\tpcc_com_ps.h"

// need to declare functions for import, unless define has already been created
// by the DLL's .cpp module for export.
#ifndef DllDecl
#define DllDecl  __declspec( dllimport )
#endif

class CCOMERR : public CBaseErr
{
	private:
		char m_szErrorText[64];

	public:
		// use this interface for genuine COM errors
		CCOMERR( HRESULT hr )
		{
			m_hr = hr;
			m_iErrorType = 0;
			m_iError = 0;
		}

		// use this interface to impersonate a non-COM error type
		CCOMERR( int iErrorType, int iError )
		{
			m_iErrorType = iErrorType;
			m_iError = iError;
			m_hr = S_OK;
		}
		int		m_hr;
		int		m_iErrorType;
		int		m_iError;

		// A CCOMERR class can impersonate another class, which happens if
the error
		// was not actually a COM Services error, but was simply transmitted
back via COM.
		int ErrorType()
		{
			if (m_iErrorType == 0)
				return ERR_TYPE_COM;
			else
				return m_iErrorType;
		}

		int ErrorNum() {return m_hr;}

		char *ErrorText()
		{
			if (m_hr == S_OK)
				sprintf( m_szErrorText, "Error: Class %d, error #
%d", m_iErrorType, m_iError );
			else
				sprintf( m_szErrorText, "Error: COM HRESULT %x",
m_hr );
			return m_szErrorText;
		}
};

class DllDecl CTPCC_COM : public CTPCC_BASE
{
	private:
		BOOL m_bSinglePool;

		// COM Interface pointers
		ITPCC*			m_pNewOrder;
		ITPCC*			m_pPayment;
		ITPCC*			m_pStockLevel;
		ITPCC*			m_pOrderStatus;

		struct COM_DATA
		{
			int ErrorType;
			int error;
			union
			{
				NEW_ORDER_DATA		NewOrder;
				PAYMENT_DATA		Payment;
				DELIVERY_DATA		Delivery;
				STOCK_LEVEL_DATA	StockLevel;
				ORDER_STATUS_DATA	OrderStatus;
			} u;
		} *m_pTxn;

		VARIANT m_vTxn;
	public:
		CTPCC_COM(BOOL bSinglePool);
		~CTPCC_COM(void);

		inline PNEW_ORDER_DATA		BuffAddr_NewOrder()
	{ return &m_pTxn->u.NewOrder;	};
```

```
                inline PPAYMENT_DATA                    BuffAddr_Payment()
        { return &m_pTxn->u.Payment;     };
                inline PDELIVERY_DATA                   BuffAddr_Delivery()
        { return &m_pTxn->u.Delivery;    };
                inline PSTOCK_LEVEL_DATA      BuffAddr_StockLevel()         { return
&m_pTxn->u.StockLevel;  };
                inline PORDER_STATUS_DATA     BuffAddr_OrderStatus()        { return
&m_pTxn->u.OrderStatus; };

                void NewOrder                 ();
                void Payment                  ();
                void StockLevel               ();
                void OrderStatus    ();
                void Delivery                 () { throw new CCOMERR(E_NOTIMPL); }
// not supported
};


inline void ReleaseInterface(IUnknown *pUnk)
{
        if (pUnk)
        {
                pUnk->Release();
                pUnk = NULL;
        }
}


// wrapper routine for class constructor
extern "C" __declspec(dllexport) CTPCC_COM* CTPCC_COM_new(BOOL);

typedef CTPCC_COM* (TYPE_CTPCC_COM)(BOOL);
```

tpcc_com_all/src/methods.h

```
/*      FILE:               METHODS.H
 *                                  Microsoft TPC-C Kit Ver. 4.20.000
 *                                  Copyright Microsoft, 1999
 *             All Rights Reserved
 *
 *                                  not yet audited
 *
 *      PURPOSE:  Header file for COM components.
 *
 *  Change history:
 *                4.20.000 - first version
 */


enum COMPONENT_ERROR
{
        ERR_MISSING_REGISTRY_ENTRIES = 1,
        ERR_LOADDLL_FAILED,
        ERR_GETPROCADDR_FAILED,
        ERR_UNKNOWN_DB_PROTOCOL
};

class CCOMPONENT_ERR : public CBaseErr
{
        public:
                CCOMPONENT_ERR(COMPONENT_ERROR Err)
                {
                        m_Error = Err;
                        m_szTextDetail = NULL;
                        m_SystemErr = 0;
                        m_szErrorText = NULL;
                };

                CCOMPONENT_ERR(COMPONENT_ERROR Err, char *szTextDetail, DWORD
dwSystemErr)
                {
                        m_Error = Err;
                        m_szTextDetail = new char[strlen(szTextDetail)+1];
                        strcpy( m_szTextDetail, szTextDetail );
                        m_SystemErr = dwSystemErr;
                        m_szErrorText = NULL;
                };

                ~CCOMPONENT_ERR()
                {
                        if (m_szTextDetail != NULL)
                                delete [] m_szTextDetail;
                        if (m_szErrorText != NULL)
                                delete [] m_szErrorText;
                };

                COMPONENT_ERROR     m_Error;
                char                        *m_szTextDetail;
                char                        *m_szErrorText;
                DWORD                       m_SystemErr;

                int ErrorType() {return ERR_TYPE_COMPONENT;};
                int ErrorNum() {return m_Error;};
                char *ErrorText();
};


static void WriteMessageToEventLog(LPTSTR lpszMsg);


////////////////////////////////////////////////////////////////////////////
// CTPCC_Common
class CTPCC_Common :
        public ITPCC,
        public IObjectControl,
        public IObjectConstruct,
        public CComObjectRootEx<CComSingleThreadModel>
{
public:
BEGIN_COM_MAP(CTPCC_Common)
        COM_INTERFACE_ENTRY(ITPCC)
        COM_INTERFACE_ENTRY(IObjectControl)
        COM_INTERFACE_ENTRY(IObjectConstruct)
END_COM_MAP()

        CTPCC_Common();
        ~CTPCC_Common();

// ITPCC
public:
        HRESULT __stdcall NewOrder(             VARIANT txn_in, VARIANT* txn_out);
        HRESULT __stdcall Payment(              VARIANT txn_in, VARIANT* txn_out);
```

```
        HRESULT __stdcall Delivery(             VARIANT txn_in, VARIANT* txn_out)
{return E_NOTIMPL;}
        HRESULT __stdcall StockLevel( VARIANT txn_in, VARIANT* txn_out);
        HRESULT __stdcall OrderStatus(          VARIANT txn_in, VARIANT* txn_out);

        HRESULT __stdcall CallSetComplete();

// IObjectControl
        STDMETHODIMP_(BOOL) CanBePooled() { return m_bCanBePooled; }
        STDMETHODIMP Activate() { return S_OK; }          // we don't support COM
Services transactions (no enlistment)
        STDMETHODIMP_(void) Deactivate() { /* nothing to do */ }

// IObjectConstruct
        STDMETHODIMP Construct(IDispatch * pUnk);

        // helper methods
private:
        BOOL                m_bCanBePooled;
        CTPCC_BASE          *m_pTxn;

        struct COM_DATA
        {
                int retval;
                int error;
                union
                {
                        NEW_ORDER_DATA              NewOrder;
                        PAYMENT_DATA                Payment;
                        DELIVERY_DATA               Delivery;
                        STOCK_LEVEL_DATA    StockLevel;
                        ORDER_STATUS_DATA   OrderStatus;
                } u;
        };

};

/////////////////////////////////////////////////////////////////////////////
// CTPCC
class CTPCC :
        public CTPCC_Common,
        public CComCoClass<CTPCC, &CLSID_TPCC>
{
public:
DECLARE_REGISTRY_RESOURCEID(IDR_TPCC)

BEGIN_COM_MAP(CTPCC)
        COM_INTERFACE_ENTRY2(IUnknown, CComObjectRootEx)
        COM_INTERFACE_ENTRY_CHAIN(CTPCC_Common)
END_COM_MAP()

};


/////////////////////////////////////////////////////////////////////////////
// CNewOrder
class CNewOrder :
        public CTPCC_Common,
        public CComCoClass<CNewOrder, &CLSID_NewOrder>
{
public:
DECLARE_REGISTRY_RESOURCEID(IDR_NEWORDER)

BEGIN_COM_MAP(CNewOrder)
        COM_INTERFACE_ENTRY2(IUnknown, CComObjectRootEx)
        COM_INTERFACE_ENTRY_CHAIN(CTPCC_Common)
END_COM_MAP()

// ITPCC
public:
//      HRESULT __stdcall NewOrder(             VARIANT txn_in, VARIANT* txn_out)
{return E_NOTIMPL;}
        HRESULT __stdcall Payment(              VARIANT txn_in, VARIANT* txn_out)
{return E_NOTIMPL;}
        HRESULT __stdcall StockLevel( VARIANT txn_in, VARIANT* txn_out) {return
E_NOTIMPL;}
        HRESULT __stdcall OrderStatus(          VARIANT txn_in, VARIANT* txn_out)
{return E_NOTIMPL;}
};


        /////////////////////////////////////////////////////////////////////////////
// COrderStatus
class COrderStatus :
        public CTPCC_Common,
        public CComCoClass<COrderStatus, &CLSID_OrderStatus>
{
public:
DECLARE_REGISTRY_RESOURCEID(IDR_ORDERSTATUS)

BEGIN_COM_MAP(COrderStatus)
        COM_INTERFACE_ENTRY2(IUnknown, CComObjectRootEx)
        COM_INTERFACE_ENTRY_CHAIN(CTPCC_Common)
END_COM_MAP()

// ITPCC
public:
        HRESULT __stdcall NewOrder(             VARIANT txn_in, VARIANT* txn_out)
{return E_NOTIMPL;}
        HRESULT __stdcall Payment(              VARIANT txn_in, VARIANT* txn_out)
{return E_NOTIMPL;}
        HRESULT __stdcall StockLevel( VARIANT txn_in, VARIANT* txn_out) {return
E_NOTIMPL;}
//      HRESULT __stdcall OrderStatus(          VARIANT txn_in, VARIANT* txn_out)
{return E_NOTIMPL;}
};


/////////////////////////////////////////////////////////////////////////////
// CPayment
class CPayment :
        public CTPCC_Common,
        public CComCoClass<CPayment, &CLSID_Payment>
{
public:
DECLARE_REGISTRY_RESOURCEID(IDR_PAYMENT)

BEGIN_COM_MAP(CPayment)
        COM_INTERFACE_ENTRY2(IUnknown, CComObjectRootEx)
        COM_INTERFACE_ENTRY_CHAIN(CTPCC_Common)
END_COM_MAP()

// ITPCC
public:
        HRESULT __stdcall NewOrder(             VARIANT txn_in, VARIANT* txn_out)
{return E_NOTIMPL;}
```

```
//        HRESULT __stdcall Payment(              VARIANT txn_in, VARIANT* txn_out)
{return E_NOTIMPL;}
          HRESULT __stdcall StockLevel( VARIANT txn_in, VARIANT* txn_out) {return
E_NOTIMPL;}
          HRESULT __stdcall OrderStatus(          VARIANT txn_in, VARIANT* txn_out)
{return E_NOTIMPL;}
};


////////////////////////////////////////////////////////////////////////////
// CStockLevel
class CStockLevel :
          public CTPCC_Common,
          public CComCoClass<CStockLevel, &CLSID_StockLevel>
{
public:
DECLARE_REGISTRY_RESOURCEID(IDR_STOCKLEVEL)

BEGIN_COM_MAP(CStockLevel)
          COM_INTERFACE_ENTRY2(IUnknown, CComObjectRootEx)
          COM_INTERFACE_ENTRY_CHAIN(CTPCC_Common)
END_COM_MAP()

// ITPCC
public:
          HRESULT __stdcall NewOrder(             VARIANT txn_in, VARIANT* txn_out)
{return E_NOTIMPL;}
          HRESULT __stdcall Payment(              VARIANT txn_in, VARIANT* txn_out)
{return E_NOTIMPL;}
//        HRESULT __stdcall StockLevel( VARIANT txn_in, VARIANT* txn_out) {return
E_NOTIMPL;}
          HRESULT __stdcall OrderStatus(          VARIANT txn_in, VARIANT* txn_out)
{return E_NOTIMPL;}
};
```

tpcc_com_all/src/resource.h

```
//{{NO_DEPENDENCIES}}
// Microsoft Developer Studio generated include file.
// Used by tpcc_com_all.rc
//
#define IDS_PROJNAME                    100
#define IDR_TPCC                        101
#define IDR_NEWORDER                    102
#define IDR_ORDERSTATUS                 103
#define IDR_PAYMENT                     104
#define IDR_STOCKLEVEL                  105

// Next default values for new objects
//
#ifdef APSTUDIO_INVOKED
#ifndef APSTUDIO_READONLY_SYMBOLS
#define _APS_NEXT_RESOURCE_VALUE        202
#define _APS_NEXT_COMMAND_VALUE         32768
#define _APS_NEXT_CONTROL_VALUE         201
#define _APS_NEXT_SYMED_VALUE           106
#endif
#endif
```

tpcc_com_all/src/tpcc_com_all.cpp

```
/*        FILE:               TPCC_COM_ALL.CPP
 *                                      Microsoft TPC-C Kit Ver. 4.20.000
 *                                      Copyright Microsoft, 1999
 *              All Rights Reserved
 *
 *                                      Version 4.10.000 audited by Richard Gimarc,
Performance Metrics, 3/17/99
 *
 *        PURPOSE:  Implementation for TPC-C Tuxedo class.
 *        Contact:  Charles Levine (clevine@microsoft.com)
 *
 *  Change history:
 *                  4.20.000 - updated rev number to match kit
 */

#define STRICT
#define _WIN32_WINNT 0x0400
#define _ATL_APARTMENT_THREADED

#include <stdio.h>
#include <atlbase.h>
//You may derive a class from CComModule and use it if you want to override
//something, but do not change the name of _Module
extern CComModule _Module;

#include <atlcom.h>
#include <initguid.h>
#include <transact.h>
#include <atlimpl.cpp>
#include <comsvcs.h>

#include <sqltypes.h>
#include <sql.h>
#include <sqlext.h>

#include "tpcc_com_ps.h"
#include "..\..\common\src\trans.h"                                             //tpckit
transaction header contains definations of structures specific to TPC-C
#include "..\..\common\src\txn_base.h"
#include "..\..\common\src\error.h"
#include "..\..\common\src\ReadRegistry.h"
#include "..\..\db_dblib_dll\src\tpcc_dblib.h"              // DBLIB implementation of
TPC-C txns
#include "..\..\db_odbc_dll\src\tpcc_odbc.h"                // ODBC implementation of
TPC-C txns

#include "resource.h"
#include "tpcc_com_all.h"
#include "tpcc_com_all_i.c"
#include "Methods.h"
#include "..\..\tpcc_com_ps\src\tpcc_com_ps_i.c"
#include "..\..\common\src\ReadRegistry.cpp"


CComModule _Module;
```

```
BEGIN_OBJECT_MAP(ObjectMap)
          OBJECT_ENTRY(CLSID_TPCC, CTPCC)
          OBJECT_ENTRY(CLSID_NewOrder, CNewOrder)
          OBJECT_ENTRY(CLSID_OrderStatus, COrderStatus)
          OBJECT_ENTRY(CLSID_Payment, CPayment)
          OBJECT_ENTRY(CLSID_StockLevel, CStockLevel)
END_OBJECT_MAP()


// configuration settings from registry
TPCCREGISTRYDATA    Reg;
char                                szMyComputerName[MAX_COMPUTERNAME_LENGTH+1];

static  HINSTANCE hLibInstanceDb = NULL;

TYPE_CTPCC_DBLIB    *pCTPCC_DBLIB_new;
TYPE_CTPCC_ODBC               *pCTPCC_ODBC_new;


////////////////////////////////////////////////////////////////////////////
// DLL Entry Point

extern "C"
BOOL WINAPI DllMain(HINSTANCE hInstance, DWORD dwReason, LPVOID /*lpReserved*/)
{
          char szDllName[128];

          try
          {
                    if (dwReason == DLL_PROCESS_ATTACH)
                    {
                              _Module.Init(ObjectMap, hInstance);
                              DisableThreadLibraryCalls(hInstance);

                              DWORD dwSize = MAX_COMPUTERNAME_LENGTH+1;
                              GetComputerName(szMyComputerName, &dwSize);
                              szMyComputerName[dwSize] = 0;

                              if ( ReadTPCCRegistrySettings( &Reg ) )
                                        throw new CCOMPONENT_ERR(
ERR_MISSING_REGISTRY_ENTRIES );

                              if (Reg.eDB_Protocol == DBLIB)
                              {
                                        strcpy( szDllName, Reg.szPath );
                                        strcat( szDllName, "tpcc_dblib.dll");
                                        hLibInstanceDb = LoadLibrary( szDllName );
                                        if (hLibInstanceDb == NULL)
                                                  throw new CCOMPONENT_ERR(
ERR_LOADDLL_FAILED, szDllName, GetLastError() );

                                        // get function pointer to wrapper for class
constructor
                                        pCTPCC_DBLIB_new = (TYPE_CTPCC_DBLIB*)
GetProcAddress(hLibInstanceDb,"CTPCC_DBLIB_new");
                                        if (pCTPCC_DBLIB_new == NULL)
                                                  throw new CCOMPONENT_ERR(
ERR_GETPROCADDR_FAILED, szDllName, GetLastError() );
                              }
                              else if (Reg.eDB_Protocol == ODBC)
                              {
                                        strcpy( szDllName, Reg.szPath );
                                        strcat( szDllName, "tpcc_odbc.dll");
                                        hLibInstanceDb = LoadLibrary( szDllName );
                                        if (hLibInstanceDb == NULL)
                                                  throw new CCOMPONENT_ERR(
ERR_LOADDLL_FAILED, szDllName, GetLastError() );

                                        // get function pointer to wrapper for class
constructor
                                        pCTPCC_ODBC_new = (TYPE_CTPCC_ODBC*)
GetProcAddress(hLibInstanceDb,"CTPCC_ODBC_new");
                                        if (pCTPCC_ODBC_new == NULL)
                                                  throw new CCOMPONENT_ERR(
ERR_GETPROCADDR_FAILED, szDllName, GetLastError() );
                              }
                              else
                                        throw new CCOMPONENT_ERR( ERR_UNKNOWN_DB_PROTOCOL
);
                    }
                    else if (dwReason == DLL_PROCESS_DETACH)
                              _Module.Term();

          }
          catch (CBaseErr *e)
          {
                    WriteMessageToEventLog(e->ErrorText());
                    delete e;
                    return FALSE;
          }
          catch (...)
          {
                    WriteMessageToEventLog(TEXT("Unhandled exception in object
DllMain"));
                    return FALSE;
          }

          return TRUE;        // OK
}

////////////////////////////////////////////////////////////////////////////
// Used to determine whether the DLL can be unloaded by OLE

STDAPI DllCanUnloadNow(void)
{
          return (_Module.GetLockCount()==0) ? S_OK : S_FALSE;
}

////////////////////////////////////////////////////////////////////////////
// Returns a class factory to create an object of the requested type

STDAPI DllGetClassObject(REFCLSID rclsid, REFIID riid, LPVOID* ppv)
{
          return _Module.GetClassObject(rclsid, riid, ppv);
}

////////////////////////////////////////////////////////////////////////////
// DllRegisterServer - Adds entries to the system registry

STDAPI DllRegisterServer(void)
{
          // registers object, typelib and all interfaces in typelib
          return _Module.RegisterServer(TRUE);
}

////////////////////////////////////////////////////////////////////////////
```

```
// DllUnregisterServer - Removes entries from the system registry

STDAPI DllUnregisterServer(void)
{
          _Module.UnregisterServer();
          return S_OK;
}


static void WriteMessageToEventLog(LPTSTR lpszMsg)
{
    TCHAR   szMsg[256];
    HANDLE  hEventSource;
    LPTSTR  lpszStrings[2];

    // Use event logging to log the error.
    //
    hEventSource = RegisterEventSource(NULL, TEXT("tpcc_com_all.dll"));

    _stprintf(szMsg, TEXT("Error in COM+ TPC-C Component: "));
    lpszStrings[0] = szMsg;
    lpszStrings[1] = lpszMsg;

    if (hEventSource != NULL)
        {
        ReportEvent(hEventSource, // handle of event source
            EVENTLOG_ERROR_TYPE,  // event type
            0,                    // event category
            0,                    // event ID
            NULL,                 // current user's SID
            2,                    // strings in lpszStrings
            0,                    // no bytes of raw data
            (LPCTSTR *)lpszStrings,    // array of error strings
            NULL);                // no raw data

        (VOID) DeregisterEventSource(hEventSource);
    }
}

inline void ReleaseInterface(IUnknown *pUnk)
{
          if (pUnk)
          {
                    pUnk->Release();
                    pUnk = NULL;
          }
}

/* FUNCTION: CCOMPONENT_ERR::ErrorText
 *
 */

char* CCOMPONENT_ERR::ErrorText(void)
{
          static SERRORMSG errorMsgs[] =
          {
                    { ERR_MISSING_REGISTRY_ENTRIES,         "Required entries missing
from registry."                                   },
                    { ERR_LOADDLL_FAILED,                             "Load of DLL
failed.  DLL="
          },
                    { ERR_GETPROCADDR_FAILED,               "Could not map proc in DLL.
GetProcAddr error.  DLL="     },
                    { ERR_UNKNOWN_DB_PROTOCOL,              "Unknown database protocol
specified in registry."                 },
                    { 0,
          ""                                                                  }
          };

          char szTmp[256];
          int i = 0;
          while (TRUE)
          {
                    if (errorMsgs[i].szMsg[0] == 0)
                    {
                              strcpy( szTmp, "Unknown error number." );
                              break;
                    }
                    if (m_Error == errorMsgs[i].iError)
                    {
                              strcpy( szTmp, errorMsgs[i].szMsg );
                              break;
                    }
                    i++;
          }

          if (m_szTextDetail)
                    strcat( szTmp, m_szTextDetail );
          if (m_SystemErr)
                    wsprintf( szTmp+strlen(szTmp), "  Error=%d", m_SystemErr );

          m_szErrorText = new char[strlen(szTmp)+1];
          strcpy( m_szErrorText, szTmp );
          return m_szErrorText;
}


CTPCC_Common::CTPCC_Common()
{
          m_pTxn = NULL;
          m_bCanBePooled = TRUE;
}

CTPCC_Common::~CTPCC_Common()
{
          if (m_pTxn)
                    delete m_pTxn;
}

HRESULT CTPCC_Common::CallSetComplete()
{
          IObjectContext* pObjectContext = NULL;

          // get our object context
          HRESULT hr = CoGetObjectContext( IID_IObjectContext, (void **)&pObjectContext
);
          pObjectContext->SetComplete();
          ReleaseInterface(pObjectContext);
          return hr;
}

//
//        called by the ctor activator
//
STDMETHODIMP CTPCC_Common::Construct(IDispatch * pUnk)
```

```
{
          // Code to access construction string, if needed later...
          //        if (!pUnk)
          //                  return E_UNEXPECTED;
          //        IObjectConstructString * pString = NULL;
          //        HRESULT hr = pUnk->QueryInterface(IID_IObjectConstructString, (void
**)&pString);
          //        pString->Release();

          try
          {
                    if (Reg.eDB_Protocol == ODBC)
                              m_pTxn = pCTPCC_ODBC_new( Reg.szDbServer, Reg.szDbUser,
Reg.szDbPassword, szMyComputerName, Reg.szDbName );
                    else if (Reg.eDB_Protocol == DBLIB)
                              m_pTxn = pCTPCC_DBLIB_new( Reg.szDbServer, Reg.szDbUser,
Reg.szDbPassword, szMyComputerName, Reg.szDbName );
          }
          catch (CBaseErr *e)
          {
                    WriteMessageToEventLog(e->ErrorText());
                    delete e;
                    return E_FAIL;
          }
          catch (...)
          {
                    WriteMessageToEventLog(TEXT("Unhandled exception in object
::Construct"));
                    return E_FAIL;
          }

          return S_OK;
}

HRESULT CTPCC_Common::NewOrder(VARIANT txn_in, VARIANT* txn_out)
{
          PNEW_ORDER_DATA     pNewOrder;
          COM_DATA            *pData;
          try
          {
                    pData = (COM_DATA*)txn_in.parray->pvData;
                    pNewOrder = m_pTxn->BuffAddr_NewOrder();

                    memcpy(pNewOrder, &pData->u.NewOrder, sizeof(NEW_ORDER_DATA));

                    m_pTxn->NewOrder();           // do the actual txn

                    VariantInit(txn_out);
                    txn_out->vt = VT_SAFEARRAY;
                    txn_out->parray = SafeArrayCreateVector(VT_UI1,
                                                                        txn_in.parray-
>rgsabound->cElements,
                                                                        txn_in.parray-
>rgsabound->cElements);
                    pData = (COM_DATA*) txn_out->parray->pvData;

                    memcpy( &pData->u.NewOrder, pNewOrder, sizeof(NEW_ORDER_DATA));

                    pData->retval = ERR_SUCCESS;
                    pData->error = 0;
                    return S_OK;
          }
          catch (CBaseErr *e)
          {
                    // check for lost database connection; if yes, component is toast
                    if ( ((e->ErrorType() == ERR_TYPE_DBLIB) && (e->ErrorNum() == 10005))
||
                              ((e->ErrorType() == ERR_TYPE_ODBC) && (e->ErrorNum() ==
10054)) )
                              m_bCanBePooled = FALSE;

                    pData->retval = e->ErrorType();
                    pData->error = e->ErrorNum();
                    delete e;
                    return E_FAIL;
          }
          catch (...)
          {
                    WriteMessageToEventLog(TEXT("Unhandled exception."));
                    pData->retval = ERR_TYPE_LOGIC;
                    pData->error = 0;
                    m_bCanBePooled = FALSE;
                    return E_FAIL;
          }
}

HRESULT CTPCC_Common::Payment(VARIANT txn_in, VARIANT* txn_out)
{
          PPAYMENT_DATA       pPayment;
          COM_DATA            *pData;
          try
          {
                    pData = (COM_DATA*)txn_in.parray->pvData;
                    pPayment = m_pTxn->BuffAddr_Payment();

                    memcpy(pPayment, &pData->u.Payment, sizeof(PAYMENT_DATA));

                    m_pTxn->Payment();            // do the actual txn

                    VariantInit(txn_out);
                    txn_out->vt = VT_SAFEARRAY;
                    txn_out->parray = SafeArrayCreateVector( VT_UI1,
                                                                        txn_in.parray-
>rgsabound->cElements,
                                                                        txn_in.parray-
>rgsabound->cElements);
                    pData = (COM_DATA*) txn_out->parray->pvData;

                    memcpy( &pData->u.Payment, pPayment, sizeof(PAYMENT_DATA));

                    pData->retval = ERR_SUCCESS;
                    pData->error = 0;
                    return S_OK;
          }
          catch (CBaseErr *e)
          {
                    // check for lost database connection; if yes, component is toast
                    if ( ((e->ErrorType() == ERR_TYPE_DBLIB) && (e->ErrorNum() == 10005))
||
                              ((e->ErrorType() == ERR_TYPE_ODBC) && (e->ErrorNum() ==
10054)) )
                              m_bCanBePooled = FALSE;

                    pData->retval = e->ErrorType();
                    pData->error = e->ErrorNum();
                    delete e;
```

```
                return E_FAIL;
        }
        catch (...)
        {
                WriteMessageToEventLog(TEXT("Unhandled exception."));
                pData->retval = ERR_TYPE_LOGIC;
                pData->error = 0;
                m_bCanBePooled = FALSE;
                return E_FAIL;
        }
}

HRESULT CTPCC_Common::StockLevel(VARIANT txn_in, VARIANT* txn_out)
{
        PSTOCK_LEVEL_DATA   pStockLevel;
        COM_DATA                    *pData;

        try
        {
                pData = (COM_DATA*)txn_in.parray->pvData;
                pStockLevel = m_pTxn->BuffAddr_StockLevel();

                memcpy(pStockLevel, &pData->u.StockLevel, sizeof(STOCK_LEVEL_DATA));

                m_pTxn->StockLevel();

                VariantInit(txn_out);
                txn_out->vt = VT_SAFEARRAY;
                txn_out->parray = SafeArrayCreateVector( VT_UI1,
                                                                txn_in.parray-
>rgsabound->cElements,
                                                                txn_in.parray-
>rgsabound->cElements);
                pData = (COM_DATA*)txn_out->parray->pvData;

                memcpy( &pData->u.StockLevel, pStockLevel, sizeof(STOCK_LEVEL_DATA));

                pData->retval = ERR_SUCCESS;
                pData->error = 0;
                return S_OK;
        }
        catch (CBaseErr *e)
        {
                // check for lost database connection; if yes, component is toast
                if ( ((e->ErrorType() == ERR_TYPE_DBLIB) && (e->ErrorNum() == 10005))
||
                           ((e->ErrorType() == ERR_TYPE_ODBC) && (e->ErrorNum() ==
10054)) )
                          m_bCanBePooled = FALSE;

                pData->retval = e->ErrorType();
                pData->error = e->ErrorNum();
                delete e;
                return E_FAIL;
        }
        catch (...)
        {
                WriteMessageToEventLog(TEXT("Unhandled exception."));
                pData->retval = ERR_TYPE_LOGIC;
                pData->error = 0;
                m_bCanBePooled = FALSE;
                return E_FAIL;
        }
}

HRESULT CTPCC_Common::OrderStatus(VARIANT txn_in, VARIANT* txn_out)
{
        PORDER_STATUS_DATA  pOrderStatus;
        COM_DATA                    *pData;
        try
        {
                pData = (COM_DATA*)txn_in.parray->pvData;
                pOrderStatus = m_pTxn->BuffAddr_OrderStatus();

                memcpy(pOrderStatus, &pData->u.OrderStatus,
sizeof(ORDER_STATUS_DATA));

                m_pTxn->OrderStatus();

                VariantInit(txn_out);
                txn_out->vt = VT_SAFEARRAY;
                txn_out->parray = SafeArrayCreateVector( VT_UI1,
                                                                txn_in.parray-
>rgsabound->cElements,
                                                                txn_in.parray-
>rgsabound->cElements);
                pData = (COM_DATA*)txn_out->parray->pvData;

                memcpy( &pData->u.OrderStatus, pOrderStatus,
sizeof(ORDER_STATUS_DATA));

                pData->retval = ERR_SUCCESS;
                pData->error = 0;
                return S_OK;
        }
        catch (CBaseErr *e)
        {
                // check for lost database connection; if yes, component is toast
                if ( ((e->ErrorType() == ERR_TYPE_DBLIB) && (e->ErrorNum() == 10005))
||
                           ((e->ErrorType() == ERR_TYPE_ODBC) && (e->ErrorNum() ==
10054)) )
                          m_bCanBePooled = FALSE;

                pData->retval = e->ErrorType();
                pData->error = e->ErrorNum();
                delete e;
                return E_FAIL;
        }
        catch (...)
        {
                WriteMessageToEventLog(TEXT("Unhandled exception."));
                pData->retval = ERR_TYPE_LOGIC;
                pData->error = 0;
                m_bCanBePooled = FALSE;
                return E_FAIL;
        }
}
```

tpcc_com_all/src/tpcc_com_all.def

```
; tpcc_com_all.def : Declares the module parameters.

LIBRARY      "tpcc_com_all.dll"

EXPORTS
          DllCanUnloadNow     @1 PRIVATE
          DllGetClassObject   @2 PRIVATE
          DllRegisterServer   @3 PRIVATE
          DllUnregisterServer @4 PRIVATE
```

tpcc_com_all/src/tpcc_com_all.h

```
#pragma warning( disable: 4049 )  /* more than 64k source lines */

/* this ALWAYS GENERATED file contains the definitions for the interfaces */


 /* File created by MIDL compiler version 5.03.0280 */
/* at Sat Apr 08 16:40:18 2000
 */
/* Compiler settings for .\src\tpcc_com_all.idl:
    Oicf (OptLev=i2), W1, Zp8, env=Win32 (32b run), ms_ext, c_ext
    error checks: allocation ref bounds_check enum stub_data
    VC __declspec() decoration level:
         __declspec(uuid()), __declspec(selectany), __declspec(novtable)
         DECLSPEC_UUID(), MIDL_INTERFACE()
*/
//@@MIDL_FILE_HEADING(  )


/* verify that the <rpcndr.h> version is high enough to compile this file*/
#ifndef __REQUIRED_RPCNDR_H_VERSION__
#define __REQUIRED_RPCNDR_H_VERSION__ 440
#endif

#include "rpc.h"
#include "rpcndr.h"

#ifndef __tpcc_com_all_h__
#define __tpcc_com_all_h__

/* Forward Declarations */

#ifndef __TPCC_FWD_DEFINED__
#define __TPCC_FWD_DEFINED__

#ifdef __cplusplus
typedef class TPCC TPCC;
#else
typedef struct TPCC TPCC;
#endif /* __cplusplus */

#endif    /* __TPCC_FWD_DEFINED__ */


#ifndef __NewOrder_FWD_DEFINED__
#define __NewOrder_FWD_DEFINED__

#ifdef __cplusplus
typedef class NewOrder NewOrder;
#else
typedef struct NewOrder NewOrder;
#endif /* __cplusplus */

#endif    /* __NewOrder_FWD_DEFINED__ */


#ifndef __OrderStatus_FWD_DEFINED__
#define __OrderStatus_FWD_DEFINED__

#ifdef __cplusplus
typedef class OrderStatus OrderStatus;
#else
typedef struct OrderStatus OrderStatus;
#endif /* __cplusplus */

#endif    /* __OrderStatus_FWD_DEFINED__ */


#ifndef __Payment_FWD_DEFINED__
#define __Payment_FWD_DEFINED__

#ifdef __cplusplus
typedef class Payment Payment;
#else
typedef struct Payment Payment;
#endif /* __cplusplus */

#endif    /* __Payment_FWD_DEFINED__ */


#ifndef __StockLevel_FWD_DEFINED__
#define __StockLevel_FWD_DEFINED__

#ifdef __cplusplus
typedef class StockLevel StockLevel;
#else
typedef struct StockLevel StockLevel;
#endif /* __cplusplus */

#endif    /* __StockLevel_FWD_DEFINED__ */


/* header files for imported files */
#include "oaidl.h"
#include "ocidl.h"
#include "tpcc_com_ps.h"

#ifdef __cplusplus
extern "C"{
#endif

void __RPC_FAR * __RPC_USER MIDL_user_allocate(size_t);
void __RPC_USER MIDL_user_free( void __RPC_FAR * );

/* interface __MIDL_itf_tpcc_com_all_0000 */
/* [local] */
```

```
extern RPC_IF_HANDLE __MIDL_itf_tpcc_com_all_0000_v0_0_c_ifspec;
extern RPC_IF_HANDLE __MIDL_itf_tpcc_com_all_0000_v0_0_s_ifspec;


#ifndef __TPCCLib_LIBRARY_DEFINED__
#define __TPCCLib_LIBRARY_DEFINED__

/* library TPCCLib */
/* [helpstring][version][uuid] */


EXTERN_C const IID LIBID_TPCCLib;

EXTERN_C const CLSID CLSID_TPCC;

#ifdef __cplusplus

class DECLSPEC_UUID("122A3128-2520-11D3-BA71-00C04FBFE08B")
TPCC;
#endif

EXTERN_C const CLSID CLSID_NewOrder;

#ifdef __cplusplus

class DECLSPEC_UUID("975BAABF-84A7-11D2-BA47-00C04FBFE08B")
NewOrder;
#endif

EXTERN_C const CLSID CLSID_OrderStatus;

#ifdef __cplusplus

class DECLSPEC_UUID("266836AD-A50D-11D2-BA4E-00C04FBFE08B")
OrderStatus;
#endif

EXTERN_C const CLSID CLSID_Payment;

#ifdef __cplusplus

class DECLSPEC_UUID("CD02F7EF-A4FA-11D2-BA4E-00C04FBFE08B")
Payment;
#endif

EXTERN_C const CLSID CLSID_StockLevel;

#ifdef __cplusplus

class DECLSPEC_UUID("2668369E-A50D-11D2-BA4E-00C04FBFE08B")
StockLevel;
#endif
#endif /* __TPCCLib_LIBRARY_DEFINED__ */

/* Additional Prototypes for ALL interfaces */

/* end of Additional Prototypes */

#ifdef __cplusplus
}
#endif

#endif
```

tpcc_com_all/src/tpcc_com_all.idl

```
/*        FILE:               TPCC.IDL
 *                                      Microsoft TPC-C Kit Ver. 4.20.000
 *                                      Copyright Microsoft, 1999
 *             All Rights Reserved
 *
 *                                      not yet audited
 *
 *        PURPOSE:  IDL source for TPCC.dll.  This file is processed by the MIDL tool to
 *                                      produce the type library (TPCC.tlb) and
marshalling code.
 *
 *  Change history:
 *                  4.20.000 - first version
 */

interface TPCC;
interface NewOrder;
interface OrderStatus;
interface Payment;
interface StockLevel;


import "oaidl.idl";
import "ocidl.idl";
import "..\tpcc_com_ps\src\tpcc_com_ps.idl";

[
          uuid(122A3117-2520-11D3-BA71-00C04FBFE08B),
          version(1.0),
          helpstring("TPC-C 1.0 Type Library")
]
library TPCCLib
{
          importlib("stdole32.tlb");
          importlib("stdole2.tlb");

          [
                    uuid(122A3128-2520-11D3-BA71-00C04FBFE08B),
                    helpstring("All Txns Class")
          ]
          coclass TPCC
          {
                    [default] interface ITPCC;
          };


          [
                    uuid(975BAABF-84A7-11D2-BA47-00C04FBFE08B),
```

```
                helpstring("NewOrder Class")
        ]
        coclass NewOrder
        {
                [default] interface ITPCC;
        };


        [
                uuid(266836AD-A50D-11D2-BA4E-00C04FBFE08B),
                helpstring("OrderStatus Class")
        ]
        coclass OrderStatus
        {
                [default] interface ITPCC;
        };


        [
                uuid(CD02F7EF-A4FA-11D2-BA4E-00C04FBFE08B),
                helpstring("Payment Class")
        ]
        coclass Payment
        {
                [default] interface ITPCC;
        };


        [
                uuid(2668369E-A50D-11D2-BA4E-00C04FBFE08B),
                helpstring("StockLevel Class")
        ]
        coclass StockLevel
        {
                [default] interface ITPCC;
        };

};
```

tpcc_com_all/src/tpcc_com_all.rc

```
//Microsoft Developer Studio generated resource script.
//
#include "resource.h"

#define APSTUDIO_READONLY_SYMBOLS
/////////////////////////////////////////////////////////////////////////////
//
// Generated from the TEXTINCLUDE 2 resource.
//
#include "winres.h"

/////////////////////////////////////////////////////////////////////////////
#undef APSTUDIO_READONLY_SYMBOLS

/////////////////////////////////////////////////////////////////////////////
// English (U.S.) resources

#if !defined(AFX_RESOURCE_DLL) || defined(AFX_TARG_ENU)
#ifdef _WIN32
LANGUAGE LANG_ENGLISH, SUBLANG_ENGLISH_US
#pragma code_page(1252)
#endif //_WIN32

#ifdef APSTUDIO_INVOKED
/////////////////////////////////////////////////////////////////////////////
//
// TEXTINCLUDE
//

1 TEXTINCLUDE DISCARDABLE
BEGIN
    "resource.h\0"
END

2 TEXTINCLUDE DISCARDABLE
BEGIN
    "#include ""winres.h""\r\n"
    "\0"
END

3 TEXTINCLUDE DISCARDABLE
BEGIN
    "1 TYPELIB ""tpcc_com_all.tlb""\r\n"
    "\0"
END

#endif    // APSTUDIO_INVOKED


#ifndef _MAC
/////////////////////////////////////////////////////////////////////////////
//
// Version
//

VS_VERSION_INFO VERSIONINFO
 FILEVERSION 1,0,0,1
 PRODUCTVERSION 1,0,0,1
 FILEFLAGSMASK 0x3fL
#ifdef _DEBUG
 FILEFLAGS 0x1L
#else
 FILEFLAGS 0x0L
#endif
 FILEOS 0x4L
 FILETYPE 0x2L
 FILESUBTYPE 0x0L
BEGIN
    BLOCK "StringFileInfo"
    BEGIN
        BLOCK "040904B0"
        BEGIN
            VALUE "CompanyName", "\0"
            VALUE "FileDescription", "tpcc_com_all Module\0"
            VALUE "FileVersion", "1, 0, 0, 1\0"
            VALUE "InternalName", "TPCCNEWORDER\0"
            VALUE "LegalCopyright", "Copyright 1997\0"
            VALUE "OriginalFilename", "tpcc_com_all.DLL\0"
            VALUE "ProductName", "tpcc_com_all Module\0"
            VALUE "ProductVersion", "1, 0, 0, 1\0"
            VALUE "OLESelfRegister", "\0"
```

```
        END
    END
    BLOCK "VarFileInfo"
    BEGIN
        VALUE "Translation", 0x409, 1200
    END
END

#endif    // !_MAC


/////////////////////////////////////////////////////////////////////////////
//
// REGISTRY
//

IDR_TPCC                REGISTRY DISCARDABLE    "tpcc_com_all.rgs"
IDR_NEWORDER            REGISTRY DISCARDABLE    "tpcc_com_no.rgs"
IDR_ORDERSTATUS         REGISTRY DISCARDABLE    "tpcc_com_os.rgs"
IDR_PAYMENT             REGISTRY DISCARDABLE    "tpcc_com_pay.rgs"
IDR_STOCKLEVEL          REGISTRY DISCARDABLE    "tpcc_com_sl.rgs"

/////////////////////////////////////////////////////////////////////////////
//
// String Table
//

STRINGTABLE DISCARDABLE
BEGIN
    IDS_PROJNAME            "tpcc_com_all"
END

#endif    // English (U.S.) resources
/////////////////////////////////////////////////////////////////////////////



#ifndef APSTUDIO_INVOKED
/////////////////////////////////////////////////////////////////////////////
//
// Generated from the TEXTINCLUDE 3 resource.
//
1 TYPELIB "tpcc_com_all.tlb"

/////////////////////////////////////////////////////////////////////////////
#endif    // not APSTUDIO_INVOKED
```

tpcc_com_all/src/tpcc_com_all.rgs

```
HKCR
{
          TPCC.AllTxns.1 = s 'All Txns Class'
          {
                    CLSID = s '{122A3128-2520-11D3-BA71-00C04FBFE08B}'
          }
          TPCC.AllTxns = s 'TPCC Class'
          {
                    CurVer = s 'TPCC.AllTxns.1'
          }
          NoRemove CLSID
          {
                    ForceRemove {122A3128-2520-11D3-BA71-00C04FBFE08B} = s 'TPCC Class'
                    {
                              ProgID = s 'TPCC.AllTxns.1'
                              VersionIndependentProgID = s 'TPCC.AllTxns'
                              InprocServer32 = s '%MODULE%'
                              {
                                        val ThreadingModel = s 'Both'
                              }
                    }
          }
}
```

tpcc_com_all/src/tpcc_com_all_i.c

```
#pragma warning( disable: 4049 )  /* more than 64k source lines */

/* this ALWAYS GENERATED file contains the IIDs and CLSIDs */

/* link this file in with the server and any clients */


 /* File created by MIDL compiler version 5.03.0280 */
/* at Sat Apr 08 16:40:18 2000
 */
/* Compiler settings for .\src\tpcc_com_all.idl:
    Oicf (OptLev=i2), W1, Zp8, env=Win32 (32b run), ms_ext, c_ext
    error checks: allocation ref bounds_check enum stub_data
    VC __declspec() decoration level:
         __declspec(uuid()), __declspec(selectany), __declspec(novtable)
         DECLSPEC_UUID(), MIDL_INTERFACE()
*/
//@@MIDL_FILE_HEADING(  )

#if !defined(_M_IA64) && !defined(_M_AXP64)

#ifdef __cplusplus
extern "C"{
#endif


#include <rpc.h>
#include <rpcndr.h>

#ifdef _MIDL_USE_GUIDDEF_

#ifndef INITGUID
#define INITGUID
#include <guiddef.h>
#undef INITGUID
#else
#include <guiddef.h>
#endif
```

```
#define MIDL_DEFINE_GUID(type,name,l,w1,w2,b1,b2,b3,b4,b5,b6,b7,b8) \
        DEFINE_GUID(name,l,w1,w2,b1,b2,b3,b4,b5,b6,b7,b8)

#else // !_MIDL_USE_GUIDDEF_

#ifndef __IID_DEFINED__
#define __IID_DEFINED__

typedef struct _IID
{
    unsigned long x;
    unsigned short s1;
    unsigned short s2;
    unsigned char  c[8];
} IID;

#endif // __IID_DEFINED__

#ifndef CLSID_DEFINED
#define CLSID_DEFINED
typedef IID CLSID;
#endif // CLSID_DEFINED

#define MIDL_DEFINE_GUID(type,name,l,w1,w2,b1,b2,b3,b4,b5,b6,b7,b8) \
        const type name = {l,w1,w2,{b1,b2,b3,b4,b5,b6,b7,b8}}

#endif !_MIDL_USE_GUIDDEF_

MIDL_DEFINE_GUID(IID,
LIBID_TPCCLib,0x122A3117,0x2520,0x11D3,0xBA,0x71,0x00,0xC0,0x4F,0xBF,0xE0,0x8B);


MIDL_DEFINE_GUID(CLSID,
CLSID_TPCC,0x122A3128,0x2520,0x11D3,0xBA,0x71,0x00,0xC0,0x4F,0xBF,0xE0,0x8B);


MIDL_DEFINE_GUID(CLSID,
CLSID_NewOrder,0x975BAABF,0x84A7,0x11D2,0xBA,0x47,0x00,0xC0,0x4F,0xBF,0xE0,0x8B);


MIDL_DEFINE_GUID(CLSID,
CLSID_OrderStatus,0x266836AD,0xA50D,0x11D2,0xBA,0x4E,0x00,0xC0,0x4F,0xBF,0xE0,0x8B);


MIDL_DEFINE_GUID(CLSID,
CLSID_Payment,0xCD02F7EF,0xA4FA,0x11D2,0xBA,0x4E,0x00,0xC0,0x4F,0xBF,0xE0,0x8B);


MIDL_DEFINE_GUID(CLSID,
CLSID_StockLevel,0x2668369E,0xA50D,0x11D2,0xBA,0x4E,0x00,0xC0,0x4F,0xBF,0xE0,0x8B);

#undef MIDL_DEFINE_GUID

#ifdef __cplusplus
}
#endif



#endif /* !defined(_M_IA64) && !defined(_M_AXP64)*/
```

```
#pragma warning( disable: 4049 )  /* more than 64k source lines */

/* this ALWAYS GENERATED file contains the IIDs and CLSIDs */

/* link this file in with the server and any clients */


 /* File created by MIDL compiler version 5.03.0280 */
/* at Sat Apr 08 16:40:18 2000
 */
/* Compiler settings for .\src\tpcc_com_all.idl:
    Oicf (OptLev=i2), W1, Zp8, env=Win64 (32b run,appending), ms_ext, c_ext, robust
    error checks: allocation ref bounds_check enum stub_data
    VC __declspec() decoration level:
         __declspec(uuid()), __declspec(selectany), __declspec(novtable)
         DECLSPEC_UUID(), MIDL_INTERFACE()
*/
//@@MIDL_FILE_HEADING(  )

#if defined(_M_IA64) || defined(_M_AXP64)

#ifdef __cplusplus
extern "C"{
#endif


#include <rpc.h>
#include <rpcndr.h>

#ifdef _MIDL_USE_GUIDDEF_

#ifndef INITGUID
#define INITGUID
#include <guiddef.h>
#undef INITGUID
#else
#include <guiddef.h>
#endif

#define MIDL_DEFINE_GUID(type,name,l,w1,w2,b1,b2,b3,b4,b5,b6,b7,b8) \
        DEFINE_GUID(name,l,w1,w2,b1,b2,b3,b4,b5,b6,b7,b8)

#else // !_MIDL_USE_GUIDDEF_

#ifndef __IID_DEFINED__
#define __IID_DEFINED__

typedef struct _IID
{
    unsigned long x;
    unsigned short s1;
    unsigned short s2;
    unsigned char  c[8];
} IID;

#endif // __IID_DEFINED__

#ifndef CLSID_DEFINED
#define CLSID_DEFINED
typedef IID CLSID;
#endif // CLSID_DEFINED

#define MIDL_DEFINE_GUID(type,name,l,w1,w2,b1,b2,b3,b4,b5,b6,b7,b8) \
```

```
        const type name = {l,w1,w2,{b1,b2,b3,b4,b5,b6,b7,b8}}

#endif !_MIDL_USE_GUIDDEF_

MIDL_DEFINE_GUID(IID,
LIBID_TPCCLib,0x122A3117,0x2520,0x11D3,0xBA,0x71,0x00,0xC0,0x4F,0xBF,0xE0,0x8B);


MIDL_DEFINE_GUID(CLSID,
CLSID_TPCC,0x122A3128,0x2520,0x11D3,0xBA,0x71,0x00,0xC0,0x4F,0xBF,0xE0,0x8B);


MIDL_DEFINE_GUID(CLSID,
CLSID_NewOrder,0x975BAABF,0x84A7,0x11D2,0xBA,0x47,0x00,0xC0,0x4F,0xBF,0xE0,0x8B);


MIDL_DEFINE_GUID(CLSID,
CLSID_OrderStatus,0x266836AD,0xA50D,0x11D2,0xBA,0x4E,0x00,0xC0,0x4F,0xBF,0xE0,0x8B);


MIDL_DEFINE_GUID(CLSID,
CLSID_Payment,0xCD02F7EF,0xA4FA,0x11D2,0xBA,0x4E,0x00,0xC0,0x4F,0xBF,0xE0,0x8B);


MIDL_DEFINE_GUID(CLSID,
CLSID_StockLevel,0x2668369E,0xA50D,0x11D2,0xBA,0x4E,0x00,0xC0,0x4F,0xBF,0xE0,0x8B);

#undef MIDL_DEFINE_GUID

#ifdef __cplusplus
}
#endif



#endif /* defined(_M_IA64) || defined(_M_AXP64)*/
```

tpcc_com_all/src/tpcc_com_no.rgs

```
HKCR
{
          TPCC.NewOrder.1 = s 'NewOrder Class'
          {
                    CLSID = s '{975BAABF-84A7-11D2-BA47-00C04FBFE08B}'
          }
          TPCC.NewOrder = s 'NewOrder Class'
          {
                    CurVer = s 'TPCC.NewOrder.1'
          }
          NoRemove CLSID
          {
                    ForceRemove {975BAABF-84A7-11D2-BA47-00C04FBFE08B} = s 'NewOrder
Class'
                    {
                              ProgID = s 'TPCC.NewOrder.1'
                              VersionIndependentProgID = s 'TPCC.NewOrder'
                              InprocServer32 = s '%MODULE%'
                              {
                                        val ThreadingModel = s 'Both'
                              }
                    }
          }
}
```

tpcc_com_all/src/tpcc_com_os.rgs

```
HKCR
{
          TPCC.OrderStatus.1 = s 'OrderStatus Class'
          {
                    CLSID = s '{266836AD-A50D-11D2-BA4E-00C04FBFE08B}'
          }
          TPCC.OrderStatus = s 'OrderStatus Class'
          {
                    CurVer = s 'TPCC.OrderStatus.1'
          }
          NoRemove CLSID
          {
                    ForceRemove {266836AD-A50D-11D2-BA4E-00C04FBFE08B} = s 'OrderStatus
Class'
                    {
                              ProgID = s 'TPCC.OrderStatus.1'
                              VersionIndependentProgID = s 'TPCC.OrderStatus'
                              InprocServer32 = s '%MODULE%'
                              {
                                        val ThreadingModel = s 'Both'
                              }
                    }
          }
}
```

tpcc_com_all/src/tpcc_com_pay.rgs

```
HKCR
{
          TPCC.Payment.1 = s 'Payment Class'
          {
                    CLSID = s '{CD02F7EF-A4FA-11D2-BA4E-00C04FBFE08B}'
          }
          TPCC.Payment = s 'Payment Class'
          {
                    CurVer = s 'TPCC.Payment.1'
          }
          NoRemove CLSID
          {
                    ForceRemove {CD02F7EF-A4FA-11D2-BA4E-00C04FBFE08B} = s 'Payment
Class'
                    {
                              ProgID = s 'TPCC.Payment.1'
                              VersionIndependentProgID = s 'TPCC.Payment'
```

```
                            InprocServer32 = s '%MODULE%'
                            {
                                    val ThreadingModel = s 'Both'
                            }
                    }
            }
}
```

tpcc_com_all/src/tpcc_com_ps.h

```
#pragma warning( disable: 4049 )  /* more than 64k source lines */

/* this ALWAYS GENERATED file contains the definitions for the interfaces */


 /* File created by MIDL compiler version 5.03.0280 */
/* at Sat Apr 08 16:40:10 2000
 */
/* Compiler settings for .\src\tpcc_com_ps.idl:
    Oicf (OptLev=i2), W1, Zp8, env=Win32 (32b run), ms_ext, c_ext
    error checks: allocation ref bounds_check enum stub_data
    VC __declspec() decoration level:
         __declspec(uuid()), __declspec(selectany), __declspec(novtable)
         DECLSPEC_UUID(), MIDL_INTERFACE()
*/
//@@MIDL_FILE_HEADING(  )


/* verify that the <rpcndr.h> version is high enough to compile this file*/
#ifndef __REQUIRED_RPCNDR_H_VERSION__
#define __REQUIRED_RPCNDR_H_VERSION__ 440
#endif

#include "rpc.h"
#include "rpcndr.h"

#ifndef __RPCNDR_H_VERSION__
#error this stub requires an updated version of <rpcndr.h>
#endif // __RPCNDR_H_VERSION__

#ifndef COM_NO_WINDOWS_H
#include "windows.h"
#include "ole2.h"
#endif /*COM_NO_WINDOWS_H*/

#ifndef __tpcc_com_ps_h__
#define __tpcc_com_ps_h__

/* Forward Declarations */

#ifndef __ITPCC_FWD_DEFINED__
#define __ITPCC_FWD_DEFINED__
typedef interface ITPCC ITPCC;
#endif    /* __ITPCC_FWD_DEFINED__ */


/* header files for imported files */
#include "oaidl.h"
#include "ocidl.h"

#ifdef __cplusplus
extern "C"{
#endif

void __RPC_FAR * __RPC_USER MIDL_user_allocate(size_t);
void __RPC_USER MIDL_user_free( void __RPC_FAR * );

/* interface __MIDL_itf_tpcc_com_ps_0000 */
/* [local] */



extern RPC_IF_HANDLE __MIDL_itf_tpcc_com_ps_0000_v0_0_c_ifspec;
extern RPC_IF_HANDLE __MIDL_itf_tpcc_com_ps_0000_v0_0_s_ifspec;

#ifndef __ITPCC_INTERFACE_DEFINED__
#define __ITPCC_INTERFACE_DEFINED__

/* interface ITPCC */
/* [unique][helpstring][uuid][oleautomation][object] */


EXTERN_C const IID IID_ITPCC;

#if defined(__cplusplus) && !defined(CINTERFACE)

    MIDL_INTERFACE("FEEE6AA2-84B1-11d2-BA47-00C04FBFE08B")
    ITPCC : public IUnknown
    {
    public:
        virtual HRESULT __stdcall NewOrder(
            /* [in] */ VARIANT txn_in,
            /* [out] */ VARIANT __RPC_FAR *txn_out) = 0;

        virtual HRESULT __stdcall Payment(
            /* [in] */ VARIANT txn_in,
            /* [out] */ VARIANT __RPC_FAR *txn_out) = 0;

        virtual HRESULT __stdcall Delivery(
            /* [in] */ VARIANT txn_in,
            /* [out] */ VARIANT __RPC_FAR *txn_out) = 0;

        virtual HRESULT __stdcall StockLevel(
            /* [in] */ VARIANT txn_in,
            /* [out] */ VARIANT __RPC_FAR *txn_out) = 0;

        virtual HRESULT __stdcall OrderStatus(
            /* [in] */ VARIANT txn_in,
            /* [out] */ VARIANT __RPC_FAR *txn_out) = 0;

        virtual HRESULT __stdcall CallSetComplete( void) = 0;

    };

#else     /* C style interface */

    typedef struct ITPCCVtbl
    {
```

```
        BEGIN_INTERFACE

        HRESULT ( STDMETHODCALLTYPE __RPC_FAR *QueryInterface )(
            ITPCC __RPC_FAR * This,
            /* [in] */ REFIID riid,
            /* [iid_is][out] */ void __RPC_FAR *__RPC_FAR *ppvObject);

        ULONG ( STDMETHODCALLTYPE __RPC_FAR *AddRef )(
            ITPCC __RPC_FAR * This);

        ULONG ( STDMETHODCALLTYPE __RPC_FAR *Release )(
            ITPCC __RPC_FAR * This);

        HRESULT ( __stdcall __RPC_FAR *NewOrder )(
            ITPCC __RPC_FAR * This,
            /* [in] */ VARIANT txn_in,
            /* [out] */ VARIANT __RPC_FAR *txn_out);

        HRESULT ( __stdcall __RPC_FAR *Payment )(
            ITPCC __RPC_FAR * This,
            /* [in] */ VARIANT txn_in,
            /* [out] */ VARIANT __RPC_FAR *txn_out);

        HRESULT ( __stdcall __RPC_FAR *Delivery )(
            ITPCC __RPC_FAR * This,
            /* [in] */ VARIANT txn_in,
            /* [out] */ VARIANT __RPC_FAR *txn_out);

        HRESULT ( __stdcall __RPC_FAR *StockLevel )(
            ITPCC __RPC_FAR * This,
            /* [in] */ VARIANT txn_in,
            /* [out] */ VARIANT __RPC_FAR *txn_out);

        HRESULT ( __stdcall __RPC_FAR *OrderStatus )(
            ITPCC __RPC_FAR * This,
            /* [in] */ VARIANT txn_in,
            /* [out] */ VARIANT __RPC_FAR *txn_out);

        HRESULT ( __stdcall __RPC_FAR *CallSetComplete )(
            ITPCC __RPC_FAR * This);

        END_INTERFACE
    } ITPCCVtbl;

    interface ITPCC
    {
        CONST_VTBL struct ITPCCVtbl __RPC_FAR *lpVtbl;
    };


#ifdef COBJMACROS


#define ITPCC_QueryInterface(This,riid,ppvObject) \
    (This)->lpVtbl -> QueryInterface(This,riid,ppvObject)

#define ITPCC_AddRef(This)    \
    (This)->lpVtbl -> AddRef(This)

#define ITPCC_Release(This)   \
    (This)->lpVtbl -> Release(This)

#define ITPCC_NewOrder(This,txn_in,txn_out)       \
    (This)->lpVtbl -> NewOrder(This,txn_in,txn_out)

#define ITPCC_Payment(This,txn_in,txn_out)        \
    (This)->lpVtbl -> Payment(This,txn_in,txn_out)

#define ITPCC_Delivery(This,txn_in,txn_out)       \
    (This)->lpVtbl -> Delivery(This,txn_in,txn_out)

#define ITPCC_StockLevel(This,txn_in,txn_out)     \
    (This)->lpVtbl -> StockLevel(This,txn_in,txn_out)

#define ITPCC_OrderStatus(This,txn_in,txn_out)    \
    (This)->lpVtbl -> OrderStatus(This,txn_in,txn_out)

#define ITPCC_CallSetComplete(This)     \
    (This)->lpVtbl -> CallSetComplete(This)

#endif /* COBJMACROS */


#endif    /* C style interface */



HRESULT __stdcall ITPCC_NewOrder_Proxy(
    ITPCC __RPC_FAR * This,
    /* [in] */ VARIANT txn_in,
    /* [out] */ VARIANT __RPC_FAR *txn_out);


void __RPC_STUB ITPCC_NewOrder_Stub(
    IRpcStubBuffer *This,
    IRpcChannelBuffer *_pRpcChannelBuffer,
    PRPC_MESSAGE _pRpcMessage,
    DWORD *_pdwStubPhase);


HRESULT __stdcall ITPCC_Payment_Proxy(
    ITPCC __RPC_FAR * This,
    /* [in] */ VARIANT txn_in,
    /* [out] */ VARIANT __RPC_FAR *txn_out);


void __RPC_STUB ITPCC_Payment_Stub(
    IRpcStubBuffer *This,
    IRpcChannelBuffer *_pRpcChannelBuffer,
    PRPC_MESSAGE _pRpcMessage,
    DWORD *_pdwStubPhase);


HRESULT __stdcall ITPCC_Delivery_Proxy(
    ITPCC __RPC_FAR * This,
    /* [in] */ VARIANT txn_in,
    /* [out] */ VARIANT __RPC_FAR *txn_out);


void __RPC_STUB ITPCC_Delivery_Stub(
    IRpcStubBuffer *This,
    IRpcChannelBuffer *_pRpcChannelBuffer,
    PRPC_MESSAGE _pRpcMessage,
    DWORD *_pdwStubPhase);
```

```
HRESULT __stdcall ITPCC_StockLevel_Proxy(
    ITPCC __RPC_FAR * This,
    /* [in] */ VARIANT txn_in,
    /* [out] */ VARIANT __RPC_FAR *txn_out);


void __RPC_STUB ITPCC_StockLevel_Stub(
    IRpcStubBuffer *This,
    IRpcChannelBuffer *_pRpcChannelBuffer,
    PRPC_MESSAGE _pRpcMessage,
    DWORD *_pdwStubPhase);


HRESULT __stdcall ITPCC_OrderStatus_Proxy(
    ITPCC __RPC_FAR * This,
    /* [in] */ VARIANT txn_in,
    /* [out] */ VARIANT __RPC_FAR *txn_out);


void __RPC_STUB ITPCC_OrderStatus_Stub(
    IRpcStubBuffer *This,
    IRpcChannelBuffer *_pRpcChannelBuffer,
    PRPC_MESSAGE _pRpcMessage,
    DWORD *_pdwStubPhase);


HRESULT __stdcall ITPCC_CallSetComplete_Proxy(
    ITPCC __RPC_FAR * This);


void __RPC_STUB ITPCC_CallSetComplete_Stub(
    IRpcStubBuffer *This,
    IRpcChannelBuffer *_pRpcChannelBuffer,
    PRPC_MESSAGE _pRpcMessage,
    DWORD *_pdwStubPhase);



#endif    /* __ITPCC_INTERFACE_DEFINED__ */


/* Additional Prototypes for ALL interfaces */

unsigned long             __RPC_USER  VARIANT_UserSize(     unsigned long __RPC_FAR *,
unsigned long           , VARIANT __RPC_FAR * );
unsigned char __RPC_FAR * __RPC_USER  VARIANT_UserMarshal(  unsigned long __RPC_FAR *,
unsigned char __RPC_FAR *, VARIANT __RPC_FAR * );
unsigned char __RPC_FAR * __RPC_USER  VARIANT_UserUnmarshal(unsigned long __RPC_FAR *,
unsigned char __RPC_FAR *, VARIANT __RPC_FAR * );
void                      __RPC_USER  VARIANT_UserFree(     unsigned long __RPC_FAR *,
VARIANT __RPC_FAR * );

/* end of Additional Prototypes */

#ifdef __cplusplus
}
#endif

#endif
```

tpcc_com_all/src/tpcc_com_sl.rgs

```
HKCR
{
          TPCC.StockLevel.1 = s 'StockLevel Class'
          {
                    CLSID = s '{2668369E-A50D-11D2-BA4E-00C04FBFE08B}'
          }
          TPCC.StockLevel = s 'StockLevel Class'
          {
                    CurVer = s 'TPCC.StockLevel.1'
          }
          NoRemove CLSID
          {
                    ForceRemove {2668369E-A50D-11D2-BA4E-00C04FBFE08B} = s 'StockLevel
Class'
                    {
                              ProgID = s 'TPCC.StockLevel.1'
                              VersionIndependentProgID = s 'TPCC.StockLevel'
                              InprocServer32 = s '%MODULE%'
                              {
                                        val ThreadingModel = s 'Both'
                              }
                    }
          }
}
```

tpcc_com_ps/src/dlldata.c

```
/*********************************************************
   DllData file -- generated by MIDL compiler

        DO NOT ALTER THIS FILE

   This file is regenerated by MIDL on every IDL file compile.

   To completely reconstruct this file, delete it and rerun MIDL
   on all the IDL files in this DLL, specifying this file for the
   /dlldata command line option

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


#include <rpcproxy.h>

#ifdef __cplusplus
extern "C"   {
#endif

EXTERN_PROXY_FILE( tpcc_com_ps )
```

```
PROXYFILE_LIST_START
/* Start of list */
  REFERENCE_PROXY_FILE( tpcc_com_ps ),
/* End of list */
PROXYFILE_LIST_END


DLLDATA_ROUTINES( aProxyFileList, GET_DLL_CLSID )

#ifdef __cplusplus
}  /*extern "C" */
#endif

/* end of generated dlldata file */
```

tpcc_com_ps/src/tpcc_com_ps.def

```
LIBRARY      "tpcc_com_ps"

DESCRIPTION  'Proxy/Stub DLL'

EXPORTS
          DllGetClassObject       @1    PRIVATE
          DllCanUnloadNow         @2    PRIVATE
          GetProxyDllInfo         @3    PRIVATE
          DllRegisterServer             @4        PRIVATE
          DllUnregisterServer           @5        PRIVATE
```

tpcc_com_ps/src/tpcc_com_ps.h

```
#pragma warning( disable: 4049 )  /* more than 64k source lines */

/* this ALWAYS GENERATED file contains the definitions for the interfaces */


 /* File created by MIDL compiler version 5.03.0280 */
/* at Sat Apr 08 16:40:10 2000
 */
/* Compiler settings for .\src\tpcc_com_ps.idl:
    Oicf (OptLev=i2), W1, Zp8, env=Win32 (32b run), ms_ext, c_ext
    error checks: allocation ref bounds_check enum stub_data
    VC __declspec() decoration level:
         __declspec(uuid()), __declspec(selectany), __declspec(novtable)
         DECLSPEC_UUID(), MIDL_INTERFACE()
*/
//@@MIDL_FILE_HEADING(  )


/* verify that the <rpcndr.h> version is high enough to compile this file*/
#ifndef __REQUIRED_RPCNDR_H_VERSION__
#define __REQUIRED_RPCNDR_H_VERSION__ 440
#endif

#include "rpc.h"
#include "rpcndr.h"

#ifndef __RPCNDR_H_VERSION__
#error this stub requires an updated version of <rpcndr.h>
#endif // __RPCNDR_H_VERSION__

#ifndef COM_NO_WINDOWS_H
#include "windows.h"
#include "ole2.h"
#endif /*COM_NO_WINDOWS_H*/

#ifndef __tpcc_com_ps_h__
#define __tpcc_com_ps_h__

/* Forward Declarations */

#ifndef __ITPCC_FWD_DEFINED__
#define __ITPCC_FWD_DEFINED__
typedef interface ITPCC ITPCC;
#endif    /* __ITPCC_FWD_DEFINED__ */


/* header files for imported files */
#include "oaidl.h"
#include "ocidl.h"

#ifdef __cplusplus
extern "C"{
#endif

void __RPC_FAR * __RPC_USER MIDL_user_allocate(size_t);
void __RPC_USER MIDL_user_free( void __RPC_FAR * );

/* interface __MIDL_itf_tpcc_com_ps_0000 */
/* [local] */



extern RPC_IF_HANDLE __MIDL_itf_tpcc_com_ps_0000_v0_0_c_ifspec;
extern RPC_IF_HANDLE __MIDL_itf_tpcc_com_ps_0000_v0_0_s_ifspec;

#ifndef __ITPCC_INTERFACE_DEFINED__
#define __ITPCC_INTERFACE_DEFINED__

/* interface ITPCC */
/* [unique][helpstring][uuid][oleautomation][object] */


EXTERN_C const IID IID_ITPCC;

#if defined(__cplusplus) && !defined(CINTERFACE)

    MIDL_INTERFACE("FEEE6AA2-84B1-11d2-BA47-00C04FBFE08B")
    ITPCC : public IUnknown
    {
    public:
        virtual HRESULT __stdcall NewOrder(
            /* [in] */ VARIANT txn_in,
            /* [out] */ VARIANT __RPC_FAR *txn_out) = 0;
```

```
        virtual HRESULT __stdcall Payment(
            /* [in] */ VARIANT txn_in,
            /* [out] */ VARIANT __RPC_FAR *txn_out) = 0;

        virtual HRESULT __stdcall Delivery(
            /* [in] */ VARIANT txn_in,
            /* [out] */ VARIANT __RPC_FAR *txn_out) = 0;

        virtual HRESULT __stdcall StockLevel(
            /* [in] */ VARIANT txn_in,
            /* [out] */ VARIANT __RPC_FAR *txn_out) = 0;

        virtual HRESULT __stdcall OrderStatus(
            /* [in] */ VARIANT txn_in,
            /* [out] */ VARIANT __RPC_FAR *txn_out) = 0;

        virtual HRESULT __stdcall CallSetComplete( void) = 0;

    };

#else     /* C style interface */

    typedef struct ITPCCVtbl
    {
        BEGIN_INTERFACE

        HRESULT ( STDMETHODCALLTYPE __RPC_FAR *QueryInterface )(
            ITPCC __RPC_FAR * This,
            /* [in] */ REFIID riid,
            /* [iid_is][out] */ void __RPC_FAR *__RPC_FAR *ppvObject);

        ULONG ( STDMETHODCALLTYPE __RPC_FAR *AddRef )(
            ITPCC __RPC_FAR * This);

        ULONG ( STDMETHODCALLTYPE __RPC_FAR *Release )(
            ITPCC __RPC_FAR * This);

        HRESULT ( __stdcall __RPC_FAR *NewOrder )(
            ITPCC __RPC_FAR * This,
            /* [in] */ VARIANT txn_in,
            /* [out] */ VARIANT __RPC_FAR *txn_out);

        HRESULT ( __stdcall __RPC_FAR *Payment )(
            ITPCC __RPC_FAR * This,
            /* [in] */ VARIANT txn_in,
            /* [out] */ VARIANT __RPC_FAR *txn_out);

        HRESULT ( __stdcall __RPC_FAR *Delivery )(
            ITPCC __RPC_FAR * This,
            /* [in] */ VARIANT txn_in,
            /* [out] */ VARIANT __RPC_FAR *txn_out);

        HRESULT ( __stdcall __RPC_FAR *StockLevel )(
            ITPCC __RPC_FAR * This,
            /* [in] */ VARIANT txn_in,
            /* [out] */ VARIANT __RPC_FAR *txn_out);

        HRESULT ( __stdcall __RPC_FAR *OrderStatus )(
            ITPCC __RPC_FAR * This,
            /* [in] */ VARIANT txn_in,
            /* [out] */ VARIANT __RPC_FAR *txn_out);

        HRESULT ( __stdcall __RPC_FAR *CallSetComplete )(
            ITPCC __RPC_FAR * This);

        END_INTERFACE
    } ITPCCVtbl;

    interface ITPCC
    {
        CONST_VTBL struct ITPCCVtbl __RPC_FAR *lpVtbl;
    };


#ifdef COBJMACROS


#define ITPCC_QueryInterface(This,riid,ppvObject) \
    (This)->lpVtbl -> QueryInterface(This,riid,ppvObject)

#define ITPCC_AddRef(This)    \
    (This)->lpVtbl -> AddRef(This)

#define ITPCC_Release(This)   \
    (This)->lpVtbl -> Release(This)


#define ITPCC_NewOrder(This,txn_in,txn_out)       \
    (This)->lpVtbl -> NewOrder(This,txn_in,txn_out)

#define ITPCC_Payment(This,txn_in,txn_out)        \
    (This)->lpVtbl -> Payment(This,txn_in,txn_out)

#define ITPCC_Delivery(This,txn_in,txn_out)       \
    (This)->lpVtbl -> Delivery(This,txn_in,txn_out)

#define ITPCC_StockLevel(This,txn_in,txn_out)     \
    (This)->lpVtbl -> StockLevel(This,txn_in,txn_out)

#define ITPCC_OrderStatus(This,txn_in,txn_out)    \
    (This)->lpVtbl -> OrderStatus(This,txn_in,txn_out)

#define ITPCC_CallSetComplete(This)     \
    (This)->lpVtbl -> CallSetComplete(This)

#endif /* COBJMACROS */


#endif    /* C style interface */



HRESULT __stdcall ITPCC_NewOrder_Proxy(
    ITPCC __RPC_FAR * This,
    /* [in] */ VARIANT txn_in,
    /* [out] */ VARIANT __RPC_FAR *txn_out);


void __RPC_STUB ITPCC_NewOrder_Stub(
    IRpcStubBuffer *This,
    IRpcChannelBuffer *_pRpcChannelBuffer,
    PRPC_MESSAGE _pRpcMessage,
    DWORD *_pdwStubPhase);
```

```
HRESULT __stdcall ITPCC_Payment_Proxy(
    ITPCC __RPC_FAR * This,
    /* [in] */ VARIANT txn_in,
    /* [out] */ VARIANT __RPC_FAR *txn_out);


void __RPC_STUB ITPCC_Payment_Stub(
    IRpcStubBuffer *This,
    IRpcChannelBuffer *_pRpcChannelBuffer,
    PRPC_MESSAGE _pRpcMessage,
    DWORD *_pdwStubPhase);


HRESULT __stdcall ITPCC_Delivery_Proxy(
    ITPCC __RPC_FAR * This,
    /* [in] */ VARIANT txn_in,
    /* [out] */ VARIANT __RPC_FAR *txn_out);


void __RPC_STUB ITPCC_Delivery_Stub(
    IRpcStubBuffer *This,
    IRpcChannelBuffer *_pRpcChannelBuffer,
    PRPC_MESSAGE _pRpcMessage,
    DWORD *_pdwStubPhase);


HRESULT __stdcall ITPCC_StockLevel_Proxy(
    ITPCC __RPC_FAR * This,
    /* [in] */ VARIANT txn_in,
    /* [out] */ VARIANT __RPC_FAR *txn_out);


void __RPC_STUB ITPCC_StockLevel_Stub(
    IRpcStubBuffer *This,
    IRpcChannelBuffer *_pRpcChannelBuffer,
    PRPC_MESSAGE _pRpcMessage,
    DWORD *_pdwStubPhase);


HRESULT __stdcall ITPCC_OrderStatus_Proxy(
    ITPCC __RPC_FAR * This,
    /* [in] */ VARIANT txn_in,
    /* [out] */ VARIANT __RPC_FAR *txn_out);


void __RPC_STUB ITPCC_OrderStatus_Stub(
    IRpcStubBuffer *This,
    IRpcChannelBuffer *_pRpcChannelBuffer,
    PRPC_MESSAGE _pRpcMessage,
    DWORD *_pdwStubPhase);


HRESULT __stdcall ITPCC_CallSetComplete_Proxy(
    ITPCC __RPC_FAR * This);


void __RPC_STUB ITPCC_CallSetComplete_Stub(
    IRpcStubBuffer *This,
    IRpcChannelBuffer *_pRpcChannelBuffer,
    PRPC_MESSAGE _pRpcMessage,
    DWORD *_pdwStubPhase);


#endif    /* __ITPCC_INTERFACE_DEFINED__ */


/* Additional Prototypes for ALL interfaces */

unsigned long             __RPC_USER  VARIANT_UserSize(     unsigned long __RPC_FAR *,
unsigned long            , VARIANT __RPC_FAR * );
unsigned char __RPC_FAR * __RPC_USER  VARIANT_UserMarshal(  unsigned long __RPC_FAR *,
unsigned char __RPC_FAR *, VARIANT __RPC_FAR * );
unsigned char __RPC_FAR * __RPC_USER  VARIANT_UserUnmarshal(unsigned long __RPC_FAR *,
unsigned char __RPC_FAR *, VARIANT __RPC_FAR * );
void                      __RPC_USER  VARIANT_UserFree(     unsigned long __RPC_FAR *,
VARIANT __RPC_FAR * );

/* end of Additional Prototypes */

#ifdef __cplusplus
}
#endif

#endif
```

tpcc_com_ps/src/tpcc_com_ps.idl

```
/*        FILE:               ITPCC.IDL
 *                                    Microsoft TPC-C Kit Ver. 4.20.000
 *                                    Copyright Microsoft, 1999
 *              All Rights Reserved
 *
 *                                    not yet audited
 *
 *        PURPOSE:  Defines the interface used by TPCC. This interface can be implemented
by C++ components.
 *
 *  Change history:
 *                  4.20.000 - first version
 */

// Forward declare all types defined
interface ITPCC;
import "oaidl.idl";
import "ocidl.idl";

          [
                    object,
                    oleautomation,
                    uuid(FEEE6AA2-84B1-11d2-BA47-00C04FBFE08B),
                    helpstring("ITPCC Interface"),
                    pointer_default(unique)
          ]
          interface ITPCC : IUnknown
          {

        HRESULT _stdcall NewOrder
```

```
                                                    (
                                                    [in] VARIANT  txn_in,
                                                    [out] VARIANT *txn_out
                                                    );

        HRESULT _stdcall Payment
                                                    (
                                                    [in] VARIANT txn_in,
                                                    [out] VARIANT *txn_out
                                                    );

        HRESULT _stdcall Delivery
                                                    (
                                                    [in] VARIANT txn_in,
                                                    [out] VARIANT *txn_out
                                                    );

        HRESULT _stdcall StockLevel
                                                    (
                                                    [in] VARIANT txn_in,
                                                    [out] VARIANT *txn_out
                                                    );

        HRESULT _stdcall OrderStatus
                                                    (
                                                    [in] VARIANT txn_in,
                                                    [out] VARIANT *txn_out
                                                    );

        HRESULT _stdcall CallSetComplete
                                                    (
                                                    );

    };    // interface ITPCC
```

tpcc_com_ps/src/tpcc_com_ps_i.c

```
#pragma warning( disable: 4049 )  /* more than 64k source lines */

/* this ALWAYS GENERATED file contains the IIDs and CLSIDs */

/* link this file in with the server and any clients */


 /* File created by MIDL compiler version 5.03.0280 */
/* at Sat Apr 08 16:40:10 2000
 */
/* Compiler settings for .\src\tpcc_com_ps.idl:
    Oicf (OptLev=i2), W1, Zp8, env=Win32 (32b run), ms_ext, c_ext
    error checks: allocation ref bounds_check enum stub_data
    VC __declspec() decoration level:
         __declspec(uuid()), __declspec(selectany), __declspec(novtable)
         DECLSPEC_UUID(), MIDL_INTERFACE()
*/
//@@MIDL_FILE_HEADING(  )

#if !defined(_M_IA64) && !defined(_M_AXP64)

#ifdef __cplusplus
extern "C"{
#endif


#include <rpc.h>
#include <rpcndr.h>

#ifdef _MIDL_USE_GUIDDEF_

#ifndef INITGUID
#define INITGUID
#include <guiddef.h>
#undef INITGUID
#else
#include <guiddef.h>
#endif

#define MIDL_DEFINE_GUID(type,name,l,w1,w2,b1,b2,b3,b4,b5,b6,b7,b8) \
        DEFINE_GUID(name,l,w1,w2,b1,b2,b3,b4,b5,b6,b7,b8)

#else // !_MIDL_USE_GUIDDEF_

#ifndef __IID_DEFINED__
#define __IID_DEFINED__

typedef struct _IID
{
    unsigned long x;
    unsigned short s1;
    unsigned short s2;
    unsigned char  c[8];
} IID;

#endif // __IID_DEFINED__

#ifndef CLSID_DEFINED
#define CLSID_DEFINED
typedef IID CLSID;
#endif // CLSID_DEFINED

#define MIDL_DEFINE_GUID(type,name,l,w1,w2,b1,b2,b3,b4,b5,b6,b7,b8) \
        const type name = {l,w1,w2,{b1,b2,b3,b4,b5,b6,b7,b8}}

#endif !_MIDL_USE_GUIDDEF_

MIDL_DEFINE_GUID(IID,
IID_ITPCC,0xFEEE6AA2,0x84B1,0x11d2,0xBA,0x47,0x00,0xC0,0x4F,0xBF,0xE0,0x8B);

#undef MIDL_DEFINE_GUID

#ifdef __cplusplus
}
#endif



#endif /* !defined(_M_IA64) && !defined(_M_AXP64)*/
```

```
#pragma warning( disable: 4049 )  /* more than 64k source lines */

/* this ALWAYS GENERATED file contains the IIDs and CLSIDs */

/* link this file in with the server and any clients */


 /* File created by MIDL compiler version 5.03.0280 */
/* at Sat Apr 08 16:40:10 2000
 */
/* Compiler settings for .\src\tpcc_com_ps.idl:
    Oicf (OptLev=i2), W1, Zp8, env=Win64 (32b run,appending), ms_ext, c_ext, robust
    error checks: allocation ref bounds_check enum stub_data
    VC __declspec() decoration level:
         __declspec(uuid()), __declspec(selectany), __declspec(novtable)
         DECLSPEC_UUID(), MIDL_INTERFACE()
*/
//@@MIDL_FILE_HEADING(  )

#if defined(_M_IA64) || defined(_M_AXP64)

#ifdef __cplusplus
extern "C"{
#endif


#include <rpc.h>
#include <rpcndr.h>

#ifdef _MIDL_USE_GUIDDEF_

#ifndef INITGUID
#define INITGUID
#include <guiddef.h>
#undef INITGUID
#else
#include <guiddef.h>
#endif

#define MIDL_DEFINE_GUID(type,name,l,w1,w2,b1,b2,b3,b4,b5,b6,b7,b8) \
        DEFINE_GUID(name,l,w1,w2,b1,b2,b3,b4,b5,b6,b7,b8)

#else // !_MIDL_USE_GUIDDEF_

#ifndef __IID_DEFINED__
#define __IID_DEFINED__

typedef struct _IID
{
    unsigned long x;
    unsigned short s1;
    unsigned short s2;
    unsigned char  c[8];
} IID;

#endif // __IID_DEFINED__

#ifndef CLSID_DEFINED
#define CLSID_DEFINED
typedef IID CLSID;
#endif // CLSID_DEFINED

#define MIDL_DEFINE_GUID(type,name,l,w1,w2,b1,b2,b3,b4,b5,b6,b7,b8) \
        const type name = {l,w1,w2,{b1,b2,b3,b4,b5,b6,b7,b8}}

#endif !_MIDL_USE_GUIDDEF_

MIDL_DEFINE_GUID(IID,
IID_ITPCC,0xFEEE6AA2,0x84B1,0x11d2,0xBA,0x47,0x00,0xC0,0x4F,0xBF,0xE0,0x8B);

#undef MIDL_DEFINE_GUID

#ifdef __cplusplus
}
#endif



#endif /* defined(_M_IA64) || defined(_M_AXP64)*/
```

tpcc_com_ps/src/tpcc_com_ps_p.c

```
#pragma warning( disable: 4049 )  /* more than 64k source lines */

/* this ALWAYS GENERATED file contains the proxy stub code */


 /* File created by MIDL compiler version 5.03.0280 */
/* at Sat Apr 08 16:40:10 2000
 */
/* Compiler settings for .\src\tpcc_com_ps.idl:
    Oicf (OptLev=i2), W1, Zp8, env=Win32 (32b run), ms_ext, c_ext
    error checks: allocation ref bounds_check enum stub_data
    VC __declspec() decoration level:
         __declspec(uuid()), __declspec(selectany), __declspec(novtable)
         DECLSPEC_UUID(), MIDL_INTERFACE()
*/
//@@MIDL_FILE_HEADING(  )

#if !defined(_M_IA64) && !defined(_M_AXP64)
#define USE_STUBLESS_PROXY


/* verify that the <rpcproxy.h> version is high enough to compile this file*/
#ifndef __REDQ_RPCPROXY_H_VERSION__
#define __REQUIRED_RPCPROXY_H_VERSION__ 440
#endif


#include "rpcproxy.h"
#ifndef __RPCPROXY_H_VERSION__
#error this stub requires an updated version of <rpcproxy.h>
#endif // __RPCPROXY_H_VERSION__


#include "tpcc_com_ps.h"
```

```
#define TYPE_FORMAT_STRING_SIZE   997
#define PROC_FORMAT_STRING_SIZE   193
#define TRANSMIT_AS_TABLE_SIZE    0
#define WIRE_MARSHAL_TABLE_SIZE   1

typedef struct _MIDL_TYPE_FORMAT_STRING
    {
    short          Pad;
    unsigned char  Format[ TYPE_FORMAT_STRING_SIZE ];
    } MIDL_TYPE_FORMAT_STRING;

typedef struct _MIDL_PROC_FORMAT_STRING
    {
    short          Pad;
    unsigned char  Format[ PROC_FORMAT_STRING_SIZE ];
    } MIDL_PROC_FORMAT_STRING;


extern const MIDL_TYPE_FORMAT_STRING __MIDL_TypeFormatString;
extern const MIDL_PROC_FORMAT_STRING __MIDL_ProcFormatString;


/* Standard interface: __MIDL_itf_tpcc_com_ps_0000, ver. 0.0,
   GUID={0x00000000,0x0000,0x0000,{0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00}} */


/* Object interface: IUnknown, ver. 0.0,
   GUID={0x00000000,0x0000,0x0000,{0xC0,0x00,0x00,0x00,0x00,0x00,0x00,0x46}} */


/* Object interface: ITPCC, ver. 0.0,
   GUID={0xFEEE6AA2,0x84B1,0x11d2,{0xBA,0x47,0x00,0xC0,0x4F,0xBF,0xE0,0x8B}} */


extern const MIDL_STUB_DESC Object_StubDesc;


extern const MIDL_SERVER_INFO ITPCC_ServerInfo;

#pragma code_seg(".orpc")
static const unsigned short ITPCC_FormatStringOffsetTable[] =
    {
    0,
    34,
    68,
    102,
    136,
    170
    };

static const MIDL_SERVER_INFO ITPCC_ServerInfo =
    {
    &Object_StubDesc,
    0,
    __MIDL_ProcFormatString.Format,
    &ITPCC_FormatStringOffsetTable[-3],
    0,
    0,
    0,
    0
    };

static const MIDL_STUBLESS_PROXY_INFO ITPCC_ProxyInfo =
    {
    &Object_StubDesc,
    __MIDL_ProcFormatString.Format,
    &ITPCC_FormatStringOffsetTable[-3],
    0,
    0,
    0
    };

CINTERFACE_PROXY_VTABLE(9) _ITPCCProxyVtbl =
{
    &ITPCC_ProxyInfo,
    &IID_ITPCC,
    IUnknown_QueryInterface_Proxy,
    IUnknown_AddRef_Proxy,
    IUnknown_Release_Proxy ,
    (void *)-1 /* ITPCC::NewOrder */ ,
    (void *)-1 /* ITPCC::Payment */ ,
    (void *)-1 /* ITPCC::Delivery */ ,
    (void *)-1 /* ITPCC::StockLevel */ ,
    (void *)-1 /* ITPCC::OrderStatus */ ,
    (void *)-1 /* ITPCC::CallSetComplete */
};

const CInterfaceStubVtbl _ITPCCStubVtbl =
{
    &IID_ITPCC,
    &ITPCC_ServerInfo,
    9,
    0, /* pure interpreted */
    CStdStubBuffer_METHODS
};

extern const USER_MARSHAL_ROUTINE_QUADRUPLE UserMarshalRoutines[ WIRE_MARSHAL_TABLE_SIZE
];

static const MIDL_STUB_DESC Object_StubDesc =
    {
    0,
    NdrOleAllocate,
    NdrOleFree,
    0,
    0,
    0,
    0,
    0,
    __MIDL_TypeFormatString.Format,
    1, /* -error bounds_check flag */
    0x20000, /* Ndr library version */
    0,
    0x5030118, /* MIDL Version 5.4.280 */
    0,
    UserMarshalRoutines,
    0,  /* notify & notify_flag routine table */
    0x1, /* MIDL flag */
    0,  /* Reserved3 */
    0,  /* Reserved4 */
    0   /* Reserved5 */
    };

#pragma data_seg(".rdata")
```

```
static const USER_MARSHAL_ROUTINE_QUADRUPLE UserMarshalRoutines[ WIRE_MARSHAL_TABLE_SIZE
] =
        {

            {
            VARIANT_UserSize
            ,VARIANT_UserMarshal
            ,VARIANT_UserUnmarshal
            ,VARIANT_UserFree
            }

        };


#if !defined(__RPC_WIN32__)
#error  Invalid build platform for this stub.
#endif

#if !(TARGET_IS_NT40_OR_LATER)
#error You need a Windows NT 4.0 or later to run this stub because it uses these
features:
#error   -Oif or -Oicf, [wire_marshal] or [user_marshal] attribute.
#error However, your C/C++ compilation flags indicate you intend to run this app on
earlier systems.
#error This app will die there with the RPC_X_WRONG_STUB_VERSION error.
#endif


static const MIDL_PROC_FORMAT_STRING __MIDL_ProcFormatString =
    {
        0,
        {

          /* Procedure NewOrder */

                                0x33,               /* FC_AUTO_HANDLE */
                                0x6c,               /* Old Flags:  object, Oi2 */
/*  2 */  NdrFcLong( 0x0 ),   /* 0 */
/*  6 */  NdrFcShort( 0x3 ),  /* 3 */
#ifndef _ALPHA_
#ifndef _PPC_
#if !defined(_MIPS_)
/*  8 */  NdrFcShort( 0x1c ), /* x86 Stack size/offset = 28 */
#else
                                NdrFcShort( 0x20 ), /*  MIPS Stack size/offset = 32 */
#endif
#else
                                NdrFcShort( 0x20 ), /* PPC Stack size/offset = 32 */
#endif
#else
                                NdrFcShort( 0x28 ), /* Alpha Stack size/offset = 40 */
#endif
/* 10 */  NdrFcShort( 0x0 ),  /* 0 */
/* 12 */  NdrFcShort( 0x8 ),  /* 8 */
/* 14 */  0x7,                /* Oi2 Flags:  srv must size, clt must size, has return, */
                                0x3,                /* 3 */

          /* Parameter txn_in */

/* 16 */  NdrFcShort( 0x8b ), /* Flags:  must size, must free, in, by val, */
#ifndef _ALPHA_
#ifndef _PPC_
#if !defined(_MIPS_)
/* 18 */  NdrFcShort( 0x4 ),  /* x86 Stack size/offset = 4 */
#else
                                NdrFcShort( 0x8 ),  /*  MIPS Stack size/offset = 8 */
#endif
#else
                                NdrFcShort( 0x8 ),  /* PPC Stack size/offset = 8 */
#endif
#else
                                NdrFcShort( 0x8 ),  /* Alpha Stack size/offset = 8 */
#endif
/* 20 */  NdrFcShort( 0x3c8 ),          /* Type Offset=968 */

          /* Parameter txn_out */

/* 22 */  NdrFcShort( 0x4113 ),         /* Flags:  must size, must free, out, simple ref,
srv alloc size=16 */
#ifndef _ALPHA_
#ifndef _PPC_
#if !defined(_MIPS_)
/* 24 */  NdrFcShort( 0x14 ), /* x86 Stack size/offset = 20 */
#else
                                NdrFcShort( 0x18 ), /*  MIPS Stack size/offset = 24 */
#endif
#else
                                NdrFcShort( 0x18 ), /* PPC Stack size/offset = 24 */
#endif
#else
                                NdrFcShort( 0x18 ), /* Alpha Stack size/offset = 24 */
#endif
/* 26 */  NdrFcShort( 0x3da ),          /* Type Offset=986 */

          /* Return value */

/* 28 */  NdrFcShort( 0x70 ), /* Flags:  out, return, base type, */
#ifndef _ALPHA_
#ifndef _PPC_
#if !defined(_MIPS_)
/* 30 */  NdrFcShort( 0x18 ), /* x86 Stack size/offset = 24 */
#else
                                NdrFcShort( 0x1c ), /*  MIPS Stack size/offset = 28 */
#endif
#else
                                NdrFcShort( 0x1c ), /* PPC Stack size/offset = 28 */
#endif
#else
                                NdrFcShort( 0x20 ), /* Alpha Stack size/offset = 32 */
#endif
/* 32 */  0x8,                /* FC_LONG */
                                0x0,                /* 0 */

          /* Procedure Payment */

/* 34 */  0x33,               /* FC_AUTO_HANDLE */
                                0x6c,               /* Old Flags:  object, Oi2 */
/* 36 */  NdrFcLong( 0x0 ),   /* 0 */
/* 40 */  NdrFcShort( 0x4 ),  /* 4 */
#ifndef _ALPHA_
#ifndef _PPC_
#if !defined(_MIPS_)
/* 42 */  NdrFcShort( 0x1c ), /* x86 Stack size/offset = 28 */
#else
                                NdrFcShort( 0x20 ), /*  MIPS Stack size/offset = 32 */
#endif
```

```
#else
                            NdrFcShort( 0x20 ), /* PPC Stack size/offset = 32 */
#endif
#else
                            NdrFcShort( 0x28 ), /* Alpha Stack size/offset = 40 */
#endif
/* 44 */  NdrFcShort( 0x0 ),  /* 0 */
/* 46 */  NdrFcShort( 0x8 ),  /* 8 */
/* 48 */  0x7,                /* Oi2 Flags:  srv must size, clt must size, has return, */
                            0x3,                /* 3 */

         /* Parameter txn_in */

/* 50 */  NdrFcShort( 0x8b ), /* Flags:  must size, must free, in, by val, */
#ifndef _ALPHA_
#ifndef _PPC_
#if !defined(_MIPS_)
/* 52 */  NdrFcShort( 0x4 ),  /* x86 Stack size/offset = 4 */
#else
                            NdrFcShort( 0x8 ),  /*  MIPS Stack size/offset = 8 */
#endif
#else
                            NdrFcShort( 0x8 ),  /* PPC Stack size/offset = 8 */
#endif
#else
                            NdrFcShort( 0x8 ),  /* Alpha Stack size/offset = 8 */
#endif
/* 54 */  NdrFcShort( 0x3c8 ),          /* Type Offset=968 */

         /* Parameter txn_out */

/* 56 */  NdrFcShort( 0x4113 ),         /* Flags:  must size, must free, out, simple ref,
srv alloc size=16 */
#ifndef _ALPHA_
#ifndef _PPC_
#if !defined(_MIPS_)
/* 58 */  NdrFcShort( 0x14 ), /* x86 Stack size/offset = 20 */
#else
                            NdrFcShort( 0x18 ), /*  MIPS Stack size/offset = 24 */
#endif
#else
                            NdrFcShort( 0x18 ), /* PPC Stack size/offset = 24 */
#endif
#else
                            NdrFcShort( 0x18 ), /* Alpha Stack size/offset = 24 */
#endif
/* 60 */  NdrFcShort( 0x3da ),          /* Type Offset=986 */

         /* Return value */

/* 62 */  NdrFcShort( 0x70 ), /* Flags:  out, return, base type, */
#ifndef _ALPHA_
#ifndef _PPC_
#if !defined(_MIPS_)
/* 64 */  NdrFcShort( 0x18 ), /* x86 Stack size/offset = 24 */
#else
                            NdrFcShort( 0x1c ), /*  MIPS Stack size/offset = 28 */
#endif
#else
                            NdrFcShort( 0x1c ), /* PPC Stack size/offset = 28 */
#endif
#else
                            NdrFcShort( 0x20 ), /* Alpha Stack size/offset = 32 */
#endif
/* 66 */  0x8,                /* FC_LONG */
                            0x0,                /* 0 */

         /* Procedure Delivery */

/* 68 */  0x33,               /* FC_AUTO_HANDLE */
                            0x6c,               /* Old Flags:  object, Oi2 */
/* 70 */  NdrFcLong( 0x0 ),   /* 0 */
/* 74 */  NdrFcShort( 0x5 ),  /* 5 */
#ifndef _ALPHA_
#ifndef _PPC_
#if !defined(_MIPS_)
/* 76 */  NdrFcShort( 0x1c ), /* x86 Stack size/offset = 28 */
#else
                            NdrFcShort( 0x20 ), /*  MIPS Stack size/offset = 32 */
#endif
#else
                            NdrFcShort( 0x20 ), /* PPC Stack size/offset = 32 */
#endif
#else
                            NdrFcShort( 0x28 ), /* Alpha Stack size/offset = 40 */
#endif
/* 78 */  NdrFcShort( 0x0 ),  /* 0 */
/* 80 */  NdrFcShort( 0x8 ),  /* 8 */
/* 82 */  0x7,                /* Oi2 Flags:  srv must size, clt must size, has return, */
                            0x3,                /* 3 */

         /* Parameter txn_in */

/* 84 */  NdrFcShort( 0x8b ), /* Flags:  must size, must free, in, by val, */
#ifndef _ALPHA_
#ifndef _PPC_
#if !defined(_MIPS_)
/* 86 */  NdrFcShort( 0x4 ),  /* x86 Stack size/offset = 4 */
#else
                            NdrFcShort( 0x8 ),  /*  MIPS Stack size/offset = 8 */
#endif
#else
                            NdrFcShort( 0x8 ),  /* PPC Stack size/offset = 8 */
#endif
#else
                            NdrFcShort( 0x8 ),  /* Alpha Stack size/offset = 8 */
#endif
/* 88 */  NdrFcShort( 0x3c8 ),          /* Type Offset=968 */

         /* Parameter txn_out */

/* 90 */  NdrFcShort( 0x4113 ),         /* Flags:  must size, must free, out, simple ref,
srv alloc size=16 */
#ifndef _ALPHA_
#ifndef _PPC_
#if !defined(_MIPS_)
/* 92 */  NdrFcShort( 0x14 ), /* x86 Stack size/offset = 20 */
#else
                            NdrFcShort( 0x18 ), /*  MIPS Stack size/offset = 24 */
#endif
#else
                            NdrFcShort( 0x18 ), /* PPC Stack size/offset = 24 */
#endif
#else
                            NdrFcShort( 0x18 ), /* Alpha Stack size/offset = 24 */
#endif
```

```
/* 94 */  NdrFcShort( 0x3da ),          /* Type Offset=986 */

          /* Return value */

/* 96 */  NdrFcShort( 0x70 ), /* Flags:  out, return, base type, */
#ifndef _ALPHA_
#ifndef _PPC_
#if !defined(_MIPS_)
/* 98 */  NdrFcShort( 0x18 ), /* x86 Stack size/offset = 24 */
#else
                              NdrFcShort( 0x1c ), /*  MIPS Stack size/offset = 28 */
#endif
#else
                              NdrFcShort( 0x1c ), /* PPC Stack size/offset = 28 */
#endif
#else
                              NdrFcShort( 0x20 ), /* Alpha Stack size/offset = 32 */
#endif
/* 100 */ 0x8,                /* FC_LONG */
                              0x0,                /* 0 */

          /* Procedure StockLevel */

/* 102 */ 0x33,               /* FC_AUTO_HANDLE */
                              0x6c,               /* Old Flags:  object, Oi2 */
/* 104 */ NdrFcLong( 0x0 ),   /* 0 */
/* 108 */ NdrFcShort( 0x6 ),  /* 6 */
#ifndef _ALPHA_
#ifndef _PPC_
#if !defined(_MIPS_)
/* 110 */ NdrFcShort( 0x1c ), /* x86 Stack size/offset = 28 */
#else
                              NdrFcShort( 0x20 ), /*  MIPS Stack size/offset = 32 */
#endif
#else
                              NdrFcShort( 0x20 ), /* PPC Stack size/offset = 32 */
#endif
#else
                              NdrFcShort( 0x28 ), /* Alpha Stack size/offset = 40 */
#endif
/* 112 */ NdrFcShort( 0x0 ),  /* 0 */
/* 114 */ NdrFcShort( 0x8 ),  /* 8 */
/* 116 */ 0x7,                /* Oi2 Flags:  srv must size, clt must size, has return, */
                              0x3,                /* 3 */

          /* Parameter txn_in */

/* 118 */ NdrFcShort( 0x8b ), /* Flags:  must size, must free, in, by val, */
#ifndef _ALPHA_
#ifndef _PPC_
#if !defined(_MIPS_)
/* 120 */ NdrFcShort( 0x4 ),  /* x86 Stack size/offset = 4 */
#else
                              NdrFcShort( 0x8 ),  /*  MIPS Stack size/offset = 8 */
#endif
#else
                              NdrFcShort( 0x8 ),  /* PPC Stack size/offset = 8 */
#endif
#else
                              NdrFcShort( 0x8 ),  /* Alpha Stack size/offset = 8 */
#endif
/* 122 */ NdrFcShort( 0x3c8 ),          /* Type Offset=968 */

          /* Parameter txn_out */

/* 124 */ NdrFcShort( 0x4113 ),         /* Flags:  must size, must free, out, simple ref,
srv alloc size=16 */
#ifndef _ALPHA_
#ifndef _PPC_
#if !defined(_MIPS_)
/* 126 */ NdrFcShort( 0x14 ), /* x86 Stack size/offset = 20 */
#else
                              NdrFcShort( 0x18 ), /*  MIPS Stack size/offset = 24 */
#endif
#else
                              NdrFcShort( 0x18 ), /* PPC Stack size/offset = 24 */
#endif
#else
                              NdrFcShort( 0x18 ), /* Alpha Stack size/offset = 24 */
#endif
/* 128 */ NdrFcShort( 0x3da ),          /* Type Offset=986 */

          /* Return value */

/* 130 */ NdrFcShort( 0x70 ), /* Flags:  out, return, base type, */
#ifndef _ALPHA_
#ifndef _PPC_
#if !defined(_MIPS_)
/* 132 */ NdrFcShort( 0x18 ), /* x86 Stack size/offset = 24 */
#else
                              NdrFcShort( 0x1c ), /*  MIPS Stack size/offset = 28 */
#endif
#else
                              NdrFcShort( 0x1c ), /* PPC Stack size/offset = 28 */
#endif
#else
                              NdrFcShort( 0x20 ), /* Alpha Stack size/offset = 32 */
#endif
/* 134 */ 0x8,                /* FC_LONG */
                              0x0,                /* 0 */

          /* Procedure OrderStatus */

/* 136 */ 0x33,               /* FC_AUTO_HANDLE */
                              0x6c,               /* Old Flags:  object, Oi2 */
/* 138 */ NdrFcLong( 0x0 ),   /* 0 */
/* 142 */ NdrFcShort( 0x7 ),  /* 7 */
#ifndef _ALPHA_
#ifndef _PPC_
#if !defined(_MIPS_)
/* 144 */ NdrFcShort( 0x1c ), /* x86 Stack size/offset = 28 */
#else
                              NdrFcShort( 0x20 ), /*  MIPS Stack size/offset = 32 */
#endif
#else
                              NdrFcShort( 0x20 ), /* PPC Stack size/offset = 32 */
#endif
#else
                              NdrFcShort( 0x28 ), /* Alpha Stack size/offset = 40 */
#endif
/* 146 */ NdrFcShort( 0x0 ),  /* 0 */
/* 148 */ NdrFcShort( 0x8 ),  /* 8 */
/* 150 */ 0x7,                /* Oi2 Flags:  srv must size, clt must size, has return, */
                              0x3,                /* 3 */

          /* Parameter txn_in */
```

```
/* 152 */ NdrFcShort( 0x8b ), /* Flags:  must size, must free, in, by val, */
#ifndef _ALPHA_
#ifndef _PPC_
#if !defined(_MIPS_)
/* 154 */ NdrFcShort( 0x4 ),  /* x86 Stack size/offset = 4 */
#else
                              NdrFcShort( 0x8 ),  /*  MIPS Stack size/offset = 8 */
#endif
#else
                              NdrFcShort( 0x8 ),  /* PPC Stack size/offset = 8 */
#endif
#else
                              NdrFcShort( 0x8 ),  /* Alpha Stack size/offset = 8 */
#endif
/* 156 */ NdrFcShort( 0x3c8 ),          /* Type Offset=968 */

         /* Parameter txn_out */

/* 158 */ NdrFcShort( 0x4113 ),         /* Flags:  must size, must free, out, simple ref,
srv alloc size=16 */
#ifndef _ALPHA_
#ifndef _PPC_
#if !defined(_MIPS_)
/* 160 */ NdrFcShort( 0x14 ), /* x86 Stack size/offset = 20 */
#else
                              NdrFcShort( 0x18 ), /*  MIPS Stack size/offset = 24 */
#endif
#else
                              NdrFcShort( 0x18 ), /* PPC Stack size/offset = 24 */
#endif
#else
                              NdrFcShort( 0x18 ), /* Alpha Stack size/offset = 24 */
#endif
/* 162 */ NdrFcShort( 0x3da ),          /* Type Offset=986 */

         /* Return value */

/* 164 */ NdrFcShort( 0x70 ), /* Flags:  out, return, base type, */
#ifndef _ALPHA_
#ifndef _PPC_
#if !defined(_MIPS_)
/* 166 */ NdrFcShort( 0x18 ), /* x86 Stack size/offset = 24 */
#else
                              NdrFcShort( 0x1c ), /*  MIPS Stack size/offset = 28 */
#endif
#else
                              NdrFcShort( 0x1c ), /* PPC Stack size/offset = 28 */
#endif
#else
                              NdrFcShort( 0x20 ), /* Alpha Stack size/offset = 32 */
#endif
/* 168 */ 0x8,                /* FC_LONG */
                              0x0,                /* 0 */

         /* Procedure CallSetComplete */

/* 170 */ 0x33,               /* FC_AUTO_HANDLE */
                              0x6c,               /* Old Flags:  object, Oi2 */
/* 172 */ NdrFcLong( 0x0 ),   /* 0 */
/* 176 */ NdrFcShort( 0x8 ),  /* 8 */
#ifndef _ALPHA_
/* 178 */ NdrFcShort( 0x8 ),  /* x86, MIPS, PPC Stack size/offset = 8 */
#else
                              NdrFcShort( 0x10 ), /* Alpha Stack size/offset = 16 */
#endif
/* 180 */ NdrFcShort( 0x0 ),  /* 0 */
/* 182 */ NdrFcShort( 0x8 ),  /* 8 */
/* 184 */ 0x4,                /* Oi2 Flags:  has return, */
                              0x1,                /* 1 */

         /* Return value */

/* 186 */ NdrFcShort( 0x70 ), /* Flags:  out, return, base type, */
#ifndef _ALPHA_
/* 188 */ NdrFcShort( 0x4 ),  /* x86, MIPS, PPC Stack size/offset = 4 */
#else
                              NdrFcShort( 0x8 ),  /* Alpha Stack size/offset = 8 */
#endif
/* 190 */ 0x8,                /* FC_LONG */
                              0x0,                /* 0 */

                              0x0
        }
    };

static const MIDL_TYPE_FORMAT_STRING __MIDL_TypeFormatString =
    {
        0,
        {
                              NdrFcShort( 0x0 ),  /* 0 */
/*  2 */
                              0x12, 0x0,          /* FC_UP */
/*  4 */  NdrFcShort( 0x3b0 ),          /* Offset= 944 (948) */
/*  6 */
                              0x2b,               /* FC_NON_ENCAPSULATED_UNION */
                              0x9,                /* FC_ULONG */
/*  8 */  0x7,                /* Corr desc: FC_USHORT */
                              0x0,                /*  */
/* 10 */  NdrFcShort( 0xfff8 ),         /* -8 */
/* 12 */  NdrFcShort( 0x2 ),  /* Offset= 2 (14) */
/* 14 */  NdrFcShort( 0x10 ), /* 16 */
/* 16 */  NdrFcShort( 0x2b ), /* 43 */
/* 18 */  NdrFcLong( 0x3 ),   /* 3 */
/* 22 */  NdrFcShort( 0x8008 ),         /* Simple arm type: FC_LONG */
/* 24 */  NdrFcLong( 0x11 ),  /* 17 */
/* 28 */  NdrFcShort( 0x8001 ),         /* Simple arm type: FC_BYTE */
/* 30 */  NdrFcLong( 0x2 ),   /* 2 */
/* 34 */  NdrFcShort( 0x8006 ),         /* Simple arm type: FC_SHORT */
/* 36 */  NdrFcLong( 0x4 ),   /* 4 */
/* 40 */  NdrFcShort( 0x800a ),         /* Simple arm type: FC_FLOAT */
/* 42 */  NdrFcLong( 0x5 ),   /* 5 */
/* 46 */  NdrFcShort( 0x800c ),         /* Simple arm type: FC_DOUBLE */
/* 48 */  NdrFcLong( 0xb ),   /* 11 */
/* 52 */  NdrFcShort( 0x8006 ),         /* Simple arm type: FC_SHORT */
/* 54 */  NdrFcLong( 0xa ),   /* 10 */
/* 58 */  NdrFcShort( 0x8008 ),         /* Simple arm type: FC_LONG */
/* 60 */  NdrFcLong( 0x6 ),   /* 6 */
/* 64 */  NdrFcShort( 0xd6 ), /* Offset= 214 (278) */
/* 66 */  NdrFcLong( 0x7 ),   /* 7 */
/* 70 */  NdrFcShort( 0x800c ),         /* Simple arm type: FC_DOUBLE */
/* 72 */  NdrFcLong( 0x8 ),   /* 8 */
/* 76 */  NdrFcShort( 0xd0 ), /* Offset= 208 (284) */
/* 78 */  NdrFcLong( 0xd ),   /* 13 */
/* 82 */  NdrFcShort( 0xe2 ), /* Offset= 226 (308) */
/* 84 */  NdrFcLong( 0x9 ),   /* 9 */
```

```
/* 88 */  NdrFcShort( 0xee ), /* Offset= 238 (326) */
/* 90 */  NdrFcLong( 0x2000 ),          /* 8192 */
/* 94 */  NdrFcShort( 0xfa ), /* Offset= 250 (344) */
/* 96 */  NdrFcLong( 0x24 ),  /* 36 */
/* 100 */ NdrFcShort( 0x308 ),          /* Offset= 776 (876) */
/* 102 */ NdrFcLong( 0x4024 ),          /* 16420 */
/* 106 */ NdrFcShort( 0x302 ),          /* Offset= 770 (876) */
/* 108 */ NdrFcLong( 0x4011 ),          /* 16401 */
/* 112 */ NdrFcShort( 0x300 ),          /* Offset= 768 (880) */
/* 114 */ NdrFcLong( 0x4002 ),          /* 16386 */
/* 118 */ NdrFcShort( 0x2fe ),          /* Offset= 766 (884) */
/* 120 */ NdrFcLong( 0x4003 ),          /* 16387 */
/* 124 */ NdrFcShort( 0x2fc ),          /* Offset= 764 (888) */
/* 126 */ NdrFcLong( 0x4004 ),          /* 16388 */
/* 130 */ NdrFcShort( 0x2fa ),          /* Offset= 762 (892) */
/* 132 */ NdrFcLong( 0x4005 ),          /* 16389 */
/* 136 */ NdrFcShort( 0x2f8 ),          /* Offset= 760 (896) */
/* 138 */ NdrFcLong( 0x400b ),          /* 16395 */
/* 142 */ NdrFcShort( 0x2e6 ),          /* Offset= 742 (884) */
/* 144 */ NdrFcLong( 0x400a ),          /* 16394 */
/* 148 */ NdrFcShort( 0x2e4 ),          /* Offset= 740 (888) */
/* 150 */ NdrFcLong( 0x4006 ),          /* 16390 */
/* 154 */ NdrFcShort( 0x2ea ),          /* Offset= 746 (900) */
/* 156 */ NdrFcLong( 0x4007 ),          /* 16391 */
/* 160 */ NdrFcShort( 0x2e0 ),          /* Offset= 736 (896) */
/* 162 */ NdrFcLong( 0x4008 ),          /* 16392 */
/* 166 */ NdrFcShort( 0x2e2 ),          /* Offset= 738 (904) */
/* 168 */ NdrFcLong( 0x400d ),          /* 16397 */
/* 172 */ NdrFcShort( 0x2e0 ),          /* Offset= 736 (908) */
/* 174 */ NdrFcLong( 0x4009 ),          /* 16393 */
/* 178 */ NdrFcShort( 0x2de ),          /* Offset= 734 (912) */
/* 180 */ NdrFcLong( 0x6000 ),          /* 24576 */
/* 184 */ NdrFcShort( 0x2dc ),          /* Offset= 732 (916) */
/* 186 */ NdrFcLong( 0x400c ),          /* 16396 */
/* 190 */ NdrFcShort( 0x2da ),          /* Offset= 730 (920) */
/* 192 */ NdrFcLong( 0x10 ),  /* 16 */
/* 196 */ NdrFcShort( 0x8002 ),         /* Simple arm type: FC_CHAR */
/* 198 */ NdrFcLong( 0x12 ),  /* 18 */
/* 202 */ NdrFcShort( 0x8006 ),         /* Simple arm type: FC_SHORT */
/* 204 */ NdrFcLong( 0x13 ),  /* 19 */
/* 208 */ NdrFcShort( 0x8008 ),         /* Simple arm type: FC_LONG */
/* 210 */ NdrFcLong( 0x16 ),  /* 22 */
/* 214 */ NdrFcShort( 0x8008 ),         /* Simple arm type: FC_LONG */
/* 216 */ NdrFcLong( 0x17 ),  /* 23 */
/* 220 */ NdrFcShort( 0x8008 ),         /* Simple arm type: FC_LONG */
/* 222 */ NdrFcLong( 0xe ),   /* 14 */
/* 226 */ NdrFcShort( 0x2be ),          /* Offset= 702 (928) */
/* 228 */ NdrFcLong( 0x400e ),          /* 16398 */
/* 232 */ NdrFcShort( 0x2c4 ),          /* Offset= 708 (940) */
/* 234 */ NdrFcLong( 0x4010 ),          /* 16400 */
/* 238 */ NdrFcShort( 0x2c2 ),          /* Offset= 706 (944) */
/* 240 */ NdrFcLong( 0x4012 ),          /* 16402 */
/* 244 */ NdrFcShort( 0x280 ),          /* Offset= 640 (884) */
/* 246 */ NdrFcLong( 0x4013 ),          /* 16403 */
/* 250 */ NdrFcShort( 0x27e ),          /* Offset= 638 (888) */
/* 252 */ NdrFcLong( 0x4016 ),          /* 16406 */
/* 256 */ NdrFcShort( 0x278 ),          /* Offset= 632 (888) */
/* 258 */ NdrFcLong( 0x4017 ),          /* 16407 */
/* 262 */ NdrFcShort( 0x272 ),          /* Offset= 626 (888) */
/* 264 */ NdrFcLong( 0x0 ),   /* 0 */
/* 268 */ NdrFcShort( 0x0 ),  /* Offset= 0 (268) */
/* 270 */ NdrFcLong( 0x1 ),   /* 1 */
/* 274 */ NdrFcShort( 0x0 ),  /* Offset= 0 (274) */
/* 276 */ NdrFcShort( 0xffffffff ),     /* Offset= -1 (275) */
/* 278 */
                                0x15,               /* FC_STRUCT */
                                0x7,                /* 7 */
/* 280 */ NdrFcShort( 0x8 ),  /* 8 */
/* 282 */ 0xb,                 /* FC_HYPER */
                                0x5b,               /* FC_END */
/* 284 */
                                0x12, 0x0,          /* FC_UP */
/* 286 */ NdrFcShort( 0xc ),  /* Offset= 12 (298) */
/* 288 */
                                0x1b,               /* FC_CARRAY */
                                0x1,                /* 1 */
/* 290 */ NdrFcShort( 0x2 ),  /* 2 */
/* 292 */ 0x9,                 /* Corr desc: FC_ULONG */
                                0x0,                /*  */
/* 294 */ NdrFcShort( 0xfffc ),         /* -4 */
/* 296 */ 0x6,                 /* FC_SHORT */
                                0x5b,               /* FC_END */
/* 298 */
                                0x17,               /* FC_CSTRUCT */
                                0x3,                /* 3 */
/* 300 */ NdrFcShort( 0x8 ),  /* 8 */
/* 302 */ NdrFcShort( 0xfffffff2 ),     /* Offset= -14 (288) */
/* 304 */ 0x8,                 /* FC_LONG */
                                0x8,                /* FC_LONG */
/* 306 */ 0x5c,                /* FC_PAD */
                                0x5b,               /* FC_END */
/* 308 */
                                0x2f,               /* FC_IP */
                                0x5a,               /* FC_CONSTANT_IID */
/* 310 */ NdrFcLong( 0x0 ),   /* 0 */
/* 314 */ NdrFcShort( 0x0 ),  /* 0 */
/* 316 */ NdrFcShort( 0x0 ),  /* 0 */
/* 318 */ 0xc0,                /* 192 */
                                0x0,                /* 0 */
/* 320 */ 0x0,                 /* 0 */
                                0x0,                /* 0 */
/* 322 */ 0x0,                 /* 0 */
                                0x0,                /* 0 */
/* 324 */ 0x0,                 /* 0 */
                                0x46,               /* 70 */
/* 326 */
                                0x2f,               /* FC_IP */
                                0x5a,               /* FC_CONSTANT_IID */
/* 328 */ NdrFcLong( 0x20400 ),         /* 132096 */
/* 332 */ NdrFcShort( 0x0 ),  /* 0 */
/* 334 */ NdrFcShort( 0x0 ),  /* 0 */
/* 336 */ 0xc0,                /* 192 */
                                0x0,                /* 0 */
/* 338 */ 0x0,                 /* 0 */
                                0x0,                /* 0 */
/* 340 */ 0x0,                 /* 0 */
                                0x0,                /* 0 */
/* 342 */ 0x0,                 /* 0 */
                                0x46,               /* 70 */
/* 344 */
                                0x12, 0x10,         /* FC_UP [pointer_deref] */
/* 346 */ NdrFcShort( 0x2 ),  /* Offset= 2 (348) */
/* 348 */
                                0x12, 0x0,          /* FC_UP */
/* 350 */ NdrFcShort( 0x1fc ),          /* Offset= 508 (858) */
/* 352 */
```

```
                            0x2a,               /* FC_ENCAPSULATED_UNION */
                            0x49,               /* 73 */
/* 354 */ NdrFcShort( 0x18 ), /* 24 */
/* 356 */ NdrFcShort( 0xa ),  /* 10 */
/* 358 */ NdrFcLong( 0x8 ),   /* 8 */
/* 362 */ NdrFcShort( 0x58 ), /* Offset= 88 (450) */
/* 364 */ NdrFcLong( 0xd ),   /* 13 */
/* 368 */ NdrFcShort( 0x78 ), /* Offset= 120 (488) */
/* 370 */ NdrFcLong( 0x9 ),   /* 9 */
/* 374 */ NdrFcShort( 0x94 ), /* Offset= 148 (522) */
/* 376 */ NdrFcLong( 0xc ),   /* 12 */
/* 380 */ NdrFcShort( 0xbc ), /* Offset= 188 (568) */
/* 382 */ NdrFcLong( 0x24 ),  /* 36 */
/* 386 */ NdrFcShort( 0x114 ),          /* Offset= 276 (662) */
/* 388 */ NdrFcLong( 0x800d ),          /* 32781 */
/* 392 */ NdrFcShort( 0x130 ),          /* Offset= 304 (696) */
/* 394 */ NdrFcLong( 0x10 ),  /* 16 */
/* 398 */ NdrFcShort( 0x148 ),          /* Offset= 328 (726) */
/* 400 */ NdrFcLong( 0x2 ),   /* 2 */
/* 404 */ NdrFcShort( 0x160 ),          /* Offset= 352 (756) */
/* 406 */ NdrFcLong( 0x3 ),   /* 3 */
/* 410 */ NdrFcShort( 0x178 ),          /* Offset= 376 (786) */
/* 412 */ NdrFcLong( 0x14 ),  /* 20 */
/* 416 */ NdrFcShort( 0x190 ),          /* Offset= 400 (816) */
/* 418 */ NdrFcShort( 0xffffffff ),     /* Offset= -1 (417) */
/* 420 */
                            0x1b,               /* FC_CARRAY */
                            0x3,                /* 3 */
/* 422 */ NdrFcShort( 0x4 ),  /* 4 */
/* 424 */ 0x19,               /* Corr desc:  field pointer, FC_ULONG */
                            0x0,                /*  */
/* 426 */ NdrFcShort( 0x0 ),  /* 0 */
/* 428 */
                            0x4b,               /* FC_PP */
                            0x5c,               /* FC_PAD */
/* 430 */
                            0x48,               /* FC_VARIABLE_REPEAT */
                            0x49,               /* FC_FIXED_OFFSET */
/* 432 */ NdrFcShort( 0x4 ),  /* 4 */
/* 434 */ NdrFcShort( 0x0 ),  /* 0 */
/* 436 */ NdrFcShort( 0x1 ),  /* 1 */
/* 438 */ NdrFcShort( 0x0 ),  /* 0 */
/* 440 */ NdrFcShort( 0x0 ),  /* 0 */
/* 442 */ 0x12, 0x0,          /* FC_UP */
/* 444 */ NdrFcShort( 0xffffff6e ),     /* Offset= -146 (298) */
/* 446 */
                            0x5b,               /* FC_END */

                            0x8,                /* FC_LONG */
/* 448 */ 0x5c,               /* FC_PAD */
                            0x5b,               /* FC_END */
/* 450 */
                            0x16,               /* FC_PSTRUCT */
                            0x3,                /* 3 */
/* 452 */ NdrFcShort( 0x8 ),  /* 8 */
/* 454 */
                            0x4b,               /* FC_PP */
                            0x5c,               /* FC_PAD */
/* 456 */
                            0x46,               /* FC_NO_REPEAT */
                            0x5c,               /* FC_PAD */
/* 458 */ NdrFcShort( 0x4 ),  /* 4 */
/* 460 */ NdrFcShort( 0x4 ),  /* 4 */
/* 462 */ 0x11, 0x0,          /* FC_RP */
/* 464 */ NdrFcShort( 0xffffffd4 ),     /* Offset= -44 (420) */
/* 466 */
                            0x5b,               /* FC_END */

                            0x8,                /* FC_LONG */
/* 468 */ 0x8,                /* FC_LONG */
                            0x5b,               /* FC_END */
/* 470 */
                            0x21,               /* FC_BOGUS_ARRAY */
                            0x3,                /* 3 */
/* 472 */ NdrFcShort( 0x0 ),  /* 0 */
/* 474 */ 0x19,               /* Corr desc:  field pointer, FC_ULONG */
                            0x0,                /*  */
/* 476 */ NdrFcShort( 0x0 ),  /* 0 */
/* 478 */ NdrFcLong( 0xffffffff ),      /* -1 */
/* 482 */ 0x4c,               /* FC_EMBEDDED_COMPLEX */
                            0x0,                /* 0 */
/* 484 */ NdrFcShort( 0xffffff50 ),     /* Offset= -176 (308) */
/* 486 */ 0x5c,               /* FC_PAD */
                            0x5b,               /* FC_END */
/* 488 */
                            0x1a,               /* FC_BOGUS_STRUCT */
                            0x3,                /* 3 */
/* 490 */ NdrFcShort( 0x8 ),  /* 8 */
/* 492 */ NdrFcShort( 0x0 ),  /* 0 */
/* 494 */ NdrFcShort( 0x6 ),  /* Offset= 6 (500) */
/* 496 */ 0x8,                /* FC_LONG */
                            0x36,               /* FC_POINTER */
/* 498 */ 0x5c,               /* FC_PAD */
                            0x5b,               /* FC_END */
/* 500 */
                            0x11, 0x0,          /* FC_RP */
/* 502 */ NdrFcShort( 0xfffffe0 ),      /* Offset= -32 (470) */
/* 504 */
                            0x21,               /* FC_BOGUS_ARRAY */
                            0x3,                /* 3 */
/* 506 */ NdrFcShort( 0x0 ),  /* 0 */
/* 508 */ 0x19,               /* Corr desc:  field pointer, FC_ULONG */
                            0x0,                /*  */
/* 510 */ NdrFcShort( 0x0 ),  /* 0 */
/* 512 */ NdrFcLong( 0xffffffff ),      /* -1 */
/* 516 */ 0x4c,               /* FC_EMBEDDED_COMPLEX */
                            0x0,                /* 0 */
/* 518 */ NdrFcShort( 0xffffff40 ),     /* Offset= -192 (326) */
/* 520 */ 0x5c,               /* FC_PAD */
                            0x5b,               /* FC_END */
/* 522 */
                            0x1a,               /* FC_BOGUS_STRUCT */
                            0x3,                /* 3 */
/* 524 */ NdrFcShort( 0x8 ),  /* 8 */
/* 526 */ NdrFcShort( 0x0 ),  /* 0 */
/* 528 */ NdrFcShort( 0x6 ),  /* Offset= 6 (534) */
/* 530 */ 0x8,                /* FC_LONG */
                            0x36,               /* FC_POINTER */
/* 532 */ 0x5c,               /* FC_PAD */
                            0x5b,               /* FC_END */
/* 534 */
                            0x11, 0x0,          /* FC_RP */
/* 536 */ NdrFcShort( 0xfffffe0 ),      /* Offset= -32 (504) */
/* 538 */
                            0x1b,               /* FC_CARRAY */
                            0x3,                /* 3 */
```

```
/* 540 */ NdrFcShort( 0x4 ),  /* 4 */
/* 542 */ 0x19,               /* Corr desc:  field pointer, FC_ULONG */
                              0x0,                /*  */
/* 544 */ NdrFcShort( 0x0 ),  /* 0 */
/* 546 */
                              0x4b,               /* FC_PP */
                              0x5c,               /* FC_PAD */
/* 548 */
                              0x48,               /* FC_VARIABLE_REPEAT */
                              0x49,               /* FC_FIXED_OFFSET */
/* 550 */ NdrFcShort( 0x4 ),  /* 4 */
/* 552 */ NdrFcShort( 0x0 ),  /* 0 */
/* 554 */ NdrFcShort( 0x1 ),  /* 1 */
/* 556 */ NdrFcShort( 0x0 ),  /* 0 */
/* 558 */ NdrFcShort( 0x0 ),  /* 0 */
/* 560 */ 0x12, 0x0,          /* FC_UP */
/* 562 */ NdrFcShort( 0x182 ),          /* Offset= 386 (948) */
/* 564 */
                              0x5b,               /* FC_END */

                              0x8,                /* FC_LONG */
/* 566 */ 0x5c,               /* FC_PAD */
                              0x5b,               /* FC_END */
/* 568 */
                              0x1a,               /* FC_BOGUS_STRUCT */
                              0x3,                /* 3 */
/* 570 */ NdrFcShort( 0x8 ),  /* 8 */
/* 572 */ NdrFcShort( 0x0 ),  /* 0 */
/* 574 */ NdrFcShort( 0x6 ),  /* Offset= 6 (580) */
/* 576 */ 0x8,                /* FC_LONG */
                              0x36,               /* FC_POINTER */
/* 578 */ 0x5c,               /* FC_PAD */
                              0x5b,               /* FC_END */
/* 580 */
                              0x11, 0x0,          /* FC_RP */
/* 582 */ NdrFcShort( 0xfffffd4 ),     /* Offset= -44 (538) */
/* 584 */
                              0x2f,               /* FC_IP */
                              0x5a,               /* FC_CONSTANT_IID */
/* 586 */ NdrFcLong( 0x2f ),  /* 47 */
/* 590 */ NdrFcShort( 0x0 ),  /* 0 */
/* 592 */ NdrFcShort( 0x0 ),  /* 0 */
/* 594 */ 0xc0,               /* 192 */
                              0x0,                /* 0 */
/* 596 */ 0x0,                /* 0 */
                              0x0,                /* 0 */
/* 598 */ 0x0,                /* 0 */
                              0x0,                /* 0 */
/* 600 */ 0x0,                /* 0 */
                              0x46,               /* 70 */
/* 602 */
                              0x1b,               /* FC_CARRAY */
                              0x0,                /* 0 */
/* 604 */ NdrFcShort( 0x1 ),  /* 1 */
/* 606 */ 0x19,               /* Corr desc:  field pointer, FC_ULONG */
                              0x0,                /*  */
/* 608 */ NdrFcShort( 0x4 ),  /* 4 */
/* 610 */ 0x1,                /* FC_BYTE */
                              0x5b,               /* FC_END */
/* 612 */
                              0x1a,               /* FC_BOGUS_STRUCT */
                              0x3,                /* 3 */
/* 614 */ NdrFcShort( 0x10 ), /* 16 */
```

```
/* 616 */ NdrFcShort( 0x0 ),  /* 0 */
/* 618 */ NdrFcShort( 0xa ),  /* Offset= 10 (628) */
/* 620 */ 0x8,                /* FC_LONG */
                              0x8,                /* FC_LONG */
/* 622 */ 0x4c,               /* FC_EMBEDDED_COMPLEX */
                              0x0,                /* 0 */
/* 624 */ NdrFcShort( 0xfffffd8 ),     /* Offset= -40 (584) */
/* 626 */ 0x36,               /* FC_POINTER */
                              0x5b,               /* FC_END */
/* 628 */
                              0x12, 0x0,          /* FC_UP */
/* 630 */ NdrFcShort( 0xffffffe4 ),     /* Offset= -28 (602) */
/* 632 */
                              0x1b,               /* FC_CARRAY */
                              0x3,                /* 3 */
/* 634 */ NdrFcShort( 0x4 ),  /* 4 */
/* 636 */ 0x19,               /* Corr desc:  field pointer, FC_ULONG */
                              0x0,                /*  */
/* 638 */ NdrFcShort( 0x0 ),  /* 0 */
/* 640 */
                              0x4b,               /* FC_PP */
                              0x5c,               /* FC_PAD */
/* 642 */
                              0x48,               /* FC_VARIABLE_REPEAT */
                              0x49,               /* FC_FIXED_OFFSET */
/* 644 */ NdrFcShort( 0x4 ),  /* 4 */
/* 646 */ NdrFcShort( 0x0 ),  /* 0 */
/* 648 */ NdrFcShort( 0x1 ),  /* 1 */
/* 650 */ NdrFcShort( 0x0 ),  /* 0 */
/* 652 */ NdrFcShort( 0x0 ),  /* 0 */
/* 654 */ 0x12, 0x0,          /* FC_UP */
/* 656 */ NdrFcShort( 0xfffffd4 ),     /* Offset= -44 (612) */
/* 658 */
                              0x5b,               /* FC_END */

                              0x8,                /* FC_LONG */
/* 660 */ 0x5c,               /* FC_PAD */
                              0x5b,               /* FC_END */
/* 662 */
                              0x1a,               /* FC_BOGUS_STRUCT */
                              0x3,                /* 3 */
/* 664 */ NdrFcShort( 0x8 ),  /* 8 */
/* 666 */ NdrFcShort( 0x0 ),  /* 0 */
/* 668 */ NdrFcShort( 0x6 ),  /* Offset= 6 (674) */
/* 670 */ 0x8,                /* FC_LONG */
                              0x36,               /* FC_POINTER */
/* 672 */ 0x5c,               /* FC_PAD */
                              0x5b,               /* FC_END */
/* 674 */
                              0x11, 0x0,          /* FC_RP */
/* 676 */ NdrFcShort( 0xfffffd4 ),     /* Offset= -44 (632) */
/* 678 */
                              0x1d,               /* FC_SMFARRAY */
                              0x0,                /* 0 */
/* 680 */ NdrFcShort( 0x8 ),  /* 8 */
/* 682 */ 0x2,                /* FC_CHAR */
                              0x5b,               /* FC_END */
/* 684 */
                              0x15,               /* FC_STRUCT */
                              0x3,                /* 3 */
/* 686 */ NdrFcShort( 0x10 ), /* 16 */
/* 688 */ 0x8,                /* FC_LONG */
                              0x6,                /* FC_SHORT */
```

```
/* 690 */ 0x6,              /* FC_SHORT */
                            0x4c,              /* FC_EMBEDDED_COMPLEX */
/* 692 */ 0x0,              /* 0 */
                            NdrFcShort( 0xfffffff1 ),     /* Offset= -15 (678) */
                            0x5b,              /* FC_END */
/* 696 */
                            0x1a,              /* FC_BOGUS_STRUCT */
                            0x3,               /* 3 */
/* 698 */ NdrFcShort( 0x18 ), /* 24 */
/* 700 */ NdrFcShort( 0x0 ),  /* 0 */
/* 702 */ NdrFcShort( 0xa ),  /* Offset= 10 (712) */
/* 704 */ 0x8,              /* FC_LONG */
                            0x36,              /* FC_POINTER */
/* 706 */ 0x4c,             /* FC_EMBEDDED_COMPLEX */
                            0x0,               /* 0 */
/* 708 */ NdrFcShort( 0xffffffe8 ),     /* Offset= -24 (684) */
/* 710 */ 0x5c,             /* FC_PAD */
                            0x5b,              /* FC_END */
/* 712 */
                            0x11, 0x0,         /* FC_RP */
/* 714 */ NdrFcShort( 0xffffff0c ),     /* Offset= -244 (470) */
/* 716 */
                            0x1b,              /* FC_CARRAY */
                            0x0,               /* 0 */
/* 718 */ NdrFcShort( 0x1 ),  /* 1 */
/* 720 */ 0x19,             /* Corr desc:  field pointer, FC_ULONG */
                            0x0,               /*  */
/* 722 */ NdrFcShort( 0x0 ),  /* 0 */
/* 724 */ 0x1,              /* FC_BYTE */
                            0x5b,              /* FC_END */
/* 726 */
                            0x16,              /* FC_PSTRUCT */
                            0x3,               /* 3 */
/* 728 */ NdrFcShort( 0x8 ),  /* 8 */
/* 730 */
                            0x4b,              /* FC_PP */
                            0x5c,              /* FC_PAD */
/* 732 */
                            0x46,              /* FC_NO_REPEAT */
                            0x5c,              /* FC_PAD */
/* 734 */ NdrFcShort( 0x4 ),  /* 4 */
/* 736 */ NdrFcShort( 0x4 ),  /* 4 */
/* 738 */ 0x12, 0x0,          /* FC_UP */
/* 740 */ NdrFcShort( 0xffffffe8 ),     /* Offset= -24 (716) */
/* 742 */
                            0x5b,              /* FC_END */

                            0x8,               /* FC_LONG */
/* 744 */ 0x8,              /* FC_LONG */
                            0x5b,              /* FC_END */
/* 746 */
                            0x1b,              /* FC_CARRAY */
                            0x1,               /* 1 */
/* 748 */ NdrFcShort( 0x2 ),  /* 2 */
/* 750 */ 0x19,             /* Corr desc:  field pointer, FC_ULONG */
                            0x0,               /*  */
/* 752 */ NdrFcShort( 0x0 ),  /* 0 */
/* 754 */ 0x6,              /* FC_SHORT */
                            0x5b,              /* FC_END */
/* 756 */
                            0x16,              /* FC_PSTRUCT */
                            0x3,               /* 3 */
/* 758 */ NdrFcShort( 0x8 ),  /* 8 */
```

```
/* 760 */
                            0x4b,              /* FC_PP */
                            0x5c,              /* FC_PAD */
/* 762 */
                            0x46,              /* FC_NO_REPEAT */
                            0x5c,              /* FC_PAD */
/* 764 */ NdrFcShort( 0x4 ),  /* 4 */
/* 766 */ NdrFcShort( 0x4 ),  /* 4 */
/* 768 */ 0x12, 0x0,          /* FC_UP */
/* 770 */ NdrFcShort( 0xffffffe8 ),     /* Offset= -24 (746) */
/* 772 */
                            0x5b,              /* FC_END */

                            0x8,               /* FC_LONG */
/* 774 */ 0x8,              /* FC_LONG */
                            0x5b,              /* FC_END */
/* 776 */
                            0x1b,              /* FC_CARRAY */
                            0x3,               /* 3 */
/* 778 */ NdrFcShort( 0x4 ),  /* 4 */
/* 780 */ 0x19,             /* Corr desc:  field pointer, FC_ULONG */
                            0x0,               /*  */
/* 782 */ NdrFcShort( 0x0 ),  /* 0 */
/* 784 */ 0x8,              /* FC_LONG */
                            0x5b,              /* FC_END */
/* 786 */
                            0x16,              /* FC_PSTRUCT */
                            0x3,               /* 3 */
/* 788 */ NdrFcShort( 0x8 ),  /* 8 */
/* 790 */
                            0x4b,              /* FC_PP */
                            0x5c,              /* FC_PAD */
/* 792 */
                            0x46,              /* FC_NO_REPEAT */
                            0x5c,              /* FC_PAD */
/* 794 */ NdrFcShort( 0x4 ),  /* 4 */
/* 796 */ NdrFcShort( 0x4 ),  /* 4 */
/* 798 */ 0x12, 0x0,          /* FC_UP */
/* 800 */ NdrFcShort( 0xffffffe8 ),     /* Offset= -24 (776) */
/* 802 */
                            0x5b,              /* FC_END */

                            0x8,               /* FC_LONG */
/* 804 */ 0x8,              /* FC_LONG */
                            0x5b,              /* FC_END */
/* 806 */
                            0x1b,              /* FC_CARRAY */
                            0x7,               /* 7 */
/* 808 */ NdrFcShort( 0x8 ),  /* 8 */
/* 810 */ 0x19,             /* Corr desc:  field pointer, FC_ULONG */
                            0x0,               /*  */
/* 812 */ NdrFcShort( 0x0 ),  /* 0 */
/* 814 */ 0xb,              /* FC_HYPER */
                            0x5b,              /* FC_END */
/* 816 */
                            0x16,              /* FC_PSTRUCT */
                            0x3,               /* 3 */
/* 818 */ NdrFcShort( 0x8 ),  /* 8 */
/* 820 */
                            0x4b,              /* FC_PP */
                            0x5c,              /* FC_PAD */
/* 822 */
                            0x46,              /* FC_NO_REPEAT */
```

```
                            0x5c,               /* FC_PAD */
/* 824 */ NdrFcShort( 0x4 ),  /* 4 */
/* 826 */ NdrFcShort( 0x4 ),  /* 4 */
/* 828 */ 0x12, 0x0,          /* FC_UP */
/* 830 */ NdrFcShort( 0xffffffe8 ),     /* Offset= -24 (806) */
/* 832 */
                            0x5b,               /* FC_END */

                            0x8,                /* FC_LONG */
/* 834 */ 0x8,              /* FC_LONG */
                            0x5b,               /* FC_END */
/* 836 */
                            0x15,               /* FC_STRUCT */
                            0x3,                /* 3 */
/* 838 */ NdrFcShort( 0x8 ),  /* 8 */
/* 840 */ 0x8,              /* FC_LONG */
                            0x8,                /* FC_LONG */
/* 842 */ 0x5c,             /* FC_PAD */
                            0x5b,               /* FC_END */
/* 844 */
                            0x1b,               /* FC_CARRAY */
                            0x3,                /* 3 */
/* 846 */ NdrFcShort( 0x8 ),  /* 8 */
/* 848 */ 0x7,              /* Corr desc: FC_USHORT */
                            0x0,                /*  */
/* 850 */ NdrFcShort( 0xffd8 ),         /* -40 */
/* 852 */ 0x4c,             /* FC_EMBEDDED_COMPLEX */
                            0x0,                /* 0 */
/* 854 */ NdrFcShort( 0xfffffffe ),     /* Offset= -18 (836) */
/* 856 */ 0x5c,             /* FC_PAD */
                            0x5b,               /* FC_END */
/* 858 */
                            0x1a,               /* FC_BOGUS_STRUCT */
                            0x3,                /* 3 */
/* 860 */ NdrFcShort( 0x28 ), /* 40 */
/* 862 */ NdrFcShort( 0xfffffffe ),     /* Offset= -18 (844) */
/* 864 */ NdrFcShort( 0x0 ),  /* Offset= 0 (864) */
/* 866 */ 0x6,              /* FC_SHORT */
                            0x6,                /* FC_SHORT */
/* 868 */ 0x38,             /* FC_ALIGNM4 */
                            0x8,                /* FC_LONG */
/* 870 */ 0x8,              /* FC_LONG */
                            0x4c,               /* FC_EMBEDDED_COMPLEX */
/* 872 */ 0x0,              /* 0 */
                            NdrFcShort( 0xfffffdf7 ),     /* Offset= -521 (352) */
                            0x5b,               /* FC_END */
/* 876 */
                            0x12, 0x0,          /* FC_UP */
/* 878 */ NdrFcShort( 0xfffffef6 ),     /* Offset= -266 (612) */
/* 880 */
                            0x12, 0x8,          /* FC_UP [simple_pointer] */
/* 882 */ 0x1,              /* FC_BYTE */
                            0x5c,               /* FC_PAD */
/* 884 */
                            0x12, 0x8,          /* FC_UP [simple_pointer] */
/* 886 */ 0x6,              /* FC_SHORT */
                            0x5c,               /* FC_PAD */
/* 888 */
                            0x12, 0x8,          /* FC_UP [simple_pointer] */
/* 890 */ 0x8,              /* FC_LONG */
                            0x5c,               /* FC_PAD */
/* 892 */
                            0x12, 0x8,          /* FC_UP [simple_pointer] */
/* 894 */ 0xa,              /* FC_FLOAT */
                            0x5c,               /* FC_PAD */
/* 896 */
                            0x12, 0x8,          /* FC_UP [simple_pointer] */
/* 898 */ 0xc,              /* FC_DOUBLE */
                            0x5c,               /* FC_PAD */
/* 900 */
                            0x12, 0x0,          /* FC_UP */
/* 902 */ NdrFcShort( 0xfffffd90 ),     /* Offset= -624 (278) */
/* 904 */
                            0x12, 0x10,         /* FC_UP [pointer_deref] */
/* 906 */ NdrFcShort( 0xfffffd92 ),     /* Offset= -622 (284) */
/* 908 */
                            0x12, 0x10,         /* FC_UP [pointer_deref] */
/* 910 */ NdrFcShort( 0xfffffda6 ),     /* Offset= -602 (308) */
/* 912 */
                            0x12, 0x10,         /* FC_UP [pointer_deref] */
/* 914 */ NdrFcShort( 0xfffffdb4 ),     /* Offset= -588 (326) */
/* 916 */
                            0x12, 0x10,         /* FC_UP [pointer_deref] */
/* 918 */ NdrFcShort( 0xfffffdc2 ),     /* Offset= -574 (344) */
/* 920 */
                            0x12, 0x10,         /* FC_UP [pointer_deref] */
/* 922 */ NdrFcShort( 0x2 ),  /* Offset= 2 (924) */
/* 924 */
                            0x12, 0x0,          /* FC_UP */
/* 926 */ NdrFcShort( 0x16 ), /* Offset= 22 (948) */
/* 928 */
                            0x15,               /* FC_STRUCT */
                            0x7,                /* 7 */
/* 930 */ NdrFcShort( 0x10 ), /* 16 */
/* 932 */ 0x6,              /* FC_SHORT */
                            0x1,                /* FC_BYTE */
/* 934 */ 0x1,              /* FC_BYTE */
                            0x38,               /* FC_ALIGNM4 */
/* 936 */ 0x8,              /* FC_LONG */
                            0x39,               /* FC_ALIGNM8 */
/* 938 */ 0xb,              /* FC_HYPER */
                            0x5b,               /* FC_END */
/* 940 */
                            0x12, 0x0,          /* FC_UP */
/* 942 */ NdrFcShort( 0xfffffff2 ),     /* Offset= -14 (928) */
/* 944 */
                            0x12, 0x8,          /* FC_UP [simple_pointer] */
/* 946 */ 0x2,              /* FC_CHAR */
                            0x5c,               /* FC_PAD */
/* 948 */
                            0x1a,               /* FC_BOGUS_STRUCT */
                            0x7,                /* 7 */
/* 950 */ NdrFcShort( 0x20 ), /* 32 */
/* 952 */ NdrFcShort( 0x0 ),  /* 0 */
/* 954 */ NdrFcShort( 0x0 ),  /* Offset= 0 (954) */
/* 956 */ 0x8,              /* FC_LONG */
                            0x8,                /* FC_LONG */
/* 958 */ 0x6,              /* FC_SHORT */
                            0x6,                /* FC_SHORT */
/* 960 */ 0x6,              /* FC_SHORT */
                            0x6,                /* FC_SHORT */
/* 962 */ 0x4c,             /* FC_EMBEDDED_COMPLEX */
                            0x0,                /* 0 */
/* 964 */ NdrFcShort( 0xfffffc42 ),     /* Offset= -958 (6) */
/* 966 */ 0x5c,             /* FC_PAD */
                            0x5b,               /* FC_END */
```

```
/* 968 */ 0xb4,              /* FC_USER_MARSHAL */
                              0x83,              /* 131 */
/* 970 */ NdrFcShort( 0x0 ),  /* 0 */
/* 972 */ NdrFcShort( 0x10 ), /* 16 */
/* 974 */ NdrFcShort( 0x0 ),  /* 0 */
/* 976 */ NdrFcShort( 0xfffffc32 ),     /* Offset= -974 (2) */
/* 978 */
                              0x11, 0x4,          /* FC_RP [alloced_on_stack] */
/* 980 */ NdrFcShort( 0x6 ),  /* Offset= 6 (986) */
/* 982 */
                              0x13, 0x0,          /* FC_OP */
/* 984 */ NdrFcShort( 0xffffffdc ),     /* Offset= -36 (948) */
/* 986 */ 0xb4,              /* FC_USER_MARSHAL */
                              0x83,              /* 131 */
/* 988 */ NdrFcShort( 0x0 ),  /* 0 */
/* 990 */ NdrFcShort( 0x10 ), /* 16 */
/* 992 */ NdrFcShort( 0x0 ),  /* 0 */
/* 994 */ NdrFcShort( 0xfffffff4 ),     /* Offset= -12 (982) */

                              0x0

        }
    };

const CInterfaceProxyVtbl * _tpcc_com_ps_ProxyVtblList[] =
{
    ( CInterfaceProxyVtbl *) &_ITPCCProxyVtbl,
    0
};

const CInterfaceStubVtbl * _tpcc_com_ps_StubVtblList[] =
{
    ( CInterfaceStubVtbl *) &_ITPCCStubVtbl,
    0
};

PCInterfaceName const _tpcc_com_ps_InterfaceNamesList[] =
{
    "ITPCC",
    0
};


#define _tpcc_com_ps_CHECK_IID(n)       IID_GENERIC_CHECK_IID( _tpcc_com_ps, pIID, n)

int __stdcall _tpcc_com_ps_IID_Lookup( const IID * pIID, int * pIndex )
{

    if(!_tpcc_com_ps_CHECK_IID(0))
        {
        *pIndex = 0;
        return 1;
        }

    return 0;
}

const ExtendedProxyFileInfo tpcc_com_ps_ProxyFileInfo =
{
    (PCInterfaceProxyVtblList *) & _tpcc_com_ps_ProxyVtblList,
    (PCInterfaceStubVtblList *) & _tpcc_com_ps_StubVtblList,
    (const PCInterfaceName * ) & _tpcc_com_ps_InterfaceNamesList,
    0, // no delegation
    & _tpcc_com_ps_IID_Lookup,
    1,
    2,
    0, /* table of [async_uuid] interfaces */
    0, /* Filler1 */
    0, /* Filler2 */
    0  /* Filler3 */
};


#endif /* !defined(_M_IA64) && !defined(_M_AXP64)*/


#pragma warning( disable: 4049 )  /* more than 64k source lines */

/* this ALWAYS GENERATED file contains the proxy stub code */


 /* File created by MIDL compiler version 5.03.0280 */
/* at Sat Apr 08 16:40:10 2000
 */
/* Compiler settings for .\src\tpcc_com_ps.idl:
    Oicf (OptLev=i2), W1, Zp8, env=Win64 (32b run,appending), ms_ext, c_ext, robust
    error checks: allocation ref bounds_check enum stub_data
    VC __declspec() decoration level:
         __declspec(uuid()), __declspec(selectany), __declspec(novtable)
         DECLSPEC_UUID(), MIDL_INTERFACE()
*/
//@@MIDL_FILE_HEADING(  )

#if defined(_M_IA64) || defined(_M_AXP64)
#define USE_STUBLESS_PROXY


/* verify that the <rpcproxy.h> version is high enough to compile this file*/
#ifndef __REDQ_RPCPROXY_H_VERSION__
#define __REQUIRED_RPCPROXY_H_VERSION__ 475
#endif


#include "rpcproxy.h"
#ifndef __RPCPROXY_H_VERSION__
#error this stub requires an updated version of <rpcproxy.h>
#endif // __RPCPROXY_H_VERSION__


#include "tpcc_com_ps.h"

#define TYPE_FORMAT_STRING_SIZE   979
#define PROC_FORMAT_STRING_SIZE   253
#define TRANSMIT_AS_TABLE_SIZE    0
#define WIRE_MARSHAL_TABLE_SIZE   1

typedef struct _MIDL_TYPE_FORMAT_STRING
    {
    short          Pad;
    unsigned char  Format[ TYPE_FORMAT_STRING_SIZE ];
    } MIDL_TYPE_FORMAT_STRING;

typedef struct _MIDL_PROC_FORMAT_STRING
    {
    short          Pad;
    unsigned char  Format[ PROC_FORMAT_STRING_SIZE ];
    } MIDL_PROC_FORMAT_STRING;
```

```
extern const MIDL_TYPE_FORMAT_STRING __MIDL_TypeFormatString;
extern const MIDL_PROC_FORMAT_STRING __MIDL_ProcFormatString;


/* Standard interface: __MIDL_itf_tpcc_com_ps_0000, ver. 0.0,
   GUID={0x00000000,0x0000,0x0000,{0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00}} */


/* Object interface: IUnknown, ver. 0.0,
   GUID={0x00000000,0x0000,0x0000,{0xC0,0x00,0x00,0x00,0x00,0x00,0x00,0x46}} */


/* Object interface: ITPCC, ver. 0.0,
   GUID={0xFEEE6AA2,0x84B1,0x11d2,{0xBA,0x47,0x00,0xC0,0x4F,0xBF,0xE0,0x8B}} */


extern const MIDL_STUB_DESC Object_StubDesc;


extern const MIDL_SERVER_INFO ITPCC_ServerInfo;

#pragma code_seg(".orpc")
static const unsigned short ITPCC_FormatStringOffsetTable[] =
    {
    0,
    44,
    88,
    132,
    176,
    220
    };

static const MIDL_SERVER_INFO ITPCC_ServerInfo =
    {
    &Object_StubDesc,
    0,
    __MIDL_ProcFormatString.Format,
    &ITPCC_FormatStringOffsetTable[-3],
    0,
    0,
    0,
    0
    };

static const MIDL_STUBLESS_PROXY_INFO ITPCC_ProxyInfo =
    {
    &Object_StubDesc,
    __MIDL_ProcFormatString.Format,
    &ITPCC_FormatStringOffsetTable[-3],
    0,
    0,
    0
    };

CINTERFACE_PROXY_VTABLE(9) _ITPCCProxyVtbl =
{
    &ITPCC_ProxyInfo,
    &IID_ITPCC,
    IUnknown_QueryInterface_Proxy,
    IUnknown_AddRef_Proxy,
    IUnknown_Release_Proxy ,
    (void *)-1 /* ITPCC::NewOrder */ ,
    (void *)-1 /* ITPCC::Payment */ ,
    (void *)-1 /* ITPCC::Delivery */ ,
    (void *)-1 /* ITPCC::StockLevel */ ,
    (void *)-1 /* ITPCC::OrderStatus */ ,
    (void *)-1 /* ITPCC::CallSetComplete */
};

const CInterfaceStubVtbl _ITPCCStubVtbl =
{
    &IID_ITPCC,
    &ITPCC_ServerInfo,
    9,
    0, /* pure interpreted */
    CStdStubBuffer_METHODS
};

extern const USER_MARSHAL_ROUTINE_QUADRUPLE UserMarshalRoutines[ WIRE_MARSHAL_TABLE_SIZE
];

static const MIDL_STUB_DESC Object_StubDesc =
    {
    0,
    NdrOleAllocate,
    NdrOleFree,
    0,
    0,
    0,
    0,
    0,
    __MIDL_TypeFormatString.Format,
    1, /* -error bounds_check flag */
    0x50002, /* Ndr library version */
    0,
    0x5030118, /* MIDL Version 5.4.280 */
    0,
    UserMarshalRoutines,
    0,  /* notify & notify_flag routine table */
    0x1, /* MIDL flag */
    0,  /* Reserved3 */
    0,  /* Reserved4 */
    0   /* Reserved5 */
    };

#pragma data_seg(".rdata")

static const USER_MARSHAL_ROUTINE_QUADRUPLE UserMarshalRoutines[ WIRE_MARSHAL_TABLE_SIZE
] =
        {

            {
            VARIANT_UserSize
            ,VARIANT_UserMarshal
            ,VARIANT_UserUnmarshal
            ,VARIANT_UserFree
            }

        };


#if !defined(__RPC_WIN64__)
#error  Invalid build platform for this stub.
#endif
```

```
static const MIDL_PROC_FORMAT_STRING __MIDL_ProcFormatString =
    {
        0,
        {

          /* Procedure NewOrder */

                                0x33,               /* FC_AUTO_HANDLE */
                                0x6c,               /* Old Flags:  object, Oi2 */
/*  2 */  NdrFcLong( 0x0 ),   /* 0 */
/*  6 */  NdrFcShort( 0x3 ),  /* 3 */
#ifndef _ALPHA_
/*  8 */  NdrFcShort( 0x38 ), /* ia64 Stack size/offset = 56 */
#else
                                NdrFcShort( 0x30 ), /* axp64 Stack size/offset = 48 */
#endif
/* 10 */  NdrFcShort( 0x0 ),  /* 0 */
/* 12 */  NdrFcShort( 0x8 ),  /* 8 */
/* 14 */  0x47,               /* Oi2 Flags:  srv must size, clt must size, has return,
has ext, */
                                0x3,                /* 3 */
/* 16 */  0xa,                /* 10 */
                                0x7,                /* Ext Flags:  new corr desc, clt corr
check, srv corr check, */
/* 18 */  NdrFcShort( 0x20 ), /* 32 */
/* 20 */  NdrFcShort( 0x20 ), /* 32 */
/* 22 */  NdrFcShort( 0x0 ),  /* 0 */
/* 24 */  NdrFcShort( 0x0 ),  /* 0 */

          /* Parameter txn_in */

/* 26 */  NdrFcShort( 0x8b ), /* Flags:  must size, must free, in, by val, */
#ifndef _ALPHA_
/* 28 */  NdrFcShort( 0x10 ), /* ia64 Stack size/offset = 16 */
#else
                                NdrFcShort( 0x8 ),  /* axp64 Stack size/offset = 8 */
#endif
/* 30 */  NdrFcShort( 0x3b6 ),          /* Type Offset=950 */

          /* Parameter txn_out */

/* 32 */  NdrFcShort( 0x6113 ),         /* Flags:  must size, must free, out, simple ref,
srv alloc size=24 */
#ifndef _ALPHA_
/* 34 */  NdrFcShort( 0x28 ), /* ia64 Stack size/offset = 40 */
#else
                                NdrFcShort( 0x20 ), /* axp64 Stack size/offset = 32 */
#endif
/* 36 */  NdrFcShort( 0x3c8 ),          /* Type Offset=968 */

          /* Return value */

/* 38 */  NdrFcShort( 0x70 ), /* Flags:  out, return, base type, */
#ifndef _ALPHA_
/* 40 */  NdrFcShort( 0x30 ), /* ia64 Stack size/offset = 48 */
#else
                                NdrFcShort( 0x28 ), /* axp64 Stack size/offset = 40 */
#endif
/* 42 */  0x8,                /* FC_LONG */
                                0x0,                /* 0 */

          /* Procedure Payment */

/* 44 */  0x33,               /* FC_AUTO_HANDLE */
                                0x6c,               /* Old Flags:  object, Oi2 */
/* 46 */  NdrFcLong( 0x0 ),   /* 0 */
/* 50 */  NdrFcShort( 0x4 ),  /* 4 */
#ifndef _ALPHA_
/* 52 */  NdrFcShort( 0x38 ), /* ia64 Stack size/offset = 56 */
#else
                                NdrFcShort( 0x30 ), /* axp64 Stack size/offset = 48 */
#endif
/* 54 */  NdrFcShort( 0x0 ),  /* 0 */
/* 56 */  NdrFcShort( 0x8 ),  /* 8 */
/* 58 */  0x47,               /* Oi2 Flags:  srv must size, clt must size, has return,
has ext, */
                                0x3,                /* 3 */
/* 60 */  0xa,                /* 10 */
                                0x7,                /* Ext Flags:  new corr desc, clt corr
check, srv corr check, */
/* 62 */  NdrFcShort( 0x20 ), /* 32 */
/* 64 */  NdrFcShort( 0x20 ), /* 32 */
/* 66 */  NdrFcShort( 0x0 ),  /* 0 */
/* 68 */  NdrFcShort( 0x0 ),  /* 0 */

          /* Parameter txn_in */

/* 70 */  NdrFcShort( 0x8b ), /* Flags:  must size, must free, in, by val, */
#ifndef _ALPHA_
/* 72 */  NdrFcShort( 0x10 ), /* ia64 Stack size/offset = 16 */
#else
                                NdrFcShort( 0x8 ),  /* axp64 Stack size/offset = 8 */
#endif
/* 74 */  NdrFcShort( 0x3b6 ),          /* Type Offset=950 */

          /* Parameter txn_out */

/* 76 */  NdrFcShort( 0x6113 ),         /* Flags:  must size, must free, out, simple ref,
srv alloc size=24 */
#ifndef _ALPHA_
/* 78 */  NdrFcShort( 0x28 ), /* ia64 Stack size/offset = 40 */
#else
                                NdrFcShort( 0x20 ), /* axp64 Stack size/offset = 32 */
#endif
/* 80 */  NdrFcShort( 0x3c8 ),          /* Type Offset=968 */

          /* Return value */

/* 82 */  NdrFcShort( 0x70 ), /* Flags:  out, return, base type, */
#ifndef _ALPHA_
/* 84 */  NdrFcShort( 0x30 ), /* ia64 Stack size/offset = 48 */
#else
                                NdrFcShort( 0x28 ), /* axp64 Stack size/offset = 40 */
#endif
/* 86 */  0x8,                /* FC_LONG */
                                0x0,                /* 0 */

          /* Procedure Delivery */

/* 88 */  0x33,               /* FC_AUTO_HANDLE */
                                0x6c,               /* Old Flags:  object, Oi2 */
/* 90 */  NdrFcLong( 0x0 ),   /* 0 */
/* 94 */  NdrFcShort( 0x5 ),  /* 5 */
#ifndef _ALPHA_
/* 96 */  NdrFcShort( 0x38 ), /* ia64 Stack size/offset = 56 */
```

```
#else
                            NdrFcShort( 0x30 ), /* axp64 Stack size/offset = 48 */
#endif
/* 98 */  NdrFcShort( 0x0 ),  /* 0 */
/* 100 */ NdrFcShort( 0x8 ),  /* 8 */
/* 102 */ 0x47,               /* Oi2 Flags:  srv must size, clt must size, has return,
has ext, */
                            0x3,                /* 3 */
/* 104 */ 0xa,              /* 10 */
                            0x7,                /* Ext Flags:  new corr desc, clt corr
check, srv corr check, */
/* 106 */ NdrFcShort( 0x20 ), /* 32 */
/* 108 */ NdrFcShort( 0x20 ), /* 32 */
/* 110 */ NdrFcShort( 0x0 ),  /* 0 */
/* 112 */ NdrFcShort( 0x0 ),  /* 0 */

          /* Parameter txn_in */

/* 114 */ NdrFcShort( 0x8b ), /* Flags:  must size, must free, in, by val, */
#ifndef _ALPHA_
/* 116 */ NdrFcShort( 0x10 ), /* ia64 Stack size/offset = 16 */
#else
                            NdrFcShort( 0x8 ),  /* axp64 Stack size/offset = 8 */
#endif
/* 118 */ NdrFcShort( 0x3b6 ),          /* Type Offset=950 */

          /* Parameter txn_out */

/* 120 */ NdrFcShort( 0x6113 ),         /* Flags:  must size, must free, out, simple ref,
srv alloc size=24 */
#ifndef _ALPHA_
/* 122 */ NdrFcShort( 0x28 ), /* ia64 Stack size/offset = 40 */
#else
                            NdrFcShort( 0x20 ), /* axp64 Stack size/offset = 32 */
#endif
/* 124 */ NdrFcShort( 0x3c8 ),          /* Type Offset=968 */

          /* Return value */

/* 126 */ NdrFcShort( 0x70 ), /* Flags:  out, return, base type, */
#ifndef _ALPHA_
/* 128 */ NdrFcShort( 0x30 ), /* ia64 Stack size/offset = 48 */
#else
                            NdrFcShort( 0x28 ), /* axp64 Stack size/offset = 40 */
#endif
/* 130 */ 0x8,                /* FC_LONG */
                            0x0,                /* 0 */

          /* Procedure StockLevel */

/* 132 */ 0x33,               /* FC_AUTO_HANDLE */
                            0x6c,               /* Old Flags:  object, Oi2 */
/* 134 */ NdrFcLong( 0x0 ),   /* 0 */
/* 138 */ NdrFcShort( 0x6 ),  /* 6 */
#ifndef _ALPHA_
/* 140 */ NdrFcShort( 0x38 ), /* ia64 Stack size/offset = 56 */
#else
                            NdrFcShort( 0x30 ), /* axp64 Stack size/offset = 48 */
#endif
/* 142 */ NdrFcShort( 0x0 ),  /* 0 */
/* 144 */ NdrFcShort( 0x8 ),  /* 8 */
/* 146 */ 0x47,               /* Oi2 Flags:  srv must size, clt must size, has return,
has ext, */
                            0x3,                /* 3 */
/* 148 */ 0xa,              /* 10 */
                            0x7,                /* Ext Flags:  new corr desc, clt corr
check, srv corr check, */
/* 150 */ NdrFcShort( 0x20 ), /* 32 */
/* 152 */ NdrFcShort( 0x20 ), /* 32 */
/* 154 */ NdrFcShort( 0x0 ),  /* 0 */
/* 156 */ NdrFcShort( 0x0 ),  /* 0 */

          /* Parameter txn_in */

/* 158 */ NdrFcShort( 0x8b ), /* Flags:  must size, must free, in, by val, */
#ifndef _ALPHA_
/* 160 */ NdrFcShort( 0x10 ), /* ia64 Stack size/offset = 16 */
#else
                            NdrFcShort( 0x8 ),  /* axp64 Stack size/offset = 8 */
#endif
/* 162 */ NdrFcShort( 0x3b6 ),          /* Type Offset=950 */

          /* Parameter txn_out */

/* 164 */ NdrFcShort( 0x6113 ),         /* Flags:  must size, must free, out, simple ref,
srv alloc size=24 */
#ifndef _ALPHA_
/* 166 */ NdrFcShort( 0x28 ), /* ia64 Stack size/offset = 40 */
#else
                            NdrFcShort( 0x20 ), /* axp64 Stack size/offset = 32 */
#endif
/* 168 */ NdrFcShort( 0x3c8 ),          /* Type Offset=968 */

          /* Return value */

/* 170 */ NdrFcShort( 0x70 ), /* Flags:  out, return, base type, */
#ifndef _ALPHA_
/* 172 */ NdrFcShort( 0x30 ), /* ia64 Stack size/offset = 48 */
#else
                            NdrFcShort( 0x28 ), /* axp64 Stack size/offset = 40 */
#endif
/* 174 */ 0x8,                /* FC_LONG */
                            0x0,                /* 0 */

          /* Procedure OrderStatus */

/* 176 */ 0x33,               /* FC_AUTO_HANDLE */
                            0x6c,               /* Old Flags:  object, Oi2 */
/* 178 */ NdrFcLong( 0x0 ),   /* 0 */
/* 182 */ NdrFcShort( 0x7 ),  /* 7 */
#ifndef _ALPHA_
/* 184 */ NdrFcShort( 0x38 ), /* ia64 Stack size/offset = 56 */
#else
                            NdrFcShort( 0x30 ), /* axp64 Stack size/offset = 48 */
#endif
/* 186 */ NdrFcShort( 0x0 ),  /* 0 */
/* 188 */ NdrFcShort( 0x8 ),  /* 8 */
/* 190 */ 0x47,               /* Oi2 Flags:  srv must size, clt must size, has return,
has ext, */
                            0x3,                /* 3 */
/* 192 */ 0xa,              /* 10 */
                            0x7,                /* Ext Flags:  new corr desc, clt corr
check, srv corr check, */
/* 194 */ NdrFcShort( 0x20 ), /* 32 */
/* 196 */ NdrFcShort( 0x20 ), /* 32 */
/* 198 */ NdrFcShort( 0x0 ),  /* 0 */
```

```
/* 200 */ NdrFcShort( 0x0 ),  /* 0 */

         /* Parameter txn_in */

/* 202 */ NdrFcShort( 0x8b ), /* Flags:  must size, must free, in, by val, */
#ifndef _ALPHA_
/* 204 */ NdrFcShort( 0x10 ), /* ia64 Stack size/offset = 16 */
#else
                              NdrFcShort( 0x8 ),  /* axp64 Stack size/offset = 8 */
#endif
/* 206 */ NdrFcShort( 0x3b6 ),          /* Type Offset=950 */

         /* Parameter txn_out */

/* 208 */ NdrFcShort( 0x6113 ),         /* Flags:  must size, must free, out, simple ref,
srv alloc size=24 */
#ifndef _ALPHA_
/* 210 */ NdrFcShort( 0x28 ), /* ia64 Stack size/offset = 40 */
#else
                              NdrFcShort( 0x20 ), /* axp64 Stack size/offset = 32 */
#endif
/* 212 */ NdrFcShort( 0x3c8 ),          /* Type Offset=968 */

         /* Return value */

/* 214 */ NdrFcShort( 0x70 ), /* Flags:  out, return, base type, */
#ifndef _ALPHA_
/* 216 */ NdrFcShort( 0x30 ), /* ia64 Stack size/offset = 48 */
#else
                              NdrFcShort( 0x28 ), /* axp64 Stack size/offset = 40 */
#endif
/* 218 */ 0x8,                /* FC_LONG */
                              0x0,                /* 0 */

         /* Procedure CallSetComplete */

/* 220 */ 0x33,               /* FC_AUTO_HANDLE */
                              0x6c,               /* Old Flags:  object, Oi2 */
/* 222 */ NdrFcLong( 0x0 ),   /* 0 */
/* 226 */ NdrFcShort( 0x8 ),  /* 8 */
/* 228 */ NdrFcShort( 0x10 ), /* ia64, axp64 Stack size/offset = 16 */
/* 230 */ NdrFcShort( 0x0 ),  /* 0 */
/* 232 */ NdrFcShort( 0x8 ),  /* 8 */
/* 234 */ 0x44,               /* Oi2 Flags:  has return, has ext, */
                              0x1,                /* 1 */
/* 236 */ 0xa,                /* 10 */
                              0x1,                /* Ext Flags:  new corr desc, */
/* 238 */ NdrFcShort( 0x0 ),  /* 0 */
/* 240 */ NdrFcShort( 0x0 ),  /* 0 */
/* 242 */ NdrFcShort( 0x0 ),  /* 0 */
/* 244 */ NdrFcShort( 0x0 ),  /* 0 */

         /* Return value */

/* 246 */ NdrFcShort( 0x70 ), /* Flags:  out, return, base type, */
/* 248 */ NdrFcShort( 0x8 ),  /* ia64, axp64 Stack size/offset = 8 */
/* 250 */ 0x8,                /* FC_LONG */
                              0x0,                /* 0 */

                              0x0

        }
    };
```

```
static const MIDL_TYPE_FORMAT_STRING __MIDL_TypeFormatString =
    {
        0,
        {
                                  NdrFcShort( 0x0 ),  /* 0 */
/*  2 */
                                  0x12, 0x0,          /* FC_UP */
/*  4 */  NdrFcShort( 0x39e ),          /* Offset= 926 (930) */
/*  6 */
                                  0x2b,               /* FC_NON_ENCAPSULATED_UNION */
                                  0x9,                /* FC_ULONG */
/*  8 */  0x7,                /* Corr desc: FC_USHORT */
                                  0x0,                /*  */
/* 10 */  NdrFcShort( 0xfff8 ),         /* -8 */
/* 12 */  NdrFcShort( 0x1 ),  /* Corr flags:  early, */
/* 14 */  NdrFcShort( 0x2 ),  /* Offset= 2 (16) */
/* 16 */  NdrFcShort( 0x10 ), /* 16 */
/* 18 */  NdrFcShort( 0x2b ), /* 43 */
/* 20 */  NdrFcLong( 0x3 ),   /* 3 */
/* 24 */  NdrFcShort( 0x8008 ),         /* Simple arm type: FC_LONG */
/* 26 */  NdrFcLong( 0x11 ),  /* 17 */
/* 30 */  NdrFcShort( 0x8001 ),         /* Simple arm type: FC_BYTE */
/* 32 */  NdrFcLong( 0x2 ),   /* 2 */
/* 36 */  NdrFcShort( 0x8006 ),         /* Simple arm type: FC_SHORT */
/* 38 */  NdrFcLong( 0x4 ),   /* 4 */
/* 42 */  NdrFcShort( 0x800a ),         /* Simple arm type: FC_FLOAT */
/* 44 */  NdrFcLong( 0x5 ),   /* 5 */
/* 48 */  NdrFcShort( 0x800c ),         /* Simple arm type: FC_DOUBLE */
/* 50 */  NdrFcLong( 0xb ),   /* 11 */
/* 54 */  NdrFcShort( 0x8006 ),         /* Simple arm type: FC_SHORT */
/* 56 */  NdrFcLong( 0xa ),   /* 10 */
/* 60 */  NdrFcShort( 0x8008 ),         /* Simple arm type: FC_LONG */
/* 62 */  NdrFcLong( 0x6 ),   /* 6 */
/* 66 */  NdrFcShort( 0xd6 ), /* Offset= 214 (280) */
/* 68 */  NdrFcLong( 0x7 ),   /* 7 */
/* 72 */  NdrFcShort( 0x800c ),         /* Simple arm type: FC_DOUBLE */
/* 74 */  NdrFcLong( 0x8 ),   /* 8 */
/* 78 */  NdrFcShort( 0xd0 ), /* Offset= 208 (286) */
/* 80 */  NdrFcLong( 0xd ),   /* 13 */
/* 84 */  NdrFcShort( 0xe4 ), /* Offset= 228 (312) */
/* 86 */  NdrFcLong( 0x9 ),   /* 9 */
/* 90 */  NdrFcShort( 0xf0 ), /* Offset= 240 (330) */
/* 92 */  NdrFcLong( 0x2000 ),          /* 8192 */
/* 96 */  NdrFcShort( 0xfc ), /* Offset= 252 (348) */
/* 98 */  NdrFcLong( 0x24 ),  /* 36 */
/* 102 */ NdrFcShort( 0x2f4 ),          /* Offset= 756 (858) */
/* 104 */ NdrFcLong( 0x4024 ),          /* 16420 */
/* 108 */ NdrFcShort( 0x2ee ),          /* Offset= 750 (858) */
/* 110 */ NdrFcLong( 0x4011 ),          /* 16401 */
/* 114 */ NdrFcShort( 0x2ec ),          /* Offset= 748 (862) */
/* 116 */ NdrFcLong( 0x4002 ),          /* 16386 */
/* 120 */ NdrFcShort( 0x2ea ),          /* Offset= 746 (866) */
/* 122 */ NdrFcLong( 0x4003 ),          /* 16387 */
/* 126 */ NdrFcShort( 0x2e8 ),          /* Offset= 744 (870) */
/* 128 */ NdrFcLong( 0x4004 ),          /* 16388 */
/* 132 */ NdrFcShort( 0x2e6 ),          /* Offset= 742 (874) */
/* 134 */ NdrFcLong( 0x4005 ),          /* 16389 */
/* 138 */ NdrFcShort( 0x2e4 ),          /* Offset= 740 (878) */
/* 140 */ NdrFcLong( 0x400b ),          /* 16395 */
/* 144 */ NdrFcShort( 0x2d2 ),          /* Offset= 722 (866) */
/* 146 */ NdrFcLong( 0x400a ),          /* 16394 */
/* 150 */ NdrFcShort( 0x2d0 ),          /* Offset= 720 (870) */
/* 152 */ NdrFcLong( 0x4006 ),          /* 16390 */
```

```
/* 156 */ NdrFcShort( 0x2d6 ),          /* Offset= 726 (882) */
/* 158 */ NdrFcLong( 0x4007 ),          /* 16391 */
/* 162 */ NdrFcShort( 0x2cc ),          /* Offset= 716 (878) */
/* 164 */ NdrFcLong( 0x4008 ),          /* 16392 */
/* 168 */ NdrFcShort( 0x2ce ),          /* Offset= 718 (886) */
/* 170 */ NdrFcLong( 0x400d ),          /* 16397 */
/* 174 */ NdrFcShort( 0x2cc ),          /* Offset= 716 (890) */
/* 176 */ NdrFcLong( 0x4009 ),          /* 16393 */
/* 180 */ NdrFcShort( 0x2ca ),          /* Offset= 714 (894) */
/* 182 */ NdrFcLong( 0x6000 ),          /* 24576 */
/* 186 */ NdrFcShort( 0x2c8 ),          /* Offset= 712 (898) */
/* 188 */ NdrFcLong( 0x400c ),          /* 16396 */
/* 192 */ NdrFcShort( 0x2c6 ),          /* Offset= 710 (902) */
/* 194 */ NdrFcLong( 0x10 ),  /* 16 */
/* 198 */ NdrFcShort( 0x8002 ),         /* Simple arm type: FC_CHAR */
/* 200 */ NdrFcLong( 0x12 ),  /* 18 */
/* 204 */ NdrFcShort( 0x8006 ),         /* Simple arm type: FC_SHORT */
/* 206 */ NdrFcLong( 0x13 ),  /* 19 */
/* 210 */ NdrFcShort( 0x8008 ),         /* Simple arm type: FC_LONG */
/* 212 */ NdrFcLong( 0x16 ),  /* 22 */
/* 216 */ NdrFcShort( 0x8008 ),         /* Simple arm type: FC_LONG */
/* 218 */ NdrFcLong( 0x17 ),  /* 23 */
/* 222 */ NdrFcShort( 0x8008 ),         /* Simple arm type: FC_LONG */
/* 224 */ NdrFcLong( 0xe ),   /* 14 */
/* 228 */ NdrFcShort( 0x2aa ),          /* Offset= 682 (910) */
/* 230 */ NdrFcLong( 0x400e ),          /* 16398 */
/* 234 */ NdrFcShort( 0x2b0 ),          /* Offset= 688 (922) */
/* 236 */ NdrFcLong( 0x4010 ),          /* 16400 */
/* 240 */ NdrFcShort( 0x2ae ),          /* Offset= 686 (926) */
/* 242 */ NdrFcLong( 0x4012 ),          /* 16402 */
/* 246 */ NdrFcShort( 0x26c ),          /* Offset= 620 (866) */
/* 248 */ NdrFcLong( 0x4013 ),          /* 16403 */
/* 252 */ NdrFcShort( 0x26a ),          /* Offset= 618 (870) */
/* 254 */ NdrFcLong( 0x4016 ),          /* 16406 */
/* 258 */ NdrFcShort( 0x264 ),          /* Offset= 612 (870) */
/* 260 */ NdrFcLong( 0x4017 ),          /* 16407 */
/* 264 */ NdrFcShort( 0x25e ),          /* Offset= 606 (870) */
/* 266 */ NdrFcLong( 0x0 ),   /* 0 */
/* 270 */ NdrFcShort( 0x0 ),  /* Offset= 0 (270) */
/* 272 */ NdrFcLong( 0x1 ),   /* 1 */
/* 276 */ NdrFcShort( 0x0 ),  /* Offset= 0 (276) */
/* 278 */ NdrFcShort( 0xffffffff ),     /* Offset= -1 (277) */
/* 280 */
                                0x15,               /* FC_STRUCT */
                                0x7,                /* 7 */
/* 282 */ NdrFcShort( 0x8 ),  /* 8 */
/* 284 */ 0xb,                /* FC_HYPER */
                                0x5b,               /* FC_END */
/* 286 */
                                0x12, 0x0,          /* FC_UP */
/* 288 */ NdrFcShort( 0xe ),  /* Offset= 14 (302) */
/* 290 */
                                0x1b,               /* FC_CARRAY */
                                0x1,                /* 1 */
/* 292 */ NdrFcShort( 0x2 ),  /* 2 */
/* 294 */ 0x9,                /* Corr desc: FC_ULONG */
                                0x0,                /*  */
/* 296 */ NdrFcShort( 0xfffc ),         /* -4 */
/* 298 */ NdrFcShort( 0x1 ),  /* Corr flags:  early, */
/* 300 */ 0x6,                /* FC_SHORT */
                                0x5b,               /* FC_END */
/* 302 */
                                0x17,               /* FC_CSTRUCT */
                                0x3,                /* 3 */
/* 304 */ NdrFcShort( 0x8 ),  /* 8 */
/* 306 */ NdrFcShort( 0xfffffff0 ),     /* Offset= -16 (290) */
/* 308 */ 0x8,                /* FC_LONG */
                                0x8,                /* FC_LONG */
/* 310 */ 0x5c,               /* FC_PAD */
                                0x5b,               /* FC_END */
/* 312 */
                                0x2f,               /* FC_IP */
                                0x5a,               /* FC_CONSTANT_IID */
/* 314 */ NdrFcLong( 0x0 ),   /* 0 */
/* 318 */ NdrFcShort( 0x0 ),  /* 0 */
/* 320 */ NdrFcShort( 0x0 ),  /* 0 */
/* 322 */ 0xc0,               /* 192 */
                                0x0,                /* 0 */
/* 324 */ 0x0,                /* 0 */
                                0x0,                /* 0 */
/* 326 */ 0x0,                /* 0 */
                                0x0,                /* 0 */
/* 328 */ 0x0,                /* 0 */
                                0x46,               /* 70 */
/* 330 */
                                0x2f,               /* FC_IP */
                                0x5a,               /* FC_CONSTANT_IID */
/* 332 */ NdrFcLong( 0x20400 ),         /* 132096 */
/* 336 */ NdrFcShort( 0x0 ),  /* 0 */
/* 338 */ NdrFcShort( 0x0 ),  /* 0 */
/* 340 */ 0xc0,               /* 192 */
                                0x0,                /* 0 */
/* 342 */ 0x0,                /* 0 */
                                0x0,                /* 0 */
/* 344 */ 0x0,                /* 0 */
                                0x0,                /* 0 */
/* 346 */ 0x0,                /* 0 */
                                0x46,               /* 70 */
/* 348 */
                                0x12, 0x10,         /* FC_UP [pointer_deref] */
/* 350 */ NdrFcShort( 0x2 ),  /* Offset= 2 (352) */
/* 352 */
                                0x12, 0x0,          /* FC_UP */
/* 354 */ NdrFcShort( 0x1e6 ),          /* Offset= 486 (840) */
/* 356 */
                                0x2a,               /* FC_ENCAPSULATED_UNION */
                                0x89,               /* 137 */
/* 358 */ NdrFcShort( 0x20 ), /* 32 */
/* 360 */ NdrFcShort( 0xa ),  /* 10 */
/* 362 */ NdrFcLong( 0x8 ),   /* 8 */
/* 366 */ NdrFcShort( 0x50 ), /* Offset= 80 (446) */
/* 368 */ NdrFcLong( 0xd ),   /* 13 */
/* 372 */ NdrFcShort( 0x70 ), /* Offset= 112 (484) */
/* 374 */ NdrFcLong( 0x9 ),   /* 9 */
/* 378 */ NdrFcShort( 0x90 ), /* Offset= 144 (522) */
/* 380 */ NdrFcLong( 0xc ),   /* 12 */
/* 384 */ NdrFcShort( 0xb0 ), /* Offset= 176 (560) */
/* 386 */ NdrFcLong( 0x24 ),  /* 36 */
/* 390 */ NdrFcShort( 0x104 ),          /* Offset= 260 (650) */
/* 392 */ NdrFcLong( 0x800d ),          /* 32781 */
/* 396 */ NdrFcShort( 0x120 ),          /* Offset= 288 (684) */
/* 398 */ NdrFcLong( 0x10 ),  /* 16 */
/* 402 */ NdrFcShort( 0x13a ),          /* Offset= 314 (716) */
/* 404 */ NdrFcLong( 0x2 ),   /* 2 */
/* 408 */ NdrFcShort( 0x150 ),          /* Offset= 336 (744) */
/* 410 */ NdrFcLong( 0x3 ),   /* 3 */
```

```
/* 414 */ NdrFcShort( 0x166 ),          /* Offset= 358 (772) */
/* 416 */ NdrFcLong( 0x14 ),  /* 20 */
/* 420 */ NdrFcShort( 0x17c ),          /* Offset= 380 (800) */
/* 422 */ NdrFcShort( 0xffffffff ),     /* Offset= -1 (421) */
/* 424 */
                           0x21,               /* FC_BOGUS_ARRAY */
                           0x3,                /* 3 */
/* 426 */ NdrFcShort( 0x0 ),  /* 0 */
/* 428 */ 0x19,               /* Corr desc:  field pointer, FC_ULONG */
                           0x0,                /*  */
/* 430 */ NdrFcShort( 0x0 ),  /* 0 */
/* 432 */ NdrFcShort( 0x1 ),  /* Corr flags:  early, */
/* 434 */ NdrFcLong( 0xffffffff ),      /* -1 */
/* 438 */ NdrFcShort( 0x0 ),  /* Corr flags:  */
/* 440 */
                           0x12, 0x0,          /* FC_UP */
/* 442 */ NdrFcShort( 0xffffff74 ),     /* Offset= -140 (302) */
/* 444 */ 0x5c,               /* FC_PAD */
                           0x5b,               /* FC_END */
/* 446 */
                           0x1a,               /* FC_BOGUS_STRUCT */
                           0x3,                /* 3 */
/* 448 */ NdrFcShort( 0x10 ), /* 16 */
/* 450 */ NdrFcShort( 0x0 ),  /* 0 */
/* 452 */ NdrFcShort( 0x6 ),  /* Offset= 6 (458) */
/* 454 */ 0x8,                /* FC_LONG */
                           0x39,               /* FC_ALIGNM8 */
/* 456 */ 0x36,               /* FC_POINTER */
                           0x5b,               /* FC_END */
/* 458 */
                           0x11, 0x0,          /* FC_RP */
/* 460 */ NdrFcShort( 0xffffffdc ),     /* Offset= -36 (424) */
/* 462 */
                           0x21,               /* FC_BOGUS_ARRAY */
                           0x3,                /* 3 */
/* 464 */ NdrFcShort( 0x0 ),  /* 0 */
/* 466 */ 0x19,               /* Corr desc:  field pointer, FC_ULONG */
                           0x0,                /*  */
/* 468 */ NdrFcShort( 0x0 ),  /* 0 */
/* 470 */ NdrFcShort( 0x1 ),  /* Corr flags:  early, */
/* 472 */ NdrFcLong( 0xffffffff ),      /* -1 */
/* 476 */ NdrFcShort( 0x0 ),  /* Corr flags:  */
/* 478 */ 0x4c,               /* FC_EMBEDDED_COMPLEX */
                           0x0,                /* 0 */
/* 480 */ NdrFcShort( 0xffffff58 ),     /* Offset= -168 (312) */
/* 482 */ 0x5c,               /* FC_PAD */
                           0x5b,               /* FC_END */
/* 484 */
                           0x1a,               /* FC_BOGUS_STRUCT */
                           0x3,                /* 3 */
/* 486 */ NdrFcShort( 0x10 ), /* 16 */
/* 488 */ NdrFcShort( 0x0 ),  /* 0 */
/* 490 */ NdrFcShort( 0x6 ),  /* Offset= 6 (496) */
/* 492 */ 0x8,                /* FC_LONG */
                           0x39,               /* FC_ALIGNM8 */
/* 494 */ 0x36,               /* FC_POINTER */
                           0x5b,               /* FC_END */
/* 496 */
                           0x11, 0x0,          /* FC_RP */
/* 498 */ NdrFcShort( 0xffffffdc ),     /* Offset= -36 (462) */
/* 500 */
                           0x21,               /* FC_BOGUS_ARRAY */
                           0x3,                /* 3 */
/* 502 */ NdrFcShort( 0x0 ),  /* 0 */
/* 504 */ 0x19,               /* Corr desc:  field pointer, FC_ULONG */
                           0x0,                /*  */
/* 506 */ NdrFcShort( 0x0 ),  /* 0 */
/* 508 */ NdrFcShort( 0x1 ),  /* Corr flags:  early, */
/* 510 */ NdrFcLong( 0xffffffff ),      /* -1 */
/* 514 */ NdrFcShort( 0x0 ),  /* Corr flags:  */
/* 516 */ 0x4c,               /* FC_EMBEDDED_COMPLEX */
                           0x0,                /* 0 */
/* 518 */ NdrFcShort( 0xffffff44 ),     /* Offset= -188 (330) */
/* 520 */ 0x5c,               /* FC_PAD */
                           0x5b,               /* FC_END */
/* 522 */
                           0x1a,               /* FC_BOGUS_STRUCT */
                           0x3,                /* 3 */
/* 524 */ NdrFcShort( 0x10 ), /* 16 */
/* 526 */ NdrFcShort( 0x0 ),  /* 0 */
/* 528 */ NdrFcShort( 0x6 ),  /* Offset= 6 (534) */
/* 530 */ 0x8,                /* FC_LONG */
                           0x39,               /* FC_ALIGNM8 */
/* 532 */ 0x36,               /* FC_POINTER */
                           0x5b,               /* FC_END */
/* 534 */
                           0x11, 0x0,          /* FC_RP */
/* 536 */ NdrFcShort( 0xffffffdc ),     /* Offset= -36 (500) */
/* 538 */
                           0x21,               /* FC_BOGUS_ARRAY */
                           0x3,                /* 3 */
/* 540 */ NdrFcShort( 0x0 ),  /* 0 */
/* 542 */ 0x19,               /* Corr desc:  field pointer, FC_ULONG */
                           0x0,                /*  */
/* 544 */ NdrFcShort( 0x0 ),  /* 0 */
/* 546 */ NdrFcShort( 0x1 ),  /* Corr flags:  early, */
/* 548 */ NdrFcLong( 0xffffffff ),      /* -1 */
/* 552 */ NdrFcShort( 0x0 ),  /* Corr flags:  */
/* 554 */
                           0x12, 0x0,          /* FC_UP */
/* 556 */ NdrFcShort( 0x176 ),          /* Offset= 374 (930) */
/* 558 */ 0x5c,               /* FC_PAD */
                           0x5b,               /* FC_END */
/* 560 */
                           0x1a,               /* FC_BOGUS_STRUCT */
                           0x3,                /* 3 */
/* 562 */ NdrFcShort( 0x10 ), /* 16 */
/* 564 */ NdrFcShort( 0x0 ),  /* 0 */
/* 566 */ NdrFcShort( 0x6 ),  /* Offset= 6 (572) */
/* 568 */ 0x8,                /* FC_LONG */
                           0x39,               /* FC_ALIGNM8 */
/* 570 */ 0x36,               /* FC_POINTER */
                           0x5b,               /* FC_END */
/* 572 */
                           0x11, 0x0,          /* FC_RP */
/* 574 */ NdrFcShort( 0xffffffdc ),     /* Offset= -36 (538) */
/* 576 */
                           0x2f,               /* FC_IP */
                           0x5a,               /* FC_CONSTANT_IID */
/* 578 */ NdrFcLong( 0x2f ),  /* 47 */
/* 582 */ NdrFcShort( 0x0 ),  /* 0 */
/* 584 */ NdrFcShort( 0x0 ),  /* 0 */
/* 586 */ 0xc0,               /* 192 */
                           0x0,                /* 0 */
/* 588 */ 0x0,                /* 0 */
                           0x0,                /* 0 */
```

```
/* 590 */ 0x0,              /* 0 */
                            0x0,              /* 0 */
/* 592 */ 0x0,              /* 0 */
                            0x46,             /* 70 */
/* 594 */
                            0x1b,             /* FC_CARRAY */
                            0x0,              /* 0 */
/* 596 */ NdrFcShort( 0x1 ),  /* 1 */
/* 598 */ 0x19,             /* Corr desc:  field pointer, FC_ULONG */
                            0x0,              /*  */
/* 600 */ NdrFcShort( 0x4 ),  /* 4 */
/* 602 */ NdrFcShort( 0x1 ),  /* Corr flags:  early, */
/* 604 */ 0x1,              /* FC_BYTE */
                            0x5b,             /* FC_END */
/* 606 */
                            0x1a,             /* FC_BOGUS_STRUCT */
                            0x3,              /* 3 */
/* 608 */ NdrFcShort( 0x18 ), /* 24 */
/* 610 */ NdrFcShort( 0x0 ),  /* 0 */
/* 612 */ NdrFcShort( 0xc ),  /* Offset= 12 (624) */
/* 614 */ 0x8,              /* FC_LONG */
                            0x8,              /* FC_LONG */
/* 616 */ 0x4c,             /* FC_EMBEDDED_COMPLEX */
                            0x0,              /* 0 */
/* 618 */ NdrFcShort( 0xffffffd6 ),     /* Offset= -42 (576) */
/* 620 */ 0x39,             /* FC_ALIGNM8 */
                            0x36,             /* FC_POINTER */
/* 622 */ 0x5c,             /* FC_PAD */
                            0x5b,             /* FC_END */
/* 624 */
                            0x12, 0x0,        /* FC_UP */
/* 626 */ NdrFcShort( 0xffffffe0 ),     /* Offset= -32 (594) */
/* 628 */
                            0x21,             /* FC_BOGUS_ARRAY */
                            0x3,              /* 3 */
/* 630 */ NdrFcShort( 0x0 ),  /* 0 */
/* 632 */ 0x19,             /* Corr desc:  field pointer, FC_ULONG */
                            0x0,              /*  */
/* 634 */ NdrFcShort( 0x0 ),  /* 0 */
/* 636 */ NdrFcShort( 0x1 ),  /* Corr flags:  early, */
/* 638 */ NdrFcLong( 0xffffffff ),      /* -1 */
/* 642 */ NdrFcShort( 0x0 ),  /* Corr flags:  */
/* 644 */
                            0x12, 0x0,        /* FC_UP */
/* 646 */ NdrFcShort( 0xffffffd8 ),     /* Offset= -40 (606) */
/* 648 */ 0x5c,             /* FC_PAD */
                            0x5b,             /* FC_END */
/* 650 */
                            0x1a,             /* FC_BOGUS_STRUCT */
                            0x3,              /* 3 */
/* 652 */ NdrFcShort( 0x10 ), /* 16 */
/* 654 */ NdrFcShort( 0x0 ),  /* 0 */
/* 656 */ NdrFcShort( 0x6 ),  /* Offset= 6 (662) */
/* 658 */ 0x8,              /* FC_LONG */
                            0x39,             /* FC_ALIGNM8 */
/* 660 */ 0x36,             /* FC_POINTER */
                            0x5b,             /* FC_END */
/* 662 */
                            0x11, 0x0,        /* FC_RP */
/* 664 */ NdrFcShort( 0xffffffdc ),     /* Offset= -36 (628) */
/* 666 */
                            0x1d,             /* FC_SMFARRAY */
                            0x0,              /* 0 */
/* 668 */ NdrFcShort( 0x8 ),  /* 8 */
/* 670 */ 0x2,              /* FC_CHAR */
                            0x5b,             /* FC_END */
/* 672 */
                            0x15,             /* FC_STRUCT */
                            0x3,              /* 3 */
/* 674 */ NdrFcShort( 0x10 ), /* 16 */
/* 676 */ 0x8,              /* FC_LONG */
                            0x6,              /* FC_SHORT */
/* 678 */ 0x6,              /* FC_SHORT */
                            0x4c,             /* FC_EMBEDDED_COMPLEX */
/* 680 */ 0x0,              /* 0 */
                            NdrFcShort( 0xfffffff1 ),     /* Offset= -15 (666) */
                            0x5b,             /* FC_END */
/* 684 */
                            0x1a,             /* FC_BOGUS_STRUCT */
                            0x3,              /* 3 */
/* 686 */ NdrFcShort( 0x20 ), /* 32 */
/* 688 */ NdrFcShort( 0x0 ),  /* 0 */
/* 690 */ NdrFcShort( 0xa ),  /* Offset= 10 (700) */
/* 692 */ 0x8,              /* FC_LONG */
                            0x39,             /* FC_ALIGNM8 */
/* 694 */ 0x36,             /* FC_POINTER */
                            0x4c,             /* FC_EMBEDDED_COMPLEX */
/* 696 */ 0x0,              /* 0 */
                            NdrFcShort( 0xffffffe7 ),     /* Offset= -25 (672) */
                            0x5b,             /* FC_END */
/* 700 */
                            0x11, 0x0,        /* FC_RP */
/* 702 */ NdrFcShort( 0xffffff10 ),     /* Offset= -240 (462) */
/* 704 */
                            0x1b,             /* FC_CARRAY */
                            0x0,              /* 0 */
/* 706 */ NdrFcShort( 0x1 ),  /* 1 */
/* 708 */ 0x19,             /* Corr desc:  field pointer, FC_ULONG */
                            0x0,              /*  */
/* 710 */ NdrFcShort( 0x0 ),  /* 0 */
/* 712 */ NdrFcShort( 0x1 ),  /* Corr flags:  early, */
/* 714 */ 0x1,              /* FC_BYTE */
                            0x5b,             /* FC_END */
/* 716 */
                            0x1a,             /* FC_BOGUS_STRUCT */
                            0x3,              /* 3 */
/* 718 */ NdrFcShort( 0x10 ), /* 16 */
/* 720 */ NdrFcShort( 0x0 ),  /* 0 */
/* 722 */ NdrFcShort( 0x6 ),  /* Offset= 6 (728) */
/* 724 */ 0x8,              /* FC_LONG */
                            0x39,             /* FC_ALIGNM8 */
/* 726 */ 0x36,             /* FC_POINTER */
                            0x5b,             /* FC_END */
/* 728 */
                            0x12, 0x0,        /* FC_UP */
/* 730 */ NdrFcShort( 0xffffffe6 ),     /* Offset= -26 (704) */
/* 732 */
                            0x1b,             /* FC_CARRAY */
                            0x1,              /* 1 */
/* 734 */ NdrFcShort( 0x2 ),  /* 2 */
/* 736 */ 0x19,             /* Corr desc:  field pointer, FC_ULONG */
                            0x0,              /*  */
/* 738 */ NdrFcShort( 0x0 ),  /* 0 */
/* 740 */ NdrFcShort( 0x1 ),  /* Corr flags:  early, */
/* 742 */ 0x6,              /* FC_SHORT */
                            0x5b,             /* FC_END */
```

```
/* 744 */
                            0x1a,               /* FC_BOGUS_STRUCT */
                            0x3,                /* 3 */
/* 746 */ NdrFcShort( 0x10 ), /* 16 */
/* 748 */ NdrFcShort( 0x0 ),  /* 0 */
/* 750 */ NdrFcShort( 0x6 ),  /* Offset= 6 (756) */
/* 752 */ 0x8,                /* FC_LONG */
                            0x39,               /* FC_ALIGNM8 */
/* 754 */ 0x36,               /* FC_POINTER */
                            0x5b,               /* FC_END */
/* 756 */
                            0x12, 0x0,          /* FC_UP */
/* 758 */ NdrFcShort( 0xffffffe6 ),     /* Offset= -26 (732) */
/* 760 */
                            0x1b,               /* FC_CARRAY */
                            0x3,                /* 3 */
/* 762 */ NdrFcShort( 0x4 ),  /* 4 */
/* 764 */ 0x19,               /* Corr desc:  field pointer, FC_ULONG */
                            0x0,                /*  */
/* 766 */ NdrFcShort( 0x0 ),  /* 0 */
/* 768 */ NdrFcShort( 0x1 ),  /* Corr flags:  early, */
/* 770 */ 0x8,                /* FC_LONG */
                            0x5b,               /* FC_END */
/* 772 */
                            0x1a,               /* FC_BOGUS_STRUCT */
                            0x3,                /* 3 */
/* 774 */ NdrFcShort( 0x10 ), /* 16 */
/* 776 */ NdrFcShort( 0x0 ),  /* 0 */
/* 778 */ NdrFcShort( 0x6 ),  /* Offset= 6 (784) */
/* 780 */ 0x8,                /* FC_LONG */
                            0x39,               /* FC_ALIGNM8 */
/* 782 */ 0x36,               /* FC_POINTER */
                            0x5b,               /* FC_END */
/* 784 */
                            0x12, 0x0,          /* FC_UP */
/* 786 */ NdrFcShort( 0xffffffe6 ),     /* Offset= -26 (760) */
/* 788 */
                            0x1b,               /* FC_CARRAY */
                            0x7,                /* 7 */
/* 790 */ NdrFcShort( 0x8 ),  /* 8 */
/* 792 */ 0x19,               /* Corr desc:  field pointer, FC_ULONG */
                            0x0,                /*  */
/* 794 */ NdrFcShort( 0x0 ),  /* 0 */
/* 796 */ NdrFcShort( 0x1 ),  /* Corr flags:  early, */
/* 798 */ 0xb,                /* FC_HYPER */
                            0x5b,               /* FC_END */
/* 800 */
                            0x1a,               /* FC_BOGUS_STRUCT */
                            0x3,                /* 3 */
/* 802 */ NdrFcShort( 0x10 ), /* 16 */
/* 804 */ NdrFcShort( 0x0 ),  /* 0 */
/* 806 */ NdrFcShort( 0x6 ),  /* Offset= 6 (812) */
/* 808 */ 0x8,                /* FC_LONG */
                            0x39,               /* FC_ALIGNM8 */
/* 810 */ 0x36,               /* FC_POINTER */
                            0x5b,               /* FC_END */
/* 812 */
                            0x12, 0x0,          /* FC_UP */
/* 814 */ NdrFcShort( 0xffffffe6 ),     /* Offset= -26 (788) */
/* 816 */
                            0x15,               /* FC_STRUCT */
                            0x3,                /* 3 */
/* 818 */ NdrFcShort( 0x8 ),  /* 8 */
/* 820 */ 0x8,                /* FC_LONG */
                            0x8,                /* FC_LONG */
/* 822 */ 0x5c,               /* FC_PAD */
                            0x5b,               /* FC_END */
/* 824 */
                            0x1b,               /* FC_CARRAY */
                            0x3,                /* 3 */
/* 826 */ NdrFcShort( 0x8 ),  /* 8 */
/* 828 */ 0x7,                /* Corr desc: FC_USHORT */
                            0x0,                /*  */
/* 830 */ NdrFcShort( 0xffc8 ),         /* -56 */
/* 832 */ NdrFcShort( 0x1 ),  /* Corr flags:  early, */
/* 834 */ 0x4c,               /* FC_EMBEDDED_COMPLEX */
                            0x0,                /* 0 */
/* 836 */ NdrFcShort( 0xffffffec ),     /* Offset= -20 (816) */
/* 838 */ 0x5c,               /* FC_PAD */
                            0x5b,               /* FC_END */
/* 840 */
                            0x1a,               /* FC_BOGUS_STRUCT */
                            0x3,                /* 3 */
/* 842 */ NdrFcShort( 0x38 ), /* 56 */
/* 844 */ NdrFcShort( 0xffffffec ),     /* Offset= -20 (824) */
/* 846 */ NdrFcShort( 0x0 ),  /* Offset= 0 (846) */
/* 848 */ 0x6,                /* FC_SHORT */
                            0x6,                /* FC_SHORT */
/* 850 */ 0x38,               /* FC_ALIGNM4 */
                            0x8,                /* FC_LONG */
/* 852 */ 0x8,                /* FC_LONG */
                            0x4c,               /* FC_EMBEDDED_COMPLEX */
/* 854 */ 0x4,                /* 4 */
                            NdrFcShort( 0xfffffe0d ),     /* Offset= -499 (356) */
                            0x5b,               /* FC_END */
/* 858 */
                            0x12, 0x0,          /* FC_UP */
/* 860 */ NdrFcShort( 0xffffff02 ),     /* Offset= -254 (606) */
/* 862 */
                            0x12, 0x8,          /* FC_UP [simple_pointer] */
/* 864 */ 0x1,                /* FC_BYTE */
                            0x5c,               /* FC_PAD */
/* 866 */
                            0x12, 0x8,          /* FC_UP [simple_pointer] */
/* 868 */ 0x6,                /* FC_SHORT */
                            0x5c,               /* FC_PAD */
/* 870 */
                            0x12, 0x8,          /* FC_UP [simple_pointer] */
/* 872 */ 0x8,                /* FC_LONG */
                            0x5c,               /* FC_PAD */
/* 874 */
                            0x12, 0x8,          /* FC_UP [simple_pointer] */
/* 876 */ 0xa,                /* FC_FLOAT */
                            0x5c,               /* FC_PAD */
/* 878 */
                            0x12, 0x8,          /* FC_UP [simple_pointer] */
/* 880 */ 0xc,                /* FC_DOUBLE */
                            0x5c,               /* FC_PAD */
/* 882 */
                            0x12, 0x0,          /* FC_UP */
/* 884 */ NdrFcShort( 0xfffffda4 ),     /* Offset= -604 (280) */
/* 886 */
                            0x12, 0x10,         /* FC_UP [pointer_deref] */
/* 888 */ NdrFcShort( 0xfffffda6 ),     /* Offset= -602 (286) */
/* 890 */
                            0x12, 0x10,         /* FC_UP [pointer_deref] */
```

```
/* 892 */ NdrFcShort( 0xfffffdbc ),     /* Offset= -580 (312) */
/* 894 */
                        0x12, 0x10,         /* FC_UP [pointer_deref] */
/* 896 */ NdrFcShort( 0xfffffdca ),     /* Offset= -566 (330) */
/* 898 */
                        0x12, 0x10,         /* FC_UP [pointer_deref] */
/* 900 */ NdrFcShort( 0xfffffdd8 ),     /* Offset= -552 (348) */
/* 902 */
                        0x12, 0x10,         /* FC_UP [pointer_deref] */
/* 904 */ NdrFcShort( 0x2 ),  /* Offset= 2 (906) */
/* 906 */
                        0x12, 0x0,          /* FC_UP */
/* 908 */ NdrFcShort( 0x16 ), /* Offset= 22 (930) */
/* 910 */
                        0x15,               /* FC_STRUCT */
                        0x7,                /* 7 */
/* 912 */ NdrFcShort( 0x10 ), /* 16 */
/* 914 */ 0x6,                /* FC_SHORT */
                        0x1,                /* FC_BYTE */
/* 916 */ 0x1,                /* FC_BYTE */
                        0x38,               /* FC_ALIGNM4 */
/* 918 */ 0x8,                /* FC_LONG */
                        0x39,               /* FC_ALIGNM8 */
/* 920 */ 0xb,                /* FC_HYPER */
                        0x5b,               /* FC_END */
/* 922 */
                        0x12, 0x0,          /* FC_UP */
/* 924 */ NdrFcShort( 0xfffffff2 ),     /* Offset= -14 (910) */
/* 926 */
                        0x12, 0x8,          /* FC_UP [simple_pointer] */
/* 928 */ 0x2,                /* FC_CHAR */
                        0x5c,               /* FC_PAD */
/* 930 */
                        0x1a,               /* FC_BOGUS_STRUCT */
                        0x7,                /* 7 */
/* 932 */ NdrFcShort( 0x20 ), /* 32 */
/* 934 */ NdrFcShort( 0x0 ),  /* 0 */
/* 936 */ NdrFcShort( 0x0 ),  /* Offset= 0 (936) */
/* 938 */ 0x8,                /* FC_LONG */
                        0x8,                /* FC_LONG */
/* 940 */ 0x6,                /* FC_SHORT */
                        0x6,                /* FC_SHORT */
/* 942 */ 0x6,                /* FC_SHORT */
                        0x6,                /* FC_SHORT */
/* 944 */ 0x4c,               /* FC_EMBEDDED_COMPLEX */
                        0x0,                /* 0 */
/* 946 */ NdrFcShort( 0xfffffc54 ),     /* Offset= -940 (6) */
/* 948 */ 0x5c,               /* FC_PAD */
                        0x5b,               /* FC_END */
/* 950 */ 0xb4,               /* FC_USER_MARSHAL */
                        0x83,               /* 131 */
/* 952 */ NdrFcShort( 0x0 ),  /* 0 */
/* 954 */ NdrFcShort( 0x18 ), /* 24 */
/* 956 */ NdrFcShort( 0x0 ),  /* 0 */
/* 958 */ NdrFcShort( 0xfffffc44 ),     /* Offset= -956 (2) */
/* 960 */
                        0x11, 0x4,          /* FC_RP [alloced_on_stack] */
/* 962 */ NdrFcShort( 0x6 ),  /* Offset= 6 (968) */
/* 964 */
                        0x13, 0x0,          /* FC_OP */
/* 966 */ NdrFcShort( 0xffffffdc ),     /* Offset= -36 (930) */
/* 968 */ 0xb4,               /* FC_USER_MARSHAL */
                        0x83,               /* 131 */
/* 970 */ NdrFcShort( 0x0 ),  /* 0 */
/* 972 */ NdrFcShort( 0x18 ), /* 24 */
/* 974 */ NdrFcShort( 0x0 ),  /* 0 */
/* 976 */ NdrFcShort( 0xfffffff4 ),     /* Offset= -12 (964) */

                                0x0
        }
    };

const CInterfaceProxyVtbl * _tpcc_com_ps_ProxyVtblList[] =
{
    ( CInterfaceProxyVtbl *) &_ITPCCProxyVtbl,
    0
};

const CInterfaceStubVtbl * _tpcc_com_ps_StubVtblList[] =
{
    ( CInterfaceStubVtbl *) &_ITPCCStubVtbl,
    0
};

PCInterfaceName const _tpcc_com_ps_InterfaceNamesList[] =
{
    "ITPCC",
    0
};


#define _tpcc_com_ps_CHECK_IID(n)       IID_GENERIC_CHECK_IID( _tpcc_com_ps, pIID, n)

int __stdcall _tpcc_com_ps_IID_Lookup( const IID * pIID, int * pIndex )
{

    if(!_tpcc_com_ps_CHECK_IID(0))
        {
        *pIndex = 0;
        return 1;
        }

    return 0;
}

const ExtendedProxyFileInfo tpcc_com_ps_ProxyFileInfo =
{
    (PCInterfaceProxyVtblList *) & _tpcc_com_ps_ProxyVtblList,
    (PCInterfaceStubVtblList *) & _tpcc_com_ps_StubVtblList,
    (const PCInterfaceName * ) & _tpcc_com_ps_InterfaceNamesList,
    0, // no delegation
    & _tpcc_com_ps_IID_Lookup,
    1,
    2,
    0, /* table of [async_uuid] interfaces */
    0, /* Filler1 */
    0, /* Filler2 */
    0  /* Filler3 */
};


#endif /* defined(_M_IA64) || defined(_M_AXP64)*/
```

common/txnlog/include/rtetime.h

```
/* FILE: rtetime.h : header file
 * Copyright 1997 Microsoft Corp., All rights reserved.
 *
 * Authors: Charles Levine, Philip Durr
 *                          Microsoft Corp.
 */

#define   MAX_JULIAN_TIME               0x7FFFFFFFFFFFFFFF
#define JULIAN_TIME __int64
#define   TC_TIME             DWORD
extern "C"
{
BOOL                InitJulianTime(LPSYSTEMTIME lpInitTime);
JULIAN_TIME         GetJulianTime(void);
DWORD               MyTickCount(void);
void                GetJulianAndTC(JULIAN_TIME *pJulian, DWORD *pTC);
JULIAN_TIME         ConvertTo(x64)Time(int iYear, int iMonth, int iDay, int iHour, int
iMinute, int iSecond);
JULIAN_TIME         Get(x64)Time(LPSYSTEMTIME lpInitTime);
int                         JulianDay( int yr, int mm, int dd );
void                JulianToTime(JULIAN_TIME julianTS, int* yr, int* mm, int* dd, int
*hh, int *mi, int *ss );
void                JulianToCalendar( int day, int* yr, int* mm, int* dd );
}
```

common/txnlog/include/spinlock.h

```
/*        FILE: SPINLOCK.H
 *
 * Copyright 1997 Microsoft Corp., All rights reserved.
 *
 * Authors: Mike Parkes, Charles Levine, Philip Durr
 *                          Microsoft Corp.
 */

#ifndef _INC_Spinlock

          const LONG LockClosed         = 1;
          const LONG LockOpen           = 0;

          /*************************************************************
           *
           *   Spinlock and Semaphore locking.
           *
           *   This class provides a very conservative locking scheme.
           *   The assumption behind the code is that locks will be
           *   held for a very short time.  When a lock is taken a memory
           *   location is exchanged.  All other threads that want this
           *   lock wait by spinning and sometimes sleeping on a semaphore
           *   until it becomes free again.  The only other choice is not
           *   to wait at all and move on to do something else.  This
           *   module should normally be used in conjunction with cache
           *   aligned memory in minimize cache line misses.
           *
           *************************************************************/

          class Spinlock
          {
                    // Private data.
                    HANDLE                      Semaphore;
                    volatile LONG               m_Spinlock;
                    volatile LONG               Waiting;

                    #ifdef _DEBUG
                              // Counters for debugging builds.
                              volatile LONG       TotalLocks;
                              volatile LONG       TotalSleeps;
                              volatile LONG       TotalSpins;
                              volatile LONG       TotalWaits;
                    #endif

                    public:
                              // Public functions.

                              Spinlock( void );

                              inline BOOL ClaimLock( BOOL Wait = TRUE );
                              inline void ReleaseLock( void );
                              ~Spinlock( void );
                              // Disabled operations.
                              Spinlock( const Spinlock & Copy );
                              void operator=( const Spinlock & Copy );

                    private:
                              // Private functions.
                              inline BOOL ClaimSpinlock( volatile LONG *sl );
                              void WaitForLock( void );
                              void WakeAllSleepers( void );
          };

          /*************************************************************
           *
           *   A guaranteed atomic exchange.
           *
           *   An attempt is made to claim the Spinlock.  This action is
           *   guaranteed to be atomic.
           *
           *************************************************************/

          inline BOOL Spinlock::ClaimSpinlock( volatile LONG *Spinlock )
          {
                    #ifdef _DEBUG
                              InterlockedIncrement( (LPLONG) & TotalLocks );
                    #endif
                    return ( ((*Spinlock) == LockOpen) && (InterlockedExchange(
(LPLONG)Spinlock, LockClosed ) == LockOpen) );
          }

          /************************************************
           *
```

```
         *   Claim the Spinlock.
         *
         *   Claim the lock if available else wait or exit.
         *
         ************************************************/

        inline BOOL Spinlock::ClaimLock( BOOL Wait )
        {
                 if ( ! ClaimSpinlock( (volatile LONG*) & m_Spinlock ) )
                 {
                          if ( Wait )
                                   WaitForLock();
                          return Wait;
                 }
                 return TRUE;
        }

        /************************************************
         *
         *   Release the Spinlock.
         *
         *   Release the lock and if needed wakeup any sleepers.
         *
         ************************************************/

        inline void Spinlock::ReleaseLock( void )
        {
                 m_Spinlock = LockOpen;
                 if ( Waiting > 0 )
                          WakeAllSleepers();
        }

        #define _INC_Spinlock

#endif
```

common/txnlog/include/txnlog.h

```
/*       FILE:              TXNLOG.H
 *                                  Microsoft TPC-C Kit Ver. 4.10.000
 *
 *                                  NOTE: this file is RTE specific and should not be
included
 *                                  in Full Disclosure Reports.
 *
 *                                  Copyright Microsoft, 1999
 *
 *       PURPOSE:  Structure definitions for logging delivery txn completion stats.
 *       Contact:  Charles Levine (clevine@microsoft.com)
 */


   typedef struct _TXN_NEWORDER
        {
        BYTE        OL_Count;           //range 0 to 31
        BYTE        OL_Remote_Count;    //range 0 to 31
        WORD        c_id;
        int                     o_id;
          } TXN_NEWORDER;

    typedef struct _TXN_PAYMENT
          {
        BYTE        CustByName;
        BYTE        IsRemote;
          } TXN_PAYMENT;

    typedef struct _TXN_ORDERSTATUS
          {
                   BYTE      CustByName;
          } TXN_ORDERSTATUS;

          typedef union _TXN_DETAILS
          {
                   TXN_NEWORDER        NewOrder;
                   TXN_PAYMENT                 Payment;
                   TXN_ORDERSTATUS     OrderStatus;
          } TXN_DETAILS;


          // Common header for all records in txn log.  The TxnType field is
          // a switch which identifies the particular variant.
          #define TXN_REC_TYPE_CONTROL            1         //
          #define TXN_REC_TYPE_TPCC                         2         // replaces
TRANSACTION_TYPE_TPCC
          #define TXN_REC_TYPE_TPCC_DELIV_DEF     3

          typedef struct _TXN_RECORD_HEADER
          {
                   JULIAN_TIME         TxnStartT0;                  // start of txn
                   BYTE      TxnType;                      // one of TXN_REC_TYPE_*
                   BYTE      TxnSubType;                             // depends on
TxnType
          } TXN_RECORD_HEADER, *PTXN_RECORD_HEADER;


          typedef struct _TXN_RECORD_CONTROL
          {
                   // common header; must exactly match TXN_RECORD_HEADER
                   JULIAN_TIME         TxnStartT0;                  // start of txn
                   BYTE      TxnType;                      // = TXN_REC_TYPE_CONTROL
                   BYTE      TxnSubType;                             // depends on
TxnType
                   // end of common header

                   DWORD     Len;                                    // number of bytes
after this field
          } TXN_RECORD_CONTROL, *PTXN_RECORD_CONTROL;


          // TPC-C Txn Record Layout:
          //
    //'TxnStartT0' is a Julian timestamp corresponding to the moment the
    //txn is sent to the SUT, i.e., beginning of response time.  Deltas
    //are in milliseconds.  Note that if RTDelay > 0, then the txn was
    //delayed by this amount.  The delay occurs at the beginning of the
    //response time.  So if RTDelay > 0, then the txn was actually sent
    //at TxnStartT0 + RTDelay.
```

```
    //
    //Graphically:
    //
    //  time -->
    //
    //    |--- Menu  ---|-- Keying  --|-- Response --|--- Think  --|
    //     <- DeltaT1 -> <- DeltaT2 -> <- DeltaT4  -> <- DeltaT3 ->
    //                                ^
    //                                ^ TxnStartT0
    //
    //RTDelay is the amount of response time delay included in DeltaT4.
    //RTDelay is recorded per txn because this value can be changed on
    //the fly, and so may vary from txn to txn.
    //
    //TxnStatus is the txn completion code.  It is used to indicate errors.
    //For example, in the New Order txn, 1% of txns abort.  TxnStatus will
    //reflect this.

          typedef struct _TXN_RECORD_TPCC
          {
                    // common header; must exactly match TXN_RECORD_HEADER
                    JULIAN_TIME         TxnStartT0;                 // start of txn
                    BYTE      TxnType;                      // = TXN_REC_TYPE_TPCC
                    BYTE      TxnSubType;                             // depends on
TxnType
                    // end of common header

                    int     DeltaT1;              // menu time (ms)
                    int     DeltaT2;              // keying time (ms)
                    int     DeltaT3;              // think time (ms)
                    int     DeltaT4;              // response time (ms)
                    int     RTDelay;              // response time delay (ms)
                    int                 TxnError;           // error code providing more
detail for TxnStatus
                    WORD      w_id;                         // warehouse ID
                    BYTE      d_id;                         // assigned district ID for
this thread
                    BYTE      d_id_ThisTxn;       // district ID chosen for this
particular
                    BYTE      TxnStatus;                    // completion status for txn
to indicate errors
                    BYTE      reserved;           // for word alignment
                    TXN_DETAILS         TxnDetails;         //
          } TXN_RECORD_TPCC, *PTXN_RECORD_TPCC;

          // TPC-C Deferred Delivery Txn Record Layout:
          //
    //Incorporating delivery transaction information into the above
          //structure would increase the size of TXN_DETAILS from 8 to 42 bytes.
    //Hence, we store delivery transaction details in a separate structure.
    //
          typedef struct _TXN_RECORD_TPCC_DELIV_DEF
          {
                    // common header; must exactly match TXN_RECORD_HEADER
                    JULIAN_TIME         TxnStartT0;                 // start of txn
                    BYTE      TxnType;                      // =
TXN_REC_TYPE_TPCC_DELIV_DEF
                    BYTE      TxnSubType;                             // = 0
                    // end of common header

                    int     DeltaT4;              // response time (ms)
                    int                 DeltaTxnExec;       // execution time (ms)
                    WORD      w_id;                         // warehouse ID
                    BYTE      TxnStatus;                    // completion status for txn
to indicate errors
                    BYTE      reserved;           // for word alignment
                    short   o_carrier_id;         // carrier id
                    long      o_id[10];           // returned delivery transaction ids
          } TXN_RECORD_TPCC_DELIV_DEF, *PTXN_RECORD_TPCC_DELIV_DEF;



#define             TXN_LOG_VERSION               1
#define             TXN_DATA_START                4096      // offset in log file where
log records start
#define             TXN_LOG_EYE_CATCHER "BC"      // signature bytes at the start of log
file


          ////////////////////////////////////////////////////////////////////////
          // The transaction log has a header as the first 4K block.
          //
          typedef struct _TXN_LOG_HEADER
          {
                    char                          EyeCatcher[2];      // signature bytes;
should always be "BC"
                    int                                     LogVersion;
          // set to TXN_LOG_VERSION
                    JULIAN_TIME                   BeginTxnTS;                   //
timestamp of first (lowest) txn start
                    JULIAN_TIME                   EndTxnTS;           // timestamp of
last (highest) txn completion time
                    int                                     iRecCount;
          // number of records in log file
                    BOOL                          bLogSorted;
                    int                                     iFileSize;
          // file size in bytes

                    // the record map provides a fast way to get close to a particular
timestamp in a sorted log file.
          //        struct
          //        {
          //                  JULIAN_TIME                   TS;
          // timestamp of record
          //                  int                                     iPos;
          // byte position in file
          //        }                                       RecMap[RecMapSize];
          //#define           RecMapSize                    200

          } TXN_LOG_HEADER, *PTXN_LOG_HEADER;



#define   READ_BUFFER_SIZE              64*1024
#define   WRITE_BUFFER_SIZE              8*1024

#define   NUM_READ_BUFFERS              1
#define   NUM_WRITE_BUFFERS             2
#define   MAX_NUM_BUFFERS                         2

// flags passed in to the constructor
#define   TXN_LOG_WRITE                 0x01
#define   TXN_LOG_READ                  0x02
#define   TXN_LOG_SORTED                0x04
```

```
#define   TXN_LOG_OS_ERROR    1
#define   TXN_LOG_NOT_SORTED  2

#define SKIP_CTRL_RECS                  1

class CTxnLog
{
          private:
                    DWORD               iBufferSize;                              //buffer
allocated size
                    DWORD               iBytesFreeInBuffer;           //total bytes
available for use in buffer
                    int                           iNumBuffers;
          //buffers in use
                    int                           iActiveBuffer;
          //indicates which buffer is active: 0 or 1
                    int                           iIoBuffer;
          //buffer for any pending IO operation
                    int                           iFilePointer;
          //position in file.
                    int                           iNextRec;
          //when reading, ordinal value of next record

                    // A "save point" is remembered each time GetNextRecord is called
with a start time specified.
                    // The next time it is called, if start time is after the save point,
we start scanning from the
                    // save point.  This is particularly useful in FindBestInterval,
where the log is scanned repeatedly.
                    JULIAN_TIME                   SavePtTime;
                    int                                     iSavePtFilePointer;
                    int                                     iSavePtNextRec;

                    JULIAN_TIME         lastTS;
          //when writing sorted output, used to verify records are sorted
                    BOOL                bWrite;
          //writing log file

                    BOOL                          bLogSorted;
          // is log file sorted?  applies to both input and output
                    JULIAN_TIME                   BeginTxnTS;
          // timestamp of first (lowest) txn start
                    JULIAN_TIME                   EndTxnTS;                 //
timestamp of last (highest) txn completion time
                    int                                     iRecCount;
          // number of records in log file

                    BYTE                *pCurrent;
          //ptr to current buffer
                    BYTE                *pBuffer[MAX_NUM_BUFFERS];

                    PTXN_RECORD_HEADER  *TxnArray;                    //transaction
record pointer array for sort

                    DWORD               dwError;
                    HANDLE              hTxnFile;                                 //handle
to log file
                    HANDLE              hMapFile;                                 //map
file used when sorting the log
                    HANDLE              hIoComplete;                              //event
to signify that there are no pending IOs
                    HANDLE              hLogFileIo;
          //event to signal the IO thread to write the inactive buffer
                    Spinlock  Spin;                                               //spin
lock to protect the txn log file buffers

                    int Write(BYTE *ptr, DWORD Size);
                    static void LogFileIO(CTxnLog *);

          public:
                    CTxnLog::CTxnLog(LPCTSTR szFileName, DWORD dwOpts);
                    ~CTxnLog(void);

                    int WriteToLog(PTXN_RECORD_TPCC pTxnRcrd);
                    int WriteToLog(PTXN_RECORD_TPCC_DELIV_DEF pTxnRcrd);
                    int WriteToLog(PTXN_RECORD_CONTROL pCtrlRec);
                    int WriteToLog(PTXN_RECORD_HEADER pCtrlRec);

                    int WriteCtrlRecToLog(BYTE SubType, LPTSTR lpStr, DWORD dwLen);

                    void CloseTransactionLogFile(void);

                    PTXN_RECORD_HEADER GetNextRecord(BOOL bSkipCtrlRecs = FALSE);
                    PTXN_RECORD_HEADER GetNextRecord(JULIAN_TIME SeekTimeT0, BOOL
bSkipCtrlRecs = FALSE);

                    int Sort(void);
                    PTXN_RECORD_HEADER GetSortedRecord(int index);

                    inline BOOL IsSorted(void) { return bLogSorted; };
                    inline JULIAN_TIME BeginTS(void) { return BeginTxnTS; };
                    inline JULIAN_TIME EndTS(void) { return EndTxnTS; };
                    inline int RecordCount(void) { return iRecCount; };
};

class CTXNLOG_ERR : public CBaseErr
{
          public:
                    enum CTPCC_DBLIB_ERRS
                    {
                              ERR_BAD_FILE_FORMAT = 1,      // "File format is invalid."
                              ERR_UNKNOWN_LOG_VERSION,      // "Log file version is
unknown."
                              ERR_BROKEN_LOG_FILE,                    // "Log file is
broken."
                              ERR_LOG_NOT_SORTED,                     // "Log file is not
sorted"
                              ERR_INVALID_TIME_SEQ,                   // "Internal Error:
Record Time Sequence invalid."
                    };

                    CTXNLOG_ERR( int iErr ) { m_errno = iErr; };

                    int                 m_errno;

                    int ErrorType() {return ERR_TYPE_TXNLOG;};
                    int ErrorNum() {return m_errno;};

                    // TODO: need to complete...
                    char *ErrorText() {return "";};
};
```

Appendix A - Application Source Code

Appendix B - Database Design

Build Scripts

```
ECHO OFF
::-------------------------------------------------------------------------------------------
::---  FILE:       SETUP.CMD
::---              Microsoft TPC-C Kit Ver. 4.62
::---              Copyright Microsoft, 2001, 2002, 2005
::---              All Rights Reserved
::---
::---  PURPOSE:    Calls RunSQLCfg.sql to configure SQL Server
::---
::---  ARGUMENTS:  /? displays help for SETUP
::---
::-------------------------------------------------------------------------------------------
@cscript SetupScripts\setup.vbs //H:CScript //I %1 %2 %3 %4 %5 %6 %7
-----------------------------------------------------------------
--                                                             --
--  File:   TABLES.SQL                                         --
--          Microsoft TPC-C Benchmark Kit Ver. 4.62            --
--          Copyright Microsoft, 2005                          --
--                                                             --
--          Creates TPC-C tables                               --
-----------------------------------------------------------------

SET ANSI_NULL_DFLT_OFF ON
GO

USE tpcc
GO

-----------------------------------
-- Remove all existing TPC-C tables
-----------------------------------
if exists ( select name from sysobjects where name = 'warehouse' )
          drop table warehouse
go
if exists ( select name from sysobjects where name = 'district' )
          drop table district
go
if exists ( select name from sysobjects where name = 'customer' )
          drop table customer
go
if exists ( select name from sysobjects where name = 'history' )
          drop table history
go
if exists ( select name from sysobjects where name = 'new_order' )
          drop table new_order
go
if exists ( select name from sysobjects where name = 'orders' )
          drop table orders
go
if exists ( select name from sysobjects where name = 'order_line' )
          drop table order_line
go
if exists ( select name from sysobjects where name = 'item' )
          drop table item
go
if exists ( select name from sysobjects where name = 'stock' )
          drop table stock
go

--------------------
-- Create new tables
--------------------
create table warehouse
(
          w_id               int,
          w_ytd              money,
          w_tax              smallmoney,
          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)
) on MSSQL_misc_fg
go

create table district
(
          d_id               tinyint,
          d_w_id             int,
          d_ytd              money,
          d_next_o_id              int,
          d_tax              smallmoney,
```

```
          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)
) on MSSQL_misc_fg
go

create table customer
(
          c_id                int,
          c_d_id              tinyint,
          c_w_id              int,
          c_discount          smallmoney,
          c_credit_lim        money,
          c_last              char(16),
          c_first             char(16),
          c_credit            char(2),
          c_balance           money,
          c_ytd_payment       money,
          c_payment_cnt       smallint,
          c_delivery_cnt      smallint,
          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_middle            char(2),
          c_data              char(500)
) on MSSQL_cs_fg
go

-- Use the following table option if using c_data varchar(max)
-- sp_tableoption 'customer','large value types out of row','1'
-- go

create table history
(
          h_c_id              int,
          h_c_d_id            tinyint,
          h_c_w_id            int,
          h_d_id              tinyint,
          h_w_id              int,
          h_date              datetime,
          h_amount            smallmoney,
          h_data              char(24)
) on MSSQL_misc_fg
go

create table new_order
(
          no_o_id             int,
          no_d_id             tinyint,
          no_w_id             int
) on MSSQL_misc_fg
go

create table orders
(
          o_id                int,
          o_d_id              tinyint,
          o_w_id              int,
          o_c_id              int,
          o_carrier_id        tinyint,
          o_ol_cnt            tinyint,
          o_all_local         tinyint,
          o_entry_d           datetime
) on MSSQL_misc_fg
go

create table order_line
(
          ol_o_id             int,
          ol_d_id             tinyint,
          ol_w_id             int,
          ol_number           tinyint,
          ol_i_id             int,
          ol_delivery_d       datetime,
          ol_amount           smallmoney,
          ol_supply_w_id      int,
          ol_quantity         smallint,
          ol_dist_info        char(24)
) on MSSQL_misc_fg
go

create table item
(
          i_id                int,
          i_name              char(24),
          i_price             smallmoney,
```

```
          i_data              char(50),
          i_im_id             int
) on MSSQL_misc_fg
go

create table stock
(
          s_i_id              int,
          s_w_id              int,
          s_quantity          smallint,
          s_ytd               int,
          s_order_cnt         smallint,
          s_remote_cnt        smallint,
          s_data              char(50),
          s_dist_01           char(24),
          s_dist_02           char(24),
          s_dist_03           char(24),
          s_dist_04           char(24),
          s_dist_05           char(24),
          s_dist_06           char(24),
          s_dist_07           char(24),
          s_dist_08           char(24),
          s_dist_09           char(24),
          s_dist_10           char(24)
) on MSSQL_cs_fg
go
-----------------------------------------------------------------
--                                                             --
--  File:   IDXCUSCL.SQL                                       --
--          Microsoft TPC-C Benchmark Kit Ver. 4.62            --
--          Copyright Microsoft, 2005                          --
--                                                             --
--          Creates clustered index on customer table          --
-----------------------------------------------------------------
USE tpcc
GO

DECLARE @startdate  DATETIME,
        @enddate    DATETIME

SELECT  @startdate = GETDATE()
SELECT  'Start date:',
        CONVERT(VARCHAR(30),@startdate,21)

IF EXISTS ( SELECT name FROM sysindexes WHERE name = 'customer_c1' )
    DROP INDEX customer.customer_c1

CREATE UNIQUE CLUSTERED INDEX customer_c1 ON customer(c_w_id, c_d_id, c_id)
    ON MSSQL_cs_fg

SELECT  @enddate = GETDATE()
SELECT  'End date:',
        CONVERT(VARCHAR(30),@enddate,21)
SELECT  'Elapsed time (in seconds): ',
        DATEDIFF(second, @startdate, @enddate)
GO
-----------------------------------------------------------------
--                                                             --
--  File:   IDXCUSNC.SQL                                       --
--          Microsoft TPC-C Benchmark Kit Ver. 4.62            --
--          Copyright Microsoft, 2005                          --
--                                                             --
--          Creates non-clustered index on customer table      --
-----------------------------------------------------------------
USE tpcc
GO

DECLARE @startdate  DATETIME,
        @enddate    DATETIME

SELECT  @startdate = GETDATE()
SELECT  'Start date:',
        CONVERT(VARCHAR(30),@startdate,21)

IF EXISTS ( SELECT name FROM sysindexes WHERE name = 'customer_nc1' )
    DROP INDEX customer.customer_nc1

CREATE UNIQUE NONCLUSTERED INDEX customer_nc1 ON customer(c_w_id, c_d_id, c_last, c_first, c_id)
    ON MSSQL_cs_fg

SELECT  @enddate = GETDATE()
SELECT  'End date:',
        CONVERT(VARCHAR(30),@enddate,21)
SELECT  'Elapsed time (in seconds): ',
        DATEDIFF(second, @startdate, @enddate)
GO
-----------------------------------------------------------------
--                                                             --
--  File:   IDXDISCL.SQL                                       --
--          Microsoft TPC-C Benchmark Kit Ver. 4.62            --
--          Copyright Microsoft, 2005                          --
--                                                             --
--          Creates clustered index on district table          --
```

```
------------------------------------------------------------------
USE tpcc
GO

DECLARE @startdate  DATETIME,
        @enddate    DATETIME

SELECT  @startdate = GETDATE()
SELECT  'Start date:',
        CONVERT(VARCHAR(30),@startdate,21)

IF EXISTS ( SELECT name FROM sysindexes WHERE name = 'district_c1' )
    DROP INDEX district.district_c1

CREATE UNIQUE CLUSTERED INDEX district_c1 ON district(d_w_id, d_id)
    WITH FILLFACTOR=100 ON MSSQL_misc_fg

SELECT  @enddate = GETDATE()
SELECT  'End date:',
        CONVERT(VARCHAR(30),@enddate,21)
SELECT  'Elapsed time (in seconds): ',
        DATEDIFF(second, @startdate, @enddate)
GO
------------------------------------------------------------------
--                                                              --
--  File:   IDXHISCL.SQL                                        --
--          Microsoft TPC-C Benchmark Kit Ver. 4.62             --
--          Copyright Microsoft, 2005                           --
--                                                              --
--          Creates clustered index on history table            --
--                                                              --
--          CAUTION: This index is only beneficial for systems  --
--          CAUTION: with 8 or more processors.                 --
--          CAUTION: It may negatively impact performance on    --
--          CAUTION: systems with less than 8 processors.       --
--                                                              --
------------------------------------------------------------------
USE tpcc
GO

DECLARE @startdate  DATETIME,
        @enddate    DATETIME

SELECT  @startdate = GETDATE()
SELECT  'Start date:',
        CONVERT(VARCHAR(30),@startdate,21)

IF EXISTS ( SELECT name FROM sysindexes WHERE name = 'history_c1' )
    DROP INDEX history.history_c1

CREATE UNIQUE CLUSTERED INDEX history_c1 ON history(h_c_w_id, h_date, h_c_d_id, h_c_id, h_amount)
    ON MSSQL_misc_fg

SELECT  @enddate = GETDATE()
SELECT  'End date:',
        CONVERT(VARCHAR(30),@enddate,21)
SELECT  'Elapsed time (in seconds): ',
        DATEDIFF(second, @startdate, @enddate)
GO
------------------------------------------------------------------
--                                                              --
--  File:   IDXITMCL.SQL                                        --
--          Microsoft TPC-C Benchmark Kit Ver. 4.62             --
--          Copyright Microsoft, 2005                           --
--                                                              --
--          Creates clustered index on item table               --
--                                                              --
------------------------------------------------------------------
USE tpcc
GO

DECLARE @startdate  DATETIME,
        @enddate    DATETIME

SELECT  @startdate = GETDATE()
SELECT  'Start date:',
        CONVERT(VARCHAR(30),@startdate,21)

IF EXISTS ( SELECT name FROM sysindexes WHERE name = 'item_c1' )
    DROP INDEX item.item_c1

CREATE UNIQUE CLUSTERED INDEX item_c1 ON item(i_id)
    ON MSSQL_misc_fg

SELECT  @enddate = GETDATE()
SELECT  'End date:',
        CONVERT(VARCHAR(30),@enddate,21)
SELECT  'Elapsed time (in seconds): ',
        DATEDIFF(second, @startdate, @enddate)
GO
------------------------------------------------------------------
--                                                              --
--  File:   IDXNODCL.SQL                                        --
```

```
--          Microsoft TPC-C Benchmark Kit Ver. 4.62             --
--          Copyright Microsoft, 2005                           --
--                                                              --
--          Creates clustered index on new-order table          --
--                                                              --
------------------------------------------------------------------
USE tpcc
GO

DECLARE @startdate  DATETIME,
        @enddate    DATETIME

SELECT  @startdate = GETDATE()
SELECT  'Start date:',
        CONVERT(VARCHAR(30),@startdate,21)

IF EXISTS ( SELECT name FROM sysindexes WHERE name = 'new_order_c1' )
    DROP INDEX new_order.new_order_c1

CREATE UNIQUE CLUSTERED INDEX new_order_c1 ON new_order(no_w_id, no_d_id, no_o_id)
    ON MSSQL_misc_fg

SELECT  @enddate = GETDATE()
SELECT  'End date:',
        CONVERT(VARCHAR(30),@enddate,21)
SELECT  'Elapsed time (in seconds): ',
        DATEDIFF(second, @startdate, @enddate)
GO
------------------------------------------------------------------
--                                                              --
--  File:   IDXODLCL.SQL                                        --
--          Microsoft TPC-C Benchmark Kit Ver. 4.62             --
--          Copyright Microsoft, 2005                           --
--                                                              --
--          Creates clustered index on order-line table         --
--                                                              --
------------------------------------------------------------------
USE tpcc
GO

DECLARE @startdate  DATETIME,
        @enddate    DATETIME

SELECT  @startdate = GETDATE()
SELECT  'Start date:',
        CONVERT(VARCHAR(30),@startdate,21)

IF EXISTS ( SELECT name FROM sysindexes WHERE name = 'order_line_c1' )
    DROP INDEX order_line.order_line_c1

CREATE UNIQUE CLUSTERED INDEX order_line_c1 ON order_line(ol_w_id, ol_d_id, ol_o_id, ol_number)
    ON MSSQL_misc_fg

SELECT  @enddate = GETDATE()
SELECT  'End date:',
        CONVERT(VARCHAR(30),@enddate,21)
SELECT  'Elapsed time (in seconds): ',
        DATEDIFF(second, @startdate, @enddate)
GO
------------------------------------------------------------------
--                                                              --
--  File:   IDXODLCL.SQL                                        --
--          Microsoft TPC-C Benchmark Kit Ver. 4.62             --
--          Copyright Microsoft, 2005                           --
--                                                              --
--          Creates clustered index on order-line table         --
--                                                              --
------------------------------------------------------------------
USE tpcc
GO

DECLARE @startdate  DATETIME,
        @enddate    DATETIME

SELECT  @startdate = GETDATE()
SELECT  'Start date:',
        CONVERT(VARCHAR(30),@startdate,21)

IF EXISTS ( SELECT name FROM sysindexes WHERE name = 'order_line_c1' )
    DROP INDEX order_line.order_line_c1

CREATE UNIQUE CLUSTERED INDEX order_line_c1 ON order_line(ol_w_id, ol_d_id, ol_o_id, ol_number)
    ON MSSQL_misc_fg

SELECT  @enddate = GETDATE()
SELECT  'End date:',
        CONVERT(VARCHAR(30),@enddate,21)
SELECT  'Elapsed time (in seconds): ',
        DATEDIFF(second, @startdate, @enddate)
GO
------------------------------------------------------------------
--                                                              --
--  File:   IDXORDNC.SQL                                        --
```

```
--          Microsoft TPC-C Benchmark Kit Ver. 4.62            --
--          Copyright Microsoft, 2005                          --
--                                                             --
--          Creates non-clustered index on orders table        --
-------------------------------------------------------------------
USE tpcc
GO

DECLARE @startdate  DATETIME,
        @enddate    DATETIME

SELECT  @startdate = GETDATE()
SELECT  'Start date:',
        CONVERT(VARCHAR(30),@startdate,21)

IF EXISTS ( SELECT name FROM sysindexes WHERE name = 'orders_nc1' )
    DROP INDEX orders.orders_nc1

CREATE INDEX orders_nc1 ON orders(o_w_id, o_d_id, o_c_id, o_id)
    ON MSSQL_misc_fg

SELECT  @enddate = GETDATE()
SELECT  'End date:',
        CONVERT(VARCHAR(30),@enddate,21)
SELECT  'Elapsed time (in seconds): ',
        DATEDIFF(second, @startdate, @enddate)
GO
-------------------------------------------------------------------
--                                                             --
--  File:   IDXSTKCL.SQL                                       --
--          Microsoft TPC-C Benchmark Kit Ver. 4.62            --
--          Copyright Microsoft, 2005                          --
--                                                             --
--          Creates clustered index on stock table             --
--                                                             --
-------------------------------------------------------------------
USE tpcc
GO

DECLARE @startdate  DATETIME,
        @enddate    DATETIME

SELECT  @startdate = GETDATE()
SELECT  'Start date:',
        CONVERT(VARCHAR(30),@startdate,21)

IF EXISTS ( SELECT name FROM sysindexes WHERE name = 'stock_c1' )
    DROP INDEX stock.stock_c1

CREATE UNIQUE CLUSTERED INDEX stock_c1 ON stock(s_i_id, s_w_id)
    ON MSSQL_cs_fg

SELECT  @enddate = GETDATE()
SELECT  'End date:',
        CONVERT(VARCHAR(30),@enddate,21)
SELECT  'Elapsed time (in seconds): ',
        DATEDIFF(second, @startdate, @enddate)
GO
-------------------------------------------------------------------
--                                                             --
--  File:   IDXWARCL.SQL                                       --
--          Microsoft TPC-C Benchmark Kit Ver. 4.62            --
--          Copyright Microsoft, 2005                          --
--                                                             --
--          Creates clustered index on warehouse table         --
--                                                             --
-------------------------------------------------------------------
USE tpcc
GO

DECLARE @startdate  DATETIME,
        @enddate    DATETIME

SELECT  @startdate = GETDATE()
SELECT  'Start date:',
        CONVERT(VARCHAR(30),@startdate,21)

IF EXISTS ( SELECT name FROM sysindexes WHERE name = 'warehouse_c1' )
    DROP INDEX warehouse.warehouse_c1

CREATE UNIQUE CLUSTERED INDEX warehouse_c1 ON warehouse(w_id)
    WITH FILLFACTOR=100 ON MSSQL_misc_fg

SELECT  @enddate = GETDATE()
SELECT  'End date:',
        CONVERT(VARCHAR(30),@enddate,21)
SELECT  'Elapsed time (in seconds): ',
        DATEDIFF(second, @startdate, @enddate)
GO


dbopt1.sql
```

```
--  File:     DBOPT1.SQL
--            Microsoft TPC-C Benchmark Kit Ver. 4.00
--            Copyright Microsoft, 1996
--  Purpose:  Sets database options for data load


use master
go

exec sp_dboption tpcc,'select into/bulkcopy',true
exec sp_dboption tpcc,'trunc. log on chkpt.',true
go

use tpcc
go

checkpoint
go
```

dbopt2.sql

```
--  File:     DBOPT2.SQL
--            Microsoft TPC-C Benchmark Kit Ver. 4.00
--            Copyright Microsoft, 1996
--  Purpose:  Resets database options after data load


use master
go

sp_dboption tpcc,'select ',false
go

sp_dboption tpcc,'trunc. ',false
go

use tpcc
go

checkpoint
go

sp_configure allow,1
go

reconfigure with override
go

/*                                          */
/* Set option values for user-defined indexes */
/*                                          */

sp_indexoption 'customer','AllowPageLocks',FALSE
go
sp_indexoption 'district','AllowPageLocks',FALSE
go
sp_indexoption 'warehouse','AllowPageLocks',FALSE
go
sp_indexoption 'stock','AllowPageLocks',FALSE
go
sp_indexoption 'order_line','AllowPageLocks',FALSE
go
sp_indexoption 'orders','AllowPageLocks',FALSE
go
sp_indexoption 'new_order','AllowRowLocks',FALSE
go
sp_indexoption 'item','AllowRowLocks',FALSE
go
sp_indexoption 'item','AllowPageLocks',FALSE
go

Print ' '
Print '******************'
Print 'Pre-specified Locking Hierarchy:'
Print '   Lockflag = 0 ==> No pre-pecified hierarchy'
Print '   Lockflag = 1 ==> Lock at Page-level then Table-level'
Print '   Lockflag = 2 ==> Lock at Row-level then Table-level'
Print '   Lockflag = 3 ==> Lock at Table-level'
Print ' '

select name,lockflags
from sysindexes
where object_id("warehouse")=id or
            object_id("district")=id or
            object_id("customer")=id or
            object_id("stock")=id or
            object_id("orders")=id or
```

```
           object_id("order_line")=id or
           object_id("history")=id or
           object_id("new_order")=id or
           object_id("item")=id
order by lockflags asc
go

sp_configure allow,0
go

reconfigure with override
go

exec sp_dboption tpcc, 'auto update statistics', FALSE
exec sp_dboption tpcc, 'auto create statistics', FALSE
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



dbopt3.sql

use tpcc
go
sp_indexoption 'orders','AllowPagelocks',TRUE
go
sp_indexoption 'orders','AllowRowlocks',FALSE
go
sp_indexoption 'order_line','AllowPagelocks',TRUE
go
sp_indexoption 'order_line','AllowRowlocks',FALSE
go

-----------------------------------------------------------------------
--                                                                   --
--  File:  BACKUP.SQL                                                --
--         Microsoft TPC-C Benchmark Kit Ver. 4.51                   --
--         Copyright Microsoft, 2003                                 --
--                                                                   --
-----------------------------------------------------------------------

declare   @startdate          datetime,
          @enddate  datetime

select    @startdate = getdate()
select    'Start date:',
                  convert(varchar(30),@startdate, 21)

dump database tpcc to tpccback1 with init, stats = 10

select    @enddate = getdate()
select    'End date: ',
                  convert(varchar(30),@enddate, 21)
select    'Elapsed time (in seconds): ',
                  datediff(second, @startdate, @enddate)
go
-----------------------------------------------------------------------
--                                                                   --
--  File:  RESTORE.SQL                                               --
--         Microsoft TPC-C Benchmark Kit Ver. 4.51                   --
--         Copyright Microsoft, 2003                                 --
--                                                                   --
-----------------------------------------------------------------------

declare   @startdate          datetime,
          @enddate  datetime

select    @startdate = getdate()
select    'Start date:',
                  convert(varchar(30),@startdate, 21)

load database tpcc from tpccback1 with stats = 10

select    @enddate = getdate()
select    'End date: ',
                  convert(varchar(30),@enddate, 21)
select    'Elapsed time (in seconds): ',
                  datediff(second, @startdate, @enddate)

go
-----------------------------------------------------------------------
--                                                                   --
--        File:     CREATEDB.SQL                                     --
--                  Microsoft TPC-C Benchmark Kit Ver. 4.50          --
--                  Copyright Microsoft, 2003                        --
--                                                                   --
--                  Creates 3100 warehouse database                  --
--                                                                   --
```

```
-----------------------------------------------------------------

SET ANSI_NULL_DFLT_OFF ON
go

use master
go

-------------------------------------
-- Create temporary table for timing
-------------------------------------
if exists ( select name from sysobjects where name = 'tpcc_timer' )
          drop table tpcc_timer
go

create table tpcc_timer
          (start_date         char(30),
           end_date char(30))

insert    into tpcc_timer values (0,0)
go

----------------------
-- Store starting time
----------------------
update    tpcc_timer
set       start_date          = (select convert(char(30), getdate(), 21))
go

----------------------------
-- create main database files
----------------------------
CREATE DATABASE tpcc
ON PRIMARY
(         NAME                = MSSQL_tpcc_root,
          FILENAME  = 'C:\MSSQL_tpcc_root.mdf',
          SIZE                = 8MB,
          FILEGROWTH          = 0),
FILEGROUP MSSQL_misc_fg
(         NAME                = MSSQL_misc1,
          FILENAME  = 'F:',
          SIZE                = 49129MB,
          FILEGROWTH          = 0),
(         NAME                = MSSQL_misc2,
          FILENAME  = 'G:',
          SIZE                = 49129MB,
          FILEGROWTH          = 0),
FILEGROUP MSSQL_cs_fg
(         NAME                = MSSQL_cs1,
          FILENAME  = 'M:',
          SIZE                = 94178MB,
          FILEGROWTH          = 0),
(         NAME                = MSSQL_cs2,
          FILENAME  = 'N:',
          SIZE                = 94178MB,
          FILEGROWTH          = 0)
LOG ON
(         NAME                = MSSQL_tpcc_log,
          FILENAME  = 'E:',
          SIZE                = 1130600MB,
          FILEGROWTH          = 0)
COLLATE Latin1_General_BIN
go

--------------------
-- Store ending time
--------------------
update    tpcc_timer
set       end_date  = (select convert(char(30), getdate(), 21))
go

select 'Elapsed time (in seconds): ', datediff(second,(select start_date from tpcc_timer),(select end_date from
tpcc_timer))

-------------------------
-- remove temporary table
-------------------------
if exists ( select name from sysobjects where name = 'tpcc_timer' )
          drop table tpcc_timer
go

-----------------------------------------------------------------
--                                                             --
--  File:  BACKUPDEV.SQL                                       --
--         Microsoft TPC-C Benchmark Kit Ver. 4.51             --
--         Copyright Microsoft, 2003                           --
--                                                             --
-----------------------------------------------------------------

use master
go

------------------------
```

```
-- create backup devices
------------------------
exec sp_addumpdevice 'disk','tpccback1','Z:\tpccback1.dmp'
go

---------------------------------------------------------------------
--                                                                 --
--  File:  REMOVEDB.SQL                                            --
--         Microsoft TPC-C Benchmark Kit Ver. 4.51                 --
--         Copyright Microsoft, 2003                               --
--                                                                 --
---------------------------------------------------------------------

use master
go

-----------------------------------------------
-- remove any existing database and backup files
-----------------------------------------------
exec sp_dbremove tpcc, dropdev
go

exec sp_dropdevice 'tpccback1'
go
```

Stored Procedures

neword.sql

```
---------------------------------------------------------------------
--                                                                 --
--  File:   NEWORD.SQL                                             --
--          Microsoft TPC-C Benchmark Kit Ver. 4.62                --
--          Copyright Microsoft, 2005                              --
--                                                                 --
--          Creates neworder stored procedure                      --
--                                                                 --
--          Interface Level:    4.20.000                           --
--                                                                 --
---------------------------------------------------------------------
SET QUOTED_IDENTIFIER OFF
GO

SET ANSI_NULLS ON
GO

USE tpcc
GO

IF EXISTS ( SELECT name FROM sysobjects WHERE name = 'tpcc_neworder' )
    DROP PROCEDURE tpcc_neworder
GO

CREATE PROCEDURE    tpcc_neworder
                        @w_id           int,
                        @d_id           tinyint,
                        @c_id           int,
                        @o_ol_cnt       tinyint,
                        @o_all_local    tinyint,
                        @i_id1  int = 0, @s_w_id1  int = 0, @ol_qty1  smallint = 0,
                        @i_id2  int = 0, @s_w_id2  int = 0, @ol_qty2  smallint = 0,
                        @i_id3  int = 0, @s_w_id3  int = 0, @ol_qty3  smallint = 0,
                        @i_id4  int = 0, @s_w_id4  int = 0, @ol_qty4  smallint = 0,
                        @i_id5  int = 0, @s_w_id5  int = 0, @ol_qty5  smallint = 0,
                        @i_id6  int = 0, @s_w_id6  int = 0, @ol_qty6  smallint = 0,
                        @i_id7  int = 0, @s_w_id7  int = 0, @ol_qty7  smallint = 0,
                        @i_id8  int = 0, @s_w_id8  int = 0, @ol_qty8  smallint = 0,
                        @i_id9  int = 0, @s_w_id9  int = 0, @ol_qty9  smallint = 0,
                        @i_id10 int = 0, @s_w_id10 int = 0, @ol_qty10 smallint = 0,
                        @i_id11 int = 0, @s_w_id11 int = 0, @ol_qty11 smallint = 0,
                        @i_id12 int = 0, @s_w_id12 int = 0, @ol_qty12 smallint = 0,
                        @i_id13 int = 0, @s_w_id13 int = 0, @ol_qty13 smallint = 0,
                        @i_id14 int = 0, @s_w_id14 int = 0, @ol_qty14 smallint = 0,
                        @i_id15 int = 0, @s_w_id15 int = 0, @ol_qty15 smallint = 0

AS
DECLARE @w_tax          smallmoney,
        @d_tax          smallmoney,
        @c_last         char(16),
        @c_credit       char(2),
        @c_discount     smallmoney,
        @i_price        smallmoney,
        @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      int,
        @li_qty         smallint,
        @ol_number      int,
        @c_id_local     int

BEGIN

BEGIN TRANSACTION n

------------------------------------------------------------
--  get district tax and next availible order id and update
--  plus initialize local variables
------------------------------------------------------------
    UPDATE  district
    SET     @d_tax          = d_tax,
            @o_id           = d_next_o_id,
            d_next_o_id     = d_next_o_id + 1,
            @o_entry_d      = GETDATE(),
            @li_no          = 0,
            @commit_flag    = 1
    WHERE   d_w_id          = @w_id AND
            d_id            = @d_id

----------------------
--  process orderlines
----------------------
    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,

                @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,

                @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 WITH (repeatableread)
        WHERE   i_id        = @li_id

----------------------
--  update stock values
----------------------
        UPDATE  stock
        SET     s_ytd           = s_ytd + @li_qty,
                @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

-------------------------------------------------------------------
--  if there actually is a stock (and item) with these ids, go to work
-------------------------------------------------------------------
        IF (@@rowcount > 0)
        BEGIN
------------------------------------------------------------
--  insert order_line data (using data from item and stock)
------------------------------------------------------------
            INSERT INTO order_line VALUES(  @o_id,
                                            @d_id,
                                            @w_id,
                                            @li_no,
                                            @li_id,
                                            'dec 31, 1899',
                                            @i_price * @li_qty,
                                            @li_s_w_id,
                                            @li_qty,
                                            @s_dist)

---------------------------------
--  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 (or stock) 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 WITH (repeatableread)
    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,
                                0,
                                @o_ol_cnt,
                                @o_all_local,
                                @o_entry_d)

-------------------------------------------------
--  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 WITH (repeatableread)
    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

SET QUOTED_IDENTIFIER OFF
GO

SET ANSI_NULLS ON
GO
----------------------------------------------------------------------
--                                                                  --
--  File:   PAYMENT.SQL                                             --
--          Microsoft TPC-C Benchmark Kit Ver. 4.62                 --
--          Copyright Microsoft, 2005                               --
--                                                                  --
--          Creates payment stored procedure                        --
--                                                                  --
--          Interface Level:    4.20.000                            --
--                                                                  --
----------------------------------------------------------------------
SET QUOTED_IDENTIFIER OFF
GO

SET ANSI_NULLS ON
GO

USE tpcc
GO

IF EXISTS ( SELECT name FROM sysobjects WHERE name = 'tpcc_payment' )
    DROP PROCEDURE tpcc_payment
GO

CREATE PROCEDURE    tpcc_payment
                        @w_id       int,
                        @c_w_id     int,
                        @h_amount   smallmoney,
                        @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   money,
        @c_balance      money,
        @c_discount     smallmoney,
        @c_data         char(42),
        @datetime       datetime,
        @w_ytd          money,
        @d_ytd          money,
        @cnt            smallint,
        @val            smallint,
        @screen_data    char(200),
        @d_id_local     tinyint,
        @w_id_local     int,
        @c_id_local     int

SELECT  @screen_data    = ""

BEGIN TRANSACTION 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 WITH (repeatableread)
        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 WITH (repeatableread)
        WHERE   c_last  = @c_last AND
                                c_w_id  = @c_w_id AND
                                c_d_id  = @c_d_id
        ORDER   BY 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,
            @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 =   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)

        --  update customer info
        UPDATE  customer
        SET     c_data          = @c_data + substring(c_data, 1, 458),
                @screen_data    = @c_data + substring(c_data, 1, 158)
        WHERE   c_id            = @c_id AND
                c_w_id          = @c_w_id AND
```

```
                c_d_id          = @c_d_id
    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 TRANSACTION 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

SET QUOTED_IDENTIFIER OFF
GO

SET ANSI_NULLS ON
GO
----------------------------------------------------------------
--                                                            --
--  File:   ORDSTAT.SQL                                       --
--          Microsoft TPC-C Benchmark Kit Ver. 4.62           --
--          Copyright Microsoft, 2005                         --
--                                                            --
--          Creates order status stored procedure             --
--                                                            --
--          Interface Level:    4.20.000                      --
--                                                            --
----------------------------------------------------------------
SET QUOTED_IDENTIFIER OFF
GO

SET ANSI_NULLS ON
GO

USE tpcc
```

```
GO

IF EXISTS ( SELECT name FROM sysobjects WHERE name = 'tpcc_orderstatus' )
    DROP PROCEDURE tpcc_orderstatus
GO

CREATE PROCEDURE    tpcc_orderstatus
                        @w_id       int,
                        @d_id       tinyint,
                        @c_id       int,
                        @c_last     char(16) = ''

AS
DECLARE @c_balance      money,
        @c_first        char(16),
        @c_middle       char(2),
        @o_id           int,
        @o_entry_d      datetime,
        @o_carrier_id   smallint,
        @cnt            smallint

BEGIN TRANSACTION o
    IF (@c_id = 0)
    BEGIN
        ------------------------------------------
        --  get customer id and info using last name
        ------------------------------------------
        SELECT  @cnt    = (count(*)+1)/2
        FROM    customer WITH (repeatableread)
        WHERE   c_last  = @c_last AND
                c_w_id  = @w_id AND
                c_d_id  = @d_id

        SET     rowcount @cnt

        SELECT  @c_id       = c_id,
                @c_balance  = c_balance,
                @c_first    = c_first,
                @c_last     = c_last,
                @c_middle   = c_middle
        FROM    customer WITH (repeatableread)
        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 WITH (repeatableread)
        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 WITH (serializable)
    WHERE   o_c_id          = @c_id AND
            o_d_id          = @d_id AND
            o_w_id          = @w_id
    ORDER   BY o_id ASC

    ------------------------------------------
    --  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 WITH (repeatableread)
    WHERE   ol_o_id = @o_id AND
            ol_d_id = @d_id AND
            ol_w_id = @w_id

    custnotfound:

    COMMIT TRANSACTION 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
-----------------------------------------------------------------
--                                                             --
--  File:   DELIVERY.SQL                                       --
--          Microsoft TPC-C Benchmark Kit Ver. 4.62            --
--          Copyright Microsoft, 2005                          --
--                                                             --
--          Creates delivery stored procedure                  --
--                                                             --
--          Interface Level:    4.20.000                       --
--                                                             --
-----------------------------------------------------------------
SET QUOTED_IDENTIFIER OFF
GO

SET ANSI_NULLS ON
GO

USE tpcc
GO

IF EXISTS ( SELECT name FROM sysobjects WHERE name = 'tpcc_delivery' )
    DROP PROCEDURE tpcc_delivery
GO

CREATE PROC tpcc_delivery
                @w_id           int,
                @o_carrier_id   smallint

AS
DECLARE @d_id       tinyint,
        @o_id       int,
        @c_id       int,
        @total      money,
        @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 TRANSACTION d
    WHILE (@d_id < 10)
    BEGIN
        SELECT  @d_id   = @d_id + 1,
                @total  = 0,
                @o_id   = 0

        SELECT  TOP 1
                @o_id   = no_o_id
        FROM    new_order WITH  (serializable updlock)
        WHERE   no_w_id = @w_id AND
                no_d_id = @d_id
        ORDER   BY no_o_id ASC

        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 TRANSACTION d

-- return delivery data to client

SELECT  @oid1,
        @oid2,
        @oid3,
        @oid4,
        @oid5,
        @oid6,
        @oid7,
        @oid8,
        @oid9,
        @oid10
GO

SET QUOTED_IDENTIFIER OFF
GO

SET ANSI_NULLS ON
GO
----------------------------------------------------------------------
--                                                                  --
--  File:   STOCKLEV.SQL                                            --
--          Microsoft TPC-C Benchmark Kit Ver. 4.62                 --
--          Copyright Microsoft, 2005                               --
--                                                                  --
--          Creates stock level stored procedure                    --
--                                                                  --
--          Interface Level:    4.20.000                            --
--                                                                  --
----------------------------------------------------------------------
SET QUOTED_IDENTIFIER OFF
GO

SET ANSI_NULLS ON
GO

USE tpcc
GO

IF EXISTS ( SELECT name FROM sysobjects WHERE name = 'tpcc_stocklevel' )
    DROP PROCEDURE tpcc_stocklevel
GO

CREATE PROCEDURE    tpcc_stocklevel
                        @w_id           int,
                        @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
OPTION(ORDER GROUP)
GO

SET QUOTED_IDENTIFIER OFF
GO

SET ANSI_NULLS ON
GO
//        File:               TPCC.H
//                                    Microsoft TPC-C Kit Ver. 4.51
//                                    Copyright Microsoft, 1996, 1997, 1998, 1999, 2000, 2001, 2002, 2003, 2005
//        Purpose:  Header file for TPC-C database loader


// Build number of TPC Benchmark Kit
#define TPCKIT_VER  "4.51"

// 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 <time.h>
#include <sys\timeb.h>
#include <sys\types.h>
#include <math.h>

// ODBC headers
#include <sql.h>
#include <sqlext.h>
#include <odbcss.h>

// General constants
#define MILLI                           1000
#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                          ""

// Default loader arguments
#define BATCH                                                   10000
#define DEFLDPACKSIZE                                   32768
#define LOADER_RES_FILE                                 "C:\\MSTPCC.450\\SETUP\\LOGS\\load.out"
#define LOADER_LOG_PATH                                 "C:\\MSTPCC.450\\SETUP\\LOGS\\"
#define LOADER_NURAND_C                                 123
#define DEF_STARTING_WAREHOUSE                  1
#define BUILD_INDEX                                     1         // build both data and indexes
#define INDEX_ORDER                                     1         // build indexes before load
#define SCALE_DOWN                                      0   // build a normal scale database
#define INDEX_SCRIPT_PATH                       "scripts"

typedef struct
{
    char                                        *server;
    char                                        *database;
    char                                        *user;
    char                                        *password;
          BOOL                                  tables_all;                           // set if loading all tables
          BOOL                                  table_item;                           // set if loading ITEM table
specifically
          BOOL                                  table_warehouse;    // set if loading WAREHOUSE, DISTRICT, and STOCK
          BOOL                                  table_customer;               // set if loading CUSTOMER and HISTORY
          BOOL                                  table_orders;                 // set if loading NEW-ORDER, ORDERS,
ORDER-LINE
    long                                        num_warehouses;
    long                                        batch;
    long                                        verbose;
          long                                  pack_size;
          char                                  *loader_res_file;
          char                                  *log_path;
          char                                  *synch_servername;
```

```
          long                                  case_sensitivity;
          long                                  starting_warehouse;
          long                                  build_index;
          long                                  index_order;
          long                                  scale_down;
          char                                  *index_script_path;
} TPCCLDR_ARGS;

// 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 CREDIT_LEN                 2
          #define C_DATA_LEN               500
          #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
          #define C_SINCE_LEN                                 23
          #define H_DATE_LEN                                  23
          #define OL_DELIVERY_D_LEN                 23
          #define O_ENTRY_D_LEN             23


// Functions in random.c
void      seed();
long      irand();
double    drand();
void      WUCreate();
short     WURand();
long      RandomNumber(long lower, long upper);

// Functions in getargs.c;
void      GetArgsLoader();
void      GetArgsLoaderUsage();

// Functions in time.c
long      TimeNow();

// Functions in strings.c
void      MakeAddress();
void      LastName();
int       MakeAlphaString();
int                 MakeAlphaStringPadded();
int       MakeOriginalAlphaString();
int       MakeNumberString();
int       MakeZipNumberString();
void      InitString();
void      InitAddress();
void      PaddString();
//===============================================================================
//        File:               TPCCLDR.C
//                                    Microsoft TPC-C Kit Ver. 4.51
//                                    Copyright Microsoft, 1996, 1997, 1998, 1999,
//                                    2000, 2001, 2002, 2003
//        Purpose:  Source file for TPC-C database loader
//===============================================================================
// Includes
#include "tpcc.h"
#include "search.h"

// Defines
#define MAXITEMS                100000
#define MAXITEMS_SCALE_DOWN             100
#define CUSTOMERS_PER_DISTRICT  3000
#define CUSTOMERS_SCALE_DOWN  30
#define DISTRICT_PER_WAREHOUSE  10
#define ORDERS_PER_DISTRICT     3000
#define ORDERS_SCALE_DOWN       30
#define MAX_CUSTOMER_THREADS    2
#define MAX_ORDER_THREADS       3
#define MAX_MAIN_THREADS        4
#define MAX_SQL_ERRORS                          10

// Functions declarations
```

```
void HandleErrorDBC (SQLHDBC  hdbc1);
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 CheckForCommit_Big();
void OpenConnections();
void BuildIndex();
void FormatDate ();

// Shared memory structures
typedef struct
{
          double                                    ol;
    long                ol_i_id;
          long                                      ol_supply_w_id;
    short               ol_quantity;
    double              ol_amount;
    char                ol_dist_info[DIST_INFO_LEN+1];
          char                                      ol_delivery_d[OL_DELIVERY_D_LEN+1];
} ORDER_LINE_STRUCT;

typedef struct
{
    long                o_id;
    short               o_d_id;
          long                                      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;
          long                                      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;
          char                              c_balance[6];
    double                                  c_ytd_payment;
          short                             c_payment_cnt;
          short                             c_delivery_cnt;
          char                              c_data[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      szLastError[300];

HENV      henv;

HDBC      v_hdbc;                                       // for SQL Server version verification
```

```
HDBC      i_hdbc1;                                          // for ITEM table
HDBC      w_hdbc1;                                          // for WAREHOUSE, DISTRICT, STOCK
HDBC      c_hdbc1;                                          // for CUSTOMER
HDBC      c_hdbc2;                                          // for HISTORY
HDBC      o_hdbc1;                                          // for ORDERS
HDBC      o_hdbc2;                                          // for NEW-ORDER
HDBC      o_hdbc3;                                          // for ORDER-LINE

HSTMT     v_hstmt;                                          // for SQL Server version verification
HSTMT     i_hstmt1;
HSTMT     w_hstmt1;
HSTMT     c_hstmt1, c_hstmt2;
HSTMT     o_hstmt1, o_hstmt2, o_hstmt3;

int                total_db_errors;

ORDERS_STRUCT       orders_buf[ORDERS_PER_DISTRICT];
CUSTOMER_STRUCT     customer_buf[CUSTOMERS_PER_DISTRICT];
long                         orders_rows_loaded;
double                       new_order_rows_loaded;
double                       order_line_rows_loaded;
long                         history_rows_loaded;
long                         customer_rows_loaded;
double                       stock_rows_loaded;
long                         district_rows_loaded;
long                         item_rows_loaded;
long                         warehouse_rows_loaded;
long                         main_time_start;
long                         main_time_end;
long                         max_items;
long                         customers_per_district;
long                         orders_per_district;
long                         first_new_order;
long                         last_new_order;

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                                  i;

          for (i=0; i<MAX_MAIN_THREADS; i++)
                    hThread[i] = NULL;

    printf("\n*************************************************");
          printf("\n*                                               *");
          printf("\n*  Microsoft SQL Server                         *");
          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);

          printf("Build interface is ODBC.\n");

          if (aptr->build_index == 0)
                    printf("Data load only - no index creation.\n");
          else
                    printf("Data load and index creation.\n");

          if (aptr->index_order == 0)
                    printf("Clustered indexes will be created after bulk load.\n");
          else
                    printf("Clustered indexes will be created before bulk load.\n");

          // set database scale values
          if (aptr->scale_down == 1)
          {
                    printf("*** Scaled Down Database ***\n");
                    max_items = MAXITEMS_SCALE_DOWN;
                    customers_per_district = CUSTOMERS_SCALE_DOWN;
                    orders_per_district = ORDERS_SCALE_DOWN;
                    first_new_order = 0;
                    last_new_order  = 30;
          }
          else
          {
                    max_items = MAXITEMS;
                    customers_per_district = CUSTOMERS_PER_DISTRICT;
```

```
                orders_per_district = ORDERS_PER_DISTRICT;
                first_new_order = 2100;
                last_new_order  = 3000;
        }

        // open connections to SQL Server
        OpenConnections();

        // open file for loader results
        fLoader = fopen(aptr->loader_res_file, "w");


    if (fLoader == NULL)
        {
                printf("Error, loader result file open failed.");
                exit(-1);
        }

    // start loading data
    sprintf(buffer,"TPC-C load started for %ld warehouses.\n",aptr->num_warehouses);
        if      (aptr->scale_down == 1)
        {
                sprintf(buffer,"SCALED DOWN DATABASE.\n");
        }

        printf("%s",buffer);
        fprintf(fLoader,"%s",buffer);

        main_time_start = (TimeNow() / MILLI);

        // start parallel load threads
        if (aptr->tables_all || 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);
                }
        }

        if (aptr->tables_all || 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);
                }
        }

        if (aptr->tables_all || 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);
                }
        }

        if (aptr->tables_all || 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);
                    }
          }

          // Wait for threads to finish...
          for (i=0; i<MAX_MAIN_THREADS; i++)
          {
                    if (hThread[i] != NULL)
                    {
                              WaitForSingleObject( hThread[i], INFINITE );
                              CloseHandle(hThread[i]);
                              hThread[i] = NULL;
                    }
          }

          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);

          SQLFreeEnv(henv);

    exit(0);

          return 0;
}


//===============================================================================
//
// Function name: LoadItem
//
//===============================================================================
void LoadItem()
{
    int                       i;
          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;
          RETCODE             rc;
          DBINT               rcint;
          char                bcphint[128];
          char                err_log_path[256];

          // Seed with unique number
          seed(11);

          printf("Loading item table...\n");

          //if build index before load
          if ((aptr->build_index == 1) && (aptr->index_order == 1))
                    BuildIndex("idxitmcl");

          InitString(i_name, I_NAME_LEN+1);
          InitString(i_data, I_DATA_LEN+1);

          sprintf(name, "%s..%s", aptr->database, "item");

          strcpy(err_log_path,aptr->log_path);
          strcat(err_log_path,"item.err");
          rc = bcp_init(i_hdbc1, name, NULL, err_log_path , DB_IN);
          if (rc != SUCCEED)
                    HandleErrorDBC(i_hdbc1);

          if ((aptr->build_index == 1) && (aptr->index_order == 1))
          {
                    sprintf(bcphint, "tablock, order (i_id), ROWS_PER_BATCH = 100000");
                    rc = bcp_control(i_hdbc1, BCPHINTS, (void*) bcphint);
                    if (rc != SUCCEED)
                              HandleErrorDBC(i_hdbc1);
          }

          i = 0;
          rc = bcp_bind(i_hdbc1, (BYTE *) &i_id, 0, SQL_VARLEN_DATA, NULL, 0, SQLINT4, ++i);
          if (rc != SUCCEED)
                    HandleErrorDBC(i_hdbc1);
```

```
          rc = bcp_bind(i_hdbc1, (BYTE *) i_name, 0, I_NAME_LEN, NULL, 0, 0, ++i);
          if (rc != SUCCEED)
                    HandleErrorDBC(i_hdbc1);
          rc = bcp_bind(i_hdbc1, (BYTE *) &i_price, 0, SQL_VARLEN_DATA, NULL, 0, SQLFLT8, ++i);
          if (rc != SUCCEED)
                    HandleErrorDBC(i_hdbc1);
          rc = bcp_bind(i_hdbc1, (BYTE *) i_data, 0, SQL_VARLEN_DATA, "", 1, 0, ++i);
          if (rc != SUCCEED)
                    HandleErrorDBC(i_hdbc1);
          rc = bcp_bind(i_hdbc1, (BYTE *) &i_im_id, 0, SQL_VARLEN_DATA, NULL, 0, SQLINT4, ++i);
          if (rc != SUCCEED)
                    HandleErrorDBC(i_hdbc1);

          time_start = (TimeNow() / MILLI);

          item_rows_loaded = 0;

          for (i_id = 1; i_id <= max_items; i_id++)
          {
                    i_im_id = RandomNumber(1L, 10000L);

                    MakeAlphaStringPadded(14, 24, I_NAME_LEN, i_name);

                    i_price = ((float) RandomNumber(100L, 10000L))/100.0;

                    MakeOriginalAlphaString(26, 50, I_DATA_LEN, i_data, 10);

                    rc = bcp_sendrow(i_hdbc1);
                    if (rc != SUCCEED)
                              HandleErrorDBC(i_hdbc1);

                    item_rows_loaded++;
                    CheckForCommit(i_hdbc1, i_hstmt1, item_rows_loaded, "item", &time_start);
          }

          rcint = bcp_done(i_hdbc1);
          if (rcint < 0)
                    HandleErrorDBC(i_hdbc1);

          printf("Finished loading item table.\n");

          SQLFreeStmt(i_hstmt1, SQL_DROP);
          SQLDisconnect(i_hdbc1);
          SQLFreeConnect(i_hdbc1);

          // if build index after load
          if ((aptr->build_index == 1) && (aptr->index_order == 0))
                    BuildIndex("idxitmcl");

}

//============================================================================
//
// Function   : LoadWarehouse
//
// Loads WAREHOUSE table and loads Stock and District as Warehouses are created
//
//============================================================================
void LoadWarehouse()
{
          int                i;
          long      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;
          RETCODE   rc;
          DBINT     rcint;
          char      bcphint[128];
          char      err_log_path[256];

          // Seed with unique number
          seed(2);

          printf("Loading warehouse table...\n");

          // if build index before load...
          if ((aptr->build_index == 1) && (aptr->index_order == 1))
                    BuildIndex("idxwarcl");

          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");

          strcpy(err_log_path,aptr->log_path);
          strcat(err_log_path,"whouse.err");
```

```
          rc = bcp_init(w_hdbc1, name, NULL, err_log_path, DB_IN);

          if (rc != SUCCEED)
                    HandleErrorDBC(w_hdbc1);

          if ((aptr->build_index == 1) && (aptr->index_order == 1))
          {
                    sprintf(bcphint, "tablock, order (w_id), ROWS_PER_BATCH = %d", aptr->num_warehouses);
                    rc = bcp_control(w_hdbc1, BCPHINTS, (void*) bcphint);
                    if (rc != SUCCEED)
                              HandleErrorDBC(w_hdbc1);
          }

          i = 0;
          rc = bcp_bind(w_hdbc1, (BYTE *) &w_id, 0, SQL_VARLEN_DATA, NULL, 0, SQLINT4, ++i);
          if (rc != SUCCEED)
                    HandleErrorDBC(w_hdbc1);
          rc = bcp_bind(w_hdbc1, (BYTE *) &w_ytd, 0, SQL_VARLEN_DATA, NULL, 0, SQLFLT8, ++i);
          if (rc != SUCCEED)
                    HandleErrorDBC(w_hdbc1);
          rc = bcp_bind(w_hdbc1, (BYTE *) &w_tax, 0, SQL_VARLEN_DATA, NULL, 0, SQLFLT8, ++i);
          if (rc != SUCCEED)
                    HandleErrorDBC(w_hdbc1);
          rc = bcp_bind(w_hdbc1, (BYTE *) w_name, 0, W_NAME_LEN, NULL, 0, 0, ++i);
          if (rc != SUCCEED)
                    HandleErrorDBC(w_hdbc1);
          rc = bcp_bind(w_hdbc1, (BYTE *) w_street_1, 0, ADDRESS_LEN, NULL, 0, 0, ++i);
          if (rc != SUCCEED)
                    HandleErrorDBC(w_hdbc1);
          rc = bcp_bind(w_hdbc1, (BYTE *) w_street_2, 0, ADDRESS_LEN, NULL, 0, 0, ++i);
          if (rc != SUCCEED)
                    HandleErrorDBC(w_hdbc1);
          rc = bcp_bind(w_hdbc1, (BYTE *) w_city, 0, ADDRESS_LEN, NULL, 0, 0, ++i);
          if (rc != SUCCEED)
                    HandleErrorDBC(w_hdbc1);
          rc = bcp_bind(w_hdbc1, (BYTE *) w_state, 0, STATE_LEN, NULL, 0, 0, ++i);
          if (rc != SUCCEED)
                    HandleErrorDBC(w_hdbc1);
          rc = bcp_bind(w_hdbc1, (BYTE *) w_zip, 0, ZIP_LEN, NULL, 0, 0, ++i);
          if (rc != SUCCEED)
                    HandleErrorDBC(w_hdbc1);

          time_start = (TimeNow() / MILLI);

          warehouse_rows_loaded = 0;

          for (w_id = (long)aptr->starting_warehouse; w_id <= aptr->num_warehouses; w_id++)
          {
                    MakeAlphaStringPadded(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;

                    rc = bcp_sendrow(w_hdbc1);
                    if (rc != SUCCEED)
                              HandleErrorDBC(w_hdbc1);

                    warehouse_rows_loaded++;
                    CheckForCommit(w_hdbc1, i_hstmt1, warehouse_rows_loaded, "warehouse", &time_start);
          }

          rcint = bcp_done(w_hdbc1);
          if (rcint < 0)
                    HandleErrorDBC(w_hdbc1);

          printf("Finished loading warehouse table.\n");

          // if build index after load...
          if ((aptr->build_index == 1) && (aptr->index_order == 0))
                    BuildIndex("idxwarcl");

          stock_rows_loaded = 0;
          district_rows_loaded = 0;

          District();
          Stock();
}

//============================================================================
//
// Function   : District
//
//============================================================================
void District()
{
    int             i;
          short     d_id;
          long      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;
          long      time_start;
          long      w_id;
          RETCODE   rc;
          DBINT     rcint;
          char      bcphint[128];
          char      err_log_path[256];

          // Seed with unique number
          seed(4);

          printf("Loading district table...\n");

          // build index before load
          if ((aptr->build_index == 1) && (aptr->index_order == 1))
                    BuildIndex("idxdiscl");

          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");

          strcpy(err_log_path,aptr->log_path);
          strcat(err_log_path,"district.err");
          rc = bcp_init(w_hdbc1, name, NULL, err_log_path, DB_IN);
          if (rc != SUCCEED)
                    HandleErrorDBC(w_hdbc1);

          if ((aptr->build_index == 1) && (aptr->index_order == 1))
          {
                    sprintf(bcphint, "tablock, order (d_w_id, d_id), ROWS_PER_BATCH = %u", (aptr->num_warehouses *
10));
                    rc = bcp_control(w_hdbc1, BCPHINTS, (void*) bcphint);
                    if (rc != SUCCEED)
                              HandleErrorDBC(w_hdbc1);
          }

          i = 0;
          rc = bcp_bind(w_hdbc1, (BYTE *) &d_id, 0, SQL_VARLEN_DATA, NULL, 0, SQLINT2, ++i);
          if (rc != SUCCEED)
                    HandleErrorDBC(w_hdbc1);
          rc = bcp_bind(w_hdbc1, (BYTE *) &d_w_id, 0, SQL_VARLEN_DATA, NULL, 0, SQLINT4, ++i);
          if (rc != SUCCEED)
                    HandleErrorDBC(w_hdbc1);
          rc = bcp_bind(w_hdbc1, (BYTE *) &d_ytd, 0, SQL_VARLEN_DATA, NULL, 0, SQLFLT8, ++i);
          if (rc != SUCCEED)
                    HandleErrorDBC(w_hdbc1);
          rc = bcp_bind(w_hdbc1, (BYTE *) &d_next_o_id, 0, SQL_VARLEN_DATA, NULL, 0, SQLINT4, ++i);
          if (rc != SUCCEED)
                    HandleErrorDBC(w_hdbc1);
          rc = bcp_bind(w_hdbc1, (BYTE *) &d_tax, 0, SQL_VARLEN_DATA, NULL, 0, SQLFLT8, ++i);
          if (rc != SUCCEED)
                    HandleErrorDBC(w_hdbc1);
          rc = bcp_bind(w_hdbc1, (BYTE *) d_name, 0, D_NAME_LEN, NULL, 0, 0, ++i);
          if (rc != SUCCEED)
                    HandleErrorDBC(w_hdbc1);
          rc = bcp_bind(w_hdbc1, (BYTE *) d_street_1, 0, ADDRESS_LEN, NULL, 0, 0, ++i);
          if (rc != SUCCEED)
                    HandleErrorDBC(w_hdbc1);
          rc = bcp_bind(w_hdbc1, (BYTE *) d_street_2, 0, ADDRESS_LEN, NULL, 0, 0, ++i);
          if (rc != SUCCEED)
                    HandleErrorDBC(w_hdbc1);
          rc = bcp_bind(w_hdbc1, (BYTE *) d_city, 0, ADDRESS_LEN, NULL, 0, 0, ++i);
          if (rc != SUCCEED)
                    HandleErrorDBC(w_hdbc1);
          rc = bcp_bind(w_hdbc1, (BYTE *) d_state, 0, STATE_LEN, NULL, 0, 0, ++i);
          if (rc != SUCCEED)
                    HandleErrorDBC(w_hdbc1);
          rc = bcp_bind(w_hdbc1, (BYTE *) d_zip, 0, ZIP_LEN, NULL, 0, 0, ++i);
          if (rc != SUCCEED)
                    HandleErrorDBC(w_hdbc1);

          d_ytd  = 30000.0;

          d_next_o_id = orders_per_district+1;

          time_start = (TimeNow() / MILLI);

          for (w_id = aptr->starting_warehouse; w_id <= aptr->num_warehouses; w_id++)
          {
                    d_w_id = w_id;

                    for (d_id = 1; d_id <= DISTRICT_PER_WAREHOUSE; d_id++)
                    {
                              MakeAlphaStringPadded(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;

                                rc = bcp_sendrow(w_hdbc1);
                                if (rc != SUCCEED)
                                        HandleErrorDBC(w_hdbc1);

                                district_rows_loaded++;
                                CheckForCommit(w_hdbc1, w_hstmt1, district_rows_loaded, "district", &time_start);
                        }
        }

                rcint = bcp_done(w_hdbc1);
                if (rcint < 0)
                        HandleErrorDBC(w_hdbc1);

                printf("Finished loading district table.\n");

                // if build index after load...
                if ((aptr->build_index == 1) && (aptr->index_order == 0))
                        BuildIndex("idxdiscl");

        return;
}

//================================================================================
//
// Function   : Stock
//
//================================================================================
void Stock()
{
                int                     i;
                long      s_i_id;
                long      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 len;
                char      name[20];
                long      time_start;
                RETCODE   rc;
                DBINT     rcint;
                char      bcphint[128];
                char      err_log_path[256];

                // Seed with unique number
                seed(3);

                // if build index before load...
                if ((aptr->build_index == 1) && (aptr->index_order == 1))
                        BuildIndex("idxstkcl");

                sprintf(name, "%s..%s", aptr->database, "stock");

                strcpy(err_log_path,aptr->log_path);
                strcat(err_log_path,"stock.err");
                rc = bcp_init(w_hdbc1, name, NULL, err_log_path, DB_IN);
                if (rc != SUCCEED)
                        HandleErrorDBC(w_hdbc1);

                if ((aptr->build_index == 1) && (aptr->index_order == 1))
                {
                        sprintf(bcphint, "tablock, order (s_i_id, s_w_id), ROWS_PER_BATCH = %u", (aptr->num_warehouses *
100000));
                        rc = bcp_control(w_hdbc1, BCPHINTS, (void*) bcphint);
                        if (rc != SUCCEED)
                                HandleErrorDBC(w_hdbc1);
                }

                i = 0;
                rc = bcp_bind(w_hdbc1, (BYTE *) &s_i_id, 0, SQL_VARLEN_DATA, NULL, 0, SQLINT4, ++i);
                if (rc != SUCCEED)
                        HandleErrorDBC(w_hdbc1);
                rc = bcp_bind(w_hdbc1, (BYTE *) &s_w_id, 0, SQL_VARLEN_DATA, NULL, 0, SQLINT4, ++i);
                if (rc != SUCCEED)
                        HandleErrorDBC(w_hdbc1);
                rc = bcp_bind(w_hdbc1, (BYTE *) &s_quantity, 0, SQL_VARLEN_DATA, NULL, 0, SQLINT2, ++i);
                if (rc != SUCCEED)
                        HandleErrorDBC(w_hdbc1);
                rc = bcp_bind(w_hdbc1, (BYTE *) &s_ytd, 0, SQL_VARLEN_DATA, NULL, 0, SQLINT4, ++i);
```

```
        if (rc != SUCCEED)
                HandleErrorDBC(w_hdbc1);
        rc = bcp_bind(w_hdbc1, (BYTE *) &s_order_cnt, 0, SQL_VARLEN_DATA, NULL, 0, SQLINT2, ++i);
        if (rc != SUCCEED)
                HandleErrorDBC(w_hdbc1);
        rc = bcp_bind(w_hdbc1, (BYTE *) &s_remote_cnt, 0, SQL_VARLEN_DATA, NULL, 0, SQLINT2, ++i);
        if (rc != SUCCEED)
                HandleErrorDBC(w_hdbc1);
        rc = bcp_bind(w_hdbc1, (BYTE *) s_data, 0, SQL_VARLEN_DATA, "", 1, 0, ++i);
        if (rc != SUCCEED)
                HandleErrorDBC(w_hdbc1);
        rc = bcp_bind(w_hdbc1, (BYTE *) s_dist_01, 0, S_DIST_LEN, NULL, 0, 0, ++i);
        if (rc != SUCCEED)
                HandleErrorDBC(w_hdbc1);
        rc = bcp_bind(w_hdbc1, (BYTE *) s_dist_02, 0, S_DIST_LEN, NULL, 0, 0, ++i);
        if (rc != SUCCEED)
                HandleErrorDBC(w_hdbc1);
        rc = bcp_bind(w_hdbc1, (BYTE *) s_dist_03, 0, S_DIST_LEN, NULL, 0, 0, ++i);
        if (rc != SUCCEED)
                HandleErrorDBC(w_hdbc1);
        rc = bcp_bind(w_hdbc1, (BYTE *) s_dist_04, 0, S_DIST_LEN, NULL, 0, 0, ++i);
        if (rc != SUCCEED)
                HandleErrorDBC(w_hdbc1);
        rc = bcp_bind(w_hdbc1, (BYTE *) s_dist_05, 0, S_DIST_LEN, NULL, 0, 0, ++i);
        if (rc != SUCCEED)
                HandleErrorDBC(w_hdbc1);
        rc = bcp_bind(w_hdbc1, (BYTE *) s_dist_06, 0, S_DIST_LEN, NULL, 0, 0, ++i);
        if (rc != SUCCEED)
                HandleErrorDBC(w_hdbc1);
        rc = bcp_bind(w_hdbc1, (BYTE *) s_dist_07, 0, S_DIST_LEN, NULL, 0, 0, ++i);
        if (rc != SUCCEED)
                HandleErrorDBC(w_hdbc1);
        rc = bcp_bind(w_hdbc1, (BYTE *) s_dist_08, 0, S_DIST_LEN, NULL, 0, 0, ++i);
        if (rc != SUCCEED)
                HandleErrorDBC(w_hdbc1);
        rc = bcp_bind(w_hdbc1, (BYTE *) s_dist_09, 0, S_DIST_LEN, NULL, 0, 0, ++i);
        if (rc != SUCCEED)
                HandleErrorDBC(w_hdbc1);
        rc = bcp_bind(w_hdbc1, (BYTE *) s_dist_10, 0, S_DIST_LEN, NULL, 0, 0, ++i);
        if (rc != SUCCEED)
                HandleErrorDBC(w_hdbc1);

        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 <= max_items; s_i_id++)
        {

                for (s_w_id = (long)aptr->starting_warehouse; s_w_id <= aptr->num_warehouses; s_w_id++)
                {

                        s_quantity = (short)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);

                        rc = bcp_sendrow(w_hdbc1);
                        if (rc != SUCCEED)
                                HandleErrorDBC(w_hdbc1);

                        stock_rows_loaded++;
                        CheckForCommit_Big(w_hdbc1, w_hstmt1, stock_rows_loaded, "stock", &time_start);
                }
        }

        rcint = bcp_done(w_hdbc1);
        if (rcint < 0)
                HandleErrorDBC(w_hdbc1);

        printf("Finished loading stock table.\n");

        SQLFreeStmt(w_hstmt1, SQL_DROP);
        SQLDisconnect(w_hdbc1);
        SQLFreeConnect(w_hdbc1);

        // if build index after load...
        if ((aptr->build_index == 1) && (aptr->index_order == 0))
                BuildIndex("idxstkcl");

        return;
}
```

```
//====================================================================
//
// Function   : LoadCustomer
//
//====================================================================
void LoadCustomer()
{
          LOADER_TIME_STRUCT      customer_time_start;
          LOADER_TIME_STRUCT      history_time_start;
          long                                          w_id;
    short                     d_id;
          DWORD                         dwThreadID[MAX_CUSTOMER_THREADS];
          HANDLE                        hThread[MAX_CUSTOMER_THREADS];
          char                          name[20];
          RETCODE                                       rc;
          DBINT                                         rcint;
          char                                          bcphint[128];
          char                                          cmd[256];
          int                                                   num_procs;
          char                                          err_log_path_cust[256];
          char                                          err_log_path_hist[256];

          // Seed with unique number
          seed(5);

          printf("Loading customer and history tables...\n");

          // if build index before load...
          if ((aptr->build_index == 1) && (aptr->index_order == 1))
          {
                    BuildIndex("idxcuscl");
                     // check the number of processors on this system
                     // if 8 or more processors, then build index on History.
                     // if less than 8 processors, do not build the index
                    num_procs = atoi(getenv( "NUMBER_OF_PROCESSORS" ));
                    if ( num_procs >= 8 )
                              BuildIndex("idxhiscl");
          }

          // Initialize bulk copy
          sprintf(name, "%s..%s", aptr->database, "customer");

          strcpy(err_log_path_cust,aptr->log_path);
          strcat(err_log_path_cust,"customer.err");
          rc = bcp_init(c_hdbc1, name, NULL, err_log_path_cust, DB_IN);
          if (rc != SUCCEED)
                    HandleErrorDBC(c_hdbc1);

          if ((aptr->build_index == 1) && (aptr->index_order == 1))
          {
                    sprintf(bcphint, "tablock, order (c_w_id, c_d_id, c_id), ROWS_PER_BATCH = %u", (aptr-
>num_warehouses * 30000));
                    rc = bcp_control(c_hdbc1, BCPHINTS, (void*) bcphint);
                    if (rc != SUCCEED)
                              HandleErrorDBC(c_hdbc1);
          }

          sprintf(name, "%s..%s", aptr->database, "history");

          rc = bcp_init(c_hdbc2, name, NULL, "logs\\history.err", DB_IN);
          strcpy(err_log_path_hist,aptr->log_path);
          strcat(err_log_path_hist,"history.err");
          rc = bcp_init(c_hdbc2, name, NULL, err_log_path_hist, DB_IN);
          if (rc != SUCCEED)
                    HandleErrorDBC(c_hdbc2);

          sprintf(bcphint, "tablock");
          rc = bcp_control(c_hdbc2, BCPHINTS, (void*) bcphint);
          if (rc != SUCCEED)
                    HandleErrorDBC(c_hdbc2);

          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 = (long)aptr->starting_warehouse; w_id <= aptr->num_warehouses; w_id++)
          {
                    for (d_id = 1; d_id <= DISTRICT_PER_WAREHOUSE; d_id++)
                    {

                              CustomerBufLoad(d_id, w_id);

                              // Start parallel loading threads here...
                              // 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);
                                }

                                WaitForSingleObject( hThread[0], INFINITE );
                                WaitForSingleObject( hThread[1], INFINITE );

                                if (CloseHandle(hThread[0]) == FALSE)
                                {
                                        printf("Error, failed in closing customer thread handle with errno: %d\n",
GetLastError());
                                }

                                if (CloseHandle(hThread[1]) == FALSE)
                                {
                                        printf("Error, failed in closing history thread handle with errno: %d\n",
GetLastError());
                                }
                        }
                }

                // flush the bulk connection
                rcint = bcp_done(c_hdbc1);
                if (rcint < 0)
                        HandleErrorDBC(c_hdbc1);

                rcint = bcp_done(c_hdbc2);
                if (rcint < 0)
                        HandleErrorDBC(c_hdbc2);

                printf("Finished loading customer table.\n");

                // if build index after load...
                if ((aptr->build_index == 1) && (aptr->index_order == 0))
                {
                        BuildIndex("idxcuscl");
                        // check the number of processors on this system
                        // if 8 or more processors, then build index on History.
                        // if less than 8 processors, do not build the index
                        num_procs = atoi(getenv( "NUMBER_OF_PROCESSORS" ));
                        if (num_procs >= 8)
                                BuildIndex("idxhiscl");
                }

                // build non-clustered index
                if (aptr->build_index == 1)
                        BuildIndex("idxcusnc");

                // Output the NURAND used for the loader into C_FIRST for C_ID = 1,
                // C_W_ID = 1, and C_D_ID = 1
                sprintf(cmd, "osql -S%s -U%s -P%s -d%s -e -Q\"update customer set c_first = 'C_LOAD = %d' where c_id = 1 and
c_w_id = 1 and c_d_id = 1\" > %snurand_load.log",
                                        aptr->server,
                                        aptr->user,
                                        aptr->password,
                                        aptr->database,
                                        LOADER_NURAND_C,
                                        aptr->log_path);

                system(cmd);

                SQLFreeStmt(c_hstmt1, SQL_DROP);
                SQLDisconnect(c_hdbc1);
                SQLFreeConnect(c_hdbc1);

                SQLFreeStmt(c_hstmt2, SQL_DROP);
                SQLDisconnect(c_hdbc2);
                SQLFreeConnect(c_hdbc2);
```

```
    return;
}

//================================================================================
//
// Function   : CustomerBufInit
//
//================================================================================
void CustomerBufInit()
{
          long     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;

                    strcpy(customer_buf[i].c_balance,"");

                    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,"");

                    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, long 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);

                    MakeAlphaStringPadded(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;
                    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;

                    strcpy(customer_buf[i].c_balance,"-10.0");
                    MakeAlphaStringPadded(300, 500, C_DATA_LEN, customer_buf[i].c_data);

                    // Generate HISTORY data
                    MakeAlphaStringPadded(12, 24, H_DATA_LEN, customer_buf[i].h_data);
            }
}

//==============================================================================
//
// Function   : LoadCustomerTable
//
//==============================================================================
void LoadCustomerTable(LOADER_TIME_STRUCT *customer_time_start)
{
            long                i;
    long        c_id;
    short       c_d_id;
            long                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;
            char                c_balance[6];
    double      c_ytd_payment;
    short       c_payment_cnt;
    short       c_delivery_cnt;
    char        c_data[C_DATA_LEN+1];
            char                c_since[C_SINCE_LEN+1];
            RETCODE             rc;

    i = 0;
            rc = bcp_bind(c_hdbc1, (BYTE *) &c_id, 0, SQL_VARLEN_DATA, NULL, 0, SQLINT4, ++i);
            if (rc != SUCCEED)
                    HandleErrorDBC(c_hdbc1);
    rc = bcp_bind(c_hdbc1, (BYTE *) &c_d_id, 0, SQL_VARLEN_DATA, NULL, 0, SQLINT2, ++i);
            if (rc != SUCCEED)
                    HandleErrorDBC(c_hdbc1);
            rc = bcp_bind(c_hdbc1, (BYTE *) &c_w_id, 0, SQL_VARLEN_DATA, NULL, 0, SQLINT4, ++i);
            if (rc != SUCCEED)
                    HandleErrorDBC(c_hdbc1);
    rc = bcp_bind(c_hdbc1, (BYTE *) &c_discount, 0, SQL_VARLEN_DATA, NULL, 0, SQLFLT8, ++i);
            if (rc != SUCCEED)
                    HandleErrorDBC(c_hdbc1);
    rc = bcp_bind(c_hdbc1, (BYTE *) &c_credit_lim, 0, SQL_VARLEN_DATA, NULL, 0, SQLFLT8, ++i);
            if (rc != SUCCEED)
                    HandleErrorDBC(c_hdbc1);
    rc = bcp_bind(c_hdbc1, (BYTE *) c_last, 0, LAST_NAME_LEN, NULL, 0, 0, ++i);
            if (rc != SUCCEED)
                    HandleErrorDBC(c_hdbc1);
            rc = bcp_bind(c_hdbc1, (BYTE *) c_first, 0, FIRST_NAME_LEN, NULL, 0, 0, ++i);
            if (rc != SUCCEED)
                    HandleErrorDBC(c_hdbc1);
    rc = bcp_bind(c_hdbc1, (BYTE *) c_credit, 0, CREDIT_LEN, NULL, 0, 0, ++i);
            if (rc != SUCCEED)
                    HandleErrorDBC(c_hdbc1);
    rc = bcp_bind(c_hdbc1, (BYTE *) c_balance, 0, 5, NULL, 0, SQLCHARACTER, ++i);
            if (rc != SUCCEED)
                    HandleErrorDBC(c_hdbc1);
    rc = bcp_bind(c_hdbc1, (BYTE *) &c_ytd_payment, 0, SQL_VARLEN_DATA, NULL, 0, SQLFLT8, ++i);
            if (rc != SUCCEED)
                    HandleErrorDBC(c_hdbc1);
    rc = bcp_bind(c_hdbc1, (BYTE *) &c_payment_cnt, 0, SQL_VARLEN_DATA, NULL, 0, SQLINT2, ++i);
            if (rc != SUCCEED)
                    HandleErrorDBC(c_hdbc1);
    rc = bcp_bind(c_hdbc1, (BYTE *) &c_delivery_cnt,0, SQL_VARLEN_DATA, NULL, 0, SQLINT2, ++i);
            if (rc != SUCCEED)
                    HandleErrorDBC(c_hdbc1);
    rc = bcp_bind(c_hdbc1, (BYTE *) c_street_1, 0, ADDRESS_LEN, NULL, 0, 0, ++i);
            if (rc != SUCCEED)
                    HandleErrorDBC(c_hdbc1);
    rc = bcp_bind(c_hdbc1, (BYTE *) c_street_2, 0, ADDRESS_LEN, NULL,0,0, ++i);
            if (rc != SUCCEED)
                    HandleErrorDBC(c_hdbc1);
    rc = bcp_bind(c_hdbc1, (BYTE *) c_city, 0, ADDRESS_LEN, NULL, 0, 0, ++i);
            if (rc != SUCCEED)
                    HandleErrorDBC(c_hdbc1);
```

```
    rc = bcp_bind(c_hdbc1, (BYTE *) c_state, 0, STATE_LEN, NULL, 0, 0, ++i);
          if (rc != SUCCEED)
                    HandleErrorDBC(c_hdbc1);
    rc = bcp_bind(c_hdbc1, (BYTE *) c_zip, 0, ZIP_LEN, NULL, 0, 0, ++i);
          if (rc != SUCCEED)
                    HandleErrorDBC(c_hdbc1);
    rc = bcp_bind(c_hdbc1, (BYTE *) c_phone, 0, PHONE_LEN, NULL, 0, 0, ++i);
          if (rc != SUCCEED)
                    HandleErrorDBC(c_hdbc1);
          rc = bcp_bind(c_hdbc1, (BYTE *) &c_since, 0, C_SINCE_LEN, NULL, 0, SQLCHARACTER, ++i);
          if (rc != SUCCEED)
                    HandleErrorDBC(c_hdbc1);
          rc = bcp_bind(c_hdbc1, (BYTE *) c_middle, 0, MIDDLE_NAME_LEN,NULL, 0, 0, ++i);
          if (rc != SUCCEED)
                    HandleErrorDBC(c_hdbc1);
    rc = bcp_bind(c_hdbc1, (BYTE *) c_data, 0, C_DATA_LEN, NULL, 0, 0, ++i);
          if (rc != SUCCEED)
                    HandleErrorDBC(c_hdbc1);

    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);

                    FormatDate(&c_since);

                    c_credit_lim = customer_buf[i].c_credit_lim;
                    c_discount = customer_buf[i].c_discount;
                    strcpy(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, customer_buf[i].c_data);

                    // Send data to server
                    rc = bcp_sendrow(c_hdbc1);
                    if (rc != SUCCEED)
                              HandleErrorDBC(c_hdbc1);

                    customer_rows_loaded++;
                    CheckForCommit(c_hdbc1, c_hstmt1, customer_rows_loaded, "customer", &customer_time_start-
>time_start);
    }
}

//==============================================================================
//
// Function   : LoadHistoryTable
//
//==============================================================================
void LoadHistoryTable(LOADER_TIME_STRUCT *history_time_start)
{
          long                i;
    long        c_id;
    short       c_d_id;
          long                c_w_id;
          double    h_amount;
    char        h_data[H_DATA_LEN+1];
          char                h_date[H_DATE_LEN+1];
          RETCODE             rc;

          i = 0;
    rc = bcp_bind(c_hdbc2, (BYTE *) &c_id, 0, SQL_VARLEN_DATA, NULL, 0, SQLINT4, ++i);
          if (rc != SUCCEED)
                    HandleErrorDBC(c_hdbc2);
    rc = bcp_bind(c_hdbc2, (BYTE *) &c_d_id, 0, SQL_VARLEN_DATA, NULL, 0, SQLINT2, ++i);
          if (rc != SUCCEED)
                    HandleErrorDBC(c_hdbc2);
          rc = bcp_bind(c_hdbc2, (BYTE *) &c_w_id, 0, SQL_VARLEN_DATA, NULL, 0, SQLINT4, ++i);
          if (rc != SUCCEED)
                    HandleErrorDBC(c_hdbc2);
    rc = bcp_bind(c_hdbc2, (BYTE *) &c_d_id, 0, SQL_VARLEN_DATA, NULL, 0, SQLINT2, ++i);
          if (rc != SUCCEED)
                    HandleErrorDBC(c_hdbc2);
          rc = bcp_bind(c_hdbc2, (BYTE *) &c_w_id, 0, SQL_VARLEN_DATA, NULL, 0, SQLINT4, ++i);
          if (rc != SUCCEED)
                    HandleErrorDBC(c_hdbc2);
          rc = bcp_bind(c_hdbc2, (BYTE *) &h_date, 0, H_DATE_LEN, NULL, 0, SQLCHARACTER, ++i);
          if (rc != SUCCEED)
                    HandleErrorDBC(c_hdbc2);
    rc = bcp_bind(c_hdbc2, (BYTE *) &h_amount, 0, SQL_VARLEN_DATA, NULL, 0, SQLFLT8, ++i);
```

```
          if (rc != SUCCEED)
                    HandleErrorDBC(c_hdbc2);
    rc = bcp_bind(c_hdbc2, (BYTE *) h_data, 0, H_DATA_LEN, NULL, 0, 0, ++i);
          if (rc != SUCCEED)
                    HandleErrorDBC(c_hdbc2);

    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);

                    FormatDate(&h_date);

                    // send to server
                    rc = bcp_sendrow(c_hdbc2);
                    if (rc != SUCCEED)
                              HandleErrorDBC(c_hdbc2);

                    history_rows_loaded++;
                    CheckForCommit(c_hdbc2, c_hstmt2, history_rows_loaded, "history", &history_time_start->time_start);
    }
}

//============================================================-===============
//
// Function   : LoadOrders
//
//============================================================================
void LoadOrders()
{
          LOADER_TIME_STRUCT      orders_time_start;
          LOADER_TIME_STRUCT      new_order_time_start;
          LOADER_TIME_STRUCT      order_line_time_start;
          long                                                w_id;
    short                     d_id;
          DWORD                           dwThreadID[MAX_ORDER_THREADS];
          HANDLE                          hThread[MAX_ORDER_THREADS];
          char                            name[20];
          RETCODE                                             rc;
          char                                                bcphint[128];
          char                                                err_log_path_ord[256];
          char                                                err_log_path_nord[256];
          char                                                err_log_path_ordl[256];

          // seed with unique number
          seed(6);

          printf("Loading orders...\n");

          // if build index before load...
          if ((aptr->build_index == 1) && (aptr->index_order == 1))
          {
                              BuildIndex("idxordcl");
                              BuildIndex("idxnodcl");
                              BuildIndex("idxodlcl");
          }

          // initialize bulk copy
          sprintf(name, "%s..%s", aptr->database, "orders");

          rc = bcp_init(o_hdbc1, name, NULL, "logs\\orders.err", DB_IN);
          strcpy(err_log_path_ord,aptr->log_path);
          strcat(err_log_path_ord,"orders.err");
          rc = bcp_init(o_hdbc1, name, NULL, err_log_path_ord, DB_IN);
          if (rc != SUCCEED)
                    HandleErrorDBC(o_hdbc1);

          if ((aptr->build_index == 1) && (aptr->index_order == 1))
          {
                    sprintf(bcphint, "tablock, order (o_w_id, o_d_id, o_id), ROWS_PER_BATCH = %u", (aptr-
>num_warehouses * 30000));
                    rc = bcp_control(o_hdbc1, BCPHINTS, (void*) bcphint);
                    if (rc != SUCCEED)
                              HandleErrorDBC(o_hdbc1);
          }

          sprintf(name, "%s..%s", aptr->database, "new_order");

          rc = bcp_init(o_hdbc2, name, NULL, "logs\\neword.err", DB_IN);
          strcpy(err_log_path_nord,aptr->log_path);
          strcat(err_log_path_nord,"neword.err");
          rc = bcp_init(o_hdbc2, name, NULL, err_log_path_nord, DB_IN);
          if (rc != SUCCEED)
                    HandleErrorDBC(o_hdbc2);

          if ((aptr->build_index == 1) && (aptr->index_order == 1))
          {
                    sprintf(bcphint, "tablock, order (no_w_id, no_d_id, no_o_id), ROWS_PER_BATCH = %u", (aptr-
>num_warehouses * 9000));
                    rc = bcp_control(o_hdbc2, BCPHINTS, (void*) bcphint);
```

```
                    if (rc != SUCCEED)
                              HandleErrorDBC(o_hdbc2);
          }

          sprintf(name, "%s..%s", aptr->database, "order_line");

          rc = bcp_init(o_hdbc3, name, NULL, "logs\\ordline.err", DB_IN);
          strcpy(err_log_path_ordl,aptr->log_path);
          strcat(err_log_path_ordl,"ordline.err");
          rc = bcp_init(o_hdbc3, name, NULL, err_log_path_ordl, DB_IN);
          if (rc != SUCCEED)
                    HandleErrorDBC(o_hdbc3);

    if ((aptr->build_index == 1) && (aptr->index_order == 1))
          {
                    sprintf(bcphint, "tablock, order (ol_w_id, ol_d_id, ol_o_id, ol_number), ROWS_PER_BATCH = %u",
(aptr->num_warehouses * 300000));
                    rc = bcp_control(o_hdbc3, BCPHINTS, (void*) bcphint);
                    if (rc != SUCCEED)
                              HandleErrorDBC(o_hdbc3);
          }

          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 = (long)aptr->starting_warehouse; w_id <= aptr->num_warehouses; w_id++)
          {
                    for (d_id = 1; d_id <= DISTRICT_PER_WAREHOUSE; d_id++)
                    {

                              OrdersBufLoad(d_id, w_id);

                              // start parallel loading threads here...
                              // 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);
                              }

                              WaitForSingleObject( hThread[0], INFINITE );
                              WaitForSingleObject( hThread[1], INFINITE );
```

```
                                WaitForSingleObject( hThread[2], INFINITE );

                                if (CloseHandle(hThread[0]) == FALSE)
                                {
                                        printf("Error, failed in closing Orders thread handle with errno: %d\n",
GetLastError());
                                }

                                if (CloseHandle(hThread[1]) == FALSE)
                                {
                                        printf("Error, failed in closing NewOrder thread handle with errno: %d\n",
GetLastError());
                                }

                                if (CloseHandle(hThread[2]) == FALSE)
                                {
                                        printf("Error, failed in closing OrderLine thread handle with errno: %d\n",
GetLastError());
                                }
                        }
                }

                printf("Finished loading orders.\n");

        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(short d_id, long w_id)
{

                int     cust[ORDERS_PER_DISTRICT+1];
                long    o_id;
                long      ol;

                printf("...Loading Order Buffer for: d_id = %d, w_id = %d\n",
                                        d_id, w_id);

                GetPermutation(cust, orders_per_district);

                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 = (short)RandomNumber(5L, 15L);

                        if (o_id < first_new_order)
                        {
                                orders_buf[o_id].o_carrier_id = (short)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, max_items);
                              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 < first_new_order)
                              {
                                        orders_buf[o_id].o_ol[ol].ol_amount = 0;
                                        // Added to insure ol_delivery_d set properly during load
                                        FormatDate(&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

                                        // odbc datetime format
                                        strcpy(orders_buf[o_id].o_ol[ol].ol_delivery_d,"1899-12-31 00:00:00.000");
                              }
                    }
          }
}

//====================================================================
//
// Function   : LoadOrdersTable
//
//====================================================================
void LoadOrdersTable(LOADER_TIME_STRUCT *orders_time_start)
{
          int         i;
    long        o_id;
          short     o_d_id;
          long                o_w_id;
    long        o_c_id;
    short       o_carrier_id;
    short       o_ol_cnt;
    short       o_all_local;
          char                o_entry_d[O_ENTRY_D_LEN+1];
          RETCODE             rc;
          DBINT               rcint;

          // bind ORDER data
    i = 0;
          rc = bcp_bind(o_hdbc1, (BYTE *) &o_id, 0, SQL_VARLEN_DATA, NULL, 0, SQLINT4, ++i);
          if (rc != SUCCEED)
                    HandleErrorDBC(o_hdbc1);
    rc = bcp_bind(o_hdbc1, (BYTE *) &o_d_id, 0, SQL_VARLEN_DATA, NULL, 0, SQLINT2, ++i);
          if (rc != SUCCEED)
                    HandleErrorDBC(o_hdbc1);
          rc = bcp_bind(o_hdbc1, (BYTE *) &o_w_id, 0, SQL_VARLEN_DATA, NULL, 0, SQLINT4, ++i);
          if (rc != SUCCEED)
                    HandleErrorDBC(o_hdbc1);
    rc = bcp_bind(o_hdbc1, (BYTE *) &o_c_id, 0, SQL_VARLEN_DATA, NULL, 0, SQLINT4, ++i);
          if (rc != SUCCEED)
                    HandleErrorDBC(o_hdbc1);
    rc = bcp_bind(o_hdbc1, (BYTE *) &o_carrier_id, 0, SQL_VARLEN_DATA, NULL, 0, SQLINT2, ++i);
          if (rc != SUCCEED)
                    HandleErrorDBC(o_hdbc1);
    rc = bcp_bind(o_hdbc1, (BYTE *) &o_ol_cnt, 0, SQL_VARLEN_DATA, NULL, 0, SQLINT2, ++i);
          if (rc != SUCCEED)
                    HandleErrorDBC(o_hdbc1);
    rc = bcp_bind(o_hdbc1, (BYTE *) &o_all_local, 0, SQL_VARLEN_DATA, NULL, 0, SQLINT2, ++i);
          if (rc != SUCCEED)
                    HandleErrorDBC(o_hdbc1);
          rc = bcp_bind(o_hdbc1, (BYTE *) &o_entry_d, 0, O_ENTRY_D_LEN, NULL, 0, SQLCHARACTER, ++i);
          if (rc != SUCCEED)
                    HandleErrorDBC(o_hdbc1);

    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;

                    FormatDate(&o_entry_d);
```

```
                    // send data to server
                    rc = bcp_sendrow(o_hdbc1);
                    if (rc != SUCCEED)
                              HandleErrorDBC(o_hdbc1);

                    orders_rows_loaded++;
                    CheckForCommit(o_hdbc1, o_hstmt1, orders_rows_loaded, "orders", &orders_time_start->time_start);
    }

          if ((o_w_id == aptr->num_warehouses) && (o_d_id == 10))
          {
                    rcint = bcp_done(o_hdbc1);
                    if (rcint < 0)
                              HandleErrorDBC(o_hdbc1);

                    SQLFreeStmt(o_hstmt1, SQL_DROP);
                    SQLDisconnect(o_hdbc1);
                    SQLFreeConnect(o_hdbc1);

                    // if build index after load...
                    if ((aptr->build_index == 1) && (aptr->index_order == 0))
                              BuildIndex("idxordcl");

                    // build non-clustered index
                    if (aptr->build_index == 1)
                              BuildIndex("idxordnc");
          }
}

//==============================================================================
//
// Function   : LoadNewOrderTable
//
//==============================================================================
void LoadNewOrderTable(LOADER_TIME_STRUCT *new_order_time_start)
{
          long                i;
    long        o_id;
    short       o_d_id;
          long                o_w_id;
          RETCODE             rc;
          DBINT               rcint;

          // Bind NEW-ORDER data
          i = 0;
    rc = bcp_bind(o_hdbc2, (BYTE *) &o_id, 0, SQL_VARLEN_DATA, NULL, 0, SQLINT4, ++i);
          if (rc != SUCCEED)
                    HandleErrorDBC(o_hdbc2);
    rc = bcp_bind(o_hdbc2, (BYTE *) &o_d_id, 0, SQL_VARLEN_DATA, NULL, 0, SQLINT2, ++i);
          if (rc != SUCCEED)
                    HandleErrorDBC(o_hdbc2);
          rc = bcp_bind(o_hdbc2, (BYTE *) &o_w_id, 0, SQL_VARLEN_DATA, NULL, 0, SQLINT4, ++i);
          if (rc != SUCCEED)
                    HandleErrorDBC(o_hdbc2);

          for (i = first_new_order; i < last_new_order; 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;

                    rc = bcp_sendrow(o_hdbc2);
                    if (rc != SUCCEED)
                              HandleErrorDBC(o_hdbc2);

                    new_order_rows_loaded++;
                    CheckForCommit_Big(o_hdbc2, o_hstmt2, new_order_rows_loaded, "new_order", &new_order_time_start-
>time_start);
          }

          if ((o_w_id == aptr->num_warehouses) && (o_d_id == 10))
          {
                    rcint = bcp_done(o_hdbc2);
                    if (rcint < 0)
                              HandleErrorDBC(o_hdbc2);

                    SQLFreeStmt(o_hstmt2, SQL_DROP);
                    SQLDisconnect(o_hdbc2);
                    SQLFreeConnect(o_hdbc2);

                    // if build index after load...
                    if ((aptr->build_index == 1) && (aptr->index_order == 0))
                              BuildIndex("idxnodcl");
          }
}

//==============================================================================
//
// Function   : LoadOrderLineTable
//
//==============================================================================
void LoadOrderLineTable(LOADER_TIME_STRUCT *order_line_time_start)
```

```
{
        long                i;
        long                j;
    long        o_id;
        short     o_d_id;
        long                o_w_id;
        double              ol;
        long      ol_i_id;
        long                ol_supply_w_id;
    short       ol_quantity;
    double      ol_amount;
    char        ol_dist_info[DIST_INFO_LEN+1];
        char                ol_delivery_d[OL_DELIVERY_D_LEN+1];
        RETCODE             rc;
        DBINT               rcint;

        // bind ORDER-LINE data
        i = 0;
    rc = bcp_bind(o_hdbc3, (BYTE *) &o_id, 0, SQL_VARLEN_DATA, NULL, 0, SQLINT4, ++i);
        if (rc != SUCCEED)
                HandleErrorDBC(o_hdbc3);
    rc = bcp_bind(o_hdbc3, (BYTE *) &o_d_id, 0, SQL_VARLEN_DATA, NULL, 0, SQLINT2, ++i);
        if (rc != SUCCEED)
                HandleErrorDBC(o_hdbc3);
        rc = bcp_bind(o_hdbc3, (BYTE *) &o_w_id, 0, SQL_VARLEN_DATA, NULL, 0, SQLINT4, ++i);
        if (rc != SUCCEED)
                HandleErrorDBC(o_hdbc3);
        rc = bcp_bind(o_hdbc3, (BYTE *) &ol, 0, SQL_VARLEN_DATA, NULL, 0, SQLFLT8, ++i);
        if (rc != SUCCEED)
                HandleErrorDBC(o_hdbc3);
    rc = bcp_bind(o_hdbc3, (BYTE *) &ol_i_id, 0, SQL_VARLEN_DATA, NULL, 0, SQLINT4, ++i);
        if (rc != SUCCEED)
                HandleErrorDBC(o_hdbc3);
        rc = bcp_bind(o_hdbc3, (BYTE *) &ol_delivery_d, 0, OL_DELIVERY_D_LEN, NULL, 0, SQLCHARACTER, ++i);
        if (rc != SUCCEED)
                HandleErrorDBC(o_hdbc3);
    rc = bcp_bind(o_hdbc3, (BYTE *) &ol_amount, 0, SQL_VARLEN_DATA, NULL, 0, SQLFLT8, ++i);
        if (rc != SUCCEED)
                HandleErrorDBC(o_hdbc3);
        rc = bcp_bind(o_hdbc3, (BYTE *) &ol_supply_w_id, 0, SQL_VARLEN_DATA, NULL, 0, SQLINT4, ++i);
        if (rc != SUCCEED)
                HandleErrorDBC(o_hdbc3);
    rc = bcp_bind(o_hdbc3, (BYTE *) &ol_quantity, 0, SQL_VARLEN_DATA, NULL, 0, SQLINT2, ++i);
        if (rc != SUCCEED)
                HandleErrorDBC(o_hdbc3);
    rc = bcp_bind(o_hdbc3, (BYTE *) ol_dist_info, 0, DIST_INFO_LEN, NULL, 0, 0, ++i);
        if (rc != SUCCEED)
                HandleErrorDBC(o_hdbc3);

        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;
                        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);

                        rc = bcp_sendrow(o_hdbc3);
                        if (rc != SUCCEED)
                                HandleErrorDBC(o_hdbc3);

                        order_line_rows_loaded++;

                        CheckForCommit_Big(o_hdbc3, o_hstmt3, order_line_rows_loaded, "order_line",
&order_line_time_start->time_start);
                }
        }

        if ((o_w_id == aptr->num_warehouses) && (o_d_id == 10))
        {
                rcint = bcp_done(o_hdbc3);
                if (rcint < 0)
                        HandleErrorDBC(o_hdbc3);

                SQLFreeStmt(o_hstmt3, SQL_DROP);
                SQLDisconnect(o_hdbc3);
                SQLFreeConnect(o_hdbc3);

                // if build index after load...
                if ((aptr->build_index == 1) && (aptr->index_order == 0))
                        BuildIndex("idxodlcl");
        }
}
```

```
//==========================================================================
//
// 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(HDBC hdbc,
                                                  HSTMT hstmt,
                                                  long rows_loaded,
                                                  char *table_name,
                                        long *time_start)
{

    long  time_end, time_diff;

    if ( !(rows_loaded % aptr->batch) )
    {
                    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   : CheckForCommit_Big
//
//==========================================================================
void CheckForCommit_Big(HDBC hdbc,
                                                  HSTMT hstmt,
                                                  double rows_loaded,
                                                  char *table_name,
                                        long *time_start)
{

    long  time_end, time_diff;

    if ( !(fmod(rows_loaded,aptr->batch) ) )
    {
                    time_end = (TimeNow() / MILLI);
                    time_diff = time_end - *time_start;

                    printf("-> Loaded %ld rows into %s in %ld sec - Total = %.0f (%.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         rc;

char                            szDriverString[300];
char                            szDriverStringOut[1024];
SQLSMALLINT                     cbDriverStringOut;


SQLAllocHandle(SQL_HANDLE_ENV, SQL_NULL_HANDLE, &henv );

SQLSetEnvAttr(henv, SQL_ATTR_ODBC_VERSION, (void*)SQL_OV_ODBC3, 0 );

SQLAllocHandle(SQL_HANDLE_DBC, henv , &i_hdbc1);
SQLAllocHandle(SQL_HANDLE_DBC, henv , &w_hdbc1);
SQLAllocHandle(SQL_HANDLE_DBC, henv , &c_hdbc1);
SQLAllocHandle(SQL_HANDLE_DBC, henv , &c_hdbc2);
SQLAllocHandle(SQL_HANDLE_DBC, henv , &o_hdbc1);
SQLAllocHandle(SQL_HANDLE_DBC, henv , &o_hdbc2);
SQLAllocHandle(SQL_HANDLE_DBC, henv , &o_hdbc3);

SQLSetConnectAttr(i_hdbc1, SQL_COPT_SS_BCP, (void *)SQL_BCP_ON, SQL_IS_INTEGER );
SQLSetConnectAttr(w_hdbc1, SQL_COPT_SS_BCP, (void *)SQL_BCP_ON, SQL_IS_INTEGER );
SQLSetConnectAttr(c_hdbc1, SQL_COPT_SS_BCP, (void *)SQL_BCP_ON, SQL_IS_INTEGER );
SQLSetConnectAttr(c_hdbc2, SQL_COPT_SS_BCP, (void *)SQL_BCP_ON, SQL_IS_INTEGER );
SQLSetConnectAttr(o_hdbc1, SQL_COPT_SS_BCP, (void *)SQL_BCP_ON, SQL_IS_INTEGER );
SQLSetConnectAttr(o_hdbc2, SQL_COPT_SS_BCP, (void *)SQL_BCP_ON, SQL_IS_INTEGER );
SQLSetConnectAttr(o_hdbc3, SQL_COPT_SS_BCP, (void *)SQL_BCP_ON, SQL_IS_INTEGER );

// Open connections to SQL Server
// Connection 1
sprintf( szDriverString , "DRIVER={SQL Server};SERVER=%s;UID=%s;PWD=%s;DATABASE=%s" ,
                                                aptr->server,
                                                aptr->user,
                                                aptr->password,
                                                aptr->database );

rc = SQLSetConnectOption (i_hdbc1, SQL_PACKET_SIZE, aptr->pack_size);
if (rc != SUCCEED)
          HandleErrorDBC(i_hdbc1);

rc = SQLDriverConnect ( i_hdbc1,
                                          NULL,
                                          (SQLCHAR*)&szDriverString[0] ,
                                          SQL_NTS,
                                          (SQLCHAR*)&szDriverStringOut[0],
                                          sizeof(szDriverStringOut),
                                          &cbDriverStringOut,
                                          SQL_DRIVER_NOPROMPT );
if ( (rc != SUCCEED) &&
          (rc != SQL_SUCCESS_WITH_INFO) )
{
          HandleErrorDBC(i_hdbc1);
          printf("TPC-C Loader aborted!\n");
          exit(9);
}

// Connection 2
sprintf( szDriverString , "DRIVER={SQL Server};SERVER=%s;UID=%s;PWD=%s;DATABASE=%s" ,
                                                aptr->server,
                                                aptr->user,
                                                aptr->password,
                                                aptr->database );

rc = SQLSetConnectOption (w_hdbc1, SQL_PACKET_SIZE, aptr->pack_size);

if (rc != SUCCEED)
          HandleErrorDBC(w_hdbc1);

rc = SQLDriverConnect ( w_hdbc1,
                                                          NULL,
                                                          (SQLCHAR*)&szDriverString[0] ,
                                                          SQL_NTS,
                                                          (SQLCHAR*)&szDriverStringOut[0],
                                                          sizeof(szDriverStringOut),
                                                          &cbDriverStringOut,
                                                          SQL_DRIVER_NOPROMPT );

if ( (rc != SUCCEED) &&
           (rc != SQL_SUCCESS_WITH_INFO) )
{
          HandleErrorDBC(w_hdbc1);
          printf("TPC-C Loader aborted!\n");
          exit(9);
}

// Connection 3
sprintf( szDriverString , "DRIVER={SQL Server};SERVER=%s;UID=%s;PWD=%s;DATABASE=%s" ,
                                                aptr->server,
                                                aptr->user,
                                                aptr->password,
                                                aptr->database );

rc = SQLSetConnectOption (c_hdbc1, SQL_PACKET_SIZE, aptr->pack_size);
if (rc != SUCCEED)
```

```
          HandleErrorDBC(c_hdbc1);

rc = SQLDriverConnect ( c_hdbc1,
                                                        NULL,
                                                        (SQLCHAR*)&szDriverString[0] ,
                                                        SQL_NTS,
                                                        (SQLCHAR*)&szDriverStringOut[0],
                                                        sizeof(szDriverStringOut),
                                                        &cbDriverStringOut,
                                                        SQL_DRIVER_NOPROMPT );
if ( (rc != SUCCEED) &&
           (rc != SQL_SUCCESS_WITH_INFO) )
{
          HandleErrorDBC(c_hdbc1);
          printf("TPC-C Loader aborted!\n");
          exit(9);
}

// Connection 4
sprintf( szDriverString , "DRIVER={SQL Server};SERVER=%s;UID=%s;PWD=%s;DATABASE=%s" ,
                                                  aptr->server,
                                                  aptr->user,
                                                  aptr->password,
                                                  aptr->database );

rc = SQLSetConnectOption (c_hdbc2, SQL_PACKET_SIZE, aptr->pack_size);
if (rc != SUCCEED)
          HandleErrorDBC(c_hdbc2);

rc = SQLDriverConnect ( c_hdbc2,
                                                        NULL,
                                                        (SQLCHAR*)&szDriverString[0] ,
                                                        SQL_NTS,
                                                        (SQLCHAR*)&szDriverStringOut[0],
                                                        sizeof(szDriverStringOut),
                                                        &cbDriverStringOut,
                                                        SQL_DRIVER_NOPROMPT );
if ( (rc != SUCCEED) &&
           (rc != SQL_SUCCESS_WITH_INFO) )
{
          HandleErrorDBC(c_hdbc2);
          printf("TPC-C Loader aborted!\n");
          exit(9);
}

// Connection 5
sprintf( szDriverString , "DRIVER={SQL Server};SERVER=%s;UID=%s;PWD=%s;DATABASE=%s" ,
                                                  aptr->server,
                                                  aptr->user,
                                                  aptr->password,
                                                  aptr->database );

rc = SQLSetConnectOption (o_hdbc1, SQL_PACKET_SIZE, aptr->pack_size);
if (rc != SUCCEED)
          HandleErrorDBC(o_hdbc1);

rc = SQLDriverConnect ( o_hdbc1,
                                                        NULL,
                                                        (SQLCHAR*)&szDriverString[0] ,
                                                        SQL_NTS,
                                                        (SQLCHAR*)&szDriverStringOut[0],
                                                        sizeof(szDriverStringOut),
                                                        &cbDriverStringOut,
                                                        SQL_DRIVER_NOPROMPT );
if ( (rc != SUCCEED) &&
           (rc != SQL_SUCCESS_WITH_INFO) )
{
          HandleErrorDBC(o_hdbc1);
          printf("TPC-C Loader aborted!\n");
          exit(9);
}

// Connection 6
sprintf( szDriverString , "DRIVER={SQL Server};SERVER=%s;UID=%s;PWD=%s;DATABASE=%s" ,
                                                  aptr->server,
                                                  aptr->user,
                                                  aptr->password,
                                                  aptr->database );

rc = SQLSetConnectOption (o_hdbc2, SQL_PACKET_SIZE, aptr->pack_size);
if (rc != SUCCEED)
          HandleErrorDBC(o_hdbc2);

rc = SQLDriverConnect ( o_hdbc2,
                                                        NULL,
                                                        (SQLCHAR*)&szDriverString[0] ,
                                                        SQL_NTS,
                                                        (SQLCHAR*)&szDriverStringOut[0],
                                                        sizeof(szDriverStringOut),
                                                        &cbDriverStringOut,
                                                        SQL_DRIVER_NOPROMPT );
if ( (rc != SUCCEED) &&
           (rc != SQL_SUCCESS_WITH_INFO) )
```

```
          {
                    HandleErrorDBC(o_hdbc2);
                    printf("TPC-C Loader aborted!\n");
                    exit(9);
          }

          // Connection 7
          sprintf( szDriverString , "DRIVER={SQL Server};SERVER=%s;UID=%s;PWD=%s;DATABASE=%s" ,
                                                        aptr->server,
                                                        aptr->user,
                                                        aptr->password,
                                                        aptr->database );

          rc = SQLSetConnectOption (o_hdbc3, SQL_PACKET_SIZE, aptr->pack_size);
          if (rc != SUCCEED)
                    HandleErrorDBC(o_hdbc3);

          rc = SQLDriverConnect ( o_hdbc3,
                                                                  NULL,
                                                                  (SQLCHAR*)&szDriverString[0] ,
                                                                  SQL_NTS,
                                                                  (SQLCHAR*)&szDriverStringOut[0],
                                                                  sizeof(szDriverStringOut),
                                                                  &cbDriverStringOut,
                                                                  SQL_DRIVER_NOPROMPT );
          if ( (rc != SUCCEED) &&
                     (rc != SQL_SUCCESS_WITH_INFO) )
          {
                    HandleErrorDBC(o_hdbc3);
                    printf("TPC-C Loader aborted!\n");
                    exit(9);
          }
}

//========================================================================
//
// Function name: BuildIndex
//
//========================================================================
void BuildIndex(char          *index_script)
{
          char      cmd[256];

          printf("Starting index creation:  %s\n",index_script);

          sprintf(cmd, "osql -S%s -U%s -P%s -e -i%s\\%s.sql > %s%s.log",
                                        aptr->server,
                                        aptr->user,
                                        aptr->password,
                                        aptr->index_script_path,
                                        index_script,
                                        aptr->log_path,
                                        index_script);

          system(cmd);

          printf("Finished index creation:  %s\n",index_script);
}

//========================================================================
//
// Function name: HandleErrorDBC
//
//========================================================================
void HandleErrorDBC (SQLHDBC  hdbc1)
{

          SQLCHAR             SqlState[6], Msg[SQL_MAX_MESSAGE_LENGTH];
          SQLLEN              NativeError;
          SQLSMALLINT i, MsgLen;
          SQLRETURN   rc2;
          char                timebuf[128];
          char                datebuf[128];
          char                err_log_path[256];
          FILE                *fp1;

          i = 1;
          while (( rc2 = SQLGetDiagRec(SQL_HANDLE_DBC , hdbc1, i, SqlState , &NativeError,
                                        Msg, sizeof(Msg) , &MsgLen )) != SQL_NO_DATA )
          {
                    sprintf( szLastError , "%s" ,  Msg );

                    _strtime(timebuf);
                    _strdate(datebuf);

                    printf( "[%s : %s] %s\n==>SQLState: %s\n" , datebuf, timebuf, szLastError, SqlState);

                    strcpy(err_log_path,aptr->log_path);
                    strcat(err_log_path,"tpccldr.err");
                    fp1 = fopen(err_log_path,"a+");
                    if (fp1 == NULL)
                              printf("ERROR:  Unable to open errorlog file.\n");
                    else
```

```
                    {
                              fprintf(fp1, "[%s : %s] %s\nSQLState: %s\n" , datebuf, timebuf, szLastError, SqlState);
                              fclose(fp1);
                    }

                    i++;
          }
}

//============================================================================
//
// Function   : HandleErrorSTMT
//
//============================================================================
void HandleErrorSTMT (HSTMT  hstmt1)
{
          SQLCHAR             SqlState[6], Msg[SQL_MAX_MESSAGE_LENGTH];
          SQLLEN              NativeError;
          SQLSMALLINT i, MsgLen;
          SQLRETURN   rc2;
          char                timebuf[128];
          char                datebuf[128];
          char                err_log_path[256];
          FILE                *fp1;

          i = 1;
          while (( rc2 = SQLGetDiagRec(SQL_HANDLE_STMT , hstmt1, i, SqlState , &NativeError,
                                        Msg, sizeof(Msg) , &MsgLen )) != SQL_NO_DATA )
          {
                    if (total_db_errors >= MAX_SQL_ERRORS)
                    {
                              printf(">>>>> Maximum SQL errors of %d exceeded.  Terminating
TPCCLDR.<<<<<\n",total_db_errors);
                              exit(9);
                    }
                    total_db_errors++;

                    sprintf( szLastError , "%s" ,  Msg );

                    _strtime(timebuf);
                    _strdate(datebuf);

                    printf( "[%s : %s] %s\nSQLState: %s\n" , datebuf, timebuf, szLastError, SqlState);

                    strcpy(err_log_path,aptr->log_path);
                    strcat(err_log_path,"tpccldr.err");
                    fp1 = fopen(err_log_path,"a+");
                    if (fp1 == NULL)
                              printf("ERROR:  Unable to open errorlog file.\n");
                    else
                    {
                              fprintf(fp1, "[%s : %s] %s\nSQLState: %s\n" , datebuf, timebuf, szLastError, SqlState);
                              fclose(fp1);
                    }

                    i++;
          }
}

//============================================================================
//
// Function   : FormatDate
//
//============================================================================
void FormatDate ( char* szTimeCOutput )
{
          struct tm when;
          time_t now;

          time( &now );
          when  = *localtime( &now );

          mktime( &when );

          // odbc datetime format
          strftime( szTimeCOutput , 30 , "%Y-%m-%d %H:%M:%S.000", &when );

          return;
}
//        File:               GETARGS.C
//                                      Microsoft TPC-C Kit Ver. 4.51
//                                      Copyright Microsoft, 1996, 1997, 1998, 1999, 2000, 2001, 2002, 2003
//        Purpose:  Source file for command line processing


// 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->tables_all                     =  TRUE;
          pargs->table_item                     =  FALSE;
          pargs->table_warehouse                =  FALSE;
          pargs->table_customer                 =  FALSE;
          pargs->table_orders                   =  FALSE;
          pargs->loader_res_file                =  LOADER_RES_FILE;
          pargs->log_path                               =  LOADER_LOG_PATH;
          pargs->pack_size                      =  DEFLDPACKSIZE;
          pargs->starting_warehouse     =  DEF_STARTING_WAREHOUSE;
          pargs->build_index                    =  BUILD_INDEX;
          pargs->index_order                    =  INDEX_ORDER;
          pargs->index_script_path      =  INDEX_SCRIPT_PATH;
          pargs->scale_down                     =  SCALE_DOWN;

    /* 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 '?':     /* Fall throught */
                                        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->tables_all = FALSE;
                                                  if (strcmp(ptr+2,"item") == 0)
                                                            pargs->table_item = TRUE;
                                                  else if (strcmp(ptr+2,"warehouse") == 0)
                                                            pargs->table_warehouse = TRUE;
                                                  else if (strcmp(ptr+2,"customer") == 0)
                                                            pargs->table_customer = TRUE;
                                                  else if (strcmp(ptr+2,"orders") == 0)
                                                            pargs->table_orders = TRUE;
                                                  else
                                                  {
```

```
                                        printf("\nUnrecognized command");
                                        GetArgsLoaderUsage();
                                        exit(1);
                                        }

                                        break;
                                }

                        case 'f':
                                pargs->loader_res_file = ptr+2;
                                break;

                        case 'L':
                                pargs->log_path = ptr+2;
                                break;

                        case 'p':
                                pargs->pack_size = atol(ptr+2);
                                break;

                        case 'i':
                                pargs->build_index = atol(ptr+2);
                                break;

                        case 'o':
                                pargs->index_order = atol(ptr+2);
                                break;

                        case 'c':
                                pargs->scale_down = atol(ptr+2);
                                break;

                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("-L Loader BCP Log Path                               %s\n", LOADER_LOG_PATH);
          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("-o Cluster Index Build Order (before = 1, after = 0) %ld\n", (long) INDEX_ORDER);
          printf("-c Build Scaled Database (normal = 0, tiny = 1)      %ld\n", (long) SCALE_DOWN);
          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("   Notes: \n");
    printf("     - the '-t' parameter may be included multiple times to \n");
    printf("       specify multiple tables to be loaded \n");
    printf("     - 'item' loads ITEM table \n");
    printf("     - 'warehouse' loads WAREHOUSE, DISTRICT, and STOCK tables \n");
    printf("     - 'customer' loads CUSTOMER and HISTORY tables \n");
```

```
    printf("     - 'orders' load NEW-ORDER, ORDERS, ORDER-LINE tables \n");

          printf("\nNote:  Command line switches are case sensitive.\n");

    exit(0);
}


//        File:               RANDOM.C
//                                    Microsoft TPC-C Kit Ver. 4.62
//                                    Copyright Microsoft, 1996, 1997, 1998, 1999, 2000, 2001, 2002, 2005
//        Purpose:  Random number generation routines for database loader


// 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;
}


//        File:              STRINGS.C
//                                   Microsoft TPC-C Kit Ver. 4.51
//                                   Copyright Microsoft, 1996, 1997, 1998, 1999, 2000, 2001, 2002, 2003
//        Purpose:  Source file for database loader string functions


// 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)
{
    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;
    char    cc = 'a';
          static    char chArray[] = "0123456789ABCDEFGHIJKLMNOPQRSTUVWXYZabcdefghijklmnopqrstuvwxyz";
          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)];
          str[len] = 0;

    return len;
}

int MakeAlphaStringPadded( int  minLen, int  maxLen, int  padLen, char *str)
{
          int                len;
          int                i;
    char    cc = 'a';
          static    char chArray[] = "0123456789ABCDEFGHIJKLMNOPQRSTUVWXYZabcdefghijklmnopqrstuvwxyz";
          static    int       chArrayMax = 61;

#ifdef DEBUG
    printf("[%ld]DBG: Entering MakeAlphaStringPadded()\n", (int) GetCurrentThreadId());
#endif

          len= RandomNumber(minLen, maxLen);

          for (i=0; i<len; i++)
                    str[i] = chArray[RandomNumber(0,chArrayMax)];
          if (len < padLen)
                    memset(str+len, ' ', padLen - len);
          str[padLen] = 0;
    return padLen;
}



//======================================================================
//
// 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 < 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 len;
}


//====================================================================
//
// 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;
}


//====================================================================
//
// 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;
}
```

```
//==============================================================================
//
// Function name: InitString
//
//==============================================================================
void InitString(char *str, int len)
{
#ifdef DEBUG
    printf("[%ld]DBG: Entering InitString()\n", (int) GetCurrentThreadId());
#endif

          memset(str, ' ', len);
    str[len] = 0;
}


//==============================================================================
// Function name: InitAddress
//
// Description:
//
//==============================================================================

void InitAddress(char *street_1, char *street_2, char *city, char *state, char *zip)
{
          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;
}


//==============================================================================
//
// Function name: PaddString
//
//==============================================================================

void PaddString(int max, char *name)
{
          int                 len;

          len = strlen(name);
          if ( len < max )
                    memset(name+len, ' ', max - len);
          name[max] = 0;

          return;
}
//        File:               TIME.C
//                                      Microsoft TPC-C Kit Ver. 4.62
//                                      Copyright Microsoft, 1996, 1997, 1998, 1999, 2000, 2001, 2002, 2005
//        Purpose:  Source file for time functions


// Includes
#include "tpcc.h"

// Globals
static long start_sec;


//==============================================================================
//
// Function name: TimeNow
//
//==============================================================================

long TimeNow()
{
   long             time_now;
   struct _timeb el_time;

#ifdef DEBUG
    printf("[%ld]DBG: Entering TimeNow()\n", (int) GetCurrentThreadId());
#endif

   _ftime(&el_time);

   time_now = ((el_time.time - start_sec) * 1000) + el_time.millitm;
```

Appendix C - Tunable Parameters

Server Configuration Parameters

Microsoft Windows 2003 Server Parameters

The following registry key was added to disable the kernel counters for Global and Per-Process I/Os:
[HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Control\Session Manager\I/O System]
"CountOperations"=dword:00000000

Microsoft Windows 2003 Server Configuration

The following services were disabled on the server:

- Alerter
- Automatic Updates
- Computer Browser
- Cryptographic Services
- DHCP Client
- Distributed File System
- Distributed Link Tracking Client
- DNS Client
- Global Array Manager Server
- Help and Support
- IPSEC Policy Agent
- License Logging Service
- Messenger
- MSSQLserver
- Microsoft Search
- Print Spooler
- Process Control Service
- Remote Registry Service
- Removable Storage
- Run as Service
- System Event Notification
- SSDP Discovery service
- Task Scheduler
- Wireless configuration

Microsoft SQL Server 2005 Startup Parameters

Microsoft SQL Server was started with the following command line options

sqlservr -c -x -T3502 –g100

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.
-T3502	Prints a message to the log at the beginning and end of each checkpoint.

-g150 Reserve 150 MB for non-buffer pool allocations

Microsoft SQL Server 2005 Configuration Parameters

```
name                                 minimum     maximum     config_value run_value
------------------------------------ ----------- ----------- ------------ -----------
Ad Hoc Distributed Queries                     0           1            1           1
affinity I/O mask                  -2147483648  2147483647            0           0
affinity mask                      -2147483648  2147483647            3           3
Agent XPs                                      0           1            0           0
allow updates                                  0           1            0           0
awe enabled                                    0           1            1           1
blocked process threshold                      0       86400            0           0
c2 audit mode                                  0           1            0           0
clr enabled                                    0           1            1           1
cost threshold for parallelism                 0       32767            5           5
cross db ownership chaining                    0           1            0           0
cursor threshold                              -1  2147483647           -1          -1
Database Mail XPs                              0           1            0           0
default full-text language                     0  2147483647         1033        1033
default language                               0        9999            0           0
default trace enabled                          0           1            1           1
disallow results from triggers                 0           1            0           0
fill factor (%)                                0         100            0           0
ft crawl bandwidth (max)                       0       32767          100         100
ft crawl bandwidth (min)                       0       32767            0           0
ft notify bandwidth (max)                      0       32767          100         100
ft notify bandwidth (min)                      0       32767            0           0
in-doubt xact resolution                       0           2            0           0
index create memory (KB)                     704  2147483647            0           0
lightweight pooling                            0           1            1           1
locks                                       5000  2147483647            0           0
max degree of parallelism                      0          64            1           1
max full-text crawl range                      0         256            4           4
max server memory (MB)                        16  2147483647         3000        3000
max text repl size (B)                         0  2147483647        65536       65536
```

```
max worker threads                      128       32767          620
              620
media retention                           0         365            0
                0
min memory per query (KB)               512  2147483647         1024
             1024
min server memory (MB)                    0  2147483647         2900
             2900
nested triggers                           0           1            1
                1
network packet size (B)                 512       32767         1024
             1024
Ole Automation Procedures                 0           1            1
                1
open objects                              0  2147483647            0
                0
PH timeout (s)                            1        3600           60
               60
precompute rank                           0           1            0
                0
priority boost                            0           1            1
                1
query governor cost limit                 0  2147483647            0
                0
query wait (s)                           -1  2147483647           -1
               -1
recovery interval (min)                   0       32767        32767
            32767
remote access                             0           1            1
                1
remote admin connections                  0           1            1
                1
remote login timeout (s)                  0  2147483647           20
               20
remote proc trans                         0           1            0
                0
remote query timeout (s)                  0  2147483647          600
              600
Replication XPs                           0           1            0
                0
scan for startup procs                    0           1            0
                0
server trigger recursion                  0           1            1
                1
set working set size                      0           1            0
                0
show advanced options                     0           1            1
                1
SMO and DMO XPs                           0           1            1
                1
SQL Mail XPs                              0           1            0
                0
transform noise words                     0           1            0
                0
two digit year cutoff                  1753        9999         2049
             2049
user connections                          0       32767            0
                0
user options                              0       32767            0
                0
Web Assistant Procedures                  0           1            0
                0
xp_cmdshell                               0           1            1
```

```
System Information report written at: 10/03/05 19:15:41
System Name: PE2800
[System Summary]

Item      Value
OS Name   Microsoft(R) Windows(R) Server 2003 Standard x64 Edition
Version   5.2.3790 Service Pack 1 Build 3790
Other OS Description          Not Available
OS Manufacturer     Microsoft Corporation
Activation Status   Activation Pending (18 days remaining)
System Name         PE2800
System Manufacturer Dell Computer Corporation
System Model        PowerEdge 2800
System Type         x64-based PC
Processor EM64T Family 15 Model 4 Stepping 8 GenuineIntel ~2793 Mhz
Processor EM64T Family 15 Model 4 Stepping 8 GenuineIntel ~2793 Mhz
Processor EM64T Family 15 Model 4 Stepping 8 GenuineIntel ~2793 Mhz
Processor EM64T Family 15 Model 4 Stepping 8 GenuineIntel ~2793 Mhz
BIOS Version/Date   Dell Computer Corporation X42, 8/18/2005
SMBIOS Version      2.3
Windows Directory   C:\WINDOWS
System Directory    C:\WINDOWS\system32
Boot Device         \Device\HarddiskVolume1
Locale    United States
Hardware Abstraction Layer    Version = "5.2.3790.1830 (srv03_sp1_rtm.050324-1447)"
User Name PE2800\Administrator
Time Zone Central Daylight Time
Total Physical Memory         8,191.08 MB
Available Physical Memory     193.78 MB
Total Virtual Memory          9.57 GB
Available Virtual Memory      2.15 GB
Page File Space     2.00 GB
Page File C:\pagefile.sys

[Hardware Resources]



[Conflicts/Sharing]

Resource  Device
I/O Port 0x00000000-0x00000CF7          PCI bus
I/O Port 0x00000000-0x00000CF7          Direct memory access controller

IRQ 16    Intel(R) E7525/E7520/E7320 PCI Express Root Port A0 - 3595
IRQ 16    Intel(R) E7525/E7520/E7320 PCI Express Root Port A1 - 3596
IRQ 16    Intel(R) E7525/E7520 PCI Express Root Port B0 - 3597
IRQ 16    Intel(R) E7520 PCI Express Root Port B1 - 3598
IRQ 16    Intel(R) E7520 PCI Express Root Port C0 - 3599
IRQ 16    Intel(R) 82801EB USB Universal Host Controller - 24D2

Memory Address 0xFC000000-0xFC0FFFFF    Intel(R) E7525/E7520/E7320 PCI Express Root Port A0 - 3595
Memory Address 0xFC000000-0xFC0FFFFF    PCI standard PCI-to-PCI bridge

Memory Address 0xE0000000-0xFEBFFFFF    PCI bus
Memory Address 0xE0000000-0xFEBFFFFF    Motherboard resources

IRQ 18    Dell PERC 4e/DC RAID Controller
IRQ 18    Dell PERC 4e/DC RAID Controller
IRQ 18    Intel(R) 82801EB USB Universal Host Controller - 24D7
IRQ 18    Radeon 7000 / RADEON VE Family (Microsoft Corporation)

Memory Address 0xA0000-0xBFFFF          PCI bus
Memory Address 0xA0000-0xBFFFF          Radeon 7000 / RADEON VE Family (Microsoft Corporation)

I/O Port 0x0000C000-0x0000DFFF          Intel(R) E7520 PCI Express Root Port B1 - 3598
I/O Port 0x0000C000-0x0000DFFF          Intel(R) 6700PXH PCI Express-to-PCI Bridge B - 032A


[DMA]

Resource  Device    Status
Channel 4 Direct memory access controller         OK
Channel 2 Standard floppy disk controller         OK

[Forced Hardware]

Device    PNP Device ID

[I/O]

Resource  Device    Status
0x00000000-0x00000CF7         PCI bus   OK
0x00000000-0x00000CF7         Direct memory access controller         OK
0x00000D00-0x0000FFFF         PCI bus   OK
0x0000E000-0x0000EFFF         Intel(R) E7525/E7520 PCI Express Root Port B0 - 3597        OK
0x0000C000-0x0000DFFF         Intel(R) E7520 PCI Express Root Port B1 - 3598    OK
0x0000C000-0x0000DFFF         Intel(R) 6700PXH PCI Express-to-PCI Bridge B - 032A         OK
0x0000D000-0x0000DFFF         Intel(R) 6700PXH PCI Express-to-PCI Bridge A - 0329         OK
0x0000DCC0-0x0000DCFF         Intel(R) PRO/1000 MT Network Connection OK
0x0000CCC0-0x0000CCFF         Intel(R) PRO/1000 MT Network Connection #2        OK
0x0000B000-0x0000BFFF         Intel(R) E7520 PCI Express Root Port C0 - 3599    OK
```

```
0x00009CE0-0x00009CFF         Intel(R) 82801EB USB Universal Host Controller - 24D2       OK
0x00009CC0-0x00009CDF         Intel(R) 82801EB USB Universal Host Controller - 24D4       OK
0x00009CA0-0x00009CBF         Intel(R) 82801EB USB Universal Host Controller - 24D7       OK
0x0000AC00-0x0000ACFF         Radeon 7000 / RADEON VE Family (Microsoft Corporation)      OK
0x000003B0-0x000003BB         Radeon 7000 / RADEON VE Family (Microsoft Corporation)      OK
0x000003C0-0x000003DF         Radeon 7000 / RADEON VE Family (Microsoft Corporation)      OK
0x00000080-0x0000009F         Direct memory access controller         OK
0x000000C0-0x000000DF         Direct memory access controller         OK
0x000000F0-0x000000FF         Numeric data processor        OK
0x00000020-0x0000003F         Programmable interrupt controller       OK
0x000000A0-0x000000BF         Programmable interrupt controller       OK
0x000004D0-0x000004D1         Programmable interrupt controller       OK
0x00000061-0x00000061         System speaker      OK
0x00000070-0x0000007F         System CMOS/real time clock   OK
0x00000040-0x0000005F         System timer        OK
0x000003F0-0x000003F5         Standard floppy disk controller         OK
0x000003F7-0x000003F7         Standard floppy disk controller         OK
0x00000060-0x00000060         Standard 101/102-Key or Microsoft Natural PS/2 Keyboard     OK
0x00000064-0x00000064         Standard 101/102-Key or Microsoft Natural PS/2 Keyboard     OK
0x000003F8-0x000003FF         Communications Port (COM1)    OK
0x00000278-0x0000027F         ECP Printer Port (LPT1)       OK
0x00000678-0x0000067F         ECP Printer Port (LPT1)       OK
0x00000800-0x0000087F         System board        OK
0x00000880-0x000008BF         System board        OK
0x000008C0-0x000008DF         System board        OK
0x000008E0-0x000008E3         System board        OK
0x00000C00-0x00000C0F         System board        OK
0x00000C10-0x00000C1F         System board        OK
0x00000CA0-0x00000CAF         System board        OK
0x00000C20-0x00000C3F         System board        OK
0x000000E0-0x000000E7         System board        OK
0x0000FC00-0x0000FC0F         Intel(R) 82801EB Ultra ATA Storage Controllers - 24DB       OK
0x000001F0-0x000001F7         Primary IDE Channel OK
0x000003F6-0x000003F6         Primary IDE Channel OK
0x00000170-0x00000177         Secondary IDE Channel         OK
0x00000376-0x00000376         Secondary IDE Channel         OK

[IRQs]

Resource  Device    Status
IRQ 9     Microsoft ACPI-Compliant System         OK
IRQ 16    Intel(R) E7525/E7520/E7320 PCI Express Root Port A0 - 3595  OK
IRQ 16    Intel(R) E7525/E7520/E7320 PCI Express Root Port A1 - 3596  OK
IRQ 16    Intel(R) E7525/E7520 PCI Express Root Port B0 - 3597        OK
IRQ 16    Intel(R) E7520 PCI Express Root Port B1 - 3598    OK
IRQ 16    Intel(R) E7520 PCI Express Root Port C0 - 3599    OK
IRQ 16    Intel(R) 82801EB USB Universal Host Controller - 24D2       OK
IRQ 46    Dell PERC 4e/Di RAID Controller         OK
IRQ 18    Dell PERC 4e/DC RAID Controller         OK
IRQ 18    Dell PERC 4e/DC RAID Controller         OK
IRQ 18    Intel(R) 82801EB USB Universal Host Controller - 24D7       OK
IRQ 18    Radeon 7000 / RADEON VE Family (Microsoft Corporation)      OK
IRQ 64    Intel(R) PRO/1000 MT Network Connection OK
IRQ 65    Intel(R) PRO/1000 MT Network Connection #2        OK
IRQ 19    Intel(R) 82801EB USB Universal Host Controller - 24D4       OK
IRQ 23    Intel(R) 82801EB USB2 Enhanced Host Controller - 24DD       OK
IRQ 13    Numeric data processor        OK
IRQ 8     System CMOS/real time clock   OK
IRQ 0     System timer        OK
IRQ 6     Standard floppy disk controller         OK
IRQ 1     Standard 101/102-Key or Microsoft Natural PS/2 Keyboard     OK
IRQ 12    PS/2 Compatible Mouse         OK
IRQ 4     Communications Port (COM1)    OK
IRQ 14    Primary IDE Channel OK
IRQ 15    Secondary IDE Channel         OK

[Memory]

Resource  Device    Status
0xA0000-0xBFFFF     PCI bus   OK
0xA0000-0xBFFFF     Radeon 7000 / RADEON VE Family (Microsoft Corporation)      OK
0xE0000000-0xFEBFFFFF         PCI bus   OK
0xE0000000-0xFEBFFFFF         Motherboard resources         OK
0xFE800000-0xFEAFFFFF         Intel(R) E7525/E7520/E7320 PCI Express Root Port A0 - 3595  OK
0xFC000000-0xFC0FFFFF         Intel(R) E7525/E7520/E7320 PCI Express Root Port A0 - 3595  OK
0xFC000000-0xFC0FFFFF         PCI standard PCI-to-PCI bridge          OK
0xFE900000-0xFEAFFFFF         PCI standard PCI-to-PCI bridge          OK
0xFC0F0000-0xFC0FFFFF         Dell PERC 4e/Di RAID Controller         OK
0xFE9C0000-0xFE9FFFFF         Dell PERC 4e/Di RAID Controller         OK
0xFE700000-0xFE7FFFFF         Intel(R) E7525/E7520/E7320 PCI Express Root Port A1 - 3596  OK
0xFE400000-0xFE6FFFFF         Intel(R) E7525/E7520 PCI Express Root Port B0 - 3597        OK
0xFA000000-0xFBFFFFFF         Intel(R) E7525/E7520 PCI Express Root Port B0 - 3597        OK
0xFE500000-0xFE6FFFFF         PCI standard PCI-to-PCI bridge          OK
0xFBF00000-0xFBFFFFFF         PCI standard PCI-to-PCI bridge          OK
0xFBFF0000-0xFBFFFFFF         Dell PERC 4e/DC RAID Controller         OK
0xFE5C0000-0xFE5FFFFF         Dell PERC 4e/DC RAID Controller         OK
0xFDF00000-0xFE3FFFFF         Intel(R) E7520 PCI Express Root Port B1 - 3598    OK
0xFE200000-0xFE3FFFFF         Intel(R) 6700PXH PCI Express-to-PCI Bridge A - 0329         OK
0xFE2E0000-0xFE2FFFFF         Intel(R) PRO/1000 MT Network Connection OK
0xFE000000-0xFE1FFFFF         Intel(R) 6700PXH PCI Express-to-PCI Bridge B - 032A         OK
0xFE0E0000-0xFE0FFFFF         Intel(R) PRO/1000 MT Network Connection #2        OK
0xFDC00000-0xFDEFFFFF         Intel(R) E7520 PCI Express Root Port C0 - 3599    OK
0xF8000000-0xF9FFFFFF         Intel(R) E7520 PCI Express Root Port C0 - 3599    OK
```

```
0xFDD00000-0xFDEFFFFF         PCI standard PCI-to-PCI bridge          OK
0xF9F00000-0xF9FFFFFF         PCI standard PCI-to-PCI bridge          OK
0xF9FF0000-0xF9FFFFFF         Dell PERC 4e/DC RAID Controller         OK
0xFDDC0000-0xFDDFFFFF         Dell PERC 4e/DC RAID Controller         OK
0xFEB00000-0xFEB003FF         Intel(R) 82801EB USB2 Enhanced Host Controller - 24DD       OK
0xF0000000-0xF7FFFFFF         Radeon 7000 / RADEON VE Family (Microsoft Corporation)      OK
0xFDAF0000-0xFDAFFFFF         Radeon 7000 / RADEON VE Family (Microsoft Corporation)      OK
0xFEBFFC00-0xFEBFFFFF         Intel(R) 82801EB Ultra ATA Storage Controllers - 24DB       OK
0xFED00000-0xFED003FF         High precision event timer    OK

[Components]


[Multimedia]


[Audio Codecs]

CODEC     Manufacturer        Description         Status    File      Version   Size      Creation Date
c:\windows\system32\imaadp32.acm        Microsoft Corporation                   OK
          C:\WINDOWS\system32\IMAADP32.ACM        5.2.3790.1830 (srv03_sp1_rtm.050324-1447)         24.00 KB (24,576
bytes)    9/21/2005 12:21 PM
c:\windows\system32\msadp32.acm         Microsoft Corporation                   OK
          C:\WINDOWS\system32\MSADP32.ACM         5.2.3790.1830 (srv03_sp1_rtm.050324-1447)         23.50 KB (24,064
bytes)    9/21/2005 12:21 PM
c:\windows\system32\msgsm32.acm         Microsoft Corporation                   OK
          C:\WINDOWS\system32\MSGSM32.ACM         5.2.3790.1830 (srv03_sp1_rtm.050324-1447)         34.50 KB (35,328
bytes)    9/21/2005 12:21 PM
c:\windows\system32\tssoft32.acm        DSP GROUP, INC.               OK        C:\WINDOWS\system32\TSSOFT32.ACM
          1.01      13.50 KB (13,824 bytes)       9/21/2005 12:22 PM
c:\windows\system32\msg711.acm          Microsoft Corporation                   OK
          C:\WINDOWS\system32\MSG711.ACM          5.2.3790.1830 (srv03_sp1_rtm.050324-1447)         13.50 KB (13,824
bytes)    9/21/2005 12:21 PM

[Video Codecs]

CODEC     Manufacturer        Description         Status    File      Version   Size      Creation Date
c:\windows\system32\msrle32.dll         Microsoft Corporation                   OK
          C:\WINDOWS\system32\MSRLE32.DLL         5.2.3790.1830 (srv03_sp1_rtm.050324-1447)         15.50 KB (15,872
bytes)    9/21/2005 12:21 PM
c:\windows\system32\tsbyuv.dll          Microsoft Corporation                   OK
          C:\WINDOWS\system32\TSBYUV.DLL          5.2.3790.1830 (srv03_sp1_rtm.050324-1447)         12.50 KB (12,800
bytes)    3/24/2005 11:34 AM
c:\windows\system32\iyuv_32.dll         Microsoft Corporation                   OK
          C:\WINDOWS\system32\IYUV_32.DLL         5.2.3790.1830 (srv03_sp1_rtm.050324-1447)         52.50 KB (53,760
bytes)    3/24/2005 11:19 AM
c:\windows\system32\msvidc32.dll        Microsoft Corporation                   OK
          C:\WINDOWS\system32\MSVIDC32.DLL        5.2.3790.1830 (srv03_sp1_rtm.050324-1447)         43.00 KB (44,032
bytes)    9/21/2005 12:21 PM
c:\windows\system32\msyuv.dll Microsoft Corporation                   OK        C:\WINDOWS\system32\MSYUV.DLL
          5.2.3790.1830 (srv03_sp1_rtm.050324-1447)         21.00 KB (21,504 bytes)       3/24/2005 11:21 AM

[CD-ROM]

Item      Value
Drive     H:
Description         CD-ROM Drive
Media Loaded        No
Media Type          CD-ROM
Name      SAMSUNG CD-ROM SN-124
Manufacturer        (Standard CD-ROM drives)
Status    OK
Transfer Rate       Not Available
SCSI Target ID      0
PNP Device ID       IDE\CDROMSAMSUNG_CD-ROM_SN-124___________________N103____\5&2A02168E&0&0.0.0
Driver    c:\windows\system32\drivers\cdrom.sys (5.2.3790.1830 (srv03_sp1_rtm.050324-1447), 75.50 KB (77,312 bytes),
9/21/2005 12:20 PM)

[Sound Device]

Item      Value

[Display]

Item      Value
Name      Radeon 7000 / RADEON VE Family (Microsoft Corporation)
PNP Device ID       PCI\VEN_1002&DEV_5159&SUBSYS_016E1028&REV_00\4&1F7DBC9F&0&68F0
Adapter Type        ATI display adapter (0x5159), ATI Technologies Inc. compatible
Adapter Description Radeon 7000 / RADEON VE Family (Microsoft Corporation)
Adapter RAM         16.00 MB (16,777,216 bytes)
Installed Drivers   ati2dvag.dll
Driver Version      6.14.10.6509
INF File  atiixpag.inf (ati2mtag_RV100 section)
Color Planes        1
Color Table Entries 4294967296
Resolution          1024 x 768 x 60 hertz
Bits/Pixel          32
Memory Address      0xF0000000-0xF7FFFFFF
I/O Port  0x0000AC00-0x0000ACFF
Memory Address      0xFDAF0000-0xFDAFFFFF
IRQ Channel         IRQ 18
```

```
I/O Port  0x000003B0-0x000003BB
I/O Port  0x000003C0-0x000003DF
Memory Address      0xA0000-0xBFFFF
Driver    c:\windows\system32\drivers\ati2mtag.sys (6.14.10.6509, 1.39 MB (1,452,544 bytes), 9/21/2005 7:37 AM)

[Infrared]

Item      Value

[Input]



[Keyboard]

Item      Value
Description         Standard 101/102-Key or Microsoft Natural PS/2 Keyboard
Name      Enhanced (101- or 102-key)
Layout    00000409
PNP Device ID       ACPI\PNP0303\4&26DD0F47&0
Number of Function Keys       12
I/O Port  0x00000060-0x00000060
I/O Port  0x00000064-0x00000064
IRQ Channel         IRQ 1
Driver    c:\windows\system32\drivers\i8042prt.sys (5.2.3790.1830 (srv03_sp1_rtm.050324-1447), 91.00 KB (93,184 bytes),
9/21/2005 12:21 PM)

[Pointing Device]

Item      Value
Hardware Type       PS/2 Compatible Mouse
Number of Buttons   3
Status    OK
PNP Device ID       ACPI\PNP0F13\4&26DD0F47&0
Power Management Supported    No
Double Click Threshold        6
Handedness          Right Handed Operation
IRQ Channel         IRQ 12
Driver    c:\windows\system32\drivers\i8042prt.sys (5.2.3790.1830 (srv03_sp1_rtm.050324-1447), 91.00 KB (93,184 bytes),
9/21/2005 12:21 PM)

[Modem]

Item      Value

[Network]



[Adapter]

Item      Value
Name      [00000001] Intel(R) PRO/1000 MT Network Connection
Adapter Type        Ethernet 802.3
Product Type        Intel(R) PRO/1000 MT Network Connection
Installed Yes
PNP Device ID       PCI\VEN_8086&DEV_1076&SUBSYS_016D1028&REV_05\5&803901B&0&380028
Last Reset          10/3/2005 4:14 PM
Index     1
Service Name        E1000
IP Address          192.1.2.28
IP Subnet 255.255.255.0
Default IP Gateway  Not Available
DHCP Enabled        No
DHCP Server         Not Available
DHCP Lease Expires  Not Available
DHCP Lease Obtained Not Available
MAC Address         00:11:43:E6:56:26
Memory Address      0xFE2E0000-0xFE2FFFFF
I/O Port  0x0000DCC0-0x0000DCFF
IRQ Channel         IRQ 64
Driver    c:\windows\system32\drivers\e1g5132e.sys (8.1.8.0 built by: WinDDK, 227.50 KB (232,960 bytes), 9/21/2005 7:37
AM)

Name      [00000002] Intel(R) PRO/1000 MT Network Connection
Adapter Type        Ethernet 802.3
Product Type        Intel(R) PRO/1000 MT Network Connection
Installed Yes
PNP Device ID       PCI\VEN_8086&DEV_1076&SUBSYS_016D1028&REV_05\5&C8E9BA0&0&400228
Last Reset          10/3/2005 4:14 PM
Index     2
Service Name        E1000
IP Address          0.0.0.0
IP Subnet 0.0.0.0
Default IP Gateway  Not Available
DHCP Enabled        Yes
DHCP Server
DHCP Lease Expires  Not Available
DHCP Lease Obtained Not Available
MAC Address         00:11:43:E6:56:27
Memory Address      0xFE0E0000-0xFE0FFFFF
I/O Port  0x0000CCC0-0x0000CCFF
IRQ Channel         IRQ 65
```

```
Driver    c:\windows\system32\drivers\e1g5132e.sys (8.1.8.0 built by: WinDDK, 227.50 KB (232,960 bytes), 9/21/2005 7:37
AM)

Name      [00000003] RAS Async Adapter
Adapter Type        Not Available
Product Type        RAS Async Adapter
Installed Yes
PNP Device ID       Not Available
Last Reset          10/3/2005 4:14 PM
Index     3
Service Name        AsyncMac
IP Address          Not Available
IP Subnet Not Available
Default IP Gateway  Not Available
DHCP Enabled        No
DHCP Server         Not Available
DHCP Lease Expires  Not Available
DHCP Lease Obtained Not Available
MAC Address         Not Available

Name      [00000004] WAN Miniport (L2TP)
Adapter Type        Not Available
Product Type        WAN Miniport (L2TP)
Installed Yes
PNP Device ID       ROOT\MS_L2TPMINIPORT\0000
Last Reset          10/3/2005 4:14 PM
Index     4
Service Name        Rasl2tp
IP Address          Not Available
IP Subnet Not Available
Default IP Gateway  Not Available
DHCP Enabled        No
DHCP Server         Not Available
DHCP Lease Expires  Not Available
DHCP Lease Obtained Not Available
MAC Address         Not Available
Driver    c:\windows\system32\drivers\rasl2tp.sys (5.2.3790.1830 (srv03_sp1_rtm.050324-1447), 132.00 KB (135,168
bytes), 9/21/2005 12:22 PM)

Name      [00000005] WAN Miniport (PPTP)
Adapter Type        Wide Area Network (WAN)
Product Type        WAN Miniport (PPTP)
Installed Yes
PNP Device ID       ROOT\MS_PPTPMINIPORT\0000
Last Reset          10/3/2005 4:14 PM
Index     5
Service Name        PptpMiniport
IP Address          Not Available
IP Subnet Not Available
Default IP Gateway  Not Available
DHCP Enabled        No
DHCP Server         Not Available
DHCP Lease Expires  Not Available
DHCP Lease Obtained Not Available
MAC Address         50:50:54:50:30:30
Driver    c:\windows\system32\drivers\raspptp.sys (5.2.3790.1830 (srv03_sp1_rtm.050324-1447), 117.50 KB (120,320
bytes), 9/21/2005 12:22 PM)

Name      [00000006] WAN Miniport (PPPOE)
Adapter Type        Wide Area Network (WAN)
Product Type        WAN Miniport (PPPOE)
Installed Yes
PNP Device ID       ROOT\MS_PPPOEMINIPORT\0000
Last Reset          10/3/2005 4:14 PM
Index     6
Service Name        RasPppoe
IP Address          Not Available
IP Subnet Not Available
Default IP Gateway  Not Available
DHCP Enabled        No
DHCP Server         Not Available
DHCP Lease Expires  Not Available
DHCP Lease Obtained Not Available
MAC Address         33:50:6F:45:30:30
Driver    c:\windows\system32\drivers\raspppoe.sys (5.2.3790.1830 (srv03_sp1_rtm.050324-1447), 67.50 KB (69,120 bytes),
9/21/2005 12:22 PM)

Name      [00000007] Direct Parallel
Adapter Type        Not Available
Product Type        Direct Parallel
Installed Yes
PNP Device ID       ROOT\MS_PTIMINIPORT\0000
Last Reset          10/3/2005 4:14 PM
Index     7
Service Name        Raspti
IP Address          Not Available
IP Subnet Not Available
Default IP Gateway  Not Available
DHCP Enabled        No
DHCP Server         Not Available
DHCP Lease Expires  Not Available
DHCP Lease Obtained Not Available
MAC Address         Not Available
```

```
Driver    c:\windows\system32\drivers\raspti.sys (5.2.3790.1830 (srv03_sp1_rtm.050324-1447), 30.50 KB (31,232 bytes),
9/21/2005 12:22 PM)

Name      [00000008] WAN Miniport (IP)
Adapter Type        Not Available
Product Type        WAN Miniport (IP)
Installed Yes
PNP Device ID       ROOT\MS_NDISWANIP\0000
Last Reset          10/3/2005 4:14 PM
Index     8
Service Name        NdisWan
IP Address          Not Available
IP Subnet Not Available
Default IP Gateway  Not Available
DHCP Enabled        No
DHCP Server         Not Available
DHCP Lease Expires  Not Available
DHCP Lease Obtained Not Available
MAC Address         Not Available
Driver    c:\windows\system32\drivers\ndiswan.sys (5.2.3790.1830 (srv03_sp1_rtm.050324-1447), 157.50 KB (161,280
bytes), 9/21/2005 12:21 PM)

[Protocol]

Item      Value
Name      MSAFD Tcpip [TCP/IP]
Connectionless Service        No
Guarantees Delivery Yes
Guarantees Sequencing         Yes
Maximum Address Size          16 bytes
Maximum Message Size          0 bytes
Message Oriented    No
Minimum Address Size          16 bytes
Pseudo Stream Oriented        No
Supports Broadcasting         No
Supports Connect Data         No
Supports Disconnect Data      No
Supports Encryption No
Supports Expedited Data       Yes
Supports Graceful Closing     Yes
Supports Guaranteed Bandwidth No
Supports Multicasting         No

Name      MSAFD Tcpip [UDP/IP]
Connectionless Service        Yes
Guarantees Delivery No
Guarantees Sequencing         No
Maximum Address Size          16 bytes
Maximum Message Size          63.93 KB (65,467 bytes)
Message Oriented    Yes
Minimum Address Size          16 bytes
Pseudo Stream Oriented        No
Supports Broadcasting         Yes
Supports Connect Data         No
Supports Disconnect Data      No
Supports Encryption No
Supports Expedited Data       No
Supports Graceful Closing     No
Supports Guaranteed Bandwidth No
Supports Multicasting         Yes

Name      RSVP UDP Service Provider
Connectionless Service        Yes
Guarantees Delivery No
Guarantees Sequencing         No
Maximum Address Size          16 bytes
Maximum Message Size          63.93 KB (65,467 bytes)
Message Oriented    Yes
Minimum Address Size          16 bytes
Pseudo Stream Oriented        No
Supports Broadcasting         Yes
Supports Connect Data         No
Supports Disconnect Data      No
Supports Encryption Yes
Supports Expedited Data       No
Supports Graceful Closing     No
Supports Guaranteed Bandwidth No
Supports Multicasting         Yes

Name      RSVP TCP Service Provider
Connectionless Service        No
Guarantees Delivery Yes
Guarantees Sequencing         Yes
Maximum Address Size          16 bytes
Maximum Message Size          0 bytes
Message Oriented    No
Minimum Address Size          16 bytes
Pseudo Stream Oriented        No
Supports Broadcasting         No
Supports Connect Data         No
Supports Disconnect Data      No
Supports Encryption Yes
Supports Expedited Data       Yes
```

```
Supports Graceful Closing     Yes
Supports Guaranteed Bandwidth No
Supports Multicasting         No

[WinSock]

Item      Value
File      c:\windows\system32\wsock32.dll
Size      24.50 KB (25,088 bytes)
Version   5.2.3790.1830 (srv03_sp1_rtm.050324-1447)

[Ports]


[Serial]

Item      Value
Name      Communications Port (COM1)
Status    OK
PNP Device ID       ACPI\PNP0501\1
Maximum Input Buffer Size     0
Maximum Output Buffer Size    No
Settable Baud Rate  Yes
Settable Data Bits  Yes
Settable Flow Control         Yes
Settable Parity     Yes
Settable Parity Check         Yes
Settable Stop Bits  Yes
Settable RLSD       Yes
Supports RLSD       Yes
Supports 16 Bit Mode          No
Supports Special Characters   No
Baud Rate 9600
Bits/Byte 8
Stop Bits 1
Parity    None
Busy      No
Abort Read/Write on Error     No
Binary Mode Enabled Yes
Continue XMit on XOff         No
CTS Outflow Control No
Discard NULL Bytes  No
DSR Outflow Control 0
DSR Sensitivity     0
DTR Flow Control Type         Enable
EOF Character       0
Error Replace Character       0
Error Replacement Enabled     No
Event Character     0
Parity Check Enabled          No
RTS Flow Control Type         Enable
XOff Character      19
XOffXMit Threshold  512
XOn Character       17
XOnXMit Threshold   2048
XOnXOff InFlow Control        0
XOnXOff OutFlow Control       0
I/O Port  0x000003F8-0x000003FF
IRQ Channel         IRQ 4
Driver    c:\windows\system32\drivers\serial.sys (5.2.3790.1830 (srv03_sp1_rtm.050324-1447), 118.50 KB (121,344 bytes),
9/21/2005 12:22 PM)

[Parallel]

Item      Value
Name      LPT1
PNP Device ID       ACPI\PNP0401\4&26DD0F47&0
I/O Port  0x00000278-0x0000027F
I/O Port  0x00000678-0x0000067F
Driver    c:\windows\system32\drivers\parport.sys (5.2.3790.1830 (srv03_sp1_rtm.050324-1447), 131.00 KB (134,144
bytes), 3/24/2005 11:22 AM)

[Storage]


[Drives]

Item      Value
Drive     A:
Description         3 1/2 Inch Floppy Drive

Drive     C:
Description         Local Fixed Disk
Compressed          No
File System         NTFS
Size      10.00 GB (10,742,202,368 bytes)
Free Space          2.06 GB (2,213,085,184 bytes)
Volume Name
Volume Serial Number          08B2F972

Drive     E:
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```
Description         Local Fixed Disk
Compressed          Not Available
File System         Not Available
Size      Not Available
Free Space          Not Available
Volume Name         Not Available
Volume Serial Number          Not Available

Drive     F:
Description         Local Fixed Disk
Compressed          Not Available
File System         Not Available
Size      Not Available
Free Space          Not Available
Volume Name         Not Available
Volume Serial Number          Not Available

Drive     G:
Description         Local Fixed Disk
Compressed          Not Available
File System         Not Available
Size      Not Available
Free Space          Not Available
Volume Name         Not Available
Volume Serial Number          Not Available

Drive     H:
Description         CD-ROM Disc

Drive     I:
Description         Local Fixed Disk
Compressed          No
File System         NTFS
Size      9.28 GB (9,969,004,544 bytes)
Free Space          5.11 GB (5,490,794,496 bytes)
Volume Name
Volume Serial Number          B8C37E56

Drive     M:
Description         Local Fixed Disk
Compressed          Not Available
File System         Not Available
Size      Not Available
Free Space          Not Available
Volume Name         Not Available
Volume Serial Number          Not Available

Drive     N:
Description         Local Fixed Disk
Compressed          Not Available
File System         Not Available
Size      Not Available
Free Space          Not Available
Volume Name         Not Available
Volume Serial Number          Not Available

Drive     Z:
Description         Local Fixed Disk
Compressed          No
File System         NTFS
Size      807.78 GB (867,347,529,728 bytes)
Free Space          574.58 GB (616,947,908,608 bytes)
Volume Name
Volume Serial Number          FC041622

[Disks]

Item      Value
Description         Disk drive
Manufacturer        (Standard disk drives)
Model     PERC  LD  0 PERCRAID SCSI Disk Device
Bytes/Sector        512
Media Loaded        Yes
Media Type          Fixed hard disk
Partitions          3
SCSI Bus  3
SCSI Logical Unit   0
SCSI Port 3
SCSI Target ID      0
Sectors/Track       63
Size      949.59 GB (1,019,613,934,080 bytes)
Total Cylinders     123,961
Total Sectors       1,991,433,465
Total Tracks        31,610,055
Tracks/Cylinder     255
Partition Disk #1, Partition #0
Partition Size      48.62 GB (52,205,819,904 bytes)
Partition Starting Offset     32,256 bytes
Partition Disk #1, Partition #1
Partition Size      93.19 GB (100,060,531,200 bytes)
Partition Starting Offset     52,205,852,160 bytes
Partition Disk #1, Partition #2
Partition Size      807.78 GB (867,347,550,720 bytes)
```

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Partition Starting Offset     152,266,383,360 bytes

Description         Disk drive
Manufacturer        (Standard disk drives)
Model     PERC  LD  0 PERCRAID SCSI Disk Device
Bytes/Sector        512
Media Loaded        Yes
Media Type          Fixed hard disk
Partitions          2
SCSI Bus  3
SCSI Logical Unit   0
SCSI Port 4
SCSI Target ID      0
Sectors/Track       63
Size      948.28 GB (1,018,207,411,200 bytes)
Total Cylinders     123,790
Total Sectors       1,988,686,350
Total Tracks        31,566,450
Tracks/Cylinder     255
Partition Disk #2, Partition #0
Partition Size      48.14 GB (51,687,627,264 bytes)
Partition Starting Offset     32,256 bytes
Partition Disk #2, Partition #1
Partition Size      92.26 GB (99,065,272,320 bytes)
Partition Starting Offset     51,687,659,520 bytes

Description         Disk drive
Manufacturer        (Standard disk drives)
Model     PERC  LD  0 PERCRAID SCSI Disk Device
Bytes/Sector        512
Media Loaded        Yes
Media Type          Fixed hard disk
Partitions          3
SCSI Bus  3
SCSI Logical Unit   0
SCSI Port 2
SCSI Target ID      0
Sectors/Track       63
Size      272.96 GB (293,091,402,240 bytes)
Total Cylinders     35,633
Total Sectors       572,444,145
Total Tracks        9,086,415
Tracks/Cylinder     255
Partition Disk #0, Partition #0
Partition Size      9.28 GB (9,969,007,104 bytes)
Partition Starting Offset     32,256 bytes
Partition Disk #0, Partition #1
Partition Size      10.00 GB (10,742,215,680 bytes)
Partition Starting Offset     117,350,069,760 bytes
Partition Disk #0, Partition #2
Partition Size      119.14 GB (127,927,779,840 bytes)
Partition Starting Offset     128,092,285,440 bytes

[SCSI]

Item      Value
Name      Dell PERC 4e/Di RAID Controller
Manufacturer        Dell
Status    OK
PNP Device ID       PCI\VEN_1028&DEV_0013&SUBSYS_016E1028&REV_06\5&39562480&0&700010
Memory Address      0xFC0F0000-0xFC0FFFFF
Memory Address      0xFE9C0000-0xFE9FFFFF
IRQ Channel         IRQ 46
Driver    c:\windows\system32\drivers\mraid35x.sys (6.44.3.64 (NT.040809-2325), 35.50 KB (36,352 bytes), 9/21/2005
12:21 PM)

Name      Dell PERC 4e/DC RAID Controller
Manufacturer        Dell
Status    OK
PNP Device ID       PCI\VEN_1000&DEV_0408&SUBSYS_00021028&REV_07\5&BAF3E0F&0&700020
Memory Address      0xFBFF0000-0xFBFFFFFF
Memory Address      0xFE5C0000-0xFE5FFFFF
IRQ Channel         IRQ 18
Driver    c:\windows\system32\drivers\mraid35x.sys (6.44.3.64 (NT.040809-2325), 35.50 KB (36,352 bytes), 9/21/2005
12:21 PM)

Name      Dell PERC 4e/DC RAID Controller
Manufacturer        Dell
Status    OK
PNP Device ID       PCI\VEN_1000&DEV_0408&SUBSYS_00021028&REV_07\5&164B5902&0&700030
Memory Address      0xF9FF0000-0xF9FFFFFF
Memory Address      0xFDDC0000-0xFDDFFFFF
IRQ Channel         IRQ 18
Driver    c:\windows\system32\drivers\mraid35x.sys (6.44.3.64 (NT.040809-2325), 35.50 KB (36,352 bytes), 9/21/2005
12:21 PM)

[IDE]

Item      Value
Name      Intel(R) 82801EB Ultra ATA Storage Controllers - 24DB
Manufacturer        Intel
Status    OK
PNP Device ID       PCI\VEN_8086&DEV_24DB&SUBSYS_016E1028&REV_02\3&13C0B0C5&0&F9
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I/O Port  0x0000FC00-0x0000FC0F
Memory Address      0xFEBFFC00-0xFEBFFFFF
Driver    c:\windows\system32\drivers\intelide.sys (5.2.3790.1830 (srv03_sp1_rtm.050324-1447), 9.00 KB (9,216 bytes),
9/21/2005 7:36 AM)

Name      Primary IDE Channel
Manufacturer        (Standard IDE ATA/ATAPI controllers)
Status    OK
PNP Device ID       PCIIDE\IDECHANNEL\4&C3EA019&0&0
I/O Port  0x000001F0-0x000001F7
I/O Port  0x000003F6-0x000003F6
IRQ Channel         IRQ 14
Driver    c:\windows\system32\drivers\atapi.sys (5.2.3790.1830 (srv03_sp1_rtm.050324-1447), 145.00 KB (148,480 bytes),
9/21/2005 12:20 PM)

Name      Secondary IDE Channel
Manufacturer        (Standard IDE ATA/ATAPI controllers)
Status    OK
PNP Device ID       PCIIDE\IDECHANNEL\4&C3EA019&0&1
I/O Port  0x00000170-0x00000177
I/O Port  0x00000376-0x00000376
IRQ Channel         IRQ 15
Driver    c:\windows\system32\drivers\atapi.sys (5.2.3790.1830 (srv03_sp1_rtm.050324-1447), 145.00 KB (148,480 bytes),
9/21/2005 12:20 PM)

[Printing]

Name      Driver    Port Name Server Name

[Problem Devices]

Device    PNP Device ID       Error Code

[USB]

Device    PNP Device ID
Intel(R) 82801EB USB Universal Host Controller - 24D2
          PCI\VEN_8086&DEV_24D2&SUBSYS_016E1028&REV_02\3&13C0B0C5&0&E8
Intel(R) 82801EB USB Universal Host Controller - 24D4
          PCI\VEN_8086&DEV_24D4&SUBSYS_016E1028&REV_02\3&13C0B0C5&0&E9
Intel(R) 82801EB USB Universal Host Controller - 24D7
          PCI\VEN_8086&DEV_24D7&SUBSYS_016E1028&REV_02\3&13C0B0C5&0&EA
Intel(R) 82801EB USB2 Enhanced Host Controller - 24DD
          PCI\VEN_8086&DEV_24DD&SUBSYS_016E1028&REV_02\3&13C0B0C5&0&EF

[Software Environment]


[System Drivers]

Name      Description         File      Type      Started   Start Mode          State     Status    Error Control
          Accept Pause        Accept Stop
abiosdsk  Abiosdsk  Not Available       Kernel Driver       No        Disabled  Stopped   OK        Ignore    No
          No
acpi      Microsoft ACPI Driver         c:\windows\system32\drivers\acpi.sys    Kernel Driver       Yes       Boot
          Running   OK        Normal    No        Yes
acpiec    ACPIEC    c:\windows\system32\drivers\acpiec.sys  Kernel Driver       No        Disabled  Stopped   OK
          Normal    No        No
adpu160m  adpu160m  Not Available       Kernel Driver       No        Disabled  Stopped   OK        Normal    No
          No
adpu320   adpu320   Not Available       Kernel Driver       No        Disabled  Stopped   OK        Normal    No
          No
afd       AFD       c:\windows\system32\drivers\afd.sys     Kernel Driver       Yes       System    Running   OK
          Normal    No        Yes
aic78u2   aic78u2   Not Available       Kernel Driver       No        Disabled  Stopped   OK        Normal    No
          No
aic78xx   aic78xx   Not Available       Kernel Driver       No        Disabled  Stopped   OK        Normal    No
          No
aliide    AliIde    Not Available       Kernel Driver       No        Disabled  Stopped   OK        Normal    No
          No
amdide    AmdIde    Not Available       Kernel Driver       No        Disabled  Stopped   OK        Normal    No
          No
arc       arc       Not Available       Kernel Driver       No        Disabled  Stopped   OK        Normal    No
          No
asyncmac  RAS Asynchronous Media Driver c:\windows\system32\drivers\asyncmac.sys          Kernel Driver       No
          Manual    Stopped   OK        Normal    No        No
atapi     Standard IDE/ESDI Hard Disk Controller  c:\windows\system32\drivers\atapi.sys   Kernel Driver       Yes
          Boot      Running   OK        Normal    No        Yes
atdisk    Atdisk    Not Available       Kernel Driver       No        Disabled  Stopped   OK        Ignore    No
          No
ati2mtag  ati2mtag  c:\windows\system32\drivers\ati2mtag.sys          Kernel Driver       Yes       Manual    Running
          OK        Ignore    No        Yes
atmarpc   ATM ARP Client Protocol       c:\windows\system32\drivers\atmarpc.sys Kernel Driver       No        Manual
          Stopped   OK        Normal    No        No
audstub   Audio Stub Driver   c:\windows\system32\drivers\audstub.sys Kernel Driver       Yes       Manual    Running
          OK        Normal    No        Yes
beep      Beep      c:\windows\system32\drivers\beep.sys    Kernel Driver       Yes       System    Running   OK
          Normal    No        Yes
cdac15ba  CdaC15BA  c:\windows\system32\drivers\cdac15ba.sys          Kernel Driver       Yes       Auto      Running
          OK        Normal    No        Yes
cdad10ba  CdaD10BA  c:\windows\system32\drivers\cdad10ba.sys          Kernel Driver       Yes       Auto      Running
          OK        Normal    No        Yes
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cdfs      Cdfs      c:\windows\system32\drivers\cdfs.sys    File System Driver  Yes       Disabled  Running   OK
          Normal    No        Yes
cdrom     CD-ROM Driver       c:\windows\system32\drivers\cdrom.sys   Kernel Driver       Yes       System    Running
          OK        Normal    No        Yes
changer   Changer   Not Available       Kernel Driver       No        System    Stopped   OK        Ignore    No
          No
clusdisk  Cluster Disk Driver c:\windows\system32\drivers\clusdisk.sys          Kernel Driver       No        Disabled
          Stopped   OK        Normal    No        No
cmdide    CmdIde    Not Available       Kernel Driver       No        Disabled  Stopped   OK        Normal    No
          No
cpqcissm  cpqcissm  Not Available       Kernel Driver       No        Disabled  Stopped   OK        Normal    No
          No
crcdisk   CRC Disk Filter Driver        c:\windows\system32\drivers\crcdisk.sys Kernel Driver       Yes       Boot
          Running   OK        Normal    No        Yes
dfsdriver DfsDriver c:\windows\system32\drivers\dfs.sys     File System Driver  Yes       Boot      Running   OK
          Normal    No        Yes
disk      Disk Driver         c:\windows\system32\drivers\disk.sys    Kernel Driver       Yes       Boot      Running
          OK        Normal    No        Yes
dmboot    dmboot    c:\windows\system32\drivers\dmboot.sys  Kernel Driver       No        Disabled  Stopped   OK
          Normal    No        No
dmio      Logical Disk Manager Driver   c:\windows\system32\drivers\dmio.sys    Kernel Driver       Yes       Boot
          Running   OK        Normal    No        Yes
dmload    dmload    c:\windows\system32\drivers\dmload.sys  Kernel Driver       Yes       Boot      Running   OK
          Normal    No        Yes
dpti2o    dpti2o    Not Available       Kernel Driver       No        Disabled  Stopped   OK        Normal    No
          No
e1000     Intel(R) PRO/1000 Device Driver         c:\windows\system32\drivers\e1g5132e.sys          Kernel Driver
          Yes       Manual    Running   OK        Normal    No        Yes
elxstor   elxstor   Not Available       Kernel Driver       No        Disabled  Stopped   OK        Normal    No
          No
fastfat   Fastfat   c:\windows\system32\drivers\fastfat.sys File System Driver  Yes       Disabled  Running   OK
          Normal    No        Yes
fdc       Floppy Disk Controller Driver c:\windows\system32\drivers\fdc.sys     Kernel Driver       Yes       Manual
          Running   OK        Normal    No        Yes
fips      Fips      c:\windows\system32\drivers\fips.sys    Kernel Driver       Yes       System    Running   OK
          Normal    No        Yes
flpydisk  Floppy Disk Driver  c:\windows\system32\drivers\flpydisk.sys          Kernel Driver       Yes       Manual
          Running   OK        Normal    No        Yes
fltmgr    FltMgr    c:\windows\system32\drivers\fltmgr.sys  File System Driver  Yes       Boot      Running   OK
          Normal    No        Yes
ftdisk    Volume Manager Driver         c:\windows\system32\drivers\ftdisk.sys  Kernel Driver       Yes       Boot
          Running   OK        Normal    No        Yes
gpc       Generic Packet Classifier     c:\windows\system32\drivers\msgpc.sys   Kernel Driver       Yes       Manual
          Running   OK        Normal    No        Yes
hpcisss   hpcisss   Not Available       Kernel Driver       No        Disabled  Stopped   OK        Normal    No
          No
http      HTTP      c:\windows\system32\drivers\http.sys    Kernel Driver       Yes       Manual    Running   OK
          Normal    No        Yes
i2omgmt   i2omgmt   Not Available       Kernel Driver       No        System    Stopped   OK        Normal    No
          No
i8042prt  i8042 Keyboard and PS/2 Mouse Port Driver         c:\windows\system32\drivers\i8042prt.sys          Kernel
Driver    Yes       System    Running   OK        Normal    No        Yes
iirsp     iirsp     Not Available       Kernel Driver       No        Disabled  Stopped   OK        Normal    No
          No
imapi     CD-Burning Filter Driver      c:\windows\system32\drivers\imapi.sys   Kernel Driver       No        System
          Stopped   OK        Normal    No        No
intelide  IntelIde  c:\windows\system32\drivers\intelide.sys          Kernel Driver       Yes       Boot      Running
          OK        Normal    No        Yes
intelppm  Intel Processor Driver        c:\windows\system32\drivers\intelppm.sys          Kernel Driver       Yes
          Manual    Running   OK        Normal    No        Yes
ip6fw     IPv6 Windows Firewall Driver  c:\windows\system32\drivers\ip6fw.sys   Kernel Driver       No        Manual
          Stopped   OK        Normal    No        No
ipfilterdriver      IP Traffic Filter Driver      c:\windows\system32\drivers\ipfltdrv.sys          Kernel Driver
          No        Manual    Stopped   OK        Normal    No        No
ipinip    IP in IP Tunnel Driver        c:\windows\system32\drivers\ipinip.sys  Kernel Driver       No        Manual
          Stopped   OK        Normal    No        No
ipnat     IP Network Address Translator c:\windows\system32\drivers\ipnat.sys   Kernel Driver       No        Manual
          Stopped   OK        Normal    No        No
ipsec     IPSEC driver        c:\windows\system32\drivers\ipsec.sys   Kernel Driver       Yes       System    Running
          OK        Normal    No        Yes
irenum    IR Enumerator Service         c:\windows\system32\drivers\irenum.sys  Kernel Driver       No        Manual
          Stopped   OK        Normal    No        No
isapnp    PnP ISA/EISA Bus Driver       c:\windows\system32\drivers\isapnp.sys  Kernel Driver       Yes       Boot
          Running   OK        Critical  No        Yes
kbdclass  Keyboard Class Driver         c:\windows\system32\drivers\kbdclass.sys          Kernel Driver       Yes
          System    Running   OK        Normal    No        Yes
ksecdd    KSecDD    c:\windows\system32\drivers\ksecdd.sys  Kernel Driver       Yes       Boot      Running   OK
          Normal    No        Yes
ksthunk   Kernel Streaming WOW64 Thunk Service    c:\windows\system32\drivers\ksthunk.sys Kernel Driver       Yes
          Manual    Running   OK        Normal    No        Yes
lp6nds35  lp6nds35  Not Available       Kernel Driver       No        Disabled  Stopped   OK        Normal    No
          No
mnmdd     mnmdd     c:\windows\system32\drivers\mnmdd.sys   Kernel Driver       Yes       System    Running   OK
          Ignore    No        Yes
modem     Modem     c:\windows\system32\drivers\modem.sys   Kernel Driver       No        Manual    Stopped   OK
          Ignore    No        No
mouclass  Mouse Class Driver  c:\windows\system32\drivers\mouclass.sys          Kernel Driver       Yes       System
          Running   OK        Normal    No        Yes
mountmgr  Mount Point Manager c:\windows\system32\drivers\mountmgr.sys          Kernel Driver       Yes       Boot
          Running   OK        Normal    No        Yes
mraid35x  mraid35x  c:\windows\system32\drivers\mraid35x.sys          Kernel Driver       Yes       Boot      Running
          OK        Normal    No        Yes
```

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mrxdav    WebDav Client Redirector      c:\windows\system32\drivers\mrxdav.sys  File System Driver  No        Manual
          Stopped   OK        Normal    No        No
mrxsmb    MRXSMB    c:\windows\system32\drivers\mrxsmb.sys  File System Driver  Yes       System    Running   OK
          Normal    No        Yes
msfs      Msfs      c:\windows\system32\drivers\msfs.sys    File System Driver  Yes       System    Running   OK
          Normal    No        Yes
mssmbios  Microsoft System Management BIOS Driver c:\windows\system32\drivers\mssmbios.sys          Kernel Driver
          Yes       Manual    Running   OK        Normal    No        Yes
mup       Mup       c:\windows\system32\drivers\mup.sys     File System Driver  Yes       Boot      Running   OK
          Normal    No        Yes
ndis      NDIS System Driver  c:\windows\system32\drivers\ndis.sys    Kernel Driver       Yes       Boot      Running
          OK        Normal    No        Yes
ndistapi  Remote Access NDIS TAPI Driver          c:\windows\system32\drivers\ndistapi.sys          Kernel Driver
          Yes       Manual    Running   OK        Normal    No        Yes
ndisuio   NDIS Usermode I/O Protocol    c:\windows\system32\drivers\ndisuio.sys Kernel Driver       No        Manual
          Stopped   OK        Normal    No        No
ndiswan   Remote Access NDIS WAN Driver c:\windows\system32\drivers\ndiswan.sys Kernel Driver       Yes       Manual
          Running   OK        Normal    No        Yes
ndproxy   NDIS Proxy          c:\windows\system32\drivers\ndproxy.sys Kernel Driver       Yes       Manual    Running
          OK        Normal    No        Yes
netbios   NetBIOS Interface   c:\windows\system32\drivers\netbios.sys File System Driver  Yes       System    Running
          OK        Normal    No        Yes
netbt     NetBios over Tcpip  c:\windows\system32\drivers\netbt.sys   Kernel Driver       Yes       System    Running
          OK        Normal    No        Yes
nfrd960   nfrd960   Not Available       Kernel Driver       No        Disabled  Stopped   OK        Normal    No
          No
npfs      Npfs      c:\windows\system32\drivers\npfs.sys    File System Driver  Yes       System    Running   OK
          Normal    No        Yes
ntfs      Ntfs      c:\windows\system32\drivers\ntfs.sys    File System Driver  Yes       Disabled  Running   OK
          Normal    No        Yes
null      Null      c:\windows\system32\drivers\null.sys    Kernel Driver       Yes       System    Running   OK
          Normal    No        Yes
parport   Parallel port driver          c:\windows\system32\drivers\parport.sys Kernel Driver       Yes       Manual
          Running   OK        Normal    No        Yes
partmgr   Partition Manager   c:\windows\system32\drivers\partmgr.sys Kernel Driver       Yes       Boot      Running
          OK        Normal    No        Yes
pci       PCI Bus Driver      c:\windows\system32\drivers\pci.sys     Kernel Driver       Yes       Boot      Running
          OK        Critical  No        Yes
pciide    PCIIde    c:\windows\system32\drivers\pciide.sys  Kernel Driver       Yes       Boot      Running   OK
          Normal    No        Yes
pcmcia    Pcmcia    c:\windows\system32\drivers\pcmcia.sys  Kernel Driver       No        Disabled  Stopped   OK
          Normal    No        No
pdcomp    PDCOMP    Not Available       Kernel Driver       No        Manual    Stopped   OK        Ignore    No
          No
pdframe   PDFRAME   Not Available       Kernel Driver       No        Manual    Stopped   OK        Ignore    No
          No
pdreli    PDRELI    Not Available       Kernel Driver       No        Manual    Stopped   OK        Ignore    No
          No
pdrframe  PDRFRAME  Not Available       Kernel Driver       No        Manual    Stopped   OK        Ignore    No
          No
pptpminiport        WAN Miniport (PPTP) c:\windows\system32\drivers\raspptp.sys Kernel Driver       Yes       Manual
          Running   OK        Normal    No        Yes
ptilink   Direct Parallel Link Driver   c:\windows\system32\drivers\ptilink.sys Kernel Driver       Yes       Manual
          Running   OK        Normal    No        Yes
ql2300    ql2300    Not Available       Kernel Driver       No        Disabled  Stopped   OK        Normal    No
          No
rasacd    Remote Access Auto Connection Driver    c:\windows\system32\drivers\rasacd.sys  Kernel Driver       Yes
          System    Running   OK        Normal    No        Yes
rasl2tp   WAN Miniport (L2TP) c:\windows\system32\drivers\rasl2tp.sys Kernel Driver       Yes       Manual    Running
          OK        Normal    No        Yes
raspppoe  Remote Access PPPOE Driver    c:\windows\system32\drivers\raspppoe.sys          Kernel Driver       Yes
          Manual    Running   OK        Normal    No        Yes
raspti    Direct Parallel     c:\windows\system32\drivers\raspti.sys  Kernel Driver       Yes       Manual    Running
          OK        Normal    No        Yes
rdbss     Rdbss     c:\windows\system32\drivers\rdbss.sys   File System Driver  Yes       System    Running   OK
          Normal    No        Yes
rdpcdd    RDPCDD    c:\windows\system32\drivers\rdpcdd.sys  Kernel Driver       Yes       System    Running   OK
          Ignore    No        Yes
rdpdr     Terminal Server Device Redirector Driver          c:\windows\system32\drivers\rdpdr.sys   Kernel Driver
          Yes       Manual    Running   OK        Normal    No        Yes
rdpwd     RDPWD     c:\windows\system32\drivers\rdpwd.sys   Kernel Driver       No        Manual    Stopped   OK
          Ignore    No        No
redbook   Digital CD Audio Playback Filter Driver c:\windows\system32\drivers\redbook.sys Kernel Driver       Yes
          System    Running   OK        Normal    No        Yes
secdrv    Security Driver     c:\windows\system32\drivers\secdrv.sys  Kernel Driver       Yes       Auto      Running
          OK        Normal    No        Yes
serenum   Serenum Filter Driver         c:\windows\system32\drivers\serenum.sys Kernel Driver       Yes       Manual
          Running   OK        Normal    No        Yes
serial    Serial port driver  c:\windows\system32\drivers\serial.sys  Kernel Driver       Yes       System    Running
          OK        Ignore    No        Yes
sfloppy   Sfloppy   c:\windows\system32\drivers\sfloppy.sys Kernel Driver       No        System    Stopped   OK
          Ignore    No        No
simbad    Simbad    Not Available       Kernel Driver       No        Disabled  Stopped   OK        Normal    No
          No
srv       Srv       c:\windows\system32\drivers\srv.sys     File System Driver  No        Manual    Stopped   OK
          Normal    No        No
swenum    Software Bus Driver c:\windows\system32\drivers\swenum.sys  Kernel Driver       Yes       Manual    Running
          OK        Normal    No        Yes
symc8xx   symc8xx   Not Available       Kernel Driver       No        Disabled  Stopped   OK        Normal    No
          No
symmpi    symmpi    Not Available       Kernel Driver       No        Disabled  Stopped   OK        Normal    No
          No
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sym_hi    sym_hi    Not Available       Kernel Driver       No        Disabled  Stopped   OK        Normal    No
          No
sym_u3    sym_u3    Not Available       Kernel Driver       No        Disabled  Stopped   OK        Normal    No
          No
tcpip     TCP/IP Protocol Driver        c:\windows\system32\drivers\tcpip.sys   Kernel Driver       Yes       System
          Running   OK        Normal    No        Yes
tdpipe    TDPIPE    c:\windows\system32\drivers\tdpipe.sys  Kernel Driver       No        Manual    Stopped   OK
          Ignore    No        No
tdtcp     TDTCP     c:\windows\system32\drivers\tdtcp.sys   Kernel Driver       No        Manual    Stopped   OK
          Ignore    No        No
termdd    Terminal Device Driver        c:\windows\system32\drivers\termdd.sys  Kernel Driver       Yes       System
          Running   OK        Normal    No        Yes
toside    TosIde    Not Available       Kernel Driver       No        Disabled  Stopped   OK        Normal    No
          No
udfs      Udfs      c:\windows\system32\drivers\udfs.sys    File System Driver  No        Disabled  Stopped   OK
          Normal    No        No
ultra     ultra     Not Available       Kernel Driver       No        Disabled  Stopped   OK        Normal    No
          No
update    Microcode Update Driver       c:\windows\system32\drivers\update.sys  Kernel Driver       Yes       Manual
          Running   OK        Normal    No        Yes
usbehci   Microsoft USB 2.0 Enhanced Host Controller Miniport Driver  c:\windows\system32\drivers\usbehci.sys Kernel
Driver    Yes       Manual    Running   OK        Normal    No        Yes
usbhub    USB2 Enabled Hub    c:\windows\system32\drivers\usbhub.sys  Kernel Driver       Yes       Manual    Running
          OK        Normal    No        Yes
usbstor   USB Mass Storage Driver       c:\windows\system32\drivers\usbstor.sys Kernel Driver       No        Manual
          Stopped   OK        Normal    No        No
usbuhci   Microsoft USB Universal Host Controller Miniport Driver     c:\windows\system32\drivers\usbuhci.sys Kernel
Driver    Yes       Manual    Running   OK        Normal    No        Yes
vgasave   VGA Display Controller.       c:\windows\system32\drivers\vga.sys     Kernel Driver       Yes       System
          Running   OK        Ignore    No        Yes
viaide    ViaIde    Not Available       Kernel Driver       No        Disabled  Stopped   OK        Normal    No
          No
volsnap   Storage volumes     c:\windows\system32\drivers\volsnap.sys Kernel Driver       Yes       Boot      Running
          OK        Normal    No        Yes
wanarp    Remote Access IP ARP Driver   c:\windows\system32\drivers\wanarp.sys  Kernel Driver       Yes       Manual
          Running   OK        Normal    No        Yes
wdica     WDICA     Not Available       Kernel Driver       No        Manual    Stopped   OK        Ignore    No
          No
wlbs      Network Load Balancing        c:\windows\system32\drivers\wlbs.sys    Kernel Driver       No        Manual
          Stopped   OK        Normal    No        No

[Signed Drivers]

Device Name         Signed    Device Class        Driver Version      Driver Date         Manufacturer        INF Name
          Driver Name         Device ID
Microsoft System Management BIOS Driver No        SYSTEM    5.2.3790.1830       10/1/2002 (Standard system devices)
          machine.inf         Not Available       ROOT\SYSTEM\0002
Microcode Update Device       No        SYSTEM    5.2.3790.1830       10/1/2002 (Standard system devices)
          machine.inf         Not Available       ROOT\SYSTEM\0001
Plug and Play Software Device Enumerator          No        SYSTEM    5.2.3790.1830       10/1/2002 (Standard system
devices)  machine.inf         Not Available       ROOT\SYSTEM\0000
Terminal Server Mouse Driver  No        SYSTEM    5.2.3790.1830       10/1/2002 (Standard system devices)
          machine.inf         Not Available       ROOT\RDP_MOU\0000
Terminal Server Keyboard Driver         No        SYSTEM    5.2.3790.1830       10/1/2002 (Standard system devices)
          machine.inf         Not Available       ROOT\RDP_KBD\0000
Terminal Server Device Redirector       No        SYSTEM    5.2.3790.1830       10/1/2002 (Standard system devices)
          machine.inf         Not Available       ROOT\RDPDR\0000
Direct Parallel     No        NET       5.2.3790.1830       10/1/2002 Microsoft netrasa.inf         Not Available
          ROOT\MS_PTIMINIPORT\0000
WAN Miniport (PPTP) No        NET       5.2.3790.1830       10/1/2002 Microsoft netrasa.inf         Not Available
          ROOT\MS_PPTPMINIPORT\0000
WAN Miniport (PPPOE)          No        NET       5.2.3790.1830       10/1/2002 Microsoft netrasa.inf         Not
Available ROOT\MS_PPPOEMINIPORT\0000
WAN Miniport (IP)   No        NET       5.2.3790.1830       10/1/2002 Microsoft netrasa.inf         Not Available
          ROOT\MS_NDISWANIP\0000
WAN Miniport (L2TP) No        NET       5.2.3790.1830       10/1/2002 Microsoft netrasa.inf         Not Available
          ROOT\MS_L2TPMINIPORT\0000
Video Codecs        No        MEDIA     5.2.3790.1830       10/1/2002 (Standard system devices)     wave.inf  Not
Available ROOT\MEDIA\MS_MMVID
Legacy Video Capture Devices  No        MEDIA     5.2.3790.1830       10/1/2002 (Standard system devices)     wave.inf
          Not Available       ROOT\MEDIA\MS_MMVCD
Media Control Devices         No        MEDIA     5.2.3790.1830       10/1/2002 (Standard system devices)     wave.inf
          Not Available       ROOT\MEDIA\MS_MMMCI
Legacy Audio Drivers          No        MEDIA     5.2.3790.1830       10/1/2002 (Standard system devices)     wave.inf
          Not Available       ROOT\MEDIA\MS_MMDRV
Audio Codecs        No        MEDIA     5.2.3790.1830       10/1/2002 (Standard system devices)     wave.inf  Not
Available ROOT\MEDIA\MS_MMACM
Remote Access IP ARP Driver   Not Available       LEGACYDRIVER        Not Available       Not Available       Not
Available Not Available       Not Available       ROOT\LEGACY_WANARP\0000
volsnap   Not Available       LEGACYDRIVER        Not Available       Not Available       Not Available       Not
Available Not Available       ROOT\LEGACY_VOLSNAP\0000
VGA Display Controller.       Not Available       LEGACYDRIVER        Not Available       Not Available       Not
Available Not Available       Not Available       ROOT\LEGACY_VGASAVE\0000
TCP/IP Protocol Driver        Not Available       LEGACYDRIVER        Not Available       Not Available       Not
Available Not Available       Not Available       ROOT\LEGACY_TCPIP\0000
Security Driver     Not Available       LEGACYDRIVER        Not Available       Not Available       Not Available
          Not Available       Not Available       ROOT\LEGACY_SECDRV\0000
RDPCDD    Not Available       LEGACYDRIVER        Not Available       Not Available       Not Available       Not
Available Not Available       ROOT\LEGACY_RDPCDD\0000
Remote Access Auto Connection Driver    Not Available       LEGACYDRIVER        Not Available       Not Available
          Not Available       Not Available       Not Available       ROOT\LEGACY_RASACD\0000
PCIIde    Not Available       LEGACYDRIVER        Not Available       Not Available       Not Available       Not
Available Not Available       ROOT\LEGACY_PCIIDE\0000
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Partition Manager   Not Available       LEGACYDRIVER        Not Available       Not Available       Not Available
          Not Available       Not Available       ROOT\LEGACY_PARTMGR\0000
Null      Not Available       LEGACYDRIVER        Not Available       Not Available       Not Available       Not
Available Not Available       ROOT\LEGACY_NULL\0000
NetBios over Tcpip  Not Available       LEGACYDRIVER        Not Available       Not Available       Not Available
          Not Available       Not Available       ROOT\LEGACY_NETBT\0000
NDProxy   Not Available       LEGACYDRIVER        Not Available       Not Available       Not Available       Not
Available Not Available       ROOT\LEGACY_NDPROXY\0000
NDIS Usermode I/O Protocol    Not Available       LEGACYDRIVER        Not Available       Not Available       Not
Available Not Available       Not Available       ROOT\LEGACY_NDISUIO\0000
Remote Access NDIS TAPI Driver          Not Available       LEGACYDRIVER        Not Available       Not Available
          Not Available       Not Available       Not Available       ROOT\LEGACY_NDISTAPI\0000
NDIS System Driver  Not Available       LEGACYDRIVER        Not Available       Not Available       Not Available
          Not Available       Not Available       ROOT\LEGACY_NDIS\0000
mountmgr  Not Available       LEGACYDRIVER        Not Available       Not Available       Not Available       Not
Available Not Available       ROOT\LEGACY_MOUNTMGR\0000
mnmdd     Not Available       LEGACYDRIVER        Not Available       Not Available       Not Available       Not
Available Not Available       ROOT\LEGACY_MNMDD\0000
ksecdd    Not Available       LEGACYDRIVER        Not Available       Not Available       Not Available       Not
Available Not Available       ROOT\LEGACY_KSECDD\0000
IPSEC driver        Not Available       LEGACYDRIVER        Not Available       Not Available       Not Available
          Not Available       Not Available       ROOT\LEGACY_IPSEC\0000
IP Network Address Translator Not Available       LEGACYDRIVER        Not Available       Not Available       Not
Available Not Available       Not Available       ROOT\LEGACY_IPNAT\0000
HTTP      Not Available       LEGACYDRIVER        Not Available       Not Available       Not Available       Not
Available Not Available       ROOT\LEGACY_HTTP\0000
Generic Packet Classifier     Not Available       LEGACYDRIVER        Not Available       Not Available       Not
Available Not Available       Not Available       ROOT\LEGACY_GPC\0000
Fips      Not Available       LEGACYDRIVER        Not Available       Not Available       Not Available       Not
Available Not Available       ROOT\LEGACY_FIPS\0000
dmload    Not Available       LEGACYDRIVER        Not Available       Not Available       Not Available       Not
Available Not Available       ROOT\LEGACY_DMLOAD\0000
dmboot    Not Available       LEGACYDRIVER        Not Available       Not Available       Not Available       Not
Available Not Available       ROOT\LEGACY_DMBOOT\0000
CRC Disk Filter Driver        Not Available       LEGACYDRIVER        Not Available       Not Available       Not
Available Not Available       Not Available       ROOT\LEGACY_CRCDISK\0000
CdaD10BA  Not Available       LEGACYDRIVER        Not Available       Not Available       Not Available       Not
Available Not Available       ROOT\LEGACY_CDAD10BA\0000
CdaC15BA  Not Available       LEGACYDRIVER        Not Available       Not Available       Not Available       Not
Available Not Available       ROOT\LEGACY_CDAC15BA\0000
Beep      Not Available       LEGACYDRIVER        Not Available       Not Available       Not Available       Not
Available Not Available       ROOT\LEGACY_BEEP\0000
AFD       Not Available       LEGACYDRIVER        Not Available       Not Available       Not Available       Not
Available Not Available       ROOT\LEGACY_AFD\0000
Generic volume      No        VOLUME    5.2.3790.1830       10/1/2002 Microsoft volume.inf          Not Available
          STORAGE\VOLUME\1&30A96598&0&SIGNATURE29628A7BOFFSET2373C8A000LENGTHC9F1F15200
Generic volume      No        VOLUME    5.2.3790.1830       10/1/2002 Microsoft volume.inf          Not Available
          STORAGE\VOLUME\1&30A96598&0&SIGNATURE29628A7BOFFSETC27B61600LENGTH174C128A00
Generic volume      No        VOLUME    5.2.3790.1830       10/1/2002 Microsoft volume.inf          Not Available
          STORAGE\VOLUME\1&30A96598&0&SIGNATURE29628A7BOFFSET7E00LENGTHC27B59800
Generic volume      No        VOLUME    5.2.3790.1830       10/1/2002 Microsoft volume.inf          Not Available
          STORAGE\VOLUME\1&30A96598&0&SIGNATURE29628A7COFFSETC08D31800LENGTH1710C01800
Generic volume      No        VOLUME    5.2.3790.1830       10/1/2002 Microsoft volume.inf          Not Available
          STORAGE\VOLUME\1&30A96598&0&SIGNATURE29628A7COFFSET7E00LENGTHC08D29A00
Generic volume      No        VOLUME    5.2.3790.1830       10/1/2002 Microsoft volume.inf          Not Available
          STORAGE\VOLUME\1&30A96598&0&SIGNATUREDB70DB70OFFSET1DD2E52A00LENGTH1DC9170200
Generic volume      No        VOLUME    5.2.3790.1830       10/1/2002 Microsoft volume.inf          Not Available
          STORAGE\VOLUME\1&30A96598&0&SIGNATUREDB70DB70OFFSET1B529BF600LENGTH280493400
Generic volume      No        VOLUME    5.2.3790.1830       10/1/2002 Microsoft volume.inf          Not Available
          STORAGE\VOLUME\1&30A96598&0&SIGNATUREDB70DB70OFFSET7E00LENGTH25232FA00
Volume Manager      No        SYSTEM    5.2.3790.1830       10/1/2002 (Standard system devices)     machine.inf
          Not Available       ROOT\FTDISK\0000
Logical Disk Manager          No        SYSTEM    5.2.3790.1830       10/1/2002 (Standard system devices)
          machine.inf         Not Available       ROOT\DMIO\0000
ACPI Fixed Feature Button     No        SYSTEM    5.2.3790.1830       10/1/2002 (Standard system devices)
          machine.inf         Not Available       ACPI\FIXEDBUTTON\2&DABA3FF&0
High precision event timer    No        SYSTEM    5.2.3790.1830       10/1/2002 (Standard system devices)
          machine.inf         Not Available       ACPI\PNP0103\0
Motherboard resources         No        SYSTEM    5.2.3790.1830       10/1/2002 (Standard system devices)
          machine.inf         Not Available       ACPI\PNP0C02\0
Secondary IDE Channel         No        HDC       5.2.3790.1830       10/1/2002 (Standard IDE ATA/ATAPI controllers)
          mshdc.inf Not Available       PCIIDE\IDECHANNEL\4&C3EA019&0&1
CD-ROM Drive        No        CDROM     5.2.3790.1830       10/1/2002 (Standard CD-ROM drives)      cdrom.inf Not
Available IDE\CDROMSAMSUNG_CD-ROM_SN-124_____________________N103____\5&2A02168E&0&0.0.0
Primary IDE Channel No        HDC       5.2.3790.1830       10/1/2002 (Standard IDE ATA/ATAPI controllers)    mshdc.inf
          Not Available       PCIIDE\IDECHANNEL\4&C3EA019&0&0
Intel(R) 82801EB Ultra ATA Storage Controllers - 24DB       No        HDC       5.2.3790.1830       10/1/2002 Intel
          mshdc.inf Not Available       PCI\VEN_8086&DEV_24DB&SUBSYS_016E1028&REV_02\3&13C0B0C5&0&F9
System board        No        SYSTEM    5.2.3790.1830       10/1/2002 (Standard system devices)     machine.inf
          Not Available       ACPI\PNP0C01\4&26DD0F47&0
Printer Port Logical Interface          No        SYSTEM    5.2.3790.1830       10/1/2002 (Standard system devices)
          machine.inf         Not Available       LPTENUM\MICROSOFTRAWPORT\5&7CE1BCF&0&LPT1
ECP Printer Port    No        PORTS     5.2.3790.1830       10/1/2002 (Standard port types)         msports.inf
          Not Available       ACPI\PNP0401\4&26DD0F47&0
Communications Port No        PORTS     5.2.3790.1830       10/1/2002 (Standard port types)         msports.inf
          Not Available       ACPI\PNP0501\1
PS/2 Compatible Mouse         No        MOUSE     5.2.3790.1830       10/1/2002 Microsoft msmouse.inf         Not
Available ACPI\PNP0F13\4&26DD0F47&0
Standard 101/102-Key or Microsoft Natural PS/2 Keyboard     No        KEYBOARD  5.2.3790.1830       10/1/2002 (Standard
keyboards)          keyboard.inf        Not Available       ACPI\PNP0303\4&26DD0F47&0
Floppy disk drive   No        FLOPPYDISK          5.2.3790.1830       10/1/2002 (Standard floppy disk drives)
          flpydisk.inf        Not Available       FDC\GENERIC_FLOPPY_DRIVE\5&14BBD7CB&0&0
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Standard floppy disk controller         No        FDC       5.2.3790.1830       10/1/2002 (Standard floppy disk
controllers)        fdc.inf   Not Available       ACPI\PNP0700\4&26DD0F47&0
System timer        No        SYSTEM    5.2.3790.1830       10/1/2002 (Standard system devices)     machine.inf
         Not Available       ACPI\PNP0100\4&26DD0F47&0
System CMOS/real time clock   No        SYSTEM    5.2.3790.1830       10/1/2002 (Standard system devices)
         machine.inf         Not Available       ACPI\PNP0B00\4&26DD0F47&0
System speaker      No        SYSTEM    5.2.3790.1830       10/1/2002 (Standard system devices)     machine.inf
         Not Available       ACPI\PNP0800\4&26DD0F47&0
Programmable interrupt controller       No        SYSTEM    5.2.3790.1830       10/1/2002 (Standard system devices)
         machine.inf         Not Available       ACPI\PNP0000\4&26DD0F47&0
Numeric data processor        No        SYSTEM    5.2.3790.1830       10/1/2002 (Standard system devices)
         machine.inf         Not Available       ACPI\PNP0C04\4&26DD0F47&0
Direct memory access controller         No        SYSTEM    5.2.3790.1830       10/1/2002 (Standard system devices)
         machine.inf         Not Available       ACPI\PNP0200\4&26DD0F47&0
Intel(R) 82801EB LPC Interface Controller - 24D0  No        SYSTEM    5.2.3790.1830       10/1/2002 Intel
         machine.inf         Not Available       PCI\VEN_8086&DEV_24D0&SUBSYS_00000000&REV_02\3&13C0B0C5&0&F8
Default Monitor     No        MONITOR   5.2.3790.1830       10/1/2002 (Standard monitor types)      monitor.inf
         Not Available       DISPLAY\DEFAULT_MONITOR\5&D64285B&0&10000000&14&0D
Radeon 7000 / RADEON VE Family (Microsoft Corporation)      No        DISPLAY   6.14.10.6508        12/3/2004 ATI
Technologies Inc.   atiixpag.inf        Not Available
         PCI\VEN_1002&DEV_5159&SUBSYS_016E1028&REV_00\4&1F7DBC9F&0&68F0
Intel(R) 82801 PCI Bridge - 244E        No        SYSTEM    5.2.3790.1830       10/1/2002 Intel     machine.inf
         Not Available       PCI\VEN_8086&DEV_244E&SUBSYS_00000000&REV_C2\3&13C0B0C5&0&F0
Generic USB Hub     No        USB       5.2.3790.1830       10/1/2002 (Generic USB Hub)   usb.inf   Not Available
         USB\VID_413C&PID_A001\5&263AC2B2&0&3
USB Root Hub        No        USB       5.2.3790.1830       10/1/2002 (Standard USB Host Controller)
         usbport.inf         Not Available       USB\ROOT_HUB20\4&2F36802A&0
Intel(R) 82801EB USB2 Enhanced Host Controller - 24DD       No        USB       5.2.3790.1830       10/1/2002 Intel
         usbport.inf         Not Available       PCI\VEN_8086&DEV_24DD&SUBSYS_016E1028&REV_02\3&13C0B0C5&0&EF
USB Root Hub        No        USB       5.2.3790.1830       10/1/2002 (Standard USB Host Controller)
         usbport.inf         Not Available       USB\ROOT_HUB\4&1D790A7C&0
Intel(R) 82801EB USB Universal Host Controller - 24D7       No        USB       5.2.3790.1830       10/1/2002 Intel
         usbport.inf         Not Available       PCI\VEN_8086&DEV_24D7&SUBSYS_016E1028&REV_02\3&13C0B0C5&0&EA
USB Root Hub        No        USB       5.2.3790.1830       10/1/2002 (Standard USB Host Controller)
         usbport.inf         Not Available       USB\ROOT_HUB\4&CF25AB&0
Intel(R) 82801EB USB Universal Host Controller - 24D4       No        USB       5.2.3790.1830       10/1/2002 Intel
         usbport.inf         Not Available       PCI\VEN_8086&DEV_24D4&SUBSYS_016E1028&REV_02\3&13C0B0C5&0&E9
USB Root Hub        No        USB       5.2.3790.1830       10/1/2002 (Standard USB Host Controller)
         usbport.inf         Not Available       USB\ROOT_HUB\4&2CD28F52&0
Intel(R) 82801EB USB Universal Host Controller - 24D2       No        USB       5.2.3790.1830       10/1/2002 Intel
         usbport.inf         Not Available       PCI\VEN_8086&DEV_24D2&SUBSYS_016E1028&REV_02\3&13C0B0C5&0&E8
PCI standard PCI-to-PCI bridge          No        SYSTEM    5.2.3790.1830       10/1/2002 (Standard system devices)
         machine.inf         Not Available       PCI\VEN_8086&DEV_0332&SUBSYS_00000000&REV_07\4&AA5CD76&0&0230
Disk drive          No        DISKDRIVE 5.2.3790.1830       10/1/2002 (Standard disk drives)        disk.inf  Not
Available SCSI\DISK&VEN_PERC&PROD__LD__0_PERCRAID&REV_\6&10EF0D9C&0&300
RAID Virtual Device No        SYSTEM    5.2.3790.1830       10/1/2002 American Megatrends, Inc.     scsidev.inf
         Not Available       SCSI\OTHER&VEN___RAID&PROD__DUMMYDEVICE&REV_0000\6&10EF0D9C&0&2390
DELL PV22XS Backplane         No        SYSTEM    5.2.3790.1830       10/1/2002 Dell      scsidev.inf         Not
Available SCSI\PROCESSOR&VEN_DELL&PROD_PV22XS&REV_E.14\6&10EF0D9C&0&160
DELL PV22XS Backplane         No        SYSTEM    5.2.3790.1830       10/1/2002 Dell      scsidev.inf         Not
Available SCSI\PROCESSOR&VEN_DELL&PROD_PV22XS&REV_E.14\6&10EF0D9C&0&060
Dell PERC 4e/DC RAID Controller         No        SCSIADAPTER         5.2.3790.1830       10/1/2002 Dell
         pnpscsi.inf         Not Available       PCI\VEN_1000&DEV_0408&SUBSYS_00021028&REV_07\5&164B5902&0&700030
PCI standard PCI-to-PCI bridge          No        SYSTEM    5.2.3790.1830       10/1/2002 (Standard system devices)
         machine.inf         Not Available       PCI\VEN_8086&DEV_0330&SUBSYS_00000000&REV_07\4&AA5CD76&0&0030
Intel(R) E7520 PCI Express Root Port C0 - 3599    No        SYSTEM    5.2.3790.1830       10/1/2002 Intel
         machine.inf         Not Available       PCI\VEN_8086&DEV_3599&SUBSYS_00000000&REV_09\3&13C0B0C5&0&30
Intel(R) PRO/1000 MT Network Connection No        NET       8.1.8.0   10/1/2002 Intel     nete1g3e.inf        Not
Available PCI\VEN_8086&DEV_1076&SUBSYS_016D1028&REV_05\5&C8E9BA0&0&400228
Intel(R) 6700PXH PCI Express-to-PCI Bridge B - 032A         No        SYSTEM    5.2.3790.1830       10/1/2002 Intel
         machine.inf         Not Available       PCI\VEN_8086&DEV_032A&SUBSYS_00000000&REV_09\4&13C5C3DD&0&0228
Intel(R) PRO/1000 MT Network Connection No        NET       8.1.8.0   10/1/2002 Intel     nete1g3e.inf        Not
Available PCI\VEN_8086&DEV_1076&SUBSYS_016D1028&REV_05\5&803901B&0&380028
Intel(R) 6700PXH PCI Express-to-PCI Bridge A - 0329         No        SYSTEM    5.2.3790.1830       10/1/2002 Intel
         machine.inf         Not Available       PCI\VEN_8086&DEV_0329&SUBSYS_00000000&REV_09\4&13C5C3DD&0&0028
Intel(R) E7520 PCI Express Root Port B1 - 3598    No        SYSTEM    5.2.3790.1830       10/1/2002 Intel
         machine.inf         Not Available       PCI\VEN_8086&DEV_3598&SUBSYS_00000000&REV_09\3&13C0B0C5&0&28
PCI standard PCI-to-PCI bridge          No        SYSTEM    5.2.3790.1830       10/1/2002 (Standard system devices)
         machine.inf         Not Available       PCI\VEN_8086&DEV_0332&SUBSYS_00000000&REV_07\4&1D56CBDB&0&0220
Disk drive          No        DISKDRIVE 5.2.3790.1830       10/1/2002 (Standard disk drives)        disk.inf  Not
Available SCSI\DISK&VEN_PERC&PROD__LD__0_PERCRAID&REV_\6&1B8A3695&0&300
RAID Virtual Device No        SYSTEM    5.2.3790.1830       10/1/2002 American Megatrends, Inc.     scsidev.inf
         Not Available       SCSI\OTHER&VEN___RAID&PROD__DUMMYDEVICE&REV_0000\6&1B8A3695&0&2390
DELL PV22XS Backplane         No        SYSTEM    5.2.3790.1830       10/1/2002 Dell      scsidev.inf         Not
Available SCSI\PROCESSOR&VEN_DELL&PROD_PV22XS&REV_E.14\6&1B8A3695&0&160
DELL PV22XS Backplane         No        SYSTEM    5.2.3790.1830       10/1/2002 Dell      scsidev.inf         Not
Available SCSI\PROCESSOR&VEN_DELL&PROD_PV22XS&REV_E.14\6&1B8A3695&0&060
Dell PERC 4e/DC RAID Controller         No        SCSIADAPTER         5.2.3790.1830       10/1/2002 Dell
         pnpscsi.inf         Not Available       PCI\VEN_1000&DEV_0408&SUBSYS_00021028&REV_07\5&BAF3E0F&0&700020
PCI standard PCI-to-PCI bridge          No        SYSTEM    5.2.3790.1830       10/1/2002 (Standard system devices)
         machine.inf         Not Available       PCI\VEN_8086&DEV_0330&SUBSYS_00000000&REV_07\4&1D56CBDB&0&0020
Intel(R) E7525/E7520 PCI Express Root Port B0 - 3597        No        SYSTEM    5.2.3790.1830       10/1/2002 Intel
         machine.inf         Not Available       PCI\VEN_8086&DEV_3597&SUBSYS_00000000&REV_09\3&13C0B0C5&0&20
Intel(R) 6700PXH PCI Express-to-PCI Bridge B - 032A         No        SYSTEM    5.2.3790.1830       10/1/2002 Intel
         machine.inf         Not Available       PCI\VEN_8086&DEV_032A&SUBSYS_00000000&REV_09\4&2676C242&0&0218
Intel(R) 6700PXH PCI Express-to-PCI Bridge A - 0329         No        SYSTEM    5.2.3790.1830       10/1/2002 Intel
         machine.inf         Not Available       PCI\VEN_8086&DEV_0329&SUBSYS_00000000&REV_09\4&2676C242&0&0018
Intel(R) E7525/E7520/E7320 PCI Express Root Port A1 - 3596  No        SYSTEM    5.2.3790.1830       10/1/2002 Intel
         machine.inf         Not Available       PCI\VEN_8086&DEV_3596&SUBSYS_00000000&REV_09\3&13C0B0C5&0&18
PCI standard PCI-to-PCI bridge          No        SYSTEM    5.2.3790.1830       10/1/2002 (Standard system devices)
         machine.inf         Not Available       PCI\VEN_8086&DEV_0332&SUBSYS_00000000&REV_06\4&3007CA40&0&0210
Disk drive          No        DISKDRIVE 5.2.3790.1830       10/1/2002 (Standard disk drives)        disk.inf  Not
Available SCSI\DISK&VEN_PERC&PROD__LD__0_PERCRAID&REV_\6&33F1244D&0&300
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RAID Virtual Device No        SYSTEM    5.2.3790.1830       10/1/2002 American Megatrends, Inc.     scsidev.inf
          Not Available       SCSI\OTHER&VEN___RAID&PROD__DUMMYDEVICE&REV_0000\6&33F1244D&0&2390
PE 1x8 Backplane    No        SYSTEM    5.2.3790.1830       10/1/2002 Dell      scsidev.inf         Not Available
          SCSI\PROCESSOR&VEN_PE/PV&PROD_1X8_SCSI_BP&REV_1.0\6&33F1244D&0&060
Dell PERC 4e/Di RAID Controller         No        SCSIADAPTER         5.2.3790.1830       10/1/2002 Dell
          pnpscsi.inf         Not Available       PCI\VEN_1028&DEV_0013&SUBSYS_016E1028&REV_06\5&39562480&0&700010
PCI standard PCI-to-PCI bridge          No        SYSTEM    5.2.3790.1830       10/1/2002 (Standard system devices)
          machine.inf         Not Available       PCI\VEN_8086&DEV_0330&SUBSYS_00000000&REV_06\4&3007CA40&0&0010
Intel(R) E7525/E7520/E7320 PCI Express Root Port A0 - 3595  No        SYSTEM    5.2.3790.1830       10/1/2002 Intel
          machine.inf         Not Available       PCI\VEN_8086&DEV_3595&SUBSYS_00000000&REV_09\3&13C0B0C5&0&10
Intel(R) E7520 Memory Controller Hub - 3590       No        SYSTEM    5.2.3790.1830       10/1/2002 Intel
          machine.inf         Not Available       PCI\VEN_8086&DEV_3590&SUBSYS_00000000&REV_09\3&13C0B0C5&0&00
PCI bus   No        SYSTEM    5.2.3790.1830       10/1/2002 (Standard system devices)     machine.inf         Not
Available ACPI\PNP0A03\1
Intel Processor     No        PROCESSOR 5.2.3790.1830       10/1/2002 Intel     cpu.inf   Not Available
          ACPI\GENUINEINTEL_-_EM64T_FAMILY_15_MODEL_4\_3
Intel Processor     No        PROCESSOR 5.2.3790.1830       10/1/2002 Intel     cpu.inf   Not Available
          ACPI\GENUINEINTEL_-_EM64T_FAMILY_15_MODEL_4\_2
Intel Processor     No        PROCESSOR 5.2.3790.1830       10/1/2002 Intel     cpu.inf   Not Available
          ACPI\GENUINEINTEL_-_EM64T_FAMILY_15_MODEL_4\_1
Intel Processor     No        PROCESSOR 5.2.3790.1830       10/1/2002 Intel     cpu.inf   Not Available
          ACPI\GENUINEINTEL_-_EM64T_FAMILY_15_MODEL_4\_0
Microsoft ACPI-Compliant System         No        SYSTEM    5.2.3790.1830       10/1/2002 Microsoft acpi.inf  Not
Available ACPI_HAL\PNP0C08\0
ACPI Multiprocessor x64-based PC        No        COMPUTER  5.2.3790.1830       10/1/2002 (Standard computers)
          hal.inf   Not Available       ROOT\ACPI_HAL\0000
Not Available       Not Available       Not Available       Not Available       Not Available       Not Available
          Not Available       Not Available       HTREE\ROOT\0

[Environment Variables]

Variable  Value     User Name
ClusterLog          C:\WINDOWS\Cluster\cluster.log          <SYSTEM>
ComSpec   %SystemRoot%\system32\cmd.exe <SYSTEM>
FP_NO_HOST_CHECK    NO        <SYSTEM>
lib       C:\Program Files\SQLXML 4.0\bin\        <SYSTEM>
NUMBER_OF_PROCESSORS          4         <SYSTEM>
OS        Windows_NT          <SYSTEM>
Path      %SystemRoot%\system32;%SystemRoot%;%SystemRoot%\System32\Wbem;C:\Program Files (x86)\Microsoft SQL
Server\80\Tools\Binn\;C:\Program Files\Microsoft SQL Server\90\Tools\binn\;C:\Program Files (x86)\Microsoft SQL
Server\90\Tools\binn\;C:\Program Files (x86)\Microsoft SQL Server\90\DTS\Binn\;C:\Program Files (x86)\Microsoft SQL
Server\90\Tools\Binn\VSShell\Common7\IDE\;C:\MSTPCC.462\SETUP\scripts\utility;.;C:\Program Files\Microsoft SQL
Server\MSSQL.1\MSSQL\Binn     <SYSTEM>
PATHEXT   .COM;.EXE;.BAT;.CMD;.VBS;.VBE;.JS;.JSE;.WSF;.WSH  <SYSTEM>
PROCESSOR_ARCHITECTURE        AMD64     <SYSTEM>
PROCESSOR_IDENTIFIER          EM64T Family 15 Model 4 Stepping 8, GenuineIntel  <SYSTEM>
PROCESSOR_LEVEL     15        <SYSTEM>
PROCESSOR_REVISION  0408      <SYSTEM>
TEMP      %SystemRoot%\TEMP   <SYSTEM>
TMP       %SystemRoot%\TEMP   <SYSTEM>
windir    %SystemRoot%        <SYSTEM>
TEMP      %USERPROFILE%\Local Settings\Temp       NT AUTHORITY\SYSTEM
TMP       %USERPROFILE%\Local Settings\Temp       NT AUTHORITY\SYSTEM
TEMP      %USERPROFILE%\Local Settings\Temp       NT AUTHORITY\NETWORK SERVICE
TMP       %USERPROFILE%\Local Settings\Temp       NT AUTHORITY\NETWORK SERVICE
TEMP      %USERPROFILE%\Local Settings\Temp       PE2800\Administrator
TMP       %USERPROFILE%\Local Settings\Temp       PE2800\Administrator

[Print Jobs]

Document  Size      Owner     Notify    Status    Time Submitted      Start Time          Until Time          Elapsed
Time      Pages Printed       Job ID    Priority  Parameters          Driver    Print Processor     Host Print Queue
          Data Type Name

[Network Connections]

Local Name          Remote Name         Type      Status    User Name

[Running Tasks]

Name      Path      Process ID          Priority  Min Working Set     Max Working Set     Start Time          Version
          Size      File Date
system idle process Not Available       0         0         Not Available       Not Available       Not Available
          Not Available       Not Available       Not Available
system    Not Available       4         8         0         1413120   Not Available       Not Available       Not
Available Not Available
smss.exe  Not Available       488       11        204800    1413120   10/3/2005 4:14 PM   Not Available       Not
Available Not Available
csrss.exe Not Available       624       13        Not Available       Not Available       10/3/2005 4:14 PM   Not
Available Not Available       Not Available
winlogon.exe        c:\windows\system32\winlogon.exe        696       13        204800    1413120   10/3/2005 4:14 PM
          5.2.3790.1830 (srv03_sp1_rtm.050324-1447)         901.00 KB (922,624 bytes)     9/21/2005 12:22 PM
services.exe        c:\windows\system32\services.exe        776       9         204800    1413120   10/3/2005 4:14 PM
          5.2.3790.1830 (srv03_sp1_rtm.050324-1447)         216.50 KB (221,696 bytes)     9/21/2005 12:22 PM
lsass.exe c:\windows\system32\lsass.exe 804       9         204800    1413120   10/3/2005 4:14 PM   5.2.3790.1830
(srv03_sp1_rtm.050324-1447)   14.00 KB (14,336 bytes)       9/21/2005 12:21 PM
svchost.exe         c:\windows\system32\svchost.exe         1016      8         204800    1413120   10/3/2005 4:14 PM
          5.2.3790.1830 (srv03_sp1_rtm.050324-1447)         24.50 KB (25,088 bytes)       9/21/2005 12:22 PM
svchost.exe         Not Available       312       8         Not Available       Not Available       10/3/2005 4:14 PM
          Not Available       Not Available       Not Available
svchost.exe         c:\windows\system32\svchost.exe         364       8         204800    1413120   10/3/2005 4:14 PM
          5.2.3790.1830 (srv03_sp1_rtm.050324-1447)         24.50 KB (25,088 bytes)       9/21/2005 12:22 PM
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msdtc.exe Not Available       656       8         Not Available       Not Available       10/3/2005 4:14 PM   Not
Available Not Available       Not Available
inetinfo.exe        c:\windows\system32\inetsrv\inetinfo.exe          1092      8         204800    1413120   10/3/2005
4:14 PM   6.0.3790.1830 (srv03_sp1_rtm.050324-1447)         17.50 KB (17,920 bytes)       9/21/2005 1:10 PM
msftesql.exe        c:\program files\microsoft sql server\mssql.1\mssql\binn\msftesql.exe 1116      8         204800
          1413120   10/3/2005 4:14 PM   12.0.5626.1         152.20 KB (155,856 bytes)     8/26/2005 5:17 PM
svchost.exe         c:\windows\system32\svchost.exe         1276      8         204800    1413120   10/3/2005 4:14 PM
          5.2.3790.1830 (srv03_sp1_rtm.050324-1447)         24.50 KB (25,088 bytes)       9/21/2005 12:22 PM
svchost.exe         c:\windows\system32\svchost.exe         1416      8         204800    1413120   10/3/2005 4:14 PM
          5.2.3790.1830 (srv03_sp1_rtm.050324-1447)         24.50 KB (25,088 bytes)       9/21/2005 12:22 PM
explorer.exe        c:\windows\explorer.exe       1740      8         204800    1413120   10/3/2005 4:14 PM
          6.00.3790.1830 (srv03_sp1_rtm.050324-1447)        1.30 MB (1,364,480 bytes)     9/21/2005 12:21 PM
cmd.exe   c:\windows\system32\cmd.exe   216       8         204800    1413120   10/3/2005 4:15 PM   5.2.3790.1830
(srv03_sp1_rtm.050324-1447)   538.50 KB (551,424 bytes)     9/21/2005 12:20 PM
sqlservr.exe        c:\program files\microsoft sql server\mssql.1\mssql\binn\sqlservr.exe 236       13        204800
          1413120   10/3/2005 4:15 PM   2005.090.1314.00    41.55 MB (43,563,736 bytes)   9/3/2005 12:12 PM
wmiprvse.exe        Not Available       408       8         Not Available       Not Available       10/3/2005 4:16 PM
          Not Available       Not Available       Not Available
wpabaln.exe         c:\windows\system32\wpabaln.exe         1732      8         204800    1413120   10/3/2005 4:16 PM
          5.2.3790.1830 (srv03_sp1_rtm.050324-1447)         33.50 KB (34,304 bytes)       9/21/2005 12:22 PM
helpctr.exe         c:\windows\pchealth\helpctr\binaries\helpctr.exe  1212      8         204800    1413120   10/3/2005
7:14 PM   5.2.3790.1830 (srv03_sp1_rtm.050324-1447)         1.30 MB (1,363,456 bytes)     9/21/2005 12:46 PM
wmiprvse.exe        Not Available       980       8         Not Available       Not Available       10/3/2005 7:14 PM
          Not Available       Not Available       Not Available
helpsvc.exe         c:\windows\pchealth\helpctr\binaries\helpsvc.exe  1748      8         204800    1413120   10/3/2005
7:14 PM   5.2.3790.1830 (srv03_sp1_rtm.050324-1447)         1.52 MB (1,591,296 bytes)     9/21/2005 12:46 PM

[Loaded Modules]

Name      Version   Size      File Date Manufacturer        Path
winlogon  5.2.3790.1830 (srv03_sp1_rtm.050324-1447)         901.00 KB (922,624 bytes)     9/21/2005 12:22 PM  Microsoft
Corporation         c:\windows\system32\winlogon.exe
ntdll     5.2.3790.1830 (srv03_sp1_rtm.050324-1447)         1.20 MB (1,257,472 bytes)     9/21/2005 12:21 PM  Microsoft
Corporation         c:\windows\system32\ntdll.dll
kernel32  5.2.3790.1830 (srv03_sp1_rtm.050324-1447)         1.43 MB (1,500,160 bytes)     9/21/2005 12:21 PM  Microsoft
Corporation         c:\windows\system32\kernel32.dll
advapi32  5.2.3790.1830 (srv03_sp1_rtm.050324-1447)         1.00 MB (1,051,136 bytes)     9/21/2005 12:20 PM  Microsoft
Corporation         c:\windows\system32\advapi32.dll
rpcrt4    5.2.3790.1830 (srv03_sp1_rtm.050324-1447)         1.63 MB (1,714,176 bytes)     9/21/2005 12:22 PM  Microsoft
Corporation         c:\windows\system32\rpcrt4.dll
crypt32   5.131.3790.1830 (srv03_sp1_rtm.050324-1447)       1.36 MB (1,428,992 bytes)     9/21/2005 12:20 PM  Microsoft
Corporation         c:\windows\system32\crypt32.dll
msasn1    5.2.3790.1830 (srv03_sp1_rtm.050324-1447)         152.50 KB (156,160 bytes)     9/21/2005 12:21 PM  Microsoft
Corporation         c:\windows\system32\msasn1.dll
msvcrt    7.0.3790.1830 (srv03_sp1_rtm.050324-1447)         508.00 KB (520,192 bytes)     9/21/2005 12:21 PM  Microsoft
Corporation         c:\windows\system32\msvcrt.dll
user32    5.2.3790.1830 (srv03_sp1_rtm.050324-1447)         1.04 MB (1,085,952 bytes)     9/21/2005 12:22 PM  Microsoft
Corporation         c:\windows\system32\user32.dll
gdi32     5.2.3790.1830 (srv03_sp1_rtm.050324-1447)         592.00 KB (606,208 bytes)     9/21/2005 12:21 PM  Microsoft
Corporation         c:\windows\system32\gdi32.dll
nddeapi   5.2.3790.1830 (srv03_sp1_rtm.050324-1447)         25.00 KB (25,600 bytes)       9/21/2005 12:21 PM  Microsoft
Corporation         c:\windows\system32\nddeapi.dll
profmap   5.2.3790.1830 (srv03_sp1_rtm.050324-1447)         36.00 KB (36,864 bytes)       9/21/2005 12:22 PM  Microsoft
Corporation         c:\windows\system32\profmap.dll
netapi32  5.2.3790.1830 (srv03_sp1_rtm.050324-1447)         589.00 KB (603,136 bytes)     9/21/2005 12:21 PM  Microsoft
Corporation         c:\windows\system32\netapi32.dll
userenv   5.2.3790.1830 (srv03_sp1_rtm.050324-1447)         1.02 MB (1,069,056 bytes)     9/21/2005 12:22 PM  Microsoft
Corporation         c:\windows\system32\userenv.dll
psapi     5.2.3790.1830 (srv03_sp1_rtm.050324-1447)         29.00 KB (29,696 bytes)       9/21/2005 12:22 PM  Microsoft
Corporation         c:\windows\system32\psapi.dll
regapi    5.2.3790.1830 (srv03_sp1_rtm.050324-1447)         108.50 KB (111,104 bytes)     9/21/2005 12:22 PM  Microsoft
Corporation         c:\windows\system32\regapi.dll
secur32   5.2.3790.1830 (srv03_sp1_rtm.050324-1447)         120.00 KB (122,880 bytes)     9/21/2005 12:22 PM  Microsoft
Corporation         c:\windows\system32\secur32.dll
setupapi  5.2.3790.1830 (srv03_sp1_rtm.050324-1447)         1.45 MB (1,523,200 bytes)     9/21/2005 12:22 PM  Microsoft
Corporation         c:\windows\system32\setupapi.dll
version   5.2.3790.1830 (srv03_sp1_rtm.050324-1447)         28.00 KB (28,672 bytes)       9/21/2005 12:22 PM  Microsoft
Corporation         c:\windows\system32\version.dll
winsta    5.2.3790.1830 (srv03_sp1_rtm.050324-1447)         89.00 KB (91,136 bytes)       9/21/2005 12:22 PM  Microsoft
Corporation         c:\windows\system32\winsta.dll
ws2_32    5.2.3790.1830 (srv03_sp1_rtm.050324-1447)         176.50 KB (180,736 bytes)     9/21/2005 12:22 PM  Microsoft
Corporation         c:\windows\system32\ws2_32.dll
ws2help   5.2.3790.1830 (srv03_sp1_rtm.050324-1447)         30.50 KB (31,232 bytes)       9/21/2005 12:22 PM  Microsoft
Corporation         c:\windows\system32\ws2help.dll
msgina    5.2.3790.1830 (srv03_sp1_rtm.050324-1447)         1.14 MB (1,193,472 bytes)     9/21/2005 12:21 PM  Microsoft
Corporation         c:\windows\system32\msgina.dll
shsvcs    6.00.3790.1830 (srv03_sp1_rtm.050324-1447)        193.50 KB (198,144 bytes)     9/21/2005 12:22 PM  Microsoft
Corporation         c:\windows\system32\shsvcs.dll
shlwapi   6.00.3790.1830 (srv03_sp1_rtm.050324-1447)        606.50 KB (621,056 bytes)     9/21/2005 12:22 PM  Microsoft
Corporation         c:\windows\system32\shlwapi.dll
sfc       5.2.3790.1830 (srv03_sp1_rtm.050324-1447)         6.00 KB (6,144 bytes)         9/21/2005 12:22 PM  Microsoft
Corporation         c:\windows\system32\sfc.dll
sfc_os    5.2.3790.1830 (srv03_sp1_rtm.050324-1447)         183.50 KB (187,904 bytes)     9/21/2005 12:22 PM  Microsoft
Corporation         c:\windows\system32\sfc_os.dll
wintrust  5.131.3790.1830 (srv03_sp1_rtm.050324-1447)       297.50 KB (304,640 bytes)     9/21/2005 12:22 PM  Microsoft
Corporation         c:\windows\system32\wintrust.dll
imagehlp  5.2.3790.1830 (srv03_sp1_rtm.050324-1447)         57.50 KB (58,880 bytes)       9/21/2005 12:21 PM  Microsoft
Corporation         c:\windows\system32\imagehlp.dll
ole32     5.2.3790.1830 (srv03_sp1_rtm.050324-1447)         2.43 MB (2,543,616 bytes)     9/21/2005 12:22 PM  Microsoft
Corporation         c:\windows\system32\ole32.dll
comctl32  6.0 (srv03_sp1_rtm.050324-1447)         1.51 MB (1,584,128 bytes)     9/21/2005 7:32 AM   Microsoft
Corporation         c:\windows\winsxs\amd64_microsoft.windows.common-controls_6595b64144ccf1df_6.0.3790.1830_x-
ww_aced72af\comctl32.dll
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winscard  5.2.3790.1830 (srv03_sp1_rtm.050324-1447)         230.00 KB (235,520 bytes)     9/21/2005 12:22 PM  Microsoft
Corporation         c:\windows\system32\winscard.dll
wtsapi32  5.2.3790.1830 (srv03_sp1_rtm.050324-1447)         29.00 KB (29,696 bytes)       9/21/2005 12:22 PM  Microsoft
Corporation         c:\windows\system32\wtsapi32.dll
winmm     5.2.3790.1830 (srv03_sp1_rtm.050324-1447)         303.50 KB (310,784 bytes)     9/21/2005 12:22 PM  Microsoft
Corporation         c:\windows\system32\winmm.dll
shell32   6.00.3790.1830 (srv03_sp1_rtm.050324-1447)        10.01 MB (10,492,416 bytes)   9/21/2005 12:22 PM  Microsoft
Corporation         c:\windows\system32\shell32.dll
sxs       5.2.3790.1830 (srv03_sp1_rtm.050324-1447)         1.91 MB (2,003,968 bytes)     9/21/2005 12:22 PM  Microsoft
Corporation         c:\windows\system32\sxs.dll
rsaenh    5.2.3790.1830 (srv03_sp1_rtm.050324-1447)         241.96 KB (247,768 bytes)     9/21/2005 12:22 PM  Microsoft
Corporation         c:\windows\system32\rsaenh.dll
wldap32   5.2.3790.1830 (srv03_sp1_rtm.050324-1447)         390.00 KB (399,360 bytes)     9/21/2005 12:22 PM  Microsoft
Corporation         c:\windows\system32\wldap32.dll
cscdll    5.2.3790.1830 (srv03_sp1_rtm.050324-1447)         151.50 KB (155,136 bytes)     9/21/2005 12:20 PM  Microsoft
Corporation         c:\windows\system32\cscdll.dll
dimsntfy  5.2.3790.1830 (srv03_sp1_rtm.050324-1447)         28.00 KB (28,672 bytes)       9/21/2005 12:20 PM  Microsoft
Corporation         c:\windows\system32\dimsntfy.dll
wlnotify  5.2.3790.1830 (srv03_sp1_rtm.050324-1447)         148.00 KB (151,552 bytes)     9/21/2005 12:22 PM  Microsoft
Corporation         c:\windows\system32\wlnotify.dll
mpr       5.2.3790.1830 (srv03_sp1_rtm.050324-1447)         115.00 KB (117,760 bytes)     9/21/2005 12:21 PM  Microsoft
Corporation         c:\windows\system32\mpr.dll
oleaut32  5.2.3790.1830       1.06 MB (1,116,160 bytes)     9/21/2005 12:22 PM  Microsoft Corporation
          c:\windows\system32\oleaut32.dll
winspool  5.2.3790.1830 (srv03_sp1_rtm.050324-1447)         247.00 KB (252,928 bytes)     9/21/2005 12:22 PM  Microsoft
Corporation         c:\windows\system32\winspool.drv
comctl32  5.82 (srv03_sp1_rtm.050324-1447)        934.50 KB (956,928 bytes)     9/21/2005 7:32 AM   Microsoft
Corporation         c:\windows\winsxs\amd64_microsoft.windows.common-controls_6595b64144ccf1df_5.82.3790.1830_x-
ww_4d792d2a\comctl32.dll
uxtheme   6.00.3790.1830 (srv03_sp1_rtm.050324-1447)        494.50 KB (506,368 bytes)     9/21/2005 12:22 PM  Microsoft
Corporation         c:\windows\system32\uxtheme.dll
samlib    5.2.3790.1830 (srv03_sp1_rtm.050324-1447)         69.00 KB (70,656 bytes)       9/21/2005 12:22 PM  Microsoft
Corporation         c:\windows\system32\samlib.dll
cscui     5.2.3790.1830 (srv03_sp1_rtm.050324-1447)         441.00 KB (451,584 bytes)     9/21/2005 12:20 PM  Microsoft
Corporation         c:\windows\system32\cscui.dll
mprapi    5.2.3790.1830 (srv03_sp1_rtm.050324-1447)         154.50 KB (158,208 bytes)     9/21/2005 12:21 PM  Microsoft
Corporation         c:\windows\system32\mprapi.dll
activeds  5.2.3790.1830 (srv03_sp1_rtm.050324-1447)         348.50 KB (356,864 bytes)     9/21/2005 12:19 PM  Microsoft
Corporation         c:\windows\system32\activeds.dll
adsldpc   5.2.3790.1830 (srv03_sp1_rtm.050324-1447)         240.50 KB (246,272 bytes)     9/21/2005 12:20 PM  Microsoft
Corporation         c:\windows\system32\adsldpc.dll
credui    5.2.3790.1830 (srv03_sp1_rtm.050324-1447)         202.00 KB (206,848 bytes)     9/21/2005 12:20 PM  Microsoft
Corporation         c:\windows\system32\credui.dll
atl       3.05.2284 96.50 KB (98,816 bytes)       9/21/2005 12:20 PM  Microsoft Corporation
          c:\windows\system32\atl.dll
rtutils   5.2.3790.1830 (srv03_sp1_rtm.050324-1447)         66.00 KB (67,584 bytes)       9/21/2005 12:22 PM  Microsoft
Corporation         c:\windows\system32\rtutils.dll
clbcatq   2001.12.4720.1830 (srv03_sp1_rtm.050324-1447)     865.00 KB (885,760 bytes)     9/21/2005 12:44 PM  Microsoft
Corporation         c:\windows\system32\clbcatq.dll
comres    2001.12.4720.1830 (srv03_sp1_rtm.050324-1447)     779.50 KB (798,208 bytes)     9/21/2005 12:20 PM  Microsoft
Corporation         c:\windows\system32\comres.dll
ntmarta   5.2.3790.1830 (srv03_sp1_rtm.050324-1447)         222.50 KB (227,840 bytes)     9/21/2005 12:21 PM  Microsoft
Corporation         c:\windows\system32\ntmarta.dll
xpsp2res  5.2.3790.1830 (srv03_sp1_rtm.050324-1447)         2.77 MB (2,899,456 bytes)     9/21/2005 12:23 PM  Microsoft
Corporation         c:\windows\system32\xpsp2res.dll
wbemprox  5.2.3790.1830 (srv03_sp1_rtm.050324-1447)         38.00 KB (38,912 bytes)       9/21/2005 12:44 PM  Microsoft
Corporation         c:\windows\system32\wbem\wbemprox.dll
wbemcomn  5.2.3790.1830 (srv03_sp1_rtm.050324-1447)         524.00 KB (536,576 bytes)     9/21/2005 12:22 PM  Microsoft
Corporation         c:\windows\system32\wbem\wbemcomn.dll
wbemsvc   5.2.3790.1830 (srv03_sp1_rtm.050324-1447)         58.00 KB (59,392 bytes)       9/21/2005 12:44 PM  Microsoft
Corporation         c:\windows\system32\wbem\wbemsvc.dll
fastprox  5.2.3790.1830 (srv03_sp1_rtm.050324-1447)         866.50 KB (887,296 bytes)     9/21/2005 12:44 PM  Microsoft
Corporation         c:\windows\system32\wbem\fastprox.dll
msvcp60   7.0.3790.1830 (srv03_sp1_rtm.050324-1447)         919.50 KB (941,568 bytes)     9/21/2005 12:21 PM  Microsoft
Corporation         c:\windows\system32\msvcp60.dll
ntdsapi   5.2.3790.1830 (srv03_sp1_rtm.050324-1447)         127.50 KB (130,560 bytes)     9/21/2005 12:21 PM  Microsoft
Corporation         c:\windows\system32\ntdsapi.dll
dnsapi    5.2.3790.1830 (srv03_sp1_rtm.050324-1447)         297.50 KB (304,640 bytes)     9/21/2005 12:20 PM  Microsoft
Corporation         c:\windows\system32\dnsapi.dll
services  5.2.3790.1830 (srv03_sp1_rtm.050324-1447)         216.50 KB (221,696 bytes)     9/21/2005 12:22 PM  Microsoft
Corporation         c:\windows\system32\services.exe
ncobjapi  5.2.3790.1830 (srv03_sp1_rtm.050324-1447)         80.00 KB (81,920 bytes)       9/21/2005 12:21 PM  Microsoft
Corporation         c:\windows\system32\ncobjapi.dll
scesrv    5.2.3790.1830 (srv03_sp1_rtm.050324-1447)         594.50 KB (608,768 bytes)     9/21/2005 12:22 PM  Microsoft
Corporation         c:\windows\system32\scesrv.dll
authz     5.2.3790.1830 (srv03_sp1_rtm.050324-1447)         167.00 KB (171,008 bytes)     9/21/2005 12:20 PM  Microsoft
Corporation         c:\windows\system32\authz.dll
umpnpmgr  5.2.3790.1830 (srv03_sp1_rtm.050324-1447)         205.00 KB (209,920 bytes)     9/21/2005 12:22 PM  Microsoft
Corporation         c:\windows\system32\umpnpmgr.dll
eventlog  5.2.3790.1830 (srv03_sp1_rtm.050324-1447)         127.00 KB (130,048 bytes)     9/21/2005 12:21 PM  Microsoft
Corporation         c:\windows\system32\eventlog.dll
lsass     5.2.3790.1830 (srv03_sp1_rtm.050324-1447)         14.00 KB (14,336 bytes)       9/21/2005 12:21 PM  Microsoft
Corporation         c:\windows\system32\lsass.exe
lsasrv    5.2.3790.1830 (srv03_sp1_rtm.050324-1447)         1.50 MB (1,568,256 bytes)     9/21/2005 12:21 PM  Microsoft
Corporation         c:\windows\system32\lsasrv.dll
samsrv    5.2.3790.1830 (srv03_sp1_rtm.050324-1447)         1.01 MB (1,059,328 bytes)     9/21/2005 12:22 PM  Microsoft
Corporation         c:\windows\system32\samsrv.dll
cryptdll  5.2.3790.1830 (srv03_sp1_rtm.050324-1447)         47.00 KB (48,128 bytes)       9/21/2005 12:20 PM  Microsoft
Corporation         c:\windows\system32\cryptdll.dll
msprivs   5.2.3790.1830 (srv03_sp1_rtm.050324-1447)         47.50 KB (48,640 bytes)       9/21/2005 12:21 PM  Microsoft
Corporation         c:\windows\system32\msprivs.dll
kerberos  5.2.3790.1830 (srv03_sp1_rtm.050324-1447)         698.00 KB (714,752 bytes)     9/21/2005 12:21 PM  Microsoft
Corporation         c:\windows\system32\kerberos.dll
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msv1_0    5.2.3790.1830 (srv03_sp1_rtm.050324-1447)        253.00 KB (259,072 bytes)     9/21/2005 12:21 PM  Microsoft
Corporation         c:\windows\system32\msv1_0.dll
iphlpapi  5.2.3790.1830 (srv03_sp1_rtm.050324-1447)        177.00 KB (181,248 bytes)     9/21/2005 12:21 PM  Microsoft
Corporation         c:\windows\system32\iphlpapi.dll
netlogon  5.2.3790.1830 (srv03_sp1_rtm.050324-1447)        666.00 KB (681,984 bytes)     9/21/2005 12:21 PM  Microsoft
Corporation         c:\windows\system32\netlogon.dll
w32time   5.2.3790.1830 (srv03_sp1_rtm.050324-1447)        400.50 KB (410,112 bytes)     9/21/2005 12:22 PM  Microsoft
Corporation         c:\windows\system32\w32time.dll
schannel  5.2.3790.1830 (srv03_sp1_rtm.050324-1447)        248.00 KB (253,952 bytes)     9/21/2005 12:22 PM  Microsoft
Corporation         c:\windows\system32\schannel.dll
wdigest   5.2.3790.1830 (srv03_sp1_rtm.050324-1447)        130.50 KB (133,632 bytes)     9/21/2005 12:22 PM  Microsoft
Corporation         c:\windows\system32\wdigest.dll
rassfm    5.2.3790.1830 (srv03_sp1_rtm.050324-1447)        36.00 KB (36,864 bytes)       9/21/2005 12:22 PM  Microsoft
Corporation         c:\windows\system32\rassfm.dll
kdcsvc    5.2.3790.1830 (srv03_sp1_rtm.050324-1447)        409.00 KB (418,816 bytes)     9/21/2005 12:21 PM  Microsoft
Corporation         c:\windows\system32\kdcsvc.dll
ntdsa     5.2.3790.1830 (srv03_sp1_rtm.050324-1447)        2.81 MB (2,948,096 bytes)     9/21/2005 12:21 PM  Microsoft
Corporation         c:\windows\system32\ntdsa.dll
esent     5.2.3790.1830 (srv03_sp1_rtm.050324-1447)        2.26 MB (2,366,976 bytes)     9/21/2005 12:21 PM  Microsoft
Corporation         c:\windows\system32\esent.dll
ntdsatq   5.2.3790.1830 (srv03_sp1_rtm.050324-1447)        51.00 KB (52,224 bytes)       9/21/2005 12:21 PM  Microsoft
Corporation         c:\windows\system32\ntdsatq.dll
mswsock   5.2.3790.1830 (srv03_sp1_rtm.050324-1447)        478.00 KB (489,472 bytes)     9/21/2005 12:21 PM  Microsoft
Corporation         c:\windows\system32\mswsock.dll
scecli    5.2.3790.1830 (srv03_sp1_rtm.050324-1447)        308.00 KB (315,392 bytes)     9/21/2005 12:22 PM  Microsoft
Corporation         c:\windows\system32\scecli.dll
ws03res   5.2.3790.1830 (srv03_sp1_rtm.050324-1447)        794.00 KB (813,056 bytes)     9/21/2005 12:23 PM  Microsoft
Corporation         c:\windows\system32\ws03res.dll
w3ssl     6.0.3790.1830 (srv03_sp1_rtm.050324-1447)        21.00 KB (21,504 bytes)       9/21/2005 12:22 PM  Microsoft
Corporation         c:\windows\system32\w3ssl.dll
strmfilt  6.0.3790.1830 (srv03_sp1_rtm.050324-1447)        131.50 KB (134,656 bytes)     9/21/2005 12:22 PM  Microsoft
Corporation         c:\windows\system32\strmfilt.dll
httpapi   5.2.3790.1830 (srv03_sp1_rtm.050324-1447)        36.50 KB (37,376 bytes)       9/21/2005 12:21 PM  Microsoft
Corporation         c:\windows\system32\httpapi.dll
hnetcfg   5.2.3790.1830 (srv03_sp1_rtm.050324-1447)        561.00 KB (574,464 bytes)     9/21/2005 12:21 PM  Microsoft
Corporation         c:\windows\system32\hnetcfg.dll
wshtcpip  5.2.3790.1830 (srv03_sp1_rtm.050324-1447)        29.00 KB (29,696 bytes)       9/21/2005 12:22 PM  Microsoft
Corporation         c:\windows\system32\wshtcpip.dll
dssenh    5.2.3790.1830 (srv03_sp1_rtm.050324-1447)        226.96 KB (232,408 bytes)     9/21/2005 12:21 PM  Microsoft
Corporation         c:\windows\system32\dssenh.dll
svchost   5.2.3790.1830 (srv03_sp1_rtm.050324-1447)        24.50 KB (25,088 bytes)       9/21/2005 12:22 PM  Microsoft
Corporation         c:\windows\system32\svchost.exe
rpcss     5.2.3790.1830 (srv03_sp1_rtm.050324-1447)        672.00 KB (688,128 bytes)     9/21/2005 12:22 PM  Microsoft
Corporation         c:\windows\system32\rpcss.dll
wkssvc    5.2.3790.1830 (srv03_sp1_rtm.050324-1447)        221.00 KB (226,304 bytes)     9/21/2005 12:22 PM  Microsoft
Corporation         c:\windows\system32\wkssvc.dll
es        2001.12.4720.1830 (srv03_sp1_rtm.050324-1447)    357.00 KB (365,568 bytes)     9/21/2005 12:21 PM  Microsoft
Corporation         c:\windows\system32\es.dll
sens      5.2.3790.1830 (srv03_sp1_rtm.050324-1447)        63.50 KB (65,024 bytes)       9/21/2005 12:22 PM  Microsoft
Corporation         c:\windows\system32\sens.dll
comsvcs   2001.12.4720.1830 (srv03_sp1_rtm.050324-1447)    2.06 MB (2,156,544 bytes)     9/21/2005 12:44 PM  Microsoft
Corporation         c:\windows\system32\comsvcs.dll
wiarpc    5.2.3790.1830 (srv03_sp1_rtm.050324-1447)        57.00 KB (58,368 bytes)       9/21/2005 12:22 PM  Microsoft
Corporation         c:\windows\system32\wiarpc.dll
netman    5.2.3790.1830 (srv03_sp1_rtm.050324-1447)        457.00 KB (467,968 bytes)     9/21/2005 12:21 PM  Microsoft
Corporation         c:\windows\system32\netman.dll
netshell  5.2.3790.1830 (srv03_sp1_rtm.050324-1447)        2.32 MB (2,437,120 bytes)     9/21/2005 12:21 PM  Microsoft
Corporation         c:\windows\system32\netshell.dll
clusapi   5.2.3790.1830 (srv03_sp1_rtm.050324-1447)        127.00 KB (130,048 bytes)     9/21/2005 12:20 PM  Microsoft
Corporation         c:\windows\system32\clusapi.dll
rasapi32  5.2.3790.1830 (srv03_sp1_rtm.050324-1447)        410.00 KB (419,840 bytes)     9/21/2005 12:22 PM  Microsoft
Corporation         c:\windows\system32\rasapi32.dll
rasman    5.2.3790.1830 (srv03_sp1_rtm.050324-1447)        95.50 KB (97,792 bytes)       9/21/2005 12:22 PM  Microsoft
Corporation         c:\windows\system32\rasman.dll
tapi32    5.2.3790.1830 (srv03_sp1_rtm.050324-1447)        332.50 KB (340,480 bytes)     9/21/2005 12:22 PM  Microsoft
Corporation         c:\windows\system32\tapi32.dll
wininet   6.00.3790.1830 (srv03_sp1_rtm.050324-1447)       1.13 MB (1,186,304 bytes)     9/21/2005 12:22 PM  Microsoft
Corporation         c:\windows\system32\wininet.dll
wzcsapi   5.2.3790.1830 (srv03_sp1_rtm.050324-1447)        49.00 KB (50,176 bytes)       3/24/2005 11:35 AM  Microsoft
Corporation         c:\windows\system32\wzcsapi.dll
wzcsvc    5.2.3790.1830 (srv03_sp1_rtm.050324-1447)        492.00 KB (503,808 bytes)     3/24/2005 11:35 AM  Microsoft
Corporation         c:\windows\system32\wzcsvc.dll
wmi       5.2.3790.1830 (srv03_sp1_rtm.050324-1447)        5.50 KB (5,632 bytes)         9/21/2005 12:22 PM  Microsoft
Corporation         c:\windows\system32\wmi.dll
dhcpcsvc  5.2.3790.1830 (srv03_sp1_rtm.050324-1447)        219.00 KB (224,256 bytes)     9/21/2005 12:20 PM  Microsoft
Corporation         c:\windows\system32\dhcpcsvc.dll
wmisvc    5.2.3790.1830 (srv03_sp1_rtm.050324-1447)        227.00 KB (232,448 bytes)     9/21/2005 12:44 PM  Microsoft
Corporation         c:\windows\system32\wbem\wmisvc.dll
vssapi    5.2.3790.1830 (srv03_sp1_rtm.050324-1447)        1.26 MB (1,320,960 bytes)     9/21/2005 12:22 PM  Microsoft
Corporation         c:\windows\system32\vssapi.dll
wbemcore  5.2.3790.1830 (srv03_sp1_rtm.050324-1447)        1.24 MB (1,299,968 bytes)     9/21/2005 12:44 PM  Microsoft
Corporation         c:\windows\system32\wbem\wbemcore.dll
esscli    5.2.3790.1830 (srv03_sp1_rtm.050324-1447)        626.50 KB (641,536 bytes)     9/21/2005 12:44 PM  Microsoft
Corporation         c:\windows\system32\wbem\esscli.dll
wmiutils  5.2.3790.1830 (srv03_sp1_rtm.050324-1447)        171.00 KB (175,104 bytes)     9/21/2005 12:44 PM  Microsoft
Corporation         c:\windows\system32\wbem\wmiutils.dll
repdrvfs  5.2.3790.1830 (srv03_sp1_rtm.050324-1447)        353.50 KB (361,984 bytes)     9/21/2005 12:44 PM  Microsoft
Corporation         c:\windows\system32\wbem\repdrvfs.dll
wmiprvsd  5.2.3790.1830 (srv03_sp1_rtm.050324-1447)        743.00 KB (760,832 bytes)     9/21/2005 12:44 PM  Microsoft
Corporation         c:\windows\system32\wbem\wmiprvsd.dll
wbemess   5.2.3790.1830 (srv03_sp1_rtm.050324-1447)        532.50 KB (545,280 bytes)     9/21/2005 12:44 PM  Microsoft
Corporation         c:\windows\system32\wbem\wbemess.dll
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rasdlg    5.2.3790.1830 (srv03_sp1_rtm.050324-1447)         859.50 KB (880,128 bytes)     9/21/2005 12:22 PM  Microsoft
Corporation         c:\windows\system32\rasdlg.dll
rasadhlp  5.2.3790.1830 (srv03_sp1_rtm.050324-1447)         12.00 KB (12,288 bytes)       9/21/2005 12:22 PM  Microsoft
Corporation         c:\windows\system32\rasadhlp.dll
ncprov    5.2.3790.1830 (srv03_sp1_rtm.050324-1447)         73.00 KB (74,752 bytes)       9/21/2005 12:44 PM  Microsoft
Corporation         c:\windows\system32\wbem\ncprov.dll
pchsvc    5.2.3790.1830 (srv03_sp1_rtm.050324-1447)         76.00 KB (77,824 bytes)       9/21/2005 12:46 PM  Microsoft
Corporation         c:\windows\pchealth\helpctr\binaries\pchsvc.dll
wbemcons  5.2.3790.1830 (srv03_sp1_rtm.050324-1447)         65.50 KB (67,072 bytes)       9/21/2005 12:44 PM  Microsoft
Corporation         c:\windows\system32\wbem\wbemcons.dll
inetinfo  6.0.3790.1830 (srv03_sp1_rtm.050324-1447)         17.50 KB (17,920 bytes)       9/21/2005 1:10 PM   Microsoft
Corporation         c:\windows\system32\inetsrv\inetinfo.exe
iisutil   6.0.3790.1830 (srv03_sp1_rtm.050324-1447)         316.50 KB (324,096 bytes)     9/21/2005 1:10 PM   Microsoft
Corporation         c:\windows\system32\inetsrv\iisutil.dll
rpcref    6.0.3790.1830 (srv03_sp1_rtm.050324-1447)         4.50 KB (4,608 bytes)         9/21/2005 1:10 PM   Microsoft
Corporation         c:\windows\system32\inetsrv\rpcref.dll
iisrtl    6.0.3790.1830 (srv03_sp1_rtm.050324-1447)         225.00 KB (230,400 bytes)     9/21/2005 1:10 PM   Microsoft
Corporation         c:\windows\system32\iisrtl.dll
iisadmin  6.0.3790.1830 (srv03_sp1_rtm.050324-1447)         30.00 KB (30,720 bytes)       9/21/2005 1:10 PM   Microsoft
Corporation         c:\windows\system32\inetsrv\iisadmin.dll
coadmin   6.0.3790.1830 (srv03_sp1_rtm.050324-1447)         100.50 KB (102,912 bytes)     9/21/2005 1:10 PM   Microsoft
Corporation         c:\windows\system32\inetsrv\coadmin.dll
admwprox  6.0.3790.1830 (srv03_sp1_rtm.050324-1447)         66.00 KB (67,584 bytes)       9/21/2005 1:10 PM   Microsoft
Corporation         c:\windows\system32\admwprox.dll
iiscfg    6.0.3790.1830 (srv03_sp1_rtm.050324-1447)         1.24 MB (1,298,432 bytes)     9/21/2005 1:10 PM   Microsoft
Corporation         c:\windows\system32\inetsrv\iiscfg.dll
metadata  6.0.3790.1830 (srv03_sp1_rtm.050324-1447)         342.00 KB (350,208 bytes)     9/21/2005 1:10 PM   Microsoft
Corporation         c:\windows\system32\inetsrv\metadata.dll
msxml3    8.70.1104.0         2.04 MB (2,141,184 bytes)     9/21/2005 12:21 PM  Microsoft Corporation
          c:\windows\system32\msxml3.dll
svcext    6.0.3790.1830 (srv03_sp1_rtm.050324-1447)         60.50 KB (61,952 bytes)       9/21/2005 1:10 PM   Microsoft
Corporation         c:\windows\system32\inetsrv\svcext.dll
security  5.2.3790.1830 (srv03_sp1_rtm.050324-1447)         6.00 KB (6,144 bytes)         9/21/2005 12:22 PM  Microsoft
Corporation         c:\windows\system32\security.dll
iismap    6.0.3790.1830 (srv03_sp1_rtm.050324-1447)         97.00 KB (99,328 bytes)       9/21/2005 1:10 PM   Microsoft
Corporation         c:\windows\system32\iismap.dll
wamreg    6.0.3790.1830 (srv03_sp1_rtm.050324-1447)         78.50 KB (80,384 bytes)       9/21/2005 1:10 PM   Microsoft
Corporation         c:\windows\system32\inetsrv\wamreg.dll
msftesql  12.0.5626.1         152.20 KB (155,856 bytes)     8/26/2005 5:17 PM   Microsoft Corporation
          c:\program files\microsoft sql server\mssql.1\mssql\binn\msftesql.exe
msfte     12.0.5626.1         3.63 MB (3,803,344 bytes)     8/26/2005 5:17 PM   Microsoft Corporation
          c:\program files\microsoft sql server\mssql.1\mssql\binn\msfte.dll
dbghelp   5.2.3790.1830 (srv03_sp1_rtm.050324-1447)         1.22 MB (1,274,368 bytes)     9/21/2005 12:20 PM  Microsoft
Corporation         c:\windows\system32\dbghelp.dll
msftepxy  12.0.5626.1         121.70 KB (124,624 bytes)     8/26/2005 5:17 PM   Microsoft Corporation
          c:\program files\microsoft sql server\mssql.1\mssql\binn\msftepxy.dll
iisw3adm  6.0.3790.1830 (srv03_sp1_rtm.050324-1447)         305.00 KB (312,320 bytes)     9/21/2005 1:10 PM   Microsoft
Corporation         c:\windows\system32\inetsrv\iisw3adm.dll
w3cache   6.0.3790.1830 (srv03_sp1_rtm.050324-1447)         27.50 KB (28,160 bytes)       9/21/2005 1:10 PM   Microsoft
Corporation         c:\windows\system32\inetsrv\w3cache.dll
w3tp      6.0.3790.1830 (srv03_sp1_rtm.050324-1447)         16.00 KB (16,384 bytes)       9/21/2005 1:10 PM   Microsoft
Corporation         c:\windows\system32\inetsrv\w3tp.dll
lonsint   6.0.3790.1830 (srv03_sp1_rtm.050324-1447)         17.50 KB (17,920 bytes)       9/21/2005 1:10 PM   Microsoft
Corporation         c:\windows\system32\inetsrv\lonsint.dll
termsrv   5.2.3790.1830 (srv03_sp1_rtm.050324-1447)         354.50 KB (363,008 bytes)     9/21/2005 12:45 PM  Microsoft
Corporation         c:\windows\system32\termsrv.dll
icaapi    5.2.3790.1830 (srv03_sp1_rtm.050324-1447)         27.50 KB (28,160 bytes)       9/21/2005 12:45 PM  Microsoft
Corporation         c:\windows\system32\icaapi.dll
mstlsapi  5.2.3790.1830 (srv03_sp1_rtm.050324-1447)         187.00 KB (191,488 bytes)     9/21/2005 12:21 PM  Microsoft
Corporation         c:\windows\system32\mstlsapi.dll
explorer  6.00.3790.1830 (srv03_sp1_rtm.050324-1447)        1.30 MB (1,364,480 bytes)     9/21/2005 12:21 PM  Microsoft
Corporation         c:\windows\explorer.exe
browseui  6.00.3790.1830 (srv03_sp1_rtm.050324-1447)        1.53 MB (1,601,536 bytes)     9/21/2005 12:20 PM  Microsoft
Corporation         c:\windows\system32\browseui.dll
shdocvw   6.00.3790.1830 (srv03_sp1_rtm.050324-1447)        2.30 MB (2,416,128 bytes)     9/21/2005 12:22 PM  Microsoft
Corporation         c:\windows\system32\shdocvw.dll
cryptui   5.131.3790.1830 (srv03_sp1_rtm.050324-1447)       705.50 KB (722,432 bytes)     9/21/2005 12:20 PM  Microsoft
Corporation         c:\windows\system32\cryptui.dll
apphelp   5.2.3790.1830 (srv03_sp1_rtm.050324-1447)         241.00 KB (246,784 bytes)     9/21/2005 12:20 PM  Microsoft
Corporation         c:\windows\system32\apphelp.dll
themeui   6.00.3790.1830 (srv03_sp1_rtm.050324-1447)        530.50 KB (543,232 bytes)     9/21/2005 12:22 PM  Microsoft
Corporation         c:\windows\system32\themeui.dll
msimg32   5.2.3790.1830 (srv03_sp1_rtm.050324-1447)         6.50 KB (6,656 bytes)         9/21/2005 12:21 PM  Microsoft
Corporation         c:\windows\system32\msimg32.dll
actxprxy  6.00.3790.1830 (srv03_sp1_rtm.050324-1447)        220.50 KB (225,792 bytes)     9/21/2005 12:19 PM  Microsoft
Corporation         c:\windows\system32\actxprxy.dll
linkinfo  5.2.3790.1830 (srv03_sp1_rtm.050324-1447)         30.00 KB (30,720 bytes)       9/21/2005 12:21 PM  Microsoft
Corporation         c:\windows\system32\linkinfo.dll
ntshrui   6.00.3790.1830 (srv03_sp1_rtm.050324-1447)        184.00 KB (188,416 bytes)     9/21/2005 12:21 PM  Microsoft
Corporation         c:\windows\system32\ntshrui.dll
urlmon    6.00.3790.1830 (srv03_sp1_rtm.050324-1447)        1.02 MB (1,074,176 bytes)     9/21/2005 12:22 PM  Microsoft
Corporation         c:\windows\system32\urlmon.dll
webcheck  6.00.3790.1830 (srv03_sp1_rtm.050324-1447)        439.00 KB (449,536 bytes)     9/21/2005 12:22 PM  Microsoft
Corporation         c:\windows\system32\webcheck.dll
wsock32   5.2.3790.1830 (srv03_sp1_rtm.050324-1447)         24.50 KB (25,088 bytes)       9/21/2005 12:22 PM  Microsoft
Corporation         c:\windows\system32\wsock32.dll
stobject  5.2.3790.1830 (srv03_sp1_rtm.050324-1447)         142.50 KB (145,920 bytes)     9/21/2005 12:22 PM  Microsoft
Corporation         c:\windows\system32\stobject.dll
batmeter  6.00.3790.1830 (srv03_sp1_rtm.050324-1447)        41.50 KB (42,496 bytes)       9/21/2005 12:20 PM  Microsoft
Corporation         c:\windows\system32\batmeter.dll
powrprof  6.00.3790.1830 (srv03_sp1_rtm.050324-1447)        32.50 KB (33,280 bytes)       9/21/2005 12:22 PM  Microsoft
Corporation         c:\windows\system32\powrprof.dll
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browselc  6.00.3790.1830 (srv03_sp1_rtm.050324-1447)        63.00 KB (64,512 bytes)       9/21/2005 12:20 PM  Microsoft
Corporation         c:\windows\system32\browselc.dll
drprov    5.2.3790.1830 (srv03_sp1_rtm.050324-1447)         24.00 KB (24,576 bytes)       9/21/2005 12:22 PM  Microsoft
Corporation         c:\windows\system32\drprov.dll
ntlanman  5.2.3790.1830 (srv03_sp1_rtm.050324-1447)         71.50 KB (73,216 bytes)       9/21/2005 12:21 PM  Microsoft
Corporation         c:\windows\system32\ntlanman.dll
netui0    5.2.3790.1830 (srv03_sp1_rtm.050324-1447)         130.00 KB (133,120 bytes)     9/21/2005 12:21 PM  Microsoft
Corporation         c:\windows\system32\netui0.dll
netui1    5.2.3790.1830 (srv03_sp1_rtm.050324-1447)         338.50 KB (346,624 bytes)     9/21/2005 12:21 PM  Microsoft
Corporation         c:\windows\system32\netui1.dll
davclnt   5.2.3790.1830 (srv03_sp1_rtm.050324-1447)         38.00 KB (38,912 bytes)       9/21/2005 12:20 PM  Microsoft
Corporation         c:\windows\system32\davclnt.dll
mlang     6.00.3790.1830 (srv03_sp1_rtm.050324-1447)        686.00 KB (702,464 bytes)     9/21/2005 12:21 PM  Microsoft
Corporation         c:\windows\system32\mlang.dll
zipfldr   6.00.3790.1830 (srv03_sp1_rtm.050324-1447)        449.50 KB (460,288 bytes)     9/21/2005 12:22 PM  Microsoft
Corporation         c:\windows\system32\zipfldr.dll
sendmail  6.00.3790.1830 (srv03_sp1_rtm.050324-1447)        64.00 KB (65,536 bytes)       9/21/2005 12:22 PM  Microsoft
Corporation         c:\windows\system32\sendmail.dll
mydocs    6.00.3790.1830 (srv03_sp1_rtm.050324-1447)        101.00 KB (103,424 bytes)     9/21/2005 12:21 PM  Microsoft
Corporation         c:\windows\system32\mydocs.dll
mmcshext  5.2.3790.1830 (srv03_sp1_rtm.050324-1447)         75.50 KB (77,312 bytes)       9/21/2005 12:21 PM  Microsoft
Corporation         c:\windows\system32\mmcshext.dll
hhsetup   5.2.3790.1830 (srv03_sp1_rtm.050324-1447)         78.00 KB (79,872 bytes)       9/21/2005 12:21 PM  Microsoft
Corporation         c:\windows\system32\hhsetup.dll
cmd       5.2.3790.1830 (srv03_sp1_rtm.050324-1447)         538.50 KB (551,424 bytes)     9/21/2005 12:20 PM  Microsoft
Corporation         c:\windows\system32\cmd.exe
sqlservr  2005.090.1314.00    41.55 MB (43,563,736 bytes)   9/3/2005 12:12 PM   Microsoft Corporation
          c:\program files\microsoft sql server\mssql.1\mssql\binn\sqlservr.exe
msvcr80   8.00.50727.26       803.50 KB (822,784 bytes)     8/30/2005 8:50 PM   Microsoft Corporation
          c:\windows\winsxs\amd64_microsoft.vc80.crt_1fc8b3b9a1e18e3b_8.0.50727.26_x-ww_3fe85033\msvcr80.dll
msvcp80   8.00.50727.26       1.05 MB (1,097,728 bytes)     8/30/2005 8:53 PM   Microsoft Corporation
          c:\windows\winsxs\amd64_microsoft.vc80.crt_1fc8b3b9a1e18e3b_8.0.50727.26_x-ww_3fe85033\msvcp80.dll
opends60  2005.090.1314.00    22.21 KB (22,744 bytes)       9/3/2005 12:07 PM   Microsoft Corporation
          c:\program files\microsoft sql server\mssql.1\mssql\binn\opends60.dll
instapi   2005.090.1314.00    40.71 KB (41,688 bytes)       9/3/2005 12:03 PM   Microsoft Corporation
          c:\program files\microsoft sql server\90\shared\instapi.dll
sqlevn70  2005.090.1314.00    1.57 MB (1,641,688 bytes)     9/3/2005 12:09 PM   Microsoft Corporation
          c:\program files\microsoft sql server\mssql.1\mssql\binn\resources\1033\sqlevn70.rll
sqlos     2005.090.1314.00    15.71 KB (16,088 bytes)       9/3/2005 12:10 PM   Microsoft Corporation
          c:\program files\microsoft sql server\mssql.1\mssql\binn\sqlos.dll
mscoree   2.0.50727.26 (RTM.050727-2600)          441.00 KB (451,584 bytes)     8/30/2005 9:01 PM   Microsoft
Corporation         c:\windows\system32\mscoree.dll
xolehlp   2001.12.4720.1830 (srv03_sp1_rtm.050324-1447)     10.50 KB (10,752 bytes)       9/21/2005 12:44 PM  Microsoft
Corporation         c:\windows\system32\xolehlp.dll
msdtcprx  2001.12.4720.1830 (srv03_sp1_rtm.050324-1447)     805.50 KB (824,832 bytes)     9/21/2005 12:44 PM  Microsoft
Corporation         c:\windows\system32\msdtcprx.dll
mtxclu    2001.12.4720.1830 (srv03_sp1_rtm.050324-1447)     141.50 KB (144,896 bytes)     9/21/2005 12:21 PM  Microsoft
Corporation         c:\windows\system32\mtxclu.dll
resutils  5.2.3790.1830 (srv03_sp1_rtm.050324-1447)         98.50 KB (100,864 bytes)      9/21/2005 12:22 PM  Microsoft
Corporation         c:\windows\system32\resutils.dll
winrnr    5.2.3790.1830 (srv03_sp1_rtm.050324-1447)         30.00 KB (30,720 bytes)       9/21/2005 12:22 PM  Microsoft
Corporation         c:\windows\system32\winrnr.dll
dbghelp   6.4.0004.3 (vbl_core(jshay).041001-1326)          1.37 MB (1,434,328 bytes)     9/3/2005 12:04 PM   Microsoft
Corporation         c:\program files\microsoft sql server\90\shared\dbghelp.dll
sqlncli   2005.090.1314.00    3.01 MB (3,152,144 bytes)     9/3/2005 12:12 PM   Microsoft Corporation
          c:\windows\system32\sqlncli.dll
comdlg32  6.00.3790.1830 (srv03_sp1_rtm.050324-1447)        446.50 KB (457,216 bytes)     9/21/2005 12:20 PM  Microsoft
Corporation         c:\windows\system32\comdlg32.dll
sqlnclir  2005.090.1314.00    201.21 KB (206,040 bytes)     9/3/2005 12:08 PM   Microsoft Corporation
          c:\windows\system32\sqlnclir.rll
wpabaln   5.2.3790.1830 (srv03_sp1_rtm.050324-1447)         33.50 KB (34,304 bytes)       9/21/2005 12:22 PM  Microsoft
Corporation         c:\windows\system32\wpabaln.exe
helpctr   5.2.3790.1830 (srv03_sp1_rtm.050324-1447)         1.30 MB (1,363,456 bytes)     9/21/2005 12:46 PM  Microsoft
Corporation         c:\windows\pchealth\helpctr\binaries\helpctr.exe
hcappres  5.2.3790.1830 (srv03_sp1_rtm.050324-1447)         7.50 KB (7,680 bytes)         9/21/2005 12:46 PM  Microsoft
Corporation         c:\windows\pchealth\helpctr\binaries\hcappres.dll
itss      5.2.3790.1830 (srv03_sp1_rtm.050324-1447)         208.00 KB (212,992 bytes)     9/21/2005 12:21 PM  Microsoft
Corporation         c:\windows\system32\itss.dll
pchshell  5.2.3790.1830 (srv03_sp1_rtm.050324-1447)         155.00 KB (158,720 bytes)     9/21/2005 12:46 PM  Microsoft
Corporation         c:\windows\pchealth\helpctr\binaries\pchshell.dll
mshtml    6.00.3790.1830 (srv03_sp1_rtm.050324-1447)        5.65 MB (5,928,448 bytes)     9/21/2005 12:21 PM  Microsoft
Corporation         c:\windows\system32\mshtml.dll
msls31    3.10.349.0          357.00 KB (365,568 bytes)     9/21/2005 12:21 PM  Microsoft Corporation
          c:\windows\system32\msls31.dll
msimtf    5.2.3790.1830 (srv03_sp1_rtm.050324-1447)         380.50 KB (389,632 bytes)     9/21/2005 12:23 PM  Microsoft
Corporation         c:\windows\system32\msimtf.dll
msctf     5.2.3790.1830 (srv03_sp1_rtm.050324-1447)         617.50 KB (632,320 bytes)     9/21/2005 12:23 PM  Microsoft
Corporation         c:\windows\system32\msctf.dll
shdoclc   6.00.3790.1830 (srv03_sp1_rtm.050324-1447)        589.50 KB (603,648 bytes)     9/21/2005 12:22 PM  Microsoft
Corporation         c:\windows\system32\shdoclc.dll
jscript   5.6.0.8827          974.50 KB (997,888 bytes)     9/21/2005 12:21 PM  Microsoft Corporation
          c:\windows\system32\jscript.dll
imm32     5.2.3790.1830 (srv03_sp1_rtm.050324-1447)         208.00 KB (212,992 bytes)     9/21/2005 12:21 PM  Microsoft
Corporation         c:\windows\system32\imm32.dll
mshtmled  6.00.3790.1830 (srv03_sp1_rtm.050324-1447)        905.50 KB (927,232 bytes)     9/21/2005 12:21 PM  Microsoft
Corporation         c:\windows\system32\mshtmled.dll
vbscript  5.6.0.8827          646.50 KB (662,016 bytes)     9/21/2005 12:22 PM  Microsoft Corporation
          c:\windows\system32\vbscript.dll
msinfo    5.2.3790.1830 (srv03_sp1_rtm.050324-1447)         636.00 KB (651,264 bytes)     9/21/2005 12:46 PM  Microsoft
Corporation         c:\windows\pchealth\helpctr\binaries\msinfo.dll
mfc42u    6.50.9146.0         1.39 MB (1,462,272 bytes)     9/21/2005 12:21 PM  Microsoft Corporation
          c:\windows\system32\mfc42u.dll
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riched32  5.2.3790.1830 (srv03_sp1_rtm.050324-1447)         7.00 KB (7,168 bytes)         9/21/2005 12:22 PM  Microsoft
Corporation         c:\windows\system32\riched32.dll
riched20  5.31.23.1224        1.10 MB (1,157,120 bytes)     9/21/2005 12:22 PM  Microsoft Corporation
          c:\windows\system32\riched20.dll
helpsvc   5.2.3790.1830 (srv03_sp1_rtm.050324-1447)         1.52 MB (1,591,296 bytes)     9/21/2005 12:46 PM  Microsoft
Corporation         c:\windows\pchealth\helpctr\binaries\helpsvc.exe

[Services]

Display Name        Name      State     Start Mode          Service Type        Path      Error Control       Start
Name      Tag ID
Application Experience Lookup Service   AeLookupSvc         Stopped   Manual    Share Process
          c:\windows\system32\svchost.exe -k netsvcs        Normal    LocalSystem         0
Alerter   Alerter   Stopped   Disabled  Share Process       c:\windows\system32\svchost.exe -k localservice   Normal
          NT AUTHORITY\LocalService     0
Application Layer Gateway Service       ALG       Stopped   Manual    Own Process         c:\windows\system32\alg.exe
          Normal    NT AUTHORITY\LocalService     0
Application Management        AppMgmt   Stopped   Manual    Share Process       c:\windows\system32\svchost.exe -k
netsvcs   Normal    LocalSystem         0
ASP.NET State Service         aspnet_state        Stopped   Manual    Own Process
          c:\windows\microsoft.net\framework64\v2.0.50727\aspnet_state.exe      Normal    NT AUTHORITY\NetworkService
          0
Windows Audio       AudioSrv  Stopped   Manual    Share Process       c:\windows\system32\svchost.exe -k netsvcs
          Normal    LocalSystem         0
Background Intelligent Transfer Service BITS      Stopped   Manual    Share Process
          c:\windows\system32\svchost.exe -k netsvcs        Normal    LocalSystem         0
Computer Browser    Browser   Stopped   Manual    Share Process       c:\windows\system32\svchost.exe -k netsvcs
          Normal    LocalSystem         0
Indexing Service    CiSvc     Stopped   Disabled  Share Process       c:\windows\system32\cisvc.exe Normal
          LocalSystem         0
ClipBook  ClipSrv   Stopped   Disabled  Own Process         c:\windows\system32\clipsrv.exe         Normal
          LocalSystem         0
.NET Runtime Optimization Service v2.0.50727_X86  clr_optimization_v2.0.50727_32          Stopped   Manual    Own
Process   c:\windows\microsoft.net\framework\v2.0.50727\mscorsvw.exe  Ignore    LocalSystem         0
.NET Runtime Optimization Service v2.0.50727_x64  clr_optimization_v2.0.50727_64          Stopped   Manual    Own
Process   c:\windows\microsoft.net\framework64\v2.0.50727\mscorsvw.exe          Ignore    LocalSystem         0
COM+ System Application       COMSysApp Stopped   Manual    Own Process         c:\windows\system32\dllhost.exe
/processid:{02d4b3f1-fd88-11d1-960d-00805fc79235} Normal    LocalSystem         0
Cryptographic Services        CryptSvc  Stopped   Manual    Share Process       c:\windows\system32\svchost.exe -k
netsvcs   Normal    LocalSystem         0
DCOM Server Process Launcher  DcomLaunch          Running   Auto      Share Process
          c:\windows\system32\svchost.exe -k dcomlaunch     Normal    LocalSystem         0
Distributed File System       Dfs       Stopped   Manual    Own Process         c:\windows\system32\dfssvc.exe
          Normal    LocalSystem         0
DHCP Client         Dhcp      Stopped   Manual    Share Process       c:\windows\system32\svchost.exe -k networkservice
          Normal    NT AUTHORITY\NetworkService   0
Logical Disk Manager Administrative Service       dmadmin   Stopped   Manual    Share Process
          c:\windows\system32\dmadmin.exe /com    Normal    LocalSystem         0
Logical Disk Manager          dmserver  Stopped   Manual    Share Process       c:\windows\system32\svchost.exe -k
netsvcs   Normal    LocalSystem         0
DNS Client          Dnscache  Stopped   Manual    Share Process       c:\windows\system32\svchost.exe -k networkservice
          Normal    NT AUTHORITY\NetworkService   0
Error Reporting Service       ERSvc     Stopped   Manual    Share Process       c:\windows\system32\svchost.exe -k
winerr    Ignore    LocalSystem         0
Event Log Eventlog  Running   Auto      Share Process       c:\windows\system32\services.exe        Normal
          LocalSystem         0
COM+ Event System   EventSystem         Running   Auto      Share Process       c:\windows\system32\svchost.exe -k
netsvcs   Normal    LocalSystem         0
Help and Support    helpsvc   Running   Manual    Share Process       c:\windows\system32\svchost.exe -k netsvcs
          Normal    LocalSystem         0
Human Interface Device Access HidServ   Stopped   Disabled  Share Process       c:\windows\system32\svchost.exe -k
netsvcs   Normal    LocalSystem         0
HTTP SSL  HTTPFilter          Running   Manual    Share Process       c:\windows\system32\lsass.exe Normal
          LocalSystem         0
IAS Jet Database Access       IASJet    Stopped   Manual    Share Process       c:\windows\syswow64\svchost.exe -k
iasjet    Normal    LocalSystem         0
IIS Admin Service   IISADMIN  Running   Manual    Share Process       c:\windows\system32\inetsrv\inetinfo.exe
          Normal    LocalSystem         0
IMAPI CD-Burning COM Service  ImapiService        Stopped   Disabled  Own Process         c:\windows\system32\imapi.exe
          Normal    LocalSystem         0
Intersite Messaging IsmServ   Stopped   Disabled  Own Process         c:\windows\system32\ismserv.exe         Normal
          LocalSystem         0
Kerberos Key Distribution Center        kdc       Stopped   Disabled  Share Process       c:\windows\system32\lsass.exe
          Normal    LocalSystem         0
Server    lanmanserver        Stopped   Manual    Share Process       c:\windows\system32\svchost.exe -k netsvcs
          Normal    LocalSystem         0
Workstation         lanmanworkstation   Running   Auto      Share Process       c:\windows\system32\svchost.exe -k
netsvcs   Normal    LocalSystem         0
License Logging     LicenseService      Stopped   Disabled  Own Process         c:\windows\system32\llssrv.exe
          Normal    NT AUTHORITY\NetworkService   0
TCP/IP NetBIOS Helper         LmHosts   Stopped   Manual    Share Process       c:\windows\system32\svchost.exe -k
localservice        Normal    NT AUTHORITY\LocalService     0
Messenger Messenger Stopped   Disabled  Share Process       c:\windows\system32\svchost.exe -k netsvcs        Normal
          LocalSystem         0
NetMeeting Remote Desktop Sharing       mnmsrvc   Stopped   Disabled  Own Process
          c:\windows\system32\mnmsrvc.exe         Normal    LocalSystem         0
Distributed Transaction Coordinator     MSDTC     Running   Auto      Own Process         c:\windows\system32\msdtc.exe
          Normal    NT AUTHORITY\NetworkService   0
SQL Server FullText Search (MSSQLSERVER)          msftesql  Running   Auto      Own Process         "c:\program
files\microsoft sql server\mssql.1\mssql\binn\msftesql.exe" -s:mssql.1 -f:mssqlserver     Normal    LocalSystem
          0
Windows Installer   MSIServer Stopped   Manual    Share Process       c:\windows\system32\msiexec.exe /v      Normal
          LocalSystem         0
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SQL Server (MSSQLSERVER)      MSSQLSERVER         Stopped   Manual    Own Process         "c:\program files\microsoft
sql server\mssql.1\mssql\binn\sqlservr.exe" -smssqlserver   Normal    LocalSystem         0
SQL Server Active Directory Helper      MSSQLServerADHelper Stopped   Disabled  Own Process         "c:\program
files\microsoft sql server\90\shared\sqladhlp90.exe"        Normal    NT AUTHORITY\NetworkService   0
SQL Server Analysis Services (MSSQLSERVER)        MSSQLServerOLAPService        Stopped   Manual    Own Process
         "c:\program files\microsoft sql server\mssql.2\olap\bin\msmdsrv.exe" -s "c:\program files\microsoft sql
server\mssql.2\olap\config"   Normal    LocalSystem         0
Network DDE         NetDDE    Stopped   Disabled  Share Process       c:\windows\system32\netdde.exe          Normal
         LocalSystem         0
Network DDE DSDM    NetDDEdsdm          Stopped   Disabled  Share Process       c:\windows\system32\netdde.exe
         Normal    LocalSystem         0
Net Logon Netlogon  Stopped   Manual    Share Process       c:\windows\system32\lsass.exe Normal    LocalSystem
         0
Network Connections Netman    Running   Manual    Share Process       c:\windows\system32\svchost.exe -k netsvcs
         Normal    LocalSystem         0
Network Location Awareness (NLA)        Nla       Running   Manual    Share Process
         c:\windows\system32\svchost.exe -k netsvcs        Normal    LocalSystem         0
File Replication    NtFrs     Stopped   Manual    Own Process         c:\windows\system32\ntfrs.exe Ignore
         LocalSystem         0
NT LM Security Support Provider         NtLmSsp   Running   Manual    Share Process       c:\windows\system32\lsass.exe
         Normal    LocalSystem         0
Removable Storage   NtmsSvc   Stopped   Manual    Share Process       c:\windows\system32\svchost.exe -k netsvcs
         Normal    LocalSystem         0
Office Source Engine          ose       Stopped   Manual    Own Process         "c:\program files (x86)\common
files\microsoft shared\source engine\ose.exe"     Normal    LocalSystem         0
Plug and Play       PlugPlay  Running   Auto      Share Process       c:\windows\system32\services.exe        Normal
         LocalSystem         0
IPSEC Services      PolicyAgent         Stopped   Manual    Share Process       c:\windows\system32\lsass.exe Normal
         LocalSystem         0
Protected Storage   ProtectedStorage    Stopped   Manual    Share Process       c:\windows\system32\lsass.exe Normal
         LocalSystem         0
Remote Access Auto Connection Manager   RasAuto   Stopped   Manual    Share Process
         c:\windows\system32\svchost.exe -k netsvcs        Normal    LocalSystem         0
Remote Access Connection Manager        RasMan    Stopped   Manual    Share Process
         c:\windows\system32\svchost.exe -k netsvcs        Normal    LocalSystem         0
Remote Desktop Help Session Manager     RDSessMgr Stopped   Manual    Own Process
         c:\windows\system32\sessmgr.exe         Normal    LocalSystem         0
Routing and Remote Access     RemoteAccess        Stopped   Disabled  Share Process
         c:\windows\system32\svchost.exe -k netsvcs        Normal    LocalSystem         0
Remote Registry     RemoteRegistry      Stopped   Manual    Share Process       c:\windows\system32\svchost.exe -k
regsvc    Normal    NT AUTHORITY\LocalService     0
Remote Procedure Call (RPC) Locator     RpcLocator          Stopped   Manual    Own Process
         c:\windows\system32\locator.exe         Normal    NT AUTHORITY\NetworkService   0
Remote Procedure Call (RPC)   RpcSs     Running   Auto      Share Process       c:\windows\system32\svchost.exe -k
rpcss     Normal    NT AUTHORITY\NetworkService   0
Resultant Set of Policy Provider        RSoPProv  Stopped   Manual    Share Process
         c:\windows\system32\rsopprov.exe        Normal    LocalSystem         0
Special Administration Console Helper   sacsvr    Stopped   Manual    Share Process
         c:\windows\system32\svchost.exe -k netsvcs        Normal    LocalSystem         0
Security Accounts Manager     SamSs     Running   Auto      Share Process       c:\windows\system32\lsass.exe Normal
         LocalSystem         0
Smart Card          SCardSvr  Stopped   Manual    Share Process       c:\windows\system32\scardsvr.exe        Ignore
         NT AUTHORITY\LocalService     0
Task Scheduler      Schedule  Stopped   Manual    Share Process       c:\windows\system32\svchost.exe -k netsvcs
         Normal    LocalSystem         0
Secondary Logon     seclogon  Stopped   Manual    Share Process       c:\windows\system32\svchost.exe -k netsvcs
         Ignore    LocalSystem         0
System Event Notification     SENS      Running   Auto      Share Process       c:\windows\system32\svchost.exe -k
netsvcs   Normal    LocalSystem         0
Windows Firewall/Internet Connection Sharing (ICS)          SharedAccess        Stopped   Disabled  Share Process
         c:\windows\system32\svchost.exe -k netsvcs        Normal    LocalSystem         0
Shell Hardware Detection      ShellHWDetection    Running   Manual    Share Process
         c:\windows\system32\svchost.exe -k netsvcs        Ignore    LocalSystem         0
Print Spooler       Spooler   Stopped   Manual    Own Process         c:\windows\system32\spoolsv.exe         Normal
         LocalSystem         0
SQL Server Browser  SQLBrowser          Stopped   Disabled  Own Process         "c:\program files (x86)\microsoft sql
server\90\shared\sqlbrowser.exe"        Normal    LocalSystem         0
SQL Server Agent (MSSQLSERVER)          SQLSERVERAGENT      Stopped   Manual    Own Process         "c:\program
files\microsoft sql server\mssql.1\mssql\binn\sqlagent90.exe" -i mssqlserver    Normal    LocalSystem         0
SQL Server VSS Writer         SQLWriter Stopped   Manual    Own Process         "c:\program files\microsoft sql
server\90\shared\sqlwriter.exe"         Normal    LocalSystem         0
Windows Image Acquisition (WIA)         stisvc    Stopped   Disabled  Share Process
         c:\windows\system32\svchost.exe -k imgsvc         Normal    NT AUTHORITY\LocalService     0
Microsoft Software Shadow Copy Provider swprv     Stopped   Manual    Own Process
         c:\windows\system32\svchost.exe -k swprv          Normal    LocalSystem         0
Performance Logs and Alerts   SysmonLog Stopped   Manual    Own Process         c:\windows\system32\smlogsvc.exe
         Normal    NT Authority\NetworkService   0
Telephony TapiSrv   Stopped   Manual    Share Process       c:\windows\system32\svchost.exe -k tapisrv        Normal
         LocalSystem         0
Terminal Services   TermService         Running   Manual    Share Process       c:\windows\system32\svchost.exe -k
termsvcs  Normal    LocalSystem         0
Themes    Themes    Stopped   Disabled  Share Process       c:\windows\system32\svchost.exe -k netsvcs        Normal
         LocalSystem         0
Telnet    TlntSvr   Stopped   Disabled  Own Process         c:\windows\system32\tlntsvr.exe         Normal    NT
AUTHORITY\LocalService        0
Distributed Link Tracking Server        TrkSvr    Stopped   Disabled  Share Process
         c:\windows\system32\svchost.exe -k netsvcs        Normal    LocalSystem         0
Distributed Link Tracking Client        TrkWks    Stopped   Manual    Share Process
         c:\windows\system32\svchost.exe -k netsvcs        Normal    LocalSystem         0
Terminal Services Session Directory     Tssdis    Stopped   Disabled  Own Process
         c:\windows\system32\tssdis.exe          Normal    LocalSystem         0
Windows User Mode Driver Framework      UMWdf     Stopped   Manual    Own Process
         c:\windows\system32\wdfmgr.exe          Normal    NT AUTHORITY\LocalService     0
```

```
Uninterruptible Power Supply  UPS       Stopped   Manual    Own Process         c:\windows\system32\ups.exe   Normal
          NT AUTHORITY\LocalService     0
Virtual Disk Service          vds       Stopped   Manual    Own Process         c:\windows\system32\vds.exe   Normal
          LocalSystem         0
Volume Shadow Copy  VSS       Stopped   Manual    Own Process         c:\windows\system32\vssvc.exe Normal
          LocalSystem         0
Windows Time        W32Time   Stopped   Manual    Share Process       c:\windows\system32\svchost.exe -k localservice
          Normal    NT AUTHORITY\LocalService     0
World Wide Web Publishing Service       W3SVC     Running   Auto      Share Process
          c:\windows\system32\svchost.exe -k iissvcs        Normal    LocalSystem         0
WebClient WebClient Stopped   Disabled  Share Process       c:\windows\system32\svchost.exe -k localservice   Normal
          NT AUTHORITY\LocalService     0
WinHTTP Web Proxy Auto-Discovery Service          WinHttpAutoProxySvc Stopped   Manual    Share Process
          c:\windows\system32\svchost.exe -k localservice   Normal    NT AUTHORITY\LocalService     0
Windows Management Instrumentation      winmgmt   Running   Manual    Share Process
          c:\windows\system32\svchost.exe -k netsvcs        Ignore    LocalSystem         0
Portable Media Serial Number Service    WmdmPmSN  Stopped   Manual    Share Process
          c:\windows\system32\svchost.exe -k netsvcs        Normal    LocalSystem         0
Windows Management Instrumentation Driver Extensions        Wmi       Stopped   Manual    Share Process
          c:\windows\system32\svchost.exe -k netsvcs        Normal    LocalSystem         0
WMI Performance Adapter       WmiApSrv  Stopped   Manual    Own Process         c:\windows\system32\wbem\wmiapsrv.exe
          Normal    LocalSystem         0
Automatic Updates   wuauserv  Stopped   Manual    Share Process       c:\windows\system32\svchost.exe -k netsvcs
          Normal    LocalSystem         0
Wireless Configuration        WZCSVC    Stopped   Manual    Share Process       c:\windows\system32\svchost.exe -k
netsvcs   Normal    LocalSystem         0
Network Provisioning Service  xmlprov   Stopped   Manual    Share Process       c:\windows\system32\svchost.exe -k
netsvcs   Normal    LocalSystem         0

[Program Groups]

Group Name          Name      User Name
Accessories         Default User:Accessories      Default User
Accessories\Accessibility     Default User:Accessories\Accessibility  Default User
Accessories\Entertainment     Default User:Accessories\Entertainment  Default User
Startup   Default User:Startup          Default User
Accessories         All Users:Accessories         All Users
Accessories\Accessibility     All Users:Accessories\Accessibility     All Users
Accessories\Communications    All Users:Accessories\Communications    All Users
Accessories\Entertainment     All Users:Accessories\Entertainment     All Users
Accessories\System Tools      All Users:Accessories\System Tools      All Users
Administrative Tools          All Users:Administrative Tools          All Users
Microsoft SQL Server 2005 CTP All Users:Microsoft SQL Server 2005 CTP All Users
Microsoft SQL Server 2005 CTP\Analysis Services   All Users:Microsoft SQL Server 2005 CTP\Analysis Services   All Users
Microsoft SQL Server 2005 CTP\Configuration Tools All Users:Microsoft SQL Server 2005 CTP\Configuration Tools All Users
Microsoft SQL Server 2005 CTP\Performance Tools   All Users:Microsoft SQL Server 2005 CTP\Performance Tools   All Users
Microsoft Visual Studio 2005  All Users:Microsoft Visual Studio 2005  All Users
Microsoft Visual Studio 2005\Visual Studio Tools  All Users:Microsoft Visual Studio 2005\Visual Studio Tools  All Users
Startup   All Users:Startup   All Users
Accessories         NT AUTHORITY\SYSTEM:Accessories         NT AUTHORITY\SYSTEM
Accessories\Accessibility     NT AUTHORITY\SYSTEM:Accessories\Accessibility     NT AUTHORITY\SYSTEM
Accessories\Entertainment     NT AUTHORITY\SYSTEM:Accessories\Entertainment     NT AUTHORITY\SYSTEM
Startup   NT AUTHORITY\SYSTEM:Startup   NT AUTHORITY\SYSTEM
Accessories         PE2800\Administrator:Accessories        PE2800\Administrator
Accessories\Accessibility     PE2800\Administrator:Accessories\Accessibility    PE2800\Administrator
Accessories\Entertainment     PE2800\Administrator:Accessories\Entertainment    PE2800\Administrator
Administrative Tools          PE2800\Administrator:Administrative Tools         PE2800\Administrator
Startup   PE2800\Administrator:Startup  PE2800\Administrator

[Startup Programs]

Program   Command   User Name Location
desktop   desktop.ini         NT AUTHORITY\SYSTEM Startup
desktop   desktop.ini         PE2800\Administrator          Startup
desktop   desktop.ini         .DEFAULT  Startup
desktop   desktop.ini         All Users Common Startup

[OLE Registration]

Object    Local Server
Sound (OLE2)        sndrec32.exe
Media Clip          mplay32.exe
Video Clip          mplay32.exe /avi
MIDI Sequence       mplay32.exe /mid
Sound     Not Available
Media Clip          Not Available
WordPad Document    "%programfiles%\windows nt\accessories\wordpad.exe"
Bitmap Image        mspaint.exe

[Windows Error Reporting]

Time      Type      Details

[Internet Settings]



[Internet Explorer]

[ Following are sub-categories of this main category ]
[Summary]

Item      Value
```

```
Version   6.0.3790.1830
Build     63790.1830
Application Path    C:\Program Files\Internet Explorer
Language  English (United States)
Active Printer      Not Available

Cipher Strength     128-bit
Content Advisor     Disabled
IEAK Install        No

[File Versions]

File      Version   Size      Date      Path      Company
actxprxy.dll        6.0.3790.1830       221 KB    3/25/2005 7:00:00 AM          C:\WINDOWS\system32 Microsoft
Corporation
actxprxy.dll        6.0.3790.1830       221 KB    3/25/2005 7:00:00 AM          .         Microsoft Corporation
advpack.dll         6.0.3790.1830       146 KB    3/25/2005 7:00:00 AM          C:\WINDOWS\system32 Microsoft
Corporation
advpack.dll         6.0.3790.1830       146 KB    3/25/2005 7:00:00 AM          .         Microsoft Corporation
asctrls.ocx         6.0.3790.1830       147 KB    3/25/2005 7:00:00 AM          C:\WINDOWS\system32 Microsoft
Corporation
asctrls.ocx         6.0.3790.1830       147 KB    3/25/2005 7:00:00 AM          .         Microsoft Corporation
browselc.dll        6.0.3790.1830       63 KB     3/25/2005 7:00:00 AM          C:\WINDOWS\system32 Microsoft
Corporation
browselc.dll        6.0.3790.1830       63 KB     3/25/2005 7:00:00 AM          .         Microsoft Corporation
browseui.dll        6.0.3790.1830       1,564 KB  3/25/2005 7:00:00 AM          C:\WINDOWS\system32 Microsoft
Corporation
browseui.dll        6.0.3790.1830       1,564 KB  3/25/2005 7:00:00 AM          .         Microsoft Corporation
cdfview.dll         6.0.3790.1830       216 KB    3/25/2005 7:00:00 AM          C:\WINDOWS\system32 Microsoft
Corporation
cdfview.dll         6.0.3790.1830       216 KB    3/25/2005 7:00:00 AM          .         Microsoft Corporation
comctl32.dll        5.82.3790.1830      935 KB    3/25/2005 7:00:00 AM          C:\WINDOWS\system32 Microsoft
Corporation
comctl32.dll        5.82.3790.1830      935 KB    3/25/2005 7:00:00 AM          .         Microsoft Corporation
dxtrans.dll         6.3.3790.1830       320 KB    3/25/2005 7:00:00 AM          C:\WINDOWS\system32 Microsoft
Corporation
dxtrans.dll         6.3.3790.1830       320 KB    3/25/2005 7:00:00 AM          .         Microsoft Corporation
dxtmsft.dll         6.3.3790.1830       549 KB    3/25/2005 7:00:00 AM          C:\WINDOWS\system32 Microsoft
Corporation
dxtmsft.dll         6.3.3790.1830       549 KB    3/25/2005 7:00:00 AM          .         Microsoft Corporation
iecont.dll          <File Missing>      Not Available       Not Available       Not Available       Not Available
iecontlc.dll        <File Missing>      Not Available       Not Available       Not Available       Not Available
iedkcs32.dll        16.0.3790.1830      417 KB    3/25/2005 7:00:00 AM          C:\WINDOWS\system32 Microsoft
Corporation
iedkcs32.dll        16.0.3790.1830      417 KB    3/25/2005 7:00:00 AM          .         Microsoft Corporation
iepeers.dll         6.0.3790.1830       361 KB    3/25/2005 7:00:00 AM          C:\WINDOWS\system32 Microsoft
Corporation
iepeers.dll         6.0.3790.1830       361 KB    3/25/2005 7:00:00 AM          .         Microsoft Corporation
iesetup.dll         6.0.3790.1830       71 KB     3/25/2005 7:00:00 AM          C:\WINDOWS\system32 Microsoft
Corporation
iesetup.dll         6.0.3790.1830       71 KB     3/25/2005 7:00:00 AM          .         Microsoft Corporation
ieuinit.inf         Not Available       24 KB     3/25/2005 7:00:00 AM          C:\WINDOWS\system32 Not Available
ieuinit.inf         Not Available       24 KB     3/25/2005 7:00:00 AM          .         Not Available
iexplore.exe        6.0.3790.1830       94 KB     3/25/2005 7:00:00 AM          C:\Program Files\Internet Explorer
         Microsoft Corporation
imgutil.dll         6.0.3790.1830       61 KB     3/25/2005 7:00:00 AM          C:\WINDOWS\system32 Microsoft
Corporation
imgutil.dll         6.0.3790.1830       61 KB     3/25/2005 7:00:00 AM          .         Microsoft Corporation
inetcpl.cpl         6.0.3790.1830       428 KB    3/25/2005 7:00:00 AM          C:\WINDOWS\system32 Microsoft
Corporation
inetcpl.cpl         6.0.3790.1830       428 KB    3/25/2005 7:00:00 AM          .         Microsoft Corporation
inetcplc.dll        6.0.3790.1830       110 KB    3/25/2005 7:00:00 AM          C:\WINDOWS\system32 Microsoft
Corporation
inetcplc.dll        6.0.3790.1830       110 KB    3/25/2005 7:00:00 AM          .         Microsoft Corporation
inseng.dll          6.0.3790.1830       147 KB    3/25/2005 7:00:00 AM          C:\WINDOWS\system32 Microsoft
Corporation
inseng.dll          6.0.3790.1830       147 KB    3/25/2005 7:00:00 AM          .         Microsoft Corporation
mlang.dll 6.0.3790.1830       686 KB    3/25/2005 7:00:00 AM          C:\WINDOWS\system32 Microsoft Corporation
mlang.dll 6.0.3790.1830       686 KB    3/25/2005 7:00:00 AM          .         Microsoft Corporation
msencode.dll        <File Missing>      Not Available       Not Available       Not Available       Not Available
mshta.exe 6.0.3790.1830       38 KB     3/25/2005 7:00:00 AM          C:\WINDOWS\system32 Microsoft Corporation
mshta.exe 6.0.3790.1830       38 KB     3/25/2005 7:00:00 AM          .         Microsoft Corporation
mshtml.dll          6.0.3790.1830       5,790 KB  3/25/2005 7:00:00 AM          C:\WINDOWS\system32 Microsoft
Corporation
mshtml.dll          6.0.3790.1830       5,790 KB  3/25/2005 7:00:00 AM          .         Microsoft Corporation
mshtml.tlb          6.0.3790.1830       1,320 KB  3/25/2005 7:00:00 AM          C:\WINDOWS\system32 Microsoft
Corporation
mshtml.tlb          6.0.3790.1830       1,320 KB  3/25/2005 7:00:00 AM          .         Microsoft Corporation
mshtmled.dll        6.0.3790.1830       906 KB    3/25/2005 7:00:00 AM          C:\WINDOWS\system32 Microsoft
Corporation
mshtmled.dll        6.0.3790.1830       906 KB    3/25/2005 7:00:00 AM          .         Microsoft Corporation
mshtmler.dll        6.0.3790.1830       56 KB     3/25/2005 7:00:00 AM          C:\WINDOWS\system32 Microsoft
Corporation
mshtmler.dll        6.0.3790.1830       56 KB     3/25/2005 7:00:00 AM          .         Microsoft Corporation
msident.dll         6.0.3790.1830       69 KB     3/25/2005 7:00:00 AM          C:\WINDOWS\system32 Microsoft
Corporation
msident.dll         6.0.3790.1830       69 KB     3/25/2005 7:00:00 AM          .         Microsoft Corporation
msidntld.dll        6.0.3790.1830       16 KB     3/25/2005 7:00:00 AM          C:\WINDOWS\system32 Microsoft
Corporation
msidntld.dll        6.0.3790.1830       16 KB     3/25/2005 7:00:00 AM          .         Microsoft Corporation
msieftp.dll         6.0.3790.1830       369 KB    3/25/2005 7:00:00 AM          C:\WINDOWS\system32 Microsoft
Corporation
msieftp.dll         6.0.3790.1830       369 KB    3/25/2005 7:00:00 AM          .         Microsoft Corporation
```

```
msrating.dll        6.0.3790.1830       240 KB    3/25/2005 7:00:00 AM          C:\WINDOWS\system32 Microsoft
Corporation
msrating.dll        6.0.3790.1830       240 KB    3/25/2005 7:00:00 AM          .         Microsoft Corporation
mstime.dll          6.0.3790.1830       878 KB    3/25/2005 7:00:00 AM          C:\WINDOWS\system32 Microsoft
Corporation
mstime.dll          6.0.3790.1830       878 KB    3/25/2005 7:00:00 AM          .         Microsoft Corporation
occache.dll         6.0.3790.1830       126 KB    3/25/2005 7:00:00 AM          C:\WINDOWS\system32 Microsoft
Corporation
occache.dll         6.0.3790.1830       126 KB    3/25/2005 7:00:00 AM          .         Microsoft Corporation
proctexe.ocx        <File Missing>      Not Available       Not Available       Not Available       Not Available
sendmail.dll        6.0.3790.1830       64 KB     3/25/2005 7:00:00 AM          C:\WINDOWS\system32 Microsoft
Corporation
sendmail.dll        6.0.3790.1830       64 KB     3/25/2005 7:00:00 AM          .         Microsoft Corporation
shdoclc.dll         6.0.3790.1830       590 KB    3/25/2005 7:00:00 AM          C:\WINDOWS\system32 Microsoft
Corporation
shdoclc.dll         6.0.3790.1830       590 KB    3/25/2005 7:00:00 AM          .         Microsoft Corporation
shdocvw.dll         6.0.3790.1830       2,360 KB  3/25/2005 7:00:00 AM          C:\WINDOWS\system32 Microsoft
Corporation
shdocvw.dll         6.0.3790.1830       2,360 KB  3/25/2005 7:00:00 AM          .         Microsoft Corporation
shfolder.dll        6.0.3790.1830       34 KB     3/25/2005 7:00:00 AM          C:\WINDOWS\system32 Microsoft
Corporation
shfolder.dll        6.0.3790.1830       34 KB     3/25/2005 7:00:00 AM          .         Microsoft Corporation
shlwapi.dll         6.0.3790.1830       607 KB    3/25/2005 7:00:00 AM          C:\WINDOWS\system32 Microsoft
Corporation
shlwapi.dll         6.0.3790.1830       607 KB    3/25/2005 7:00:00 AM          .         Microsoft Corporation
tdc.ocx   1.3.0.3130          91 KB     3/25/2005 7:00:00 AM          C:\WINDOWS\system32 Microsoft Corporation
tdc.ocx   1.3.0.3130          91 KB     3/25/2005 7:00:00 AM          .         Microsoft Corporation
url.dll   6.0.3790.1830       40 KB     3/25/2005 7:00:00 AM          C:\WINDOWS\system32 Microsoft Corporation
url.dll   6.0.3790.1830       40 KB     3/25/2005 7:00:00 AM          .         Microsoft Corporation
urlmon.dll          6.0.3790.1830       1,049 KB  3/25/2005 7:00:00 AM          C:\WINDOWS\system32 Microsoft
Corporation
urlmon.dll          6.0.3790.1830       1,049 KB  3/25/2005 7:00:00 AM          .         Microsoft Corporation
webcheck.dll        6.0.3790.1830       439 KB    3/25/2005 7:00:00 AM          C:\WINDOWS\system32 Microsoft
Corporation
webcheck.dll        6.0.3790.1830       439 KB    3/25/2005 7:00:00 AM          .         Microsoft Corporation
wininet.dll         6.0.3790.1830       1,159 KB  3/25/2005 7:00:00 AM          C:\WINDOWS\system32 Microsoft
Corporation
wininet.dll         6.0.3790.1830       1,159 KB  3/25/2005 7:00:00 AM          .         Microsoft Corporation

[Connectivity]

Item      Value
Connection Preference         Never dial

LAN Settings

AutoConfigProxy     wininet.dll
AutoProxyDetectMode Enabled
AutoConfigURL
Proxy     Disabled
ProxyServer
ProxyOverride

[Cache]

[ Following are sub-categories of this main category ]
[Summary]

Item      Value
Page Refresh Type   Automatic
Temporary Internet Files Folder         C:\Documents and Settings\Administrator\Local Settings\Temporary Internet Files
Total Disk Space    Not Available
Available Disk Space          Not Available
Maximum Cache Size  Not Available
Available Cache Size          Not Available

[List of Objects]

Program File        Status    CodeBase
No cached object information available

[Content]

[ Following are sub-categories of this main category ]
[Summary]

Item      Value
Content Advisor     Disabled

[Personal Certificates]

Issued To Issued By Validity  Signature Algorithm
No personal certificate information available

[Other People Certificates]

Issued To Issued By Validity  Signature Algorithm
No other people certificate information available

[Publishers]

Name
No publisher information available
```

```
[Security]

Zone      Security Level
My Computer         Custom
Local intranet      Custom
Trusted sites       Low
Internet  Medium
Restricted sites    Custom
```

RTE Input Parameters

Profile: 3080_pe2800_PAXVILLE
File Path: C:\Program Files\BenchCraft\3080_pe2800_PAXVILLE.xml
Version: 5

Number of Engines: 4

Name: DRIVER1
Description: rte103_1
Directory: c:\tpcclog\rte103_1.log
Machine: rte103
Parameter Set: PARAM2
Index: 700000000
Seed: 59915
Configured Users: 7700
Pipe Name: DRIVER8-922426029
Connect Rate: 1200
Start Rate: 1200
Max. Concurrency: -1
Concurrency Rate: 10
CLIENT_NURAND: 233
CPU: 0
Additional Options:

Name: DRIVER2
Description: rte103_2
Directory: c:\tpcclog\rte103_2.log
Machine: rte103
Parameter Set: PARAM2
Index: 100000000
Seed: 59915
Configured Users: 7700
Pipe Name: DRIVER2-1764008608
Connect Rate: 1200
Start Rate: 1200
Max. Concurrency: -1
Concurrency Rate: 10
CLIENT_NURAND: 233
CPU: 1
Additional Options:

Name: DRIVER3
Description: rte104_1
Directory: c:\tpcclog\rte104_1.log
Machine: rte104

Parameter Set: PARAM2
Index: 200000000
Seed: 59915
Configured Users: 7700
Pipe Name: DRIVER3-1689047983
Connect Rate: 1200
Start Rate: 1200
Max. Concurrency: -1
Concurrency Rate: 10
CLIENT_NURAND: 233
CPU: 0
Additional Options:

Name: DRIVER4
Description: rte104_2
Directory: c:\tpcclog\ret104_2.log
Machine: rte104
Parameter Set: PARAM2
Index: 300000000
Seed: 59915
Configured Users: 7700
Pipe Name: DRIVER4190963968
Connect Rate: 1200
Start Rate: 1200
Max. Concurrency: -1
Concurrency Rate: 10
CLIENT_NURAND: 233
CPU: 1
Additional Options:

Number of User groups: 4

Driver Engine: DRIVER1
IIS Server: client90
SQL Server: pe2800
Database: tpcc
User: sa
Protocol: HTML
w_id Range: 1 - 770
w_id Min Warehouse: 1
w_id Max Warehouse: 3080
Scale: Normal
User Count: 7700
District id: 1
Scale Down: No

Driver Engine: DRIVER2
IIS Server: client90
SQL Server: pe2800
Database: tpcc
User: sa
Protocol: HTML
w_id Range: 771 - 1540
w_id Min Warehouse: 1
w_id Max Warehouse: 3080

Scale: Normal
User Count: 7700
District id: 1
Scale Down: No

Driver Engine: DRIVER3
IIS Server: client90
SQL Server: pe2800
Database: tpcc
User: sa
Protocol: HTML
w_id Range: 1541 - 2310
w_id Min Warehouse: 1
w_id Max Warehouse: 3080
Scale: Normal
User Count: 7700
District id: 1
Scale Down: No

Driver Engine: DRIVER4
IIS Server: client90
SQL Server: pe2800
Database: tpcc
User: sa
Protocol: HTML
w_id Range: 2311 - 3080
w_id Min Warehouse: 1
w_id Max Warehouse: 3080
Scale: Normal
User Count: 7700
District id: 1
Scale Down: No

Number of Parameter Sets: 5

~Default
Default Parameter Set

	Txn Weight	Think Time	Key Time	RT Delay	RT Fence	Menu Delay	
New Order	10.00	12.05	18.01	0.10	5.00	0.10	
Payment	10.00	12.05	3.01	0.10	5.00	0.10	
Delivery	1.00	5.05	2.01	0.10	5.00	0.10	
Stock Level	1.00	5.05	2.01	0.10	20.00	0.10	
Order Status	1.00	10.05	2.01	0.10	5.00	0.10	

PARAM2

	Txn Weight	Think Time	Key Time	RT Delay	RT Fence	Menu Delay	
New Order	44.84	12.04	18.02	0.10	5.00	0.10	
Payment	43.04	12.04	3.02	0.10	5.00	0.10	
Delivery	4.05	5.04	2.02	0.10	5.00	0.10	
Stock Level	4.05	5.04	2.02	0.10	20.00	0.10	
Order Status	4.05	10.04	2.02	0.10	5.00	0.10	

50run

	Txn Weight	Think Time	Key Time	RT Delay	RT Fence	Menu Delay
New Order	44.84	30.00	18.02	0.10	5.00	0.10
Payment	43.04	30.00	3.02	0.10	5.00	0.10
Delivery	4.05	15.00	2.02	0.10	5.00	0.10
Stock Level	4.05	15.00	2.02	0.10	20.00	0.10
Order Status	4.05	25.00	2.02	0.10	5.00	0.10

50run2

	Txn Weight	Think Time	Key Time	RT Delay	RT Fence	Menu Delay
New Order	44.84	33.00	18.02	0.10	5.00	0.10
Payment	43.04	33.00	3.02	0.10	5.00	0.10
Delivery	4.05	18.00	2.02	0.10	5.00	0.10
Stock Level	4.05	18.00	2.02	0.10	20.00	0.10
Order Status	4.05	28.00	2.02	0.10	5.00	0.10

80run

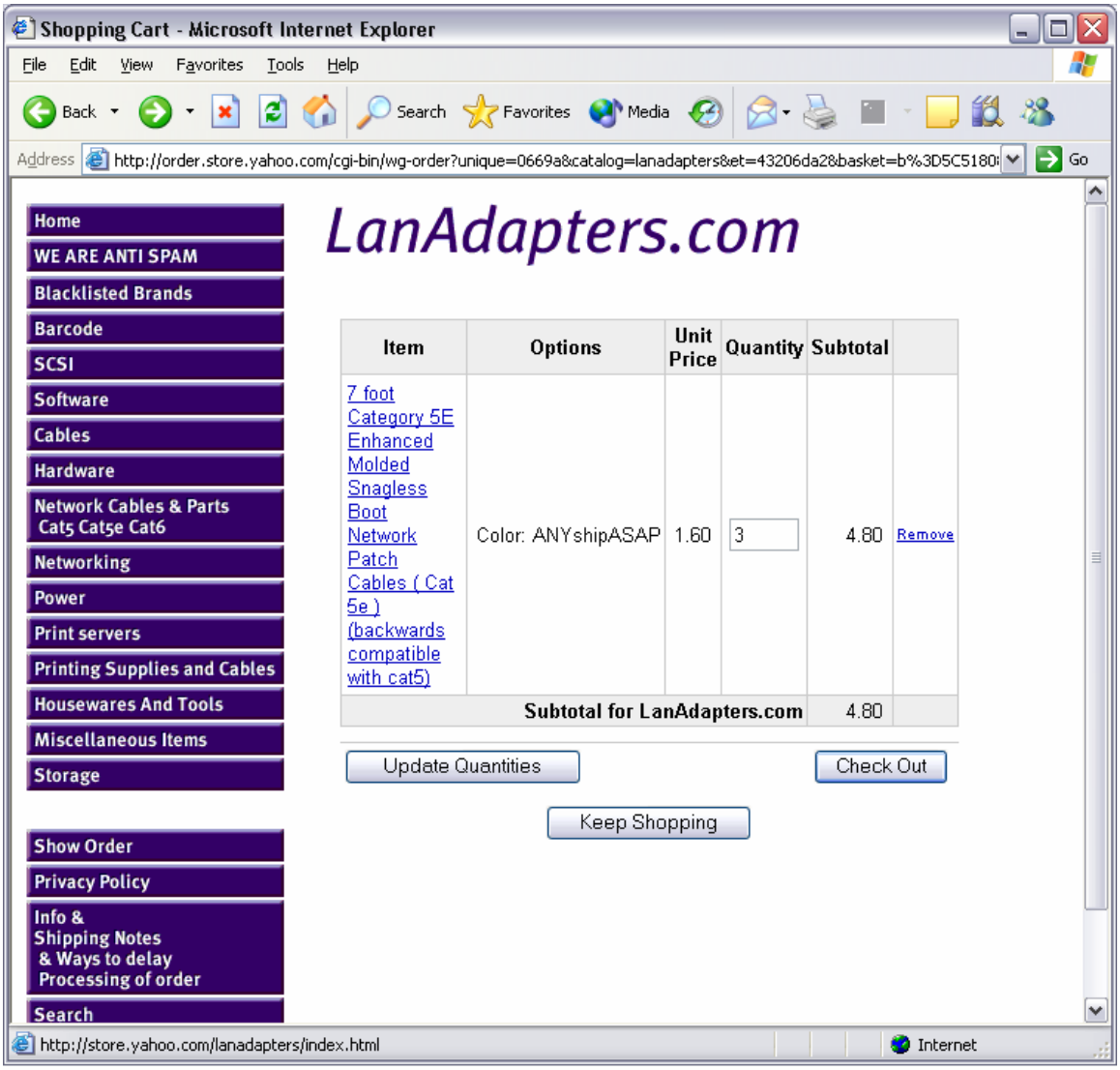
	Txn Weight	Think Time	Key Time	RT Delay	RT Fence	Menu Delay
New Order	44.84	19.00	18.02	0.10	5.00	0.10
Payment	43.04	19.00	3.02	0.10	5.00	0.10
Delivery	4.05	14.00	2.02	0.10	5.00	0.10
Stock Level	4.05	14.00	2.02	0.10	20.00	0.10
Order Status	4.05	9.00	2.02	0.10	5.00	0.10

Appendix D – Disk Storage

TPC-C 60 Day Space Requirements						
Warehouses	3100				TpmC	38,622.54
Table	Rows	Data KB	Index KB	Extra 5% KB	8hr Space	Total Space KB
Warehouse	3100	336	24	18		378
District	31000	3448	24	174		3646
Customer	93000000	67636368	4220080	3,592,822		75449270
History	93000000	5430672	80		1,100,547	5430752
NewOrder	27900000	497112	1264	24,919		523295
Orders	93000000	3036736	1481336		6,408,630	4518072
OrderLine	930005291	60983960	143656		13,870,560	61127616
Item	100000	9416	40	473		9929
Stock	310000000	99200008	209208	4,970,461		104379677
Total		236,798,056	6,055,712	8,588,866	21,379,737	251,442,634
	MB					
Dynamic Space	67,824	Sum of Data for Order, Orderline and History				
Static Space	177,726	Sum of Data+Index+5%-Dynamic Space				
Free Space	na	Total Allocated Spac - (Dynamic + Static Space)				
Daily Growth	13,520	(Dynamic Space/(W*62.5))*tpmc				
Daily Spread	-	(Free Space -1.5*Daily Growth) Zero Assumed				
60 Day Space MB	988,932					
60 Day Space GB	965.75	GB				
Log Size	61,281.99	MB				
KB Per New Order	6.39	KB				
8 hr log MB	115,776	MB				
8 hr log MB	113.0629	GB				
		Disks	Disks	Formatted Size	Space	
Space Usage	GB Needed	Measured	Size	Size	Available	
180 Day Space DB	965.75	56	36GB	33.860	1896.16	

Total DB		56.00			**1896.16**	
8-hr log + mirror	226.1258	8	72GB	68.240	**545.92**	
OS, Swap	3	0	9GB	0.000	0.00	
Total Storage	1,194.88	GB			2,442.08	

Appendix E - Price Quotations



Microsoft Corporation
One Microsoft Way
Redmond, WA 98052-6399

Tel 425 882 8080
Fax 425 936 7329
http://www.microsoft.com/

Microsoft

September 22, 2005

Dell Inc.
Dan Hambrick
1 Dell Way
Round Rock, TX 78680

Mr. Hambrick:

Here is the information you requested regarding pricing for several Microsoft products to be used in conjunction with your TPC-C benchmark testing.

All pricing shown is in US Dollars ($).

Part Number	Description	Unit Price	Quantity	Price
810-00846	**SQL Server 2005 Standard (x64) Edition** *Per Processing Licensing* *Discount Schedule: No Discounts Applied.*	$5,999	1	$5,999
P73-00295	**Windows Server 2003, Standard x64 Edition** *Server License Only - No CALs* *Discount Schedule: Open Program - No Level* *Unit Price reflects a 28% discount from the retail unit price of $999.*	$719	1	$719
P73-00295	**Windows Server 2003, Standard Edition** *Server License Only - No CALs* *Discount Schedule: Open Program - No Level* *Unit Price reflects a 28% discount from the retail unit price of $999.*	$719	1	$719
254-00170	**Visual C++ Standard Edition** *Discount Schedule: No Discounts Applied*	$109	1	$109
	Microsoft Problem Resolution Services *Professional Support* *(1 incident)*	$245	1	$245

Some products may not be currently orderable but will be available through Microsoft's normal distribution channels by November 8, 2005.

This quote is valid for the next 90 days.

If we can be of any further assistance, please contact Jamie Reding at (425) 703-0510 or jamiere@microsoft.com.

Reference ID: PCDham0520095159.
Please include this Reference ID in any correspondence regarding this price quote.