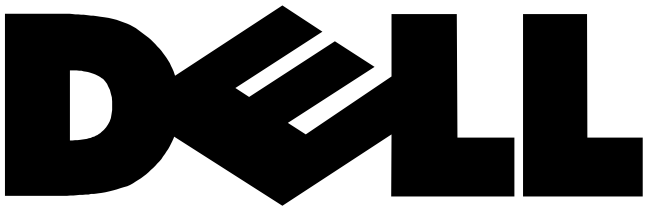


TPC Benchmark™ C
Full Disclosure Report
for
Dell PowerEdge 6600
Using
Microsoft SQL Server 2000 8.0 Enterprise Edition
and
Microsoft Windows .NET Enterprise Server

First Edition
Submitted for Review
Oct 30, 2002

First Printing, OCT 30, 2002

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 publication date, OCT 30, 2002 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 6600. The tests were run in a client/server configuration using Six PowerEdge 1500's as clients. The operating system used for the benchmark was Microsoft Windows .NET Enterprise Server on the database server and Microsoft Windows 2000 Server on the clients. The database was Microsoft SQL Server 2000 Enterprise Edition. Microsoft COM+ provided the database connection queues. All tests were done in compliance with Revision 5.0 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 6600	Microsoft Windows .NET Enterprise Server Windows 2000 Server SQL Server 2000 Enterprise Edition	$288,627	51,069.87	$5.66	Dec 31, 2002

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 5.0 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 Drive
Round Rock, TX 78682
Attention: Mike Molloy

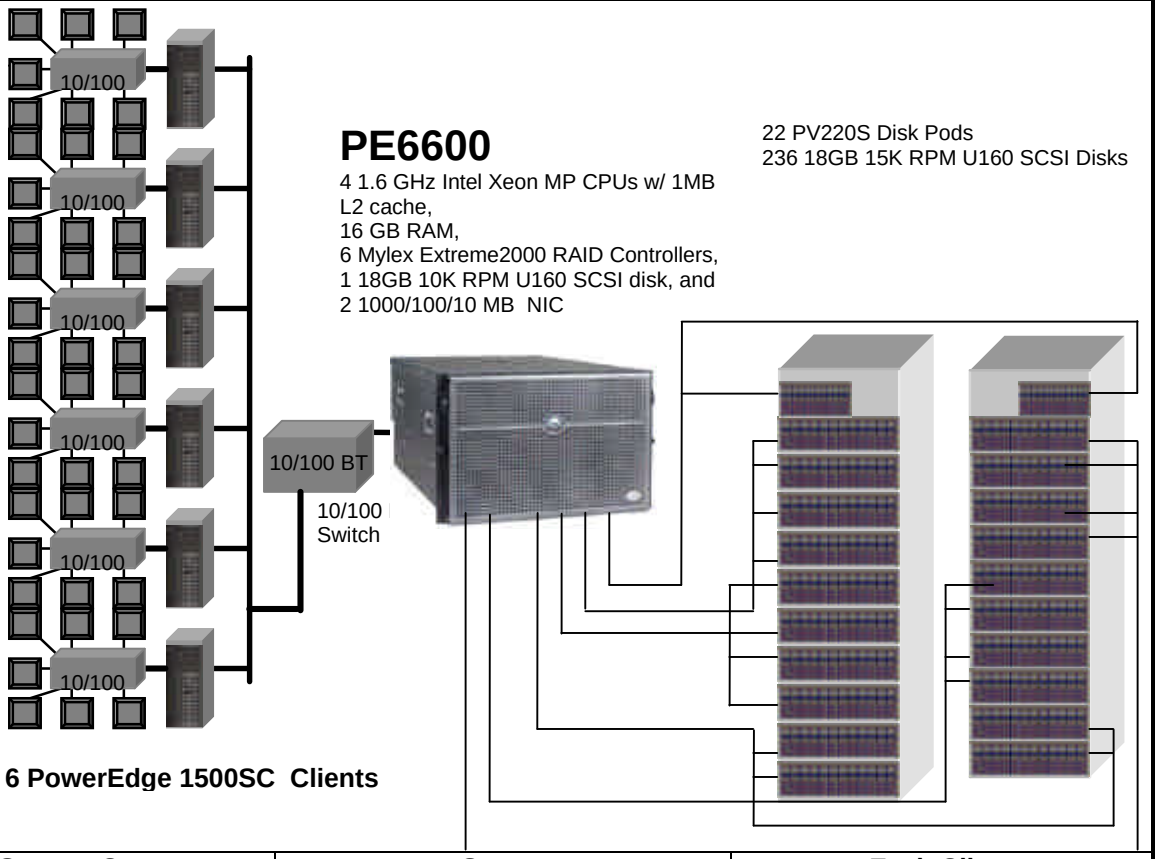
PowerEdge 6600

Client/Server w/6 PE1500 Front Ends

TPC-C Rev 5.0
Report Date
Oct 30, 2002

Total System Cost	TPC-C Throughput	Price/Performance	Availability Date
$288,627	**51,069.87 tpmC**	**$5.66/ tpmC**	Dec 31, 2002

Processors	Database Manager	OS	Other Software	Number of Users
4 x Intel Xeon™ MP Processors 1.6 GHz 1MB L2 Cache	Microsoft SQL Server 2000 Enterprise Edition	Microsoft Windows .NET Enterprise Server	Windows 2000 Server w/ COM+ Internet Information Server 5.0 Microsoft Visual C++	41,000



System Component	Server		Each Client	
Processors Cache	4	Intel Xeon MP @ 1.6GHz 1MB cache	1	Pentium® III w/ 512 KB L2 6 clients @ 1.13 GHz
Memory		16,384 MB		512 MB
Disk Controllers	6 1	Mylex ExtremeRAID 2000 Adaptec On-Board	1	Adaptec On-Board
Disk Drives	237	18 GB SCSI	1	18 GB
Total Storage		3971.56 GB		18 GB
Other	2 1 1	1GB NIC CD-ROM DAT	2 1	10/100MB BT NIC

Dell	PowerEdge 6600	TPC-C REV 5.0 EXECUTIVE SUMMARY PAGE 2 OF 2
	Client/Server	Report Date: 30-Oct-02

Description	Part Number	Third Party Brand	Third Party Pricing	Unit Price	Qty	Extended Price	3 yr. Maint. Price
Server Hardware							
Dell PowerEdge 6600	220-8304		1	8,126	1	8,126	1,299
Intel Xeon MP 1.6GHz / 1MB L2 - 4 processors	311-1528		1	14,999	1	14,999	-
16 GB,DDR, 16 x 1024MB DIMMS	311-1555		1	9,899	1	9,899	-
18 GB U160M SCSI 10K RPM Hard Drive	340-3767		1	249	1	249	-
Tape Backup Unit	340-7562		1	799	1	799	-
Dell 15" Monitor	320-0960		1	149	1	149	-
Extreme RAID 2000 PCI SCSI 4 channel RAID controller***	08P3834	Mylex	3	1,228	8	9,824	-
					Subtotal	44,045	1,299
PowerVault Disk Subsystem							
PV220S, U3 SCSI, PS, Rack mount	220-4476, etc.		1	2,756	22	60,632	13,200
SCSI Cables	310-0679		1	99	11	1,089	-
18 GB SCSI 10K RPM Hard Drive *	340-3087		1	399	236	94,164	-
42U Rack	220-4492		1	1,264	2	2,528	-
					Subtotal	158,413	13,200
Server Software							
SQL Server 2000 Ent Edition, Per processor licensing **	810-00846	Microsoft	2	16,541	4	66,164	5,850
Windows .NET Enterprise Server 2003 **		Microsoft	2	2,699	1	2,699	-
					Subtotal	68,863	5,850
Client Hardware							
Dell PowerEdge 1500SC, 1.13 GHz Pentium III w/ 512KB L2	220-0888		1	1,665	6	9,990	4,788
512MB RAM, 4 DIMMs	311-1833		1	408	6	2,448	-
18GB,U160,10K, SCSI Hard Drive,	340-9450		1	249	6	1,494	-
Ether Express PRO 100+ Ethernet Adapter	430-0369	Intel	1	59	6	354	-
Dell 15" Monitor	320-0960		1	149	6	894	-
					Subtotal	15,180	4,788
Client Software							
Windows 2000 Server, 5 Client Licenses **	C11-00821	Microsoft	2	738	6	4,428	-
Visual C++ Professional 6.0 Win32 **	048-00317	Microsoft	2	549	1	549	-
					Subtotal	4,977	-
User Connectivity							
16 Port Ethernet Switch	220-1499	Dell	1	119	1	119	65
					Subtotal	119	105
					Other Discounts	(28,212)	-
					Total	**263,385**	**25,242**

Notes: * Maint. included in PowerVault 220S disk pod or PV650F/630F fibre channel disk pod

** All Microsoft maintenance is covered by the maintenance costs of Microsoft SQL Server

*** 10% or minimum 2 spares are added in place of onsite service (products have a five year return-to-vendor warranty) Pricing: 1 - Dell 2 - Microsoft 3 - Computer Giants

**** Discount based upon total system cost as purchased by a regular customer. Pricing may be verified by calling 1-800-BUY-DELL referencing quote numbers 93483308 as complex quotes.

Audited by Lorna Livingtree, Performance Metrics Inc.

Three-Year Cost of Ownership:	**$288,627**
tpmC Rating:	**51069.87**
$ / tpmC:	**5.66**

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.

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MQTh, computed Maximum Qualified Throughput 51,069.87 tpmC

Response Times (in seconds)	Average	90th	Max
- Neworder	0.44	0.49	39.19
- Payment	0.27	0.35	37.10
- Order Status	0.29	0.37	37.03
- Delivery (interactive portion)	0.11	0.17	35.35
- Delivery (deferred portion)	0.20	0.32	21.09
- Stock-Level	1.11	1.58	38.70
- Menu	0.11	0.20	35.85

Response time delay added for emulated components Menu 0.1
Resp 0.1

Transaction Mix, in percent of total transactions

- New-Order	44.86%
- Payment	43.02 %
- Order-Status	4.04 %
- Delivery	4.04 %
- Stock-Level	4.05 %

Keying/Think Times (in seconds),	Min		Average		Max	
- New-Order	18.01	0.0	18.02	12.04	18.57	120.43
- Payment	3.01	0.0	3.02	12.04	3.85	120.44
- Order-Status	2.01	0.0	2.02	10.05	2.46	100.42
- Delivery	2.01	0.0	2.02	5.05	2.49	50.41
- Stock-Level	2.01	0.0	2.02	5.04	2.88	50.41

Test Duration

- Ramp-up time	22 minutes
- Measurement interval	120 minutes
- Number of checkpoints	4
- Checkpoint interval	30 minutes
- Number of transactions (all types) completed in measurement interval	14,213,636

Table of Contents

Introduction

Document Structure

The TPC Benchmark C Standard Specification Revision 5.0, 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 6600 server driven by six Dell PowerEdge 1500 clients. The clients and server are networked together via a 100 Base T switch. Ten remote terminal emulator (RTE) systems (PowerEdge 2200's) emulate 41,000 users executing the standard TPC-C workload. The RTE's are connected to the six clients through 10/100BaseT switches. Each switch connects to one client machine at 100BaseT and to the RTE machines at 10BaseT, half duplex. Microsoft Windows .NET Enterprise Server was the operating system used on the server. Microsoft Windows 2000 Server was used on the clients. Microsoft SQL Server 2000 Enterprise Edition was the database on the server machine.

The PowerEdge 6600 motherboard uses the ServerWorks Grand Champion High End chipset and can hold up to four Pentium® 4 processors (1.6 GHz with 1MB L2 cache each). The system has 10 PCI-X 64-bit/100MHz I/O slots and a single legacy 32-bit/33MHz PCI slot. The measured configuration used 16Gbytes of DDR RAM, which was achieved by using 16 1024Mbyte DIMMs.

The PowerEdge 6600 has an integrated Adaptec AIC-7892 U160 SCSI controller to which was attached one 18GB disk drive containing the operating system. In addition, 6 Mylex ExtremeRAID 2000 4-channel RAID controllers were installed in six PCI-X slots and connected to 8 PowerVault 220S disk pods, which can hold 14 disks each. Five ExtremeRAID 2000 was connected to 20 PV220 disk pods enclosing a total of 220 18GB SCSI disks, containing database data. The last ExtremeRAID 2000 was connected two PV220 disk pods enclosing 16 18Gb SCSI drives mirrored using RAID10, configured for transaction log data. There were four empty PCI-X slots. The legacy 33MHz PCI slot was also empty.

Each client had a single 1.13GHz Pentium® III processor with 512 Kbytes of L2 cache. Each client had 512 Mbytes of RAM, one 9 GB hard disk, one intergrated Intel Ether Express Pro100+ PCI Ethernet adapter and one Intel Pro 100 Network Interface Card. On each client the Intel Ethernet adapter was connected to the RTE machines through a 10/100 BaseT switch and the Intel Pro NIC was connected to the Database Server through a 10/100 Base T switch. The six clients were driven through a total of 20 network segments. 2050 emulated users were run on each network segment for a total of 41,000 emulated users. The network segments between the switches and RTEs were fixed at 10 Mbit/sec, half duplex.

General Items

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 .NET Enterprise Server, Windows 2000 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

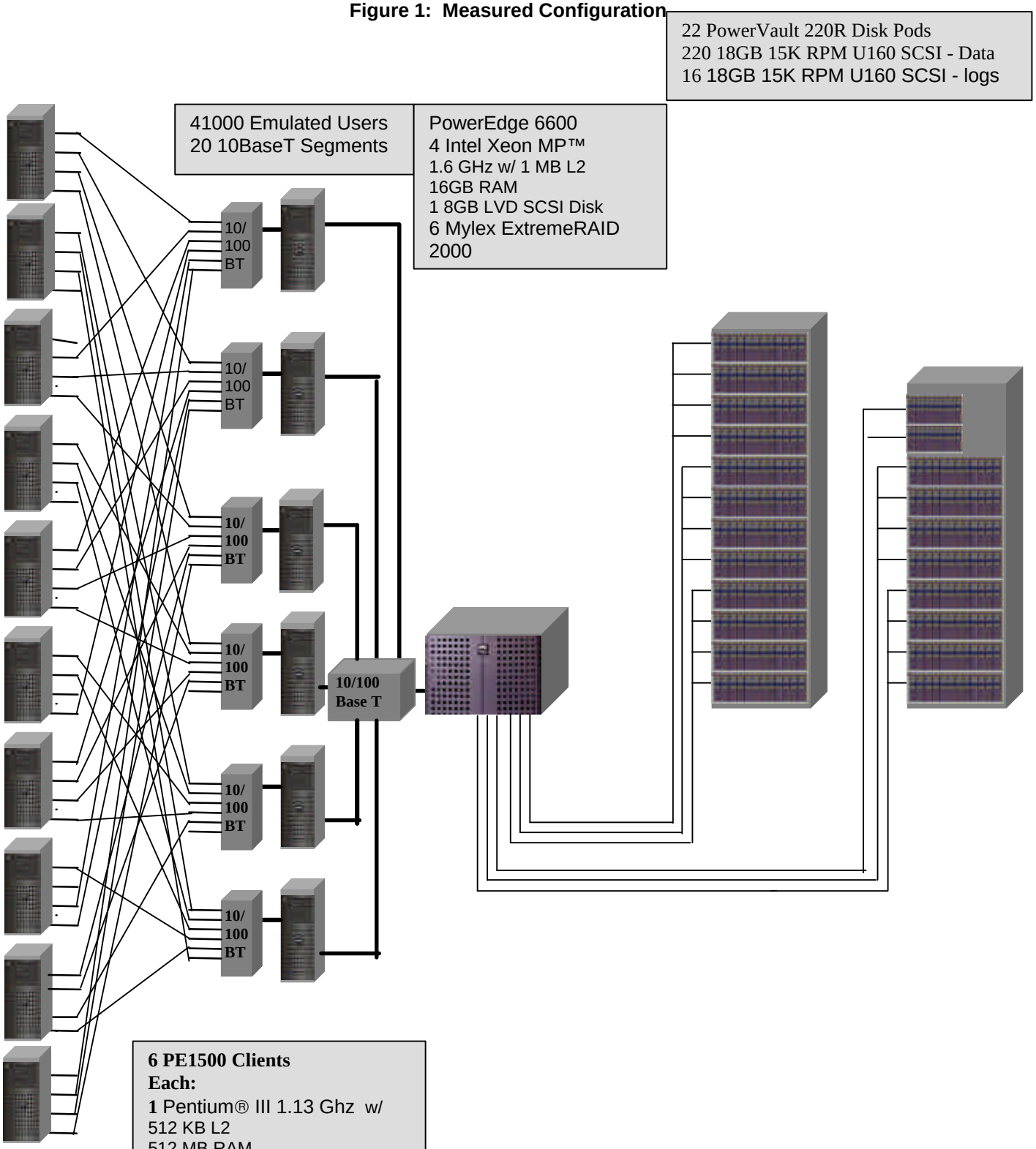
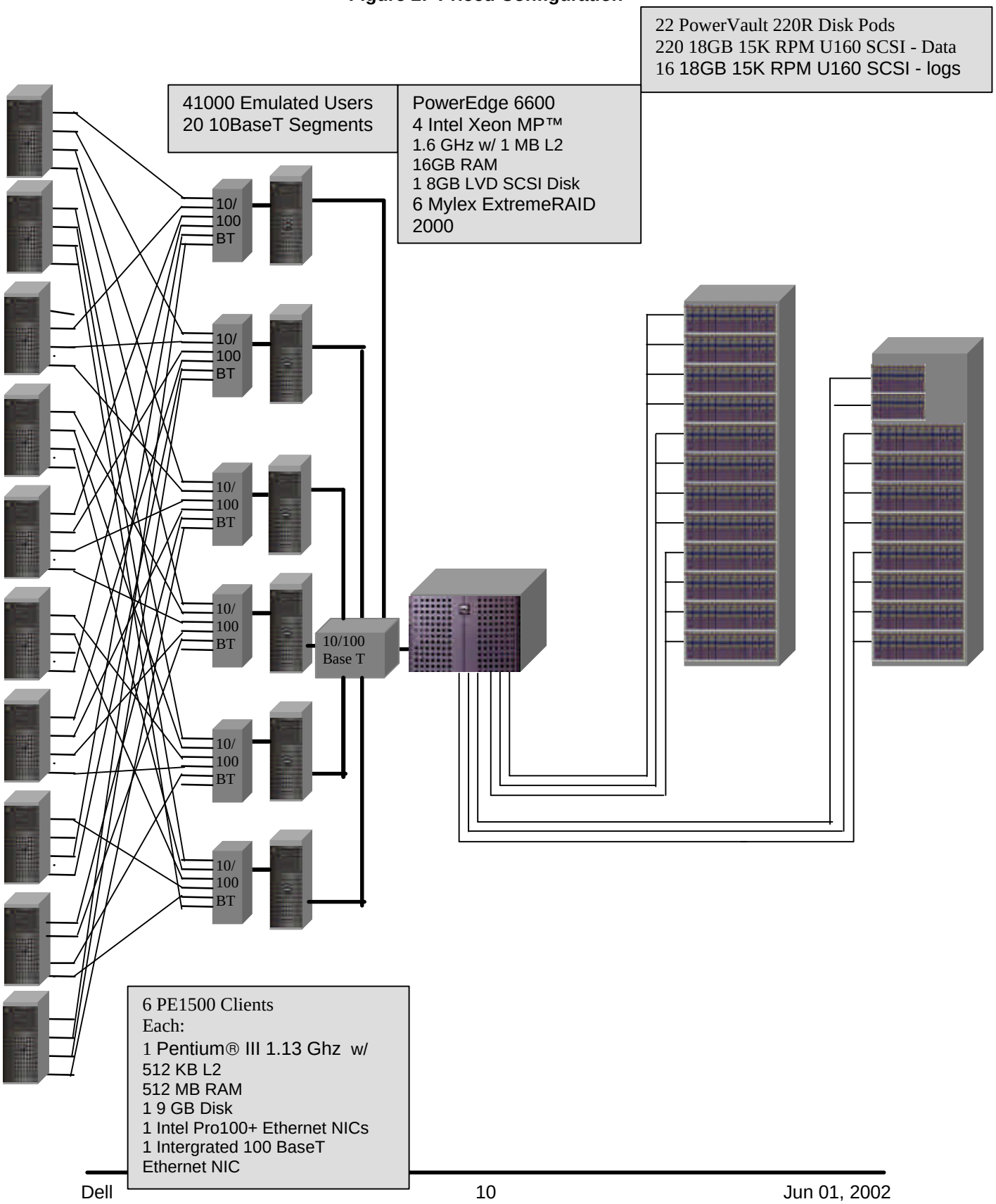


Figure 2: Priced Configuration



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 237 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	15.02%
	Non-Primary Key Access	60.03%
Order Status	Non-Primary Key Access	60.12%
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	44.86%
Payment	43.02%
Order Status	4.04%
Delivery	4.04%
Stock Level	4.05%

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.

Clause 3 -- Transaction and System Properties Related Items

ACID Tests

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

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

Atomicity

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

Completed Transactions

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

Aborted Transactions

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

Consistency

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

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

Isolation

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

Isolation tests one through seven were executed using shell scripts to issue queries to the database. Each script included timestamps to demonstrate the concurrency of operations. The results of the queries were captured to files. The captured files were verified by the auditor to demonstrate the required isolation had been met.

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

For Isolation test seven, case A was followed.

Durability

The tested system must guarantee durability: the ability to preserve the effects of committed 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 a 450 warehouse database. The standard driving mechanism was used to generate the transaction load of 4500 users for the Loss of Data.

Loss of Data

Loss of data was demonstrated on the 450 Warehouse database. The standard driving mechanism was used to generate the transaction load of 4500 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 450 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. 4500 users were logged in to the database and ran transactions.
5. One disk drive in the data array was removed causing SQL Server errors.
6. The RTE was allowed to continue running. Completed transactions enroute from the clients were recorded. Error messages began appearing on the RTE screen.
7. The RTE was stopped.
8. SQL Server was stopped and restarted and a dump of the transaction log was taken.
9. SQL Server was stopped, Windows 2000 was shutdown and the machine powered off.
10. The failed disk was replaced.
11. The machine was powered up, Windows 2000 and SQL Server were started.
12. The TPC-C database was dropped and restored from backup.
13. The transaction log was restored and transactions rolled forward.
14. 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.

Instantaneous Interruption and Loss of Memory/Loss of Log

Instantaneous Interruption and Loss of Memory were demonstrated on the full database with 4100 warehouses in a single test. The standard driving mechanism was used to generate the transaction load of 41,000 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. 41,000 users were logged in to the database and ran transactions.
4. The system was run is steady state for 5 minutes
5. One disk drive in the transaction log array was removed with no effect on Windows 2000 or SQL Server.
6. The system ran for an additional 5 minutes.
6. The Server was powered off by normal means, causing instantaneous interruption.

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

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 3000 warehouses. The performance run used 2808 warehouses and this is verified by runcheck

Table 3: Table Cardinality

Table	Cardinality as Benchmarked
Warehouse	4,500
District	45,000
Customer	135,000,000
History	135,000,000
NewOrder	40,500,000
Orders	135,000,000
OrderLine	1,350,004,843
Item	100,000
Stock	450,000,000
Deleted Warehouses	0

Constant Values

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

Table 4: Constant Values

Function	Constant C Value
C_LAST (Build)	123
C_LAST (Run)	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 237 disks: 220 18GB for data, 16 18GB for log, and 1 18GB for OS and application software. The data drives were configured as hardware RAID 0. Logs were configured as hardware RAID 10. Mylex ExtremeRAID 2000 RAID Controllers were configured with 1 logical drives each. Each logical drive spanned 44 disk drives for data and 16 for logs. Each Windows .NET 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

.NET Disk Administration	Adaptec 7899 Configuration					
Disk **0 17357MB**	On-Board Controller # **1**					
Partition	On-Board		Channels			
1	Internal	SCSI ID	0			
C: OS		0	**A0-1**			
NTFS		1				
17357 MB		2				
		3				

.NET Disk Administration	MYLEX EXR2000P Configuration					
Disk **1 137277MB**	Controller # **1**					
Partition	Slot# **2**		Channels			
1		SCSI ID	A	B	C	D
S:		0	**A1-1**	**A1-2**		
LOG		1	**A2-1**	**A2-2**		
Unknown		2	**A3-1**	**A3-2**		
137277MB		3	**A4-1**	**A4-2**		
		4	**A5-1**	**A5-2**		
		5	A6-1	A6-2		
		8	A7-1	A7-2		
		9	A8-1	A8-2		
		10				
		11				
		12				
		13				

.NET Disk Administration			MYLEX EX2000P Configuration					
Disk **2 755036MB**			Controller # **2**					
Partition			Slot# **4**		Channels			
1	2	3		SCSI ID	A	B	C	D
E:	**F:**	**V:**		0	**A1-1**	**A2-1**	**A3-1**	**A4-1**
CS1	**MS1**	**Backup1**		1	**A1-2**	**A2-2**	**A3-2**	**A4-2**
Unknown	**Unknown**	**NTFS**		2	**A1-3**	**A2-3**	**A3-3**	**A4-3**
116019MB	**64256MB**	**200000MB**		3	**A1-4**	**A2-4**	**A3-4**	**A4-4**
				4	**A1-5**	**A2-5**	**A3-5**	**A4-5**
				5	**A1-6**	**A2-6**	**A3-6**	**A4-6**
				8	**A1-7**	**A2-7**	**A3-7**	**A4-7**
				9	**A1-8**	**A2-8**	**A3-8**	**A4-8**
				10	**A1-9**	**A2-9**	**A3-9**	**A4-9**
				11	**A1-10**	**A2-10**	**A3-10**	**A4-10**
				12	**A1-11**	**A2-11**	**A3-11**	**A4-11**
				13				
				14				
				15				

.NET Disk Administration			MYLEX EX2000P Configuration					
Disk **3 755036MB**			Controller # **3**					
Partition			Slot# **6**		Channels			
1	2	3		SCSI ID	A	B	C	D
G:	**H:**	**W:**		0	**A1-1**	**A2-1**	**A3-1**	**A4-1**
CS1	**MS1**	**Backup1**		1	**A1-2**	**A2-2**	**A3-2**	**A4-2**
Unknown	**Unknown**	**NTFS**		2	**A1-3**	**A2-3**	**A3-3**	**A4-3**
116019MB	**64256MB**	**200000MB**		3	**A1-4**	**A2-4**	**A3-4**	**A4-4**
				4	**A1-5**	**A2-5**	**A3-5**	**A4-5**
				5	**A1-6**	**A2-6**	**A3-6**	**A4-6**
				8	**A1-7**	**A2-7**	**A3-7**	**A4-7**
				9	**A1-8**	**A2-8**	**A3-8**	**A4-8**
				10	**A1-9**	**A2-9**	**A3-9**	**A4-9**
				11	**A1-10**	**A2-10**	**A3-10**	**A4-10**
				12	**A1-11**	**A2-11**	**A3-11**	**A4-11**
				13				
				14				
				15				

.NET Disk Administration			MYLEX EX2000P Configuration					
Disk **4 755036MB**			Controller # **4**					
Partition			Slot# **8**		Channels			
1	2	3		SCSI ID	A	B	C	D
I:	**J:**	**X:**		0	**A1-1**	**A2-1**	**A3-1**	**A4-1**
CS1	**MS1**	**Backup1**		1	**A1-2**	**A2-2**	**A3-2**	**A4-2**
Unknown	**Unknown**	**NTFS**		2	**A1-3**	**A2-3**	**A3-3**	**A4-3**
116019MB	**64256MB**	**200000MB**		3	**A1-4**	**A2-4**	**A3-4**	**A4-4**
				4	**A1-5**	**A2-5**	**A3-5**	**A4-5**
				5	**A1-6**	**A2-6**	**A3-6**	**A4-6**
				8	**A1-7**	**A2-7**	**A3-7**	**A4-7**
				9	**A1-8**	**A2-8**	**A3-8**	**A4-8**
				10	**A1-9**	**A2-9**	**A3-9**	**A4-9**
				11	**A1-10**	**A2-10**	**A3-10**	**A4-10**
				12	**A1-11**	**A2-11**	**A3-11**	**A4-11**
				13				
				14				
				15				

.NET Disk Administration			MYLEX EX2000P Configuration					
Disk **5 755036MB**			Controller # **5**					
Partition			Slot# **10**		Channels			
1	2	3		SCSI ID	A	B	C	D
K:	**L:**	**Y:**		0	**A1-1**	**A2-1**	**A3-1**	**A4-1**
CS1	**MS1**	**Backup1**		1	**A1-2**	**A2-2**	**A3-2**	**A4-2**
Unknown	**Unknown**	**NTFS**		2	**A1-3**	**A2-3**	**A3-3**	**A4-3**
116019MB	**64256MB**	**200000MB**		3	**A1-4**	**A2-4**	**A3-4**	**A4-4**
				4	**A1-5**	**A2-5**	**A3-5**	**A4-5**
				5	**A1-6**	**A2-6**	**A3-6**	**A4-6**
				8	**A1-7**	**A2-7**	**A3-7**	**A4-7**
				9	**A1-8**	**A2-8**	**A3-8**	**A4-8**
				10	**A1-9**	**A2-9**	**A3-9**	**A4-9**
				11	**A1-10**	**A2-10**	**A3-10**	**A4-10**
				12	**A1-11**	**A2-11**	**A3-11**	**A4-11**
				13				
				14				
				15				

W2K Disk Administration			MYLEX EX2000P Configuration					
Disk **6 755036MB**			Controller # **6**					
Partition			Slot# **11**		Channels			
1	2	3		SCSI ID	A	B	C	D
M:	**N:**	**Z:**		0	**A1-1**	**A2-1**	**A3-1**	**A4-1**
CS1	**MS1**	**Backup1**		1	**A1-2**	**A2-2**	**A3-2**	**A4-2**
Unknown	**Unknown**	**NTFS**		2	**A1-3**	**A2-3**	**A3-3**	**A4-3**
116019MB	**64256MB**	**200000MB**		3	**A1-4**	**A2-4**	**A3-4**	**A4-4**
				4	**A1-5**	**A2-5**	**A3-5**	**A4-5**
				5	**A1-6**	**A2-6**	**A3-6**	**A4-6**
				8	**A1-7**	**A2-7**	**A3-7**	**A4-7**
				9	**A1-8**	**A2-8**	**A3-8**	**A4-8**
				10	**A1-9**	**A2-9**	**A3-9**	**A4-9**
				11	**A1-10**	**A2-10**	**A3-10**	**A4-10**
				12	**A1-11**	**A2-11**	**A3-11**	**A4-11**
				13				
				14				
				15				

***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 2000 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. (8.1.5.4)*
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 of 133.76 GB (including mirror) to sustain the log for 8 hours. Space available on the transaction log volume was 134.06GB (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	51,069.87
Price per TpmC	$5.66

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	0.44	0.49	39.19
Payment	0.27	0.32	37.10
Order Status	0.29	0.37	37.03
Interactive Delivery	0.11	0.17	35.35
Deferred Delivery	0.20	0.32	21.09
Stock Level	1.11	1.58	38.70
Menu	0.11	0.20	35.85

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	18.01	18.02	18.57
Payment	3.01	3.02	3.85
Order Status	2.01	2.02	2.17
Delivery	2.01	2.02	2.49
Stock Level	2.01	2.02	2.88

Table 8: Transaction Think Times

Transaction	Minimum	Average	Maximum
New Order	0.00	12.04	120.43
Payment	0.00	12.04	120.44
Order Status	0.00	10.04	100.42
Delivery	0.00	5.05	50.41
Stock Level	0.00	5.04	50.41

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 2: New Order Response Time Distribution

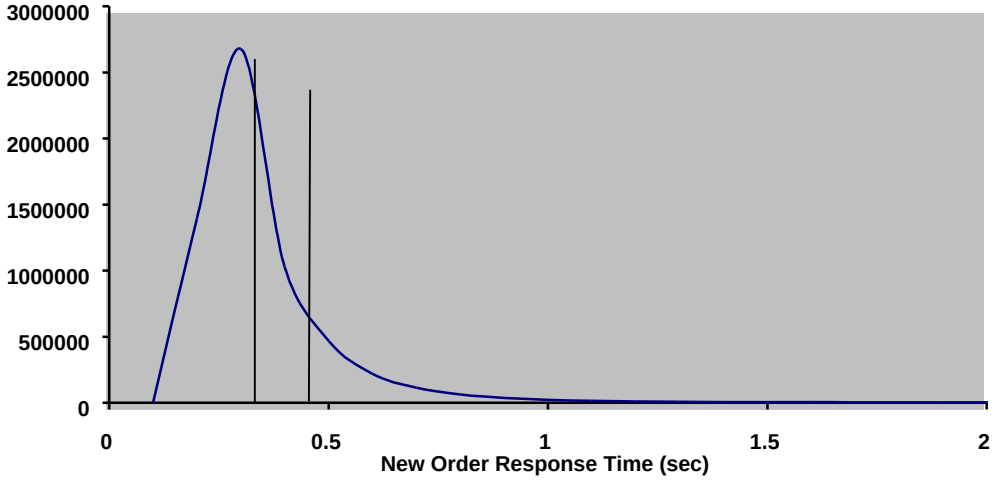


Figure 3: Payment Response Time Distribution

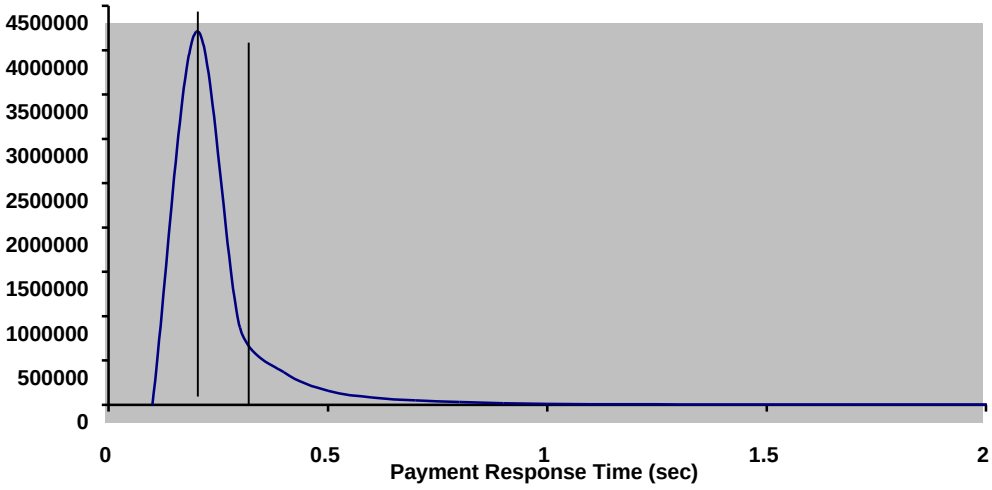


Figure 4: Order Status Response Time Distribution

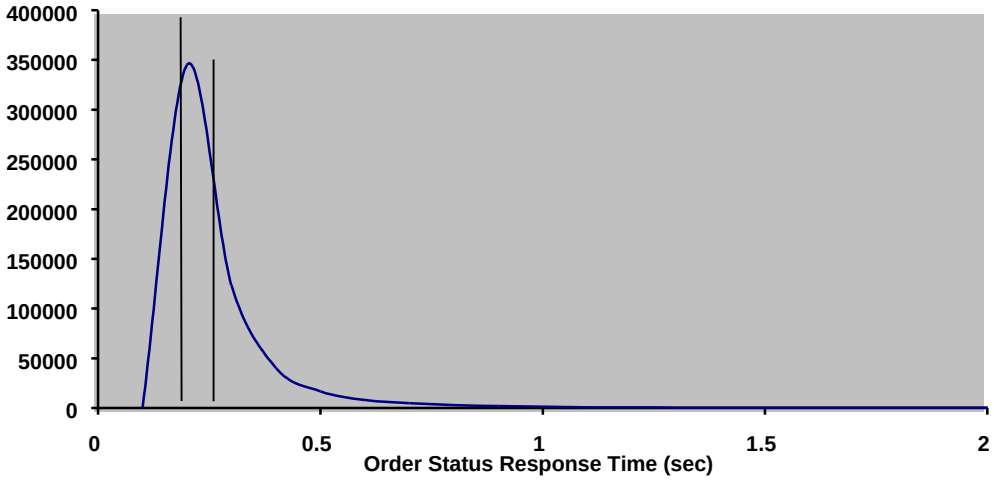


Figure 5: Delivery Response Time Distribution

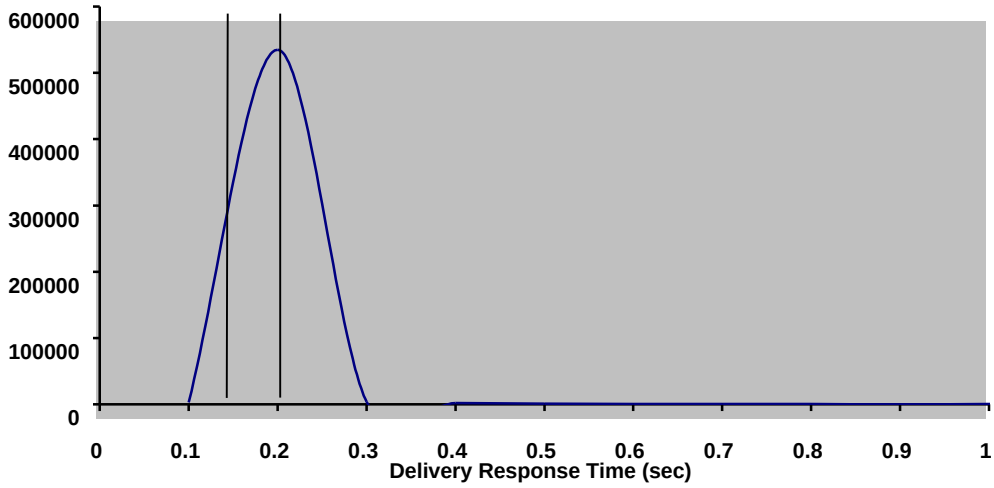
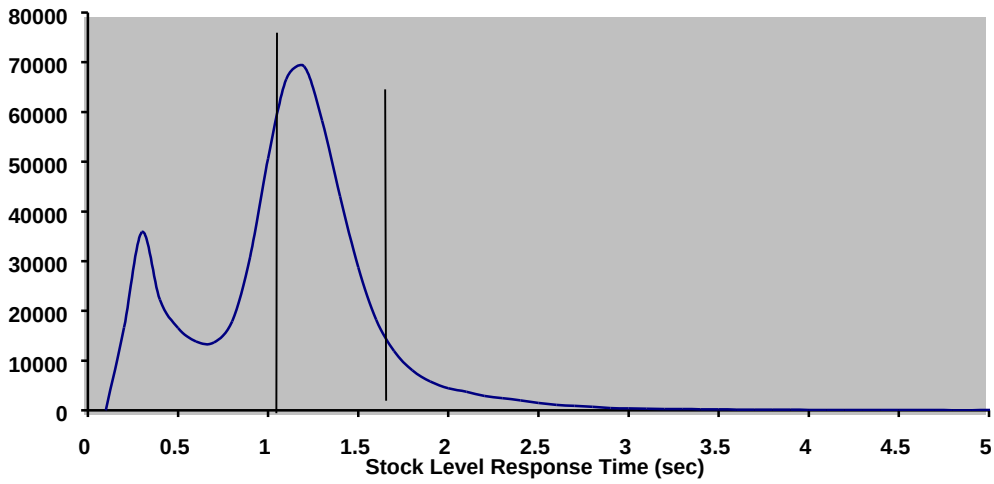


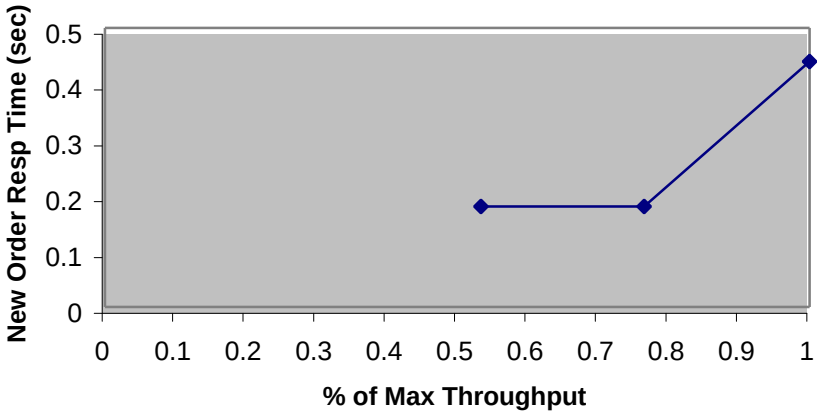
Figure 6: Stock Level Response Time Distribution



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)

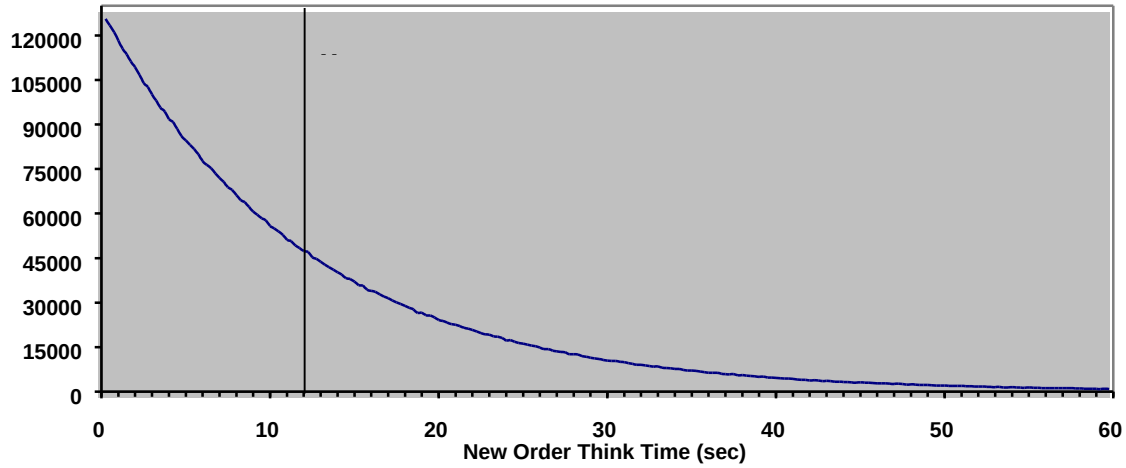
Figure 8: New Order Response Time vs. Throughput



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)

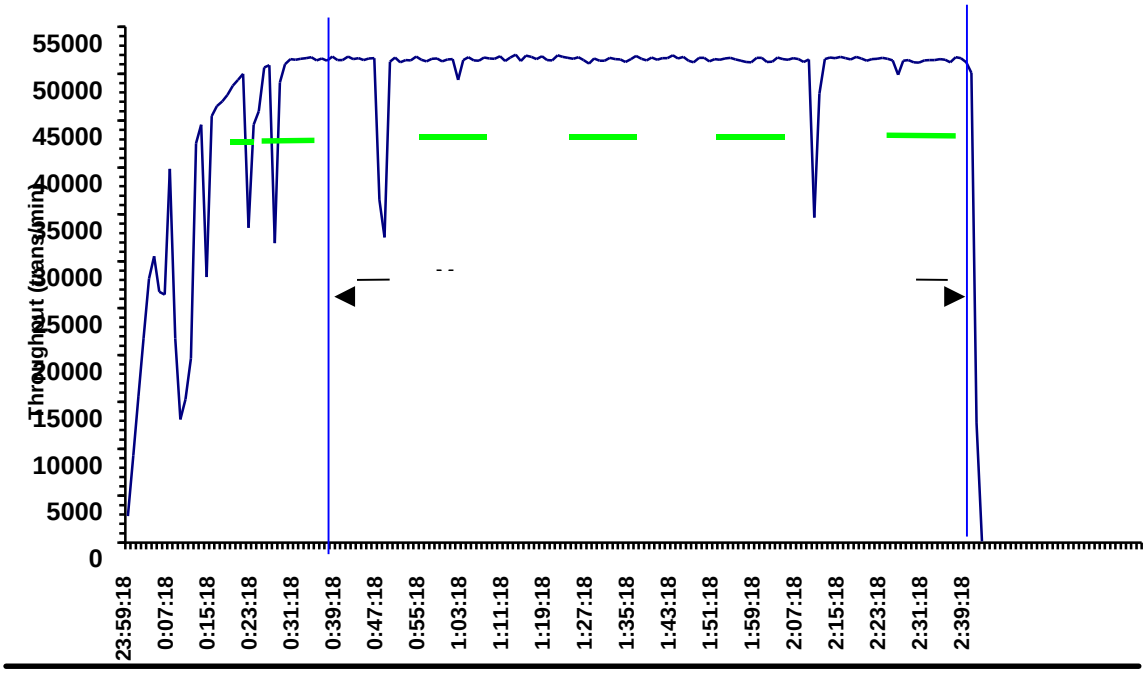
Figure 9: New Order Think Time Distribution



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	00:40:37	02:40:37	7,200
1st Checkpoint	00:56:18	01:10:06	828
2nd Checkpoint	01:26:00	01:40:00	840
3rd Checkpoint	01:55:54	02:09:54	840
4th Checkpoint	02:25:52	02:39:52	840

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	44.86%
Payment	43.02%
Order Status	4.04%
Delivery	4.05%
Stock Level	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	99.00%
	Remote Warehouse Items	1.00%
	Rolled Back Transactions	1.00%
	Average Lines Per Order	10.00
Payment	Home Warehouse	84.98%
	Remote Warehouse	15.02%
	Non-Primary Key Access	60.03%
Order Status	Non-Primary Key Access	60.12%
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:

- 10 BaseT (10 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: Oct 30, 2002
Software Availability Date: Dec 31, 2002

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: 51,069.87 tpmC
Price Performance Metric: $5.66

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:

- 6 Microsoft Windows 2000 Server Licenses
- 1 Microsoft Windows .NET Enterprise Server License
- 1 Microsoft SQL Server 2000 Enterprise Edition License.
- 1 Microsoft Visual C++ 32 bit 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

Auditor's Letter of Attestation

October 29, 2002

Mike Molloy
Senior Manager, Server Performance Analysis
Dell Computer Corporation
One Dell Way
Round Rock, TX 78682

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

Platform: PowerEdge 6600
Database Manager: Microsoft SQL Server 2000 Enterprise Edition
Operating System: Microsoft Windows .NET Enterprise Server 2003
Transaction Monitor: Microsoft COM+

Servers: PowerEdge 6600				
CPU's	Memory	Disks (total)	90% Response	TpmC
4 Intel Xeon @ 1.6 Ghz	Main: 15.13 GB Cache: 1024 KB	237 @ 18GB	0.49	51,069.87
6 Clients: PowerEdge 1500SC				
1 Pentium III @ 1.13 Ghz	Main: 512 MB Cache: 512 KB	1 @ 18 GB	Na	Na

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 and populated.
- The database was properly scaled with 4500 warehouses of which 4100 were active during the measured interval.
- The ACID properties were successfully demonstrated.
- 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 day space calculation was verified.
- The controller cache was disabled on the log controller.
- The steady state portion of the test was 120 minutes.
- One checkpoint was taken before the measured interval.
- Four checkpoints were taken during the measured interval.

Auditor Notes:

None.

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(short 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 );
                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 =
Get64BitTime(&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)(Get64BitTime(&trans_end) - txnDeliRec.TxnStartT0);
                                txnDeliRec.DeltaTxnExec =
(int)(Get64BitTime(&trans_end) - Get64BitTime(&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(short 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=4><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 );
                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: %4.4d   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: %4.4d   ",
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: %4.4d   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, "  %4.4d   %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: %4.4d"
                              "                         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>"
```

Appendix A - Application Source Code

```
                            "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: %4.4d
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: %4.4d  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: %4.4d   ",
                    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, "  %4.4d       %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: %4.4d<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 =
(short)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;

          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];
} 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;

#define ERR_FATAL_LEVEL                 1
#define ERR_WARNING_LEVEL               2
#define ERR_INFORMATION_LEVEL 3


#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


class CBaseErr
{
public:
          char      *m_szApp;
          char      *m_szMsg;
          char      *m_szLoc; // code location where the error occurred
          int               m_idMsg;

          CBaseErr(void)
          {
                    m_idMsg             = 0;
                    m_szMsg             = new char[m_szMsg_size];
                    m_szApp             = new char[m_szApp_size];
                    m_szLoc             = NULL;

                    m_szMsg[0]          = 0;
                    m_szApp[0]          = 0;

                    GetModuleFileName(GetModuleHandle(NULL), m_szApp, m_szApp_size);
          }
```

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

CBaseErr(int idMsg)
{
          m_idMsg             = idMsg;
          m_szApp             = new char[m_szApp_size];
          m_szMsg             = new char[m_szMsg_size];
          m_szLoc             = NULL;

          GetModuleFileName(GetModuleHandle(NULL), m_szApp, m_szApp_size);
          LoadString(GetModuleHandle(NULL), idMsg, m_szMsg, m_szMsg_size);
}

CBaseErr(LPCTSTR szMsg)
{
          m_idMsg             = 0;
          m_szApp             = new char[m_szApp_size];
          m_szMsg             = new char[m_szMsg_size];
          m_szLoc             = NULL;

          GetModuleFileName(GetModuleHandle(NULL), m_szApp, m_szApp_size);
          strcpy(m_szMsg, szMsg);
}

void SetError(char *szMsg, LPCTSTR szLocation)
{
          if (szMsg != NULL)
                    strcpy(m_szMsg, szMsg);
          else
                    m_szMsg[0] = 0;

          if (szLocation != NULL)
          {
                    delete [] m_szLoc;
                    m_szLoc = new char[strlen(szLocation)+1];
                    strcpy(m_szLoc, szLocation);
          }
          else
          {
                    delete [] m_szLoc;
                    m_szLoc = NULL;
          }
}

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

          if (szStr)
                    j = wsprintf(szTmp, "%s\n",szStr);
          if (m_szLoc)
                    j += wsprintf(szTmp+j, "Location=%s\n",m_szLoc);
          if (m_szMsg)
                    j += wsprintf(szTmp+j, "%s\n", m_szMsg);
                    ::MessageBox(hwnd, szTmp, m_szApp, MB_OK);
          }

          char *GetApp(void) { return m_szApp; }
          char *GetMsg(void) { return m_szMsg; }
          char *GetLocation(void) { return m_szLoc; }

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

};

class CSocketErr : public CBaseErr
{
public:
          enum Action
          {
                    eNone,
                    eSend,
                    eSocket,
                    eConnect
          };

          CSocketErr(Action eAction, LPCTSTR szLocation);
          CSocketErr(int iError) { m_errId = iError; };
          int                 m_errId;
          Action    m_eAction;

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

class CSystemErr : public CBaseErr
{
public:
          enum Action
          {
                    eNone,
                    eTransactNamedPipe,
                    eWaitNamedPipe,
                    eSetNamedPipeHandleState,
                    eCreateFile,
                    eCreateProcess,
                    eCallNamedPipe,
                    eCreateEvent,
                    eCreateThread,
                    eVirtualAlloc,
                    eReadFile,
                    eWriteFile,
                    eMapViewOfFile,
                    eCreateFileMapping,
                    eInitializeSecurityDescriptor,
                    eSetSecurityDescriptorDacl,
                    eCreateNamedPipe,
                    eConnectNamedPipe,
                    eWaitForSingleObject,
                    eRegOpenKeyEx,
```

```
                eRegQueryValueEx,
        };

        CSystemErr(Action eAction, LPCTSTR szLocation);

        void Draw(HWND hwnd, LPCTSTR szStr = NULL);

        int                m_errId;
        Action    m_eAction;

        int ErrorType() { return ERR_TYPE_OS;}
        int ErrorNum() { return m_errId;}
        char *ErrorText() { return m_szMsg; }
};

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

        int ErrorType() { return ERR_TYPE_MEMORY;}
        int ErrorNum() { return 0;}
        char *ErrorText() { return "Insufficient Memory to continue.";}
};
```

common/src/trans.h

```
/*        FILE:               TRANS.H
 *                                    Microsoft TPC-C Kit Ver. 4.20.000
 *                                    Copyright Microsoft, 1999
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 *
 *                                    Version 4.10.000 audited by Richard Gimarc,
Performance Metrics, 3/17/99
 *
 *        PURPOSE:  Header file for TPC-C structure templates.
 *
 *  Change history:
 *                  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
          short                                   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
          short               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
        short                                w_id;
        short                                d_id;
        long                                 c_id;
        short                                c_d_id;
        short                                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;
        short                               ol_supply_w_id;
        short                               ol_quantity;
        double                              ol_amount;
        TIMESTAMP_STRUCT    ol_delivery_d;
} OL_ORDER_STATUS_DATA;
```

```
typedef struct
{       // input params
        short               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
        short                        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
        short               w_id;                       //delivery warehouse
        short               o_carrier_id;       //carrier id
} DELIVERY_TRANSACTION;

typedef struct
{       // input params
        short                                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
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```

```
 *
 *                                      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;
};
```

db_dblib_dll/src/tpcc_dblib.cpp

```
/*        FILE:               TPCC_DBLIB.CPP
 *                                      Microsoft TPC-C Kit Ver. 4.20.000
 *                                      Copyright Microsoft, 1999
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 *
 *                                      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:
 *                  4.20.000 - 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

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."                                                  },
                { 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, SQLINT2, -1, -1, (BYTE *)
&m_txn.StockLevel.w_id);                  // @w_id smallint
                              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) || (++iTryCount > iMaxRetries))
                                        throw;

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


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, SQLINT2, -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, SQLINT2, -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, 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, 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, pData,
dbdatlen(m_dbproc,1), SQLFLT8, (BYTE *)&m_txn.NewOrder.w_tax, 8);
                                if (pData=dbdata(m_dbproc, 2))

                                        dbconvert(m_dbproc, SQLNUMERIC, 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, 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) || (++iTryCount > iMaxRetries))
                                        throw;

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


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, SQLINT2, -1, -1, (BYTE *)
&m_txn.Payment.w_id);
                        dbrpcparam(m_dbproc, NULL, 0, SQLINT2, -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, pData,
dbdatlen(m_dbproc,24), SQLFLT8, (BYTE *)&m_txn.Payment.c_credit_lim, 8);
                        if(pData=dbdata(m_dbproc, 25))
                                dbconvert(m_dbproc, SQLNUMERIC, pData,
dbdatlen(m_dbproc,25), SQLFLT8, (BYTE *)&m_txn.Payment.c_discount, 8);
                        if(pData=dbdata(m_dbproc, 26))
                                dbconvert(m_dbproc, SQLNUMERIC, 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) || (++iTryCount > iMaxRetries))
                                throw;

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


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, SQLINT2, -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, 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, 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) || (++iTryCount > iMaxRetries))
                                        throw;

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


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, SQLINT2, -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) || (++iTryCount > iMaxRetries))
                                throw;

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

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
definations 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 defination 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 5.3.280 */
    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( 0xffffffe0 ),     /* 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( 0xfffffff0 ),     /* 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( 0xffffffd4 ),     /* 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( 0xffffffd8 ),     /* Offset= -40 (584) */
/* 626 */ 0x36,               /* FC_POINTER */
                            0x5b,               /* FC_END */
/* 628 */
                            0x12, 0x0,          /* FC_UP */
/* 630 */ NdrFcShort( 0xfffffe4 ),      /* 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( 0xffffffd4 ),     /* 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( 0xffffffd4 ),     /* 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( 0xfffffffe8 ),     /* 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( 0xfffffff8 ),     /* 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( 0xfffffff8 ),     /* 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 */
```

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                            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( 0xfffffe8 ),     /* 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( 0xfffffe8 ),     /* 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( 0xfffffee ),     /* Offset= -18 (836) */
/* 856 */ 0x5c,               /* FC_PAD */
                            0x5b,               /* FC_END */
/* 858 */
                            0x1a,               /* FC_BOGUS_STRUCT */
                            0x3,                /* 3 */
/* 860 */ NdrFcShort( 0x28 ), /* 40 */
/* 862 */ NdrFcShort( 0xfffffee ),     /* 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( 0xffffef6 ),     /* 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 5.3.280 */
    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( 0xfffffe0 ),      /* 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( 0xfffffe6 ),     /* 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( 0xfffffe6 ),     /* 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( 0xfffffe6 ),     /* 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( 0xfffffe6 ),     /* 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( 0xfffffffc ),     /* 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         ConvertTo64BitTime(int iYear, int iMonth, int iDay, int iHour, int
iMinute, int iSecond);
JULIAN_TIME         Get64BitTime(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 B - Database Design

Build Scripts

setup.cmd

```
ECHO OFF

@ECHO ******************************************************************************
@ECHO *                                                                            *
@ECHO *  Microsoft TPC-C Benchmark Kit Ver. 4.01                                    *
@ECHO *                                                                            *
@ECHO ******************************************************************************

if '%1'=='' goto usage
if '%2'=='' goto usage
if '%3'=='' goto usage
if '%4'=='' goto usage
if not '%5'=='' if not '%5' == 'scaled' goto usage

::Cleanup any old .err files
@if exist logs\*.err del logs\*.err
         >nul

if  '%3'=='full' goto start
if  '%3'=='builddb' goto builddb
if  '%3'=='objects' goto objects
if  '%3'=='bulkload' goto bulkload
if  '%3'=='objectsfull' goto objects
if  '%3'=='bulkloadfull' goto bulkload
if  '%3'=='backup' goto backup
goto usage

:start
:: Cleanup the logs directory...
@if exist logs\version.log del logs\version.log                                >nul
@if exist logs\db.log del logs\db.log                                          >nul
@if exist logs\objects.log del logs\objects.log                                >nul
@if exist logs\objects.log del logs\objects.log                                >nul
@if exist logs\bulkload.log del logs\bulkload.log                      >nul
@if exist logs\backup.log del logs\backup.log                                  >nul

isql -Usa -P -S%1 -Q"select @@version"                                         >
logs\version.log
isql -Usa -P -S%1 -Q"select getdate()"                                         >>
logs\version.log

:builddb
@if exist logs\db.log del logs\db.log                                          >nul
@ECHO Building database files and database...
isql -Usa -P -S%1 -e < scripts\%2.war\%4\createdb.sql                          >
logs\db.log
@ECHO Database build complete.
if  '%3'=='full' goto objects
goto end

:objects
@if exist logs\objects.log del logs\objects.log                                >nul
@ECHO Creating database objects...
isql -Usa -P -S%1 -e < scripts\ddl\%4\tables.sql                       >  logs\objects.log
isql -Usa -P -S%1 -e < scripts\dml\%4\neword.sql                       >> logs\objects.log
isql -Usa -P -S%1 -e < scripts\dml\%4\payment.sql                      >> logs\objects.log
isql -Usa -P -S%1 -e < scripts\dml\%4\ordstat.sql                      >> logs\objects.log
isql -Usa -P -S%1 -e < scripts\dml\%4\delivery.sql                             >>
logs\objects.log
isql -Usa -P -S%1 -e < scripts\dml\%4\stocklev.sql                             >>
logs\objects.log
@ECHO Database object creation complete.
if  '%3'=='full' goto bulkload
if  '%3'=='objectsfull' goto bulkload
goto end

:bulkload
@if exist logs\bulkload.log del logs\bulkload.log                      >nul
@ECHO Beginning data load and index creation...
isql -Usa -P -S%1 -e < scripts\utility\%4\dbopt1.sql                           >>
logs\objects.log
if '%4'=='mssql70' goto odbc
if '%4'=='mssql65' goto dblib
goto usage
:dblib
if '%5'==''      loader\%4\bin\tpccldr -S%1 -W%2 -flogs\bulkload.log -dscripts\ddl\%4 -c0
if '%5'=='normal' loader\%4\bin\tpccldr -S%1 -W%2 -flogs\bulkload.log -dscripts\ddl\%4 -
c0
if '%5'=='scaled' loader\%4\bin\tpccldr -S%1 -W%2 -flogs\bulkload.log -dscripts\ddl\%4 -
c1
goto bulkloaddone
:odbc
if '%5'==''      loader\%4\bin\tpccldr -S%1 -W%2 -flogs\bulkload.log -dscripts\ddl\%4 -c0
if '%5'=='normal' loader\%4\bin\tpccldr -S%1 -W%2 -flogs\bulkload.log -dscripts\ddl\%4 -
c0
if '%5'=='scaled' loader\%4\bin\tpccldr -S%1 -W%2 -flogs\bulkload.log -dscripts\ddl\%4 -
c1
goto bulkloaddone
:bulkloaddone
isql -Usa -P -S%1 -e < scripts\utility\%4\dbopt2.sql                           >>
logs\bulkload.log
@ECHO Data load and index creation complete.
if  '%3'=='full' goto backup
if  '%3'=='objectsfull' goto backup
if  '%3'=='bulkloadfull' goto backup
goto end

:backup
@if exist logs\backup.log del logs\backup.log                                  >nul
@ECHO Backing up database...
isql -Usa -P -S%1 -e < scripts\%2.war\%4\backup.sql                            >
logs\backup.log
@ECHO Database backup complete.
if  '%3'=='full' goto verifyload
if  '%3'=='objectsfull' goto verifyload
if  '%3'=='bulkloadfull' goto verifyload
goto complete

:verifyload
@if exist logs\verifyload.log del logs\verifyload.log                          >nul
@Echo Verifying TPC-C database load...
```

```
isql -Usa -P -S%1 < scripts\utility\%4\verifytpccload.sql                    >
logs\verifyload.log
@ECHO Check logs\verifyload.log to verify database load.

:complete
@ECHO ****************************************************************************
@ECHO *                                                                          *
@ECHO *  Full TPC-C build complete.  Check logs directory for setup errors.       *
@ECHO *                                                                          *
@ECHO ****************************************************************************

goto end

:usage
@ECHO ****************************************************************************
@ECHO *                                                                          *
@ECHO *  The TPC-C setup command file requires the following parameters:          *
@ECHO *                                                                          *
@ECHO *  setup SERVER NUMWAR BLDOPT VERSION DBTYPE                                *
@ECHO *                                                                          *
@ECHO *      SERVER  = machine name of server (use "" for local server)          *
@ECHO *      NUMWAR  = number of warehouses                                      *
@ECHO *      BLDOPT  = full, builddb, objects, objectsfull, bulkload,            *
@ECHO *                bulkloadfull, or backup                                   *
@ECHO *      VERSION = mssql65 or mssql70                                        *
@ECHO *      DBTYPE  = normal or scaled                                          *
@ECHO *                                                                          *
@ECHO *  Note #1: the BLDOPT and VERSION parameters are case sensitive.          *
@ECHO *                                                                          *
@ECHO *  Note #2: the DBTYPE is optional.  If no DBTYPE is specified, SETUP      *
@ECHO *           will default to NORMAL.                                        *
@ECHO *                                                                          *
@ECHO *  Example:                                                                *
@ECHO *                                                                          *
@ECHO *  The following command would be used to build a complete 200             *
@ECHO *  warehouse database on SQL Server 7.0 runnning on server \\myserver.     *
@ECHO *                                                                          *
@ECHO *      SETUP myserver 200 full mssql70                                     *
@ECHO *                                                                          *
@ECHO *  Note, this command file does a backup of the database by default        *
@ECHO *  after the database build process is complete.  If you do not wish       *
@ECHO *  to make a backup (strongly discouraged), you must edit this file        *
@ECHO *  and comment that section out.  Also, if you need to run the dbcheck     *
@ECHO *  and the dbtables scripts on the fresh database load for an audit,       *
@ECHO *  you must either run them manually or edit this file to include them.    *
@ECHO *                                                                          *
@ECHO ****************************************************************************

:end

echo on
```

createdb.sql

```
--  File:     CREATEDB.SQL
--            Microsoft TPC-C Benchmark Kit Ver. 4.21
--            Copyright Microsoft, 1999, 2000
--  Purpose:  Creates tpcc database and backup files


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(),9))
go

--  create main database files

CREATE DATABASE tpcc
ON PRIMARY
(         NAME                = MSSQL70_tpcc_root,
          FILENAME  = "C:\MSSQL70_tpcc_root.mdf",
          SIZE                = 8MB,
          FILEGROWTH          =0),
FILEGROUP MSSQL70_misc_fg
(         NAME                = MSSQL70_misc1,
          FILENAME  = "F:",
          SIZE                = 64225MB,
          FILEGROWTH          = 0),
(         NAME                = MSSQL70_misc2,
          FILENAME  = "H:",
          SIZE                = 64225MB,
          FILEGROWTH          = 0),
(         NAME                = MSSQL70_misc3,
          FILENAME  = "J:",
          SIZE                = 64225MB,
          FILEGROWTH          = 0),
(         NAME                = MSSQL70_misc4,
          FILENAME  = "L:",
          SIZE                = 64225MB,
          FILEGROWTH          = 0),
(         NAME                = MSSQL70_misc5,
          FILENAME  = "N:",
          SIZE                = 64225MB,
          FILEGROWTH          = 0),

FILEGROUP MSSQL70_cs_fg
(         NAME                = MSSQL70_cs1,
          FILENAME  = "E:",
          SIZE                = 116000MB,
          FILEGROWTH          = 0),
(         NAME                = MSSQL70_cs2,
          FILENAME  = "G:",
          SIZE                = 116000MB,
          FILEGROWTH          = 0),
(         NAME                = MSSQL70_cs3,
```

```
          FILENAME  = "I:",
          SIZE                = 116000MB,
          FILEGROWTH          = 0),
(         NAME                = MSSQL70_cs4,
          FILENAME  = "K:",
          SIZE                = 116000MB,
          FILEGROWTH          = 0),
(         NAME                = MSSQL70_cs5,
          FILENAME  = "M:",
          SIZE                = 116000MB,
          FILEGROWTH          = 0)
LOG ON
(         NAME                =MSSQL70_tpccv3_log,
          FILENAME  ="S:",
          SIZE                =137195MB,
          FILEGROWTH          =0)
go

-- Store ending time
update    tpcc_timer
set       end_date  = (select convert(char(30), getdate(),9))
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
```

tables.sql

```
--  File:     TABLES.SQL
--            Microsoft TPC-C Benchmark Kit Ver. 4.00
--            Copyright Microsoft, 1996
--  Purpose:  Creates TPC-C tables


use tpcc
go

if exists ( select name from sysobjects where name = 'warehouse' )
          drop table warehouse
go
create table warehouse
(
          w_id                                  smallint,
          w_name                                char(10),
          w_street_1                            char(20),
          w_street_2                            char(20),
          w_city                                char(20),
          w_state                               char(2),
          w_zip                                 char(9),
          w_tax                                 numeric(4,4),
          w_ytd                                 numeric(12,2)
) on MSSQL70_misc_fg
go

if exists ( select name from sysobjects where name = 'district' )
          drop table district
go
create table district
(
          d_id                                  tinyint,
          d_w_id                                smallint,
          d_name                                char(10),
          d_street_1                            char(20),
          d_street_2                            char(20),
          d_city                                char(20),
          d_state                               char(2),
          d_zip                                 char(9),
          d_tax                                 numeric(4,4),
          d_ytd                                 numeric(12,2),
          d_next_o_id                           int
) on MSSQL70_misc_fg
go

if exists ( select name from sysobjects where name = 'customer' )
          drop table customer
go
create table customer
(
          c_id                                  int,
          c_d_id                                tinyint,
          c_w_id                                smallint,
          c_first                               char(16),
          c_middle                      char(2),
          c_last                                char(16),
          c_street_1                            char(20),
          c_street_2                            char(20),
          c_city                                char(20),
          c_state                               char(2),
          c_zip                                 char(9),
          c_phone                               char(16),
          c_since                               datetime,
          c_credit                      char(2),
          c_credit_lim                  numeric(12,2),
          c_discount                            numeric(4,4),
          c_balance                     numeric(12,2),
          c_ytd_payment                 numeric(12,2),
          c_payment_cnt                 smallint,
          c_delivery_cnt                smallint,
          c_data                                char(500)
) on MSSQL70_cs_fg
go

if exists ( select name from sysobjects where name = 'history' )
          drop table history
go
create table history
(
          h_c_id                                int,
          h_c_d_id                      tinyint,
          h_c_w_id                      smallint,
          h_d_id                                tinyint,
          h_w_id                                smallint,
          h_date                                datetime,
          h_amount                      numeric(6,2),
          h_data                                char(24)
) on MSSQL70_misc_fg
go
```

```
if exists ( select name from sysobjects where name = 'new_order' )
          drop table new_order
go
create table new_order
(
          no_o_id                                 int,
          no_d_id                                 tinyint,
          no_w_id                                 smallint
) on MSSQL70_misc_fg
go

if exists ( select name from sysobjects where name = 'orders' )
          drop table orders
go
create table orders
(
          o_id                                    int,
          o_d_id                                  tinyint,
          o_w_id                                  smallint,
          o_c_id                                  int,
          o_entry_d                     datetime,
          o_carrier_id                  tinyint,
          o_ol_cnt                      tinyint,
          o_all_local                             tinyint
) on MSSQL70_misc_fg
go

if exists ( select name from sysobjects where name = 'order_line' )
          drop table order_line
go
create table order_line
(
          ol_o_id                                 int,
          ol_d_id                                 tinyint,
          ol_w_id                                 smallint,
          ol_number                     tinyint,
          ol_i_id                                 int,
          ol_supply_w_id                smallint,
          ol_delivery_d                 datetime,
          ol_quantity                             smallint,
          ol_amount                     numeric(6,2),
          ol_dist_info                  char(24)
) on MSSQL70_misc_fg
go

if exists ( select name from sysobjects where name = 'item' )
          drop table item
go
create table item
(
          i_id                                    int,
          i_im_id                                 int,
          i_name                                  char(24),
          i_price                                 numeric(5,2),
          i_data                                  char(50)
) on MSSQL70_misc_fg
go

if exists ( select name from sysobjects where name = 'stock' )
          drop table stock
go
create table stock
(
          s_i_id                                  int,
          s_w_id                                  smallint,
          s_quantity                              smallint,
          s_dist_01                     char(24),
          s_dist_02                     char(24),
          s_dist_03                     char(24),
          s_dist_04                     char(24),
          s_dist_05                     char(24),
          s_dist_06                     char(24),
          s_dist_07                     char(24),
          s_dist_08                     char(24),
          s_dist_09                     char(24),
          s_dist_10                     char(24),
          s_ytd                                   int,
          s_order_cnt                             smallint,
          s_remote_cnt                  smallint,
          s_data                                  char(50)
) on MSSQL70_cs_fg
go
```

idxcuscl.sql

```
--  File:     IDXCUSCL.SQL
--            Microsoft TPC-C Benchmark Kit Ver. 4.00
--            Copyright Microsoft, 1996
--  Purpose:  Creates clustered index on customer table


use tpcc
go

declare @startdate datetime
declare @enddate datetime
select @startdate = getdate()
select "Start date:", convert(varchar(30),@startdate,9)

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 MSSQL70_cs_fg

select @enddate = getdate()
select "End date: ", convert(varchar(30),@enddate,9)
select "Elapsed time (in seconds): ", datediff(second, @startdate, @enddate)

go
```

idxcusnc.sql

```
--  File:     IDXCUSNC.SQL
--            Microsoft TPC-C Benchmark Kit Ver. 4.00
```

```
--            Copyright Microsoft, 1996
--  Purpose:  Creates non-clustered index on customer table


use tpcc
go

declare @startdate datetime
declare @enddate datetime
select @startdate = getdate()
select "Start date:", convert(varchar(30),@startdate,9)

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 MSSQL70_cs_fg

select @enddate = getdate()
select "End date: ", convert(varchar(30),@enddate,9)
select "Elapsed time (in seconds): ", datediff(second, @startdate, @enddate)

go
```

idxdiscl.sql

```
--  File:     IDXDISCL.SQL
--            Microsoft TPC-C Benchmark Kit Ver. 4.00
--            Copyright Microsoft, 1996
--  Purpose:  Creates clustered index on district table


use tpcc
go

declare @startdate datetime
declare @enddate datetime
select @startdate = getdate()
select "Start date:", convert(varchar(30),@startdate,9)

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 MSSQL70_misc_fg

select @enddate = getdate()
select "End date: ", convert(varchar(30),@enddate,9)
select "Elapsed time (in seconds): ", datediff(second, @startdate, @enddate)

go
```

idxitmcl.sql

```
--  File:     IDXITMCL.SQL
--            Microsoft TPC-C Benchmark Kit Ver. 4.00
--            Copyright Microsoft, 1996
--  Purpose:  Creates clustered index on item table

use tpcc
go

declare @startdate datetime
declare @enddate datetime
select @startdate = getdate()
select "Start date:", convert(varchar(30),@startdate,9)

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 MSSQL70_misc_fg

select @enddate = getdate()
select "End date: ", convert(varchar(30),@enddate,9)
select "Elapsed time (in seconds): ", datediff(second, @startdate, @enddate)

go
```

idxnodcl.sql

```
--  File:     IDXNODCL.SQL
--            Microsoft TPC-C Benchmark Kit Ver. 4.00
--            Copyright Microsoft, 1996
--  Purpose:  Creates clustered index on new_order table


use tpcc
go

declare @startdate datetime
declare @enddate datetime
select @startdate = getdate()
select "Start date:", convert(varchar(30),@startdate,9)

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 MSSQL70_misc_fg

select @enddate = getdate()
select "End date: ", convert(varchar(30),@enddate,9)
select "Elapsed time (in seconds): ", datediff(second, @startdate, @enddate)

go
```

idxodlcl.sql

```
--  File:     IDXNODCL.SQL
--            Microsoft TPC-C Benchmark Kit Ver. 4.00
--            Copyright Microsoft, 1996
--  Purpose:  Creates clustered index on new_order table


use tpcc
go

declare @startdate datetime
declare @enddate datetime
select @startdate = getdate()
select "Start date:", convert(varchar(30),@startdate,9)

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 MSSQL70_misc_fg

select @enddate = getdate()
select "End date: ", convert(varchar(30),@enddate,9)
select "Elapsed time (in seconds): ", datediff(second, @startdate, @enddate)

go
```

idxordcl.sql

```
--  File:     IDXORDCL.SQL
--            Microsoft TPC-C Benchmark Kit Ver. 4.00
--            Copyright Microsoft, 1996
--  Purpose:  Creates clustered index on orders table


use tpcc
go

declare @startdate datetime
declare @enddate datetime
select @startdate = getdate()
select "Start date:", convert(varchar(30),@startdate,9)

if exists ( select name from sysindexes where  name = 'orders_c1' )
          drop index orders.orders_c1

create unique clustered index orders_c1 on orders(o_w_id, o_d_id, o_id)
          on MSSQL70_misc_fg

select @enddate = getdate()
select "End date: ", convert(varchar(30),@enddate,9)
select "Elapsed time (in seconds): ", datediff(second, @startdate, @enddate)

go
```

idxstkcl.sql

```
--  File:     IDXSTKCL.SQL
--            Microsoft TPC-C Benchmark Kit Ver. 4.00
--            Copyright Microsoft, 1996
--  Purpose:  Creates clustered index on stock table


use tpcc
go

declare @startdate datetime
declare @enddate datetime
select @startdate = getdate()
select "Start date:", convert(varchar(30),@startdate,9)

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 MSSQL70_cs_fg

select @enddate = getdate()
select "End date: ", convert(varchar(30),@enddate,9)
select "Elapsed time (in seconds): ", datediff(second, @startdate, @enddate)

go
```

idxwarcl.sql

```
--  File:     IDXWARCL.SQL
--            Microsoft TPC-C Benchmark Kit Ver. 4.00
--            Copyright Microsoft, 1996
--  Purpose:  Creates clustered index on warehouse table


use tpcc
go

declare @startdate datetime
declare @enddate datetime
select @startdate = getdate()
select "Start date:", convert(varchar(30),@startdate,9)

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 MSSQL70_misc_fg

select @enddate = getdate()
select "End date: ", convert(varchar(30),@enddate,9)
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
```

backup.sql

```
--  File:     BACKUP.SQL
--            Microsoft TPC-C Benchmark Kit Ver. 4.21
--            Copyright Microsoft, 1999, 2000
--  Purpose:  Creates backup of tpcc database


declare @startdate datetime
declare @enddate datetime
select @startdate = getdate()
select "Start date:", convert(varchar(30),@startdate,9)

dump database tpcc to tpccback1,tpccback2,tpccback3,tpccback4,tpccback5 with init, stats
= 5

select @enddate = getdate()
select "End date: ", convert(varchar(30),@enddate,9)
select "Elapsed time (in seconds): ", datediff(second, @startdate, @enddate)

go
```

restore.sql

```
--  File:     RESTORE.SQL
--            Microsoft TPC-C Benchmark Kit Ver. 4.21
--            Copyright Microsoft, 1999, 2000
--  Purpose:  Loads database backup from backup files


declare @startdate datetime
declare @enddate datetime
select @startdate = getdate()
select "Start date:", convert(varchar(30),@startdate,9)

load database tpcc from tpccback1,tpccback2,tpccback3,tpccback4,tpccback5 with stats = 5

select @enddate = getdate()
select "End date: ", convert(varchar(30),@enddate,9)
select "Elapsed time (in seconds): ", datediff(second, @startdate, @enddate)

go
```

Stored Procedures

neword.sql

```
--  File:     NEWORD.SQL
--            Microsoft TPC-C Benchmark Kit Ver. 4.01
--            Copyright Microsoft, 1996
--  Purpose:  Creates new order transaction stored procedure
--
--  Modified 9/21/98 - Jamie Reding - Microsoft Corporation
--                   Reordered @rowcount check so that invalid supply warehouse id,
--      as well as invalid item id, is detected and causes explicit
--                   transaction rollback.
--

use tpcc
go

if exists ( select name from sysobjects where name = "tpcc_neworder" )
          drop procedure tpcc_neworder
go

create proc tpcc_neworder
                                                @w_id           smallint,
                                                @d_id           tinyint,
                                                @c_id           int,
                                                @o_ol_cnt       tinyint,
                                                @o_all_local    tinyint,
                                                @i_id1  int = 0, @s_w_id1 smallint = 0,
@ol_qty1 smallint = 0,
                                                @i_id2  int = 0, @s_w_id2 smallint = 0,
@ol_qty2 smallint = 0,
                                                @i_id3  int = 0, @s_w_id3 smallint = 0,
@ol_qty3 smallint = 0,
                                                @i_id4  int = 0, @s_w_id4 smallint = 0,
@ol_qty4 smallint = 0,
                                                @i_id5  int = 0, @s_w_id5 smallint = 0,
@ol_qty5 smallint = 0,
                                                @i_id6  int = 0, @s_w_id6 smallint = 0,
@ol_qty6 smallint = 0,
                                                @i_id7  int = 0, @s_w_id7 smallint = 0,
@ol_qty7 smallint = 0,
                                                @i_id8  int = 0, @s_w_id8 smallint = 0,
@ol_qty8 smallint = 0,
                                                @i_id9  int = 0, @s_w_id9 smallint = 0,
@ol_qty9 smallint = 0,
                                                @i_id10 int = 0, @s_w_id10 smallint =
0, @ol_qty10 smallint = 0,
                                                @i_id11 int = 0, @s_w_id11 smallint =
0, @ol_qty11 smallint = 0,
                                                @i_id12 int = 0, @s_w_id12 smallint =
0, @ol_qty12 smallint = 0,
                                                @i_id13 int = 0, @s_w_id13 smallint =
0, @ol_qty13 smallint = 0,
                                                @i_id14 int = 0, @s_w_id14 smallint =
0, @ol_qty14 smallint = 0,
                                                @i_id15 int = 0, @s_w_id15 smallint =
0, @ol_qty15 smallint = 0


as
declare   @w_tax          numeric(4,4),
        @d_tax          numeric(4,4),
        @c_last         char(16),
        @c_credit       char(2),
        @c_discount     numeric(4,4),
        @i_price        numeric(5,2),
        @i_name         char(24),
        @i_data         char(50),
        @o_entry_d      datetime,
        @remote_flag    int,
        @s_quantity     smallint,
        @s_data         char(50),
        @s_dist         char(24),
                @li_no          int,
                @o_id                           int,
                @commit_flag    tinyint,
        @li_id          int,
        @li_s_w_id      smallint,
        @li_qty         smallint,
                @ol_number                      int,
                @c_id_local                     int

begin

          begin transaction n

--  get 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 (tablock 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,

                                        @li_s_w_id,

                                        "dec 31, 1899",

                                        @li_qty,

                                        @i_price * @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 (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,
                                                    @o_entry_d,
                                                        0,
                                                        @o_ol_cnt,
                                                        @o_all_local)

--  insert corresponding row into new-order table

        insert into new_order values (@o_id,
                                                                                @d_id,
                                                                                @w_id)

--  select warehouse tax

        select    @w_tax    = w_tax
        from      warehouse (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
```

payment.sql

```
--  File:     PAYMENT.SQL
--            Microsoft TPC-C Benchmark Kit Ver. 4.00
--            Copyright Microsoft, 1996
--  Purpose:  Creates payment transaction stored procedure


use tpcc
go

if exists (select name from sysobjects where name = "tpcc_payment" )
          drop procedure tpcc_payment
go

create proc tpcc_payment @w_id           smallint,
                                                                @c_w_id         smallint,
                                                                @h_amount
numeric(6,2),
                                                                @d_id           tinyint,
                                                                @c_d_id         tinyint,
                                                                @c_id           int,
                                                                @c_last         char(16) =
""


as
declare  @w_street_1     char(20),
         @w_street_2     char(20),
         @w_city         char(20),
         @w_state        char(2),
         @w_zip          char(9),
         @w_name         char(10),
         @d_street_1     char(20),
         @d_street_2     char(20),
         @d_city         char(20),
         @d_state        char(2),
         @d_zip          char(9),
         @d_name         char(10),
         @c_first        char(16),
         @c_middle       char(2),
         @c_street_1     char(20),
         @c_street_2     char(20),
         @c_city         char(20),
         @c_state        char(2),
         @c_zip          char(9),
         @c_phone        char(16),
         @c_since        datetime,
         @c_credit       char(2),
         @c_credit_lim   numeric(12,2),
         @c_balance      numeric(12,2),
         @c_discount     numeric(4,4),
         @data           char(500),
         @c_data         char(500),
         @datetime       datetime,
         @w_ytd          numeric(12,2),
```

```
        @d_ytd          numeric(12,2),
        @cnt            smallint,
        @val            smallint,
        @screen_data          char(200),
                    @d_id_local         tinyint,
                    @w_id_local         smallint,
                    @c_id_local         int

select @screen_data = ""

begin tran p

--  get payment date

         select @datetime = getdate()

         if (@c_id = 0)
         begin

--  get customer id and info using last name

                    select @cnt = count(*)
                    from customer (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 (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,
                    @data          = c_data,
                    @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) +
                                          substring(@data, 1, 458)

--  update customer info

                    update customer set
                           c_data = @c_data
                    where c_id   = @c_id and
                                c_w_id = @c_w_id and
                          c_d_id = @c_d_id

                    select @screen_data = substring (@c_data,1,200)
         end

--  get district data and update year-to-date

         update district
         set d_ytd       = d_ytd + @h_amount,
                    @d_street_1 = d_street_1,
                    @d_street_2 = d_street_2,
                    @d_city     = d_city,
                    @d_state    = d_state,
                    @d_zip      = d_zip,
                    @d_name     = d_name,
                    @d_id_local = d_id
         where d_w_id = @w_id and
               d_id   = @d_id

--  get warehouse data and update year-to-date

         update warehouse
         set w_ytd       = w_ytd + @h_amount,
                    @w_street_1 = w_street_1,
               @w_street_2 = w_street_2,
               @w_city     = w_city,
               @w_state    = w_state,
               @w_zip      = w_zip,
               @w_name     = w_name,
                    @w_id_local = w_id
         where w_id = @w_id

--  create history record

         insert into history values  (@c_id_local,
                                                                                @c_d_id,
                                                                                      @c_w_id,

@d_id_local,
```

```
@w_id_local,

@datetime,

@h_amount,                                                              @w_name

+ "    " + @d_name)

commit tran p

--  return data to client

select  @c_id,
                    @c_last,
                    @datetime,
                    @w_street_1,
                    @w_street_2,
                    @w_city,
                    @w_state,
                    @w_zip,
                    @d_street_1,
                    @d_street_2,
                    @d_city,
                    @d_state,
                    @d_zip,
                    @c_first,
                    @c_middle,
                    @c_street_1,
                    @c_street_2,
                    @c_city,
                    @c_state,
                    @c_zip,
                    @c_phone,
                    @c_since,
                    @c_credit,
                    @c_credit_lim,
                    @c_discount,
                    @c_balance,
                    @screen_data

go
```

ordstat.sql

```
--  File:     ORDSTAT.SQL
--            Microsoft TPC-C Benchmark Kit Ver. 4.00
--            Copyright Microsoft, 1996
--  Purpose:  Creates order status transaction stored procedure


use tpcc
go

if exists ( select name from sysobjects where name = "tpcc_orderstatus" )
         drop procedure   tpcc_orderstatus
go

create proc tpcc_orderstatus @w_id               smallint,
          tinyint,
          int,
= ""
as
declare @c_balance            numeric(12,2),
        @c_first              char(16),
        @c_middle             char(2),
        @o_id                           int,
        @o_entry_d            datetime,
        @o_carrier_id         smallint,
        @cnt                            smallint

begin tran o

          if (@c_id = 0)
                    begin

--  get customer id and info using last name

                    select @cnt = (count(*)+1)/2
                    from customer (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 (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 (repeatableread)
                    where c_id   = @c_id and
                          c_d_id = @d_id and
                          c_w_id = @w_id

                    select @cnt = @@rowcount

                    end
                                                                                @d_id

                                                                                @c_id

                                                                                @c_last  char(16)
```

```
--  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 (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 (repeatableread)
          where ol_o_id = @o_id and
                ol_d_id = @d_id and
                ol_w_id = @w_id

custnotfound:

commit tran o

--  return data to client

select @c_id,
             @c_last,
             @c_first,
             @c_middle,
             @o_entry_d,
             @o_carrier_id,
             @c_balance,
             @o_id

go
```

delivery.sql

```
--  File:     DELIVERY.SQL
--            Microsoft TPC-C Benchmark Kit Ver. 4.00
--            Copyright Microsoft, 1996
--  Purpose:  Creates delivery transaction stored procedure

use tpcc
go

if exists (select name from sysobjects where name = "tpcc_delivery" )
          drop procedure tpcc_delivery
go

create proc tpcc_delivery     @w_id           smallint,

                                                                    @o_carrier_id   smallint
as

declare @d_id tinyint,
        @o_id int,
        @c_id int,
        @total numeric(12,2),
        @oid1 int,
        @oid2 int,
        @oid3 int,
        @oid4 int,
        @oid5 int,
        @oid6 int,
        @oid7 int,
        @oid8 int,
        @oid9 int,
        @oid10 int

select @d_id = 0

begin tran d

    while (@d_id < 10)
    begin

        select @d_id  = @d_id + 1,
               @total = 0,
               @o_id  = 0

                    select top 1 @o_id = no_o_id
                    from new_order (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 tran d

-- return delivery data to client

select @oid1,
       @oid2,
       @oid3,
       @oid4,
       @oid5,
       @oid6,
       @oid7,
       @oid8,
       @oid9,
       @oid10

go
```

stocklev.sql

```
--  File:     STOCKLEV.SQL
--            Microsoft TPC-C Benchmark Kit Ver. 4.00
--            Copyright Microsoft, 1996
--  Purpose:  Creates stock level transaction stored procedure


use tpcc
go

if exists (select name from sysobjects where name = "tpcc_stocklevel" )
        drop procedure tpcc_stocklevel
go

create proc tpcc_stocklevel   @w_id               smallint,
                                                        @d_id               tinyint,
                                                        @threshhold         smallint
as

          declare @o_id_low int,
                        @o_id_high int

    select @o_id_low  = (d_next_o_id - 20),
                  @o_id_high = (d_next_o_id - 1)
    from district
    where d_w_id = @w_id and
                     d_id   = @d_id

    select count(distinct(s_i_id))
          from  stock, order_line
    where ol_w_id    =  @w_id and
                ol_d_id    =  @d_id and
                ol_o_id between @o_id_low and @o_id_high and
          s_w_id     =  ol_w_id and
                s_i_id     =  ol_i_id and
                s_quantity <  @threshhold

go
```

Loader Source Code

tpcc.h

```
//        File:               TPCC.H
//                                        Microsoft TPC-C Kit Ver. 4.00
//                                        Copyright Microsoft, 1996, 1997, 1998

//        Purpose:  Header file for TPC-C database loader


// Build number of TPC Benchmark Kit
#define TPCKIT_VER  "4.00"

// 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>

// 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 ORDERS_PER_DIST                  3000
#define LOADER_RES_FILE                   "logs\\load.out"
#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                                  *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       MakeOriginalAlphaString();
int       MakeNumberString();
int       MakeZipNumberString();
void      InitString();
void      InitAddress();
```

```
void      PaddString();
```

tpccldr.c

```
//        File:               TPCCLDR.C
//                                    Microsoft TPC-C Kit Ver. 4.00
//                                    Copyright Microsoft, 1996, 1997, 1998
//        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

// 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 OpenConnections();
void BuildIndex();
void FormatDate ();
```

```
// Shared memory structures

typedef struct
{
    long                ol;
    long                ol_i_id;
    short               ol_supply_w_id;
    short               ol_quantity;
    double              ol_amount;
    char                ol_dist_info[DIST_INFO_LEN+1];
          char                                      ol_delivery_d[OL_DELIVERY_D_LEN+1];
} ORDER_LINE_STRUCT;

typedef struct
{
    long                o_id;
    short               o_d_id;
    short               o_w_id;
    long                o_c_id;
    short               o_carrier_id;
    short               o_ol_cnt;
    short               o_all_local;
          ORDER_LINE_STRUCT   o_ol[15];
} ORDERS_STRUCT;

typedef struct
{
    long                                  c_id;
    short                                 c_d_id;
    short                                 c_w_id;
          char                                      c_first[FIRST_NAME_LEN+1];
    char                                  c_middle[MIDDLE_NAME_LEN+1];
    char                                  c_last[LAST_NAME_LEN+1];
    char                                  c_street_1[ADDRESS_LEN+1];
    char                                  c_street_2[ADDRESS_LEN+1];
    char                                  c_city[ADDRESS_LEN+1];
    char                                  c_state[STATE_LEN+1];
    char                                  c_zip[ZIP_LEN+1];
    char                                  c_phone[PHONE_LEN+1];
    char                                  c_credit[CREDIT_LEN+1];
    double                                        c_credit_lim;
    double                                        c_discount;
//  fix to avoid ODBC float to numeric conversion problem.
//  double                                        c_balance;
          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      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     i_hstmt1;
HSTMT     w_hstmt1;
HSTMT     c_hstmt1, c_hstmt2;
HSTMT     o_hstmt1, o_hstmt2, o_hstmt3;

ORDERS_STRUCT   orders_buf[ORDERS_PER_DISTRICT];
CUSTOMER_STRUCT customer_buf[CUSTOMERS_PER_DISTRICT];
long            orders_rows_loaded;
long            new_order_rows_loaded;
long            order_line_rows_loaded;
long            history_rows_loaded;
long            customer_rows_loaded;
long            stock_rows_loaded;
long            district_rows_loaded;
long            item_rows_loaded;
long            warehouse_rows_loaded;
long            main_time_start;
long            main_time_end;
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);

          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()
{
    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];

          // Seed with unique number
          seed(1);

          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");

          rc = bcp_init(i_hdbc1, name, NULL, "logs\\item.err", 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);
          }

          rc = bcp_bind(i_hdbc1, (BYTE *) &i_id, 0, SQL_VARLEN_DATA, NULL, 0, SQLINT4,
1);
          if (rc != SUCCEED)
                    HandleErrorDBC(i_hdbc1);

          rc = bcp_bind(i_hdbc1, (BYTE *) &i_im_id, 0, SQL_VARLEN_DATA, NULL, 0, SQLINT4,
2);
          if (rc != SUCCEED)
                    HandleErrorDBC(i_hdbc1);

          rc = bcp_bind(i_hdbc1, (BYTE *) i_name, 0, I_NAME_LEN, NULL, 0, 0, 3);
          if (rc != SUCCEED)
                    HandleErrorDBC(i_hdbc1);

          rc = bcp_bind(i_hdbc1, (BYTE *) &i_price, 0, SQL_VARLEN_DATA, NULL, 0, SQLFLT8,
4);
          if (rc != SUCCEED)
                    HandleErrorDBC(i_hdbc1);

          rc = bcp_bind(i_hdbc1, (BYTE *) i_data, 0, I_DATA_LEN, NULL, 0, 0, 5);
          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);

                    MakeAlphaString(14, 24, I_NAME_LEN, i_name);

                    i_price = ((float) RandomNumber(100L, 10000L))/100.0;

                    MakeOriginalAlphaString(26, 50, I_DATA_LEN, i_data, 10);

                    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()
{
    short w_id;
    char  w_name[W_NAME_LEN+1];
    char  w_street_1[ADDRESS_LEN+1];
    char  w_street_2[ADDRESS_LEN+1];
    char  w_city[ADDRESS_LEN+1];
    char  w_state[STATE_LEN+1];
    char  w_zip[ZIP_LEN+1];
    double          w_tax;
    double          w_ytd;
          char      name[20];
          long      time_start;
          RETCODE   rc;
          DBINT     rcint;
```

```
	char	bcphint[128];


	// 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");

	rc = bcp_init(w_hdbc1, name, NULL, "logs\\whouse.err", 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);
	}

	rc = bcp_bind(w_hdbc1, (BYTE *) &w_id, 0, SQL_VARLEN_DATA, NULL, 0, SQLINT2,
1);
	if (rc != SUCCEED)
		HandleErrorDBC(w_hdbc1);

	rc = bcp_bind(w_hdbc1, (BYTE *) w_name, 0, W_NAME_LEN, NULL, 0, 0, 2);
	if (rc != SUCCEED)
		HandleErrorDBC(w_hdbc1);

	rc = bcp_bind(w_hdbc1, (BYTE *) w_street_1, 0, ADDRESS_LEN, NULL, 0, 0, 3);
	if (rc != SUCCEED)
		HandleErrorDBC(w_hdbc1);

	rc = bcp_bind(w_hdbc1, (BYTE *) w_street_2, 0, ADDRESS_LEN, NULL, 0, 0, 4);
	if (rc != SUCCEED)
		HandleErrorDBC(w_hdbc1);

	rc = bcp_bind(w_hdbc1, (BYTE *) w_city, 0, ADDRESS_LEN, NULL, 0, 0, 5);
	if (rc != SUCCEED)
		HandleErrorDBC(w_hdbc1);

	rc = bcp_bind(w_hdbc1, (BYTE *) w_state, 0, STATE_LEN, NULL, 0, 0, 6);
	if (rc != SUCCEED)
		HandleErrorDBC(w_hdbc1);

	rc = bcp_bind(w_hdbc1, (BYTE *) w_zip, 0, ZIP_LEN, NULL, 0, 0, 7);
	if (rc != SUCCEED)
		HandleErrorDBC(w_hdbc1);

	rc = bcp_bind(w_hdbc1, (BYTE *) &w_tax, 0, SQL_VARLEN_DATA, NULL, 0, SQLFLT8,
8);
	if (rc != SUCCEED)
		HandleErrorDBC(w_hdbc1);

	rc = bcp_bind(w_hdbc1, (BYTE *) &w_ytd, 0, SQL_VARLEN_DATA, NULL, 0, SQLFLT8,
9);
	if (rc != SUCCEED)
		HandleErrorDBC(w_hdbc1);

	time_start = (TimeNow() / MILLI);

	warehouse_rows_loaded = 0;

	for (w_id = (short)aptr->starting_warehouse; w_id <= aptr->num_warehouses;
w_id++)
	{
		MakeAlphaString(6,10, W_NAME_LEN, w_name);

		MakeAddress(w_street_1, w_street_2, w_city, w_state, w_zip);

		w_tax = ((float) RandomNumber(0L,2000L))/10000.00;

		w_ytd = 300000.00;

		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()
{
    short d_id;
    short d_w_id;
    char  d_name[D_NAME_LEN+1];
    char  d_street_1[ADDRESS_LEN+1];
    char  d_street_2[ADDRESS_LEN+1];
    char  d_city[ADDRESS_LEN+1];
```

```
    char  d_state[STATE_LEN+1];
    char  d_zip[ZIP_LEN+1];
    double          d_tax;
    double          d_ytd;
          char      name[20];
    long  d_next_o_id;
          long      time_start;
          int                 w_id;
          RETCODE   rc;
          DBINT     rcint;
          char      bcphint[128];

          // 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");

          rc = bcp_init(w_hdbc1, name, NULL, "logs\\district.err", 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);
          }

          rc = bcp_bind(w_hdbc1, (BYTE *) &d_id, 0, SQL_VARLEN_DATA, NULL, 0, SQLINT2,
1);
          if (rc != SUCCEED)
                    HandleErrorDBC(w_hdbc1);

          rc = bcp_bind(w_hdbc1, (BYTE *) &d_w_id, 0, SQL_VARLEN_DATA, NULL, 0, SQLINT2,
2);
          if (rc != SUCCEED)
                    HandleErrorDBC(w_hdbc1);

          rc = bcp_bind(w_hdbc1, (BYTE *) d_name, 0, D_NAME_LEN, NULL, 0, 0, 3);
          if (rc != SUCCEED)
                    HandleErrorDBC(w_hdbc1);

          rc = bcp_bind(w_hdbc1, (BYTE *) d_street_1, 0, ADDRESS_LEN, NULL, 0, 0, 4);
          if (rc != SUCCEED)
                    HandleErrorDBC(w_hdbc1);

          rc = bcp_bind(w_hdbc1, (BYTE *) d_street_2, 0, ADDRESS_LEN, NULL, 0, 0, 5);
          if (rc != SUCCEED)
                    HandleErrorDBC(w_hdbc1);

          rc = bcp_bind(w_hdbc1, (BYTE *) d_city, 0, ADDRESS_LEN, NULL, 0, 0, 6);
          if (rc != SUCCEED)
                    HandleErrorDBC(w_hdbc1);

          rc = bcp_bind(w_hdbc1, (BYTE *) d_state, 0, STATE_LEN, NULL, 0, 0, 7);
          if (rc != SUCCEED)
                    HandleErrorDBC(w_hdbc1);

          rc = bcp_bind(w_hdbc1, (BYTE *) d_zip, 0, ZIP_LEN, NULL, 0, 0, 8);
          if (rc != SUCCEED)
                    HandleErrorDBC(w_hdbc1);

          rc = bcp_bind(w_hdbc1, (BYTE *) &d_tax, 0, SQL_VARLEN_DATA, NULL, 0, SQLFLT8,
9);
          if (rc != SUCCEED)
                    HandleErrorDBC(w_hdbc1);

          rc = bcp_bind(w_hdbc1, (BYTE *) &d_ytd, 0, SQL_VARLEN_DATA, NULL, 0, SQLFLT8,
10);
          if (rc != SUCCEED)
                    HandleErrorDBC(w_hdbc1);

          rc = bcp_bind(w_hdbc1, (BYTE *) &d_next_o_id, 0, SQL_VARLEN_DATA, NULL, 0,
SQLINT4, 11);
          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++)
                    {
                              MakeAlphaString(6,10,D_NAME_LEN, d_name);

                              MakeAddress(d_street_1, d_street_2, d_city, d_state,
d_zip);

                              d_tax = ((float) RandomNumber(0L,2000L))/10000.00;

                              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()
{
    long  s_i_id;
    short s_w_id;
    short s_quantity;
    char  s_dist_01[S_DIST_LEN+1];
    char  s_dist_02[S_DIST_LEN+1];
    char  s_dist_03[S_DIST_LEN+1];
    char  s_dist_04[S_DIST_LEN+1];
    char  s_dist_05[S_DIST_LEN+1];
    char  s_dist_06[S_DIST_LEN+1];
    char  s_dist_07[S_DIST_LEN+1];
    char  s_dist_08[S_DIST_LEN+1];
    char  s_dist_09[S_DIST_LEN+1];
    char  s_dist_10[S_DIST_LEN+1];
    long  s_ytd;
    short s_order_cnt;
    short s_remote_cnt;
    char  s_data[S_DATA_LEN+1];
    short len;
          char      name[20];
          long      time_start;
          RETCODE   rc;
          DBINT     rcint;
          char      bcphint[128];

          // 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");

          rc = bcp_init(w_hdbc1, name, NULL, "logs\\stock.err", 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);
          }

          rc = bcp_bind(w_hdbc1, (BYTE *) &s_i_id, 0, SQL_VARLEN_DATA, NULL, 0, SQLINT4,
1);
          if (rc != SUCCEED)
                    HandleErrorDBC(w_hdbc1);

          bcp_bind(w_hdbc1, (BYTE *) &s_w_id, 0, SQL_VARLEN_DATA, NULL, 0, SQLINT2, 2);
          if (rc != SUCCEED)
                    HandleErrorDBC(w_hdbc1);

          rc = bcp_bind(w_hdbc1, (BYTE *) &s_quantity, 0, SQL_VARLEN_DATA, NULL, 0,
SQLINT2, 3);
          if (rc != SUCCEED)
                    HandleErrorDBC(w_hdbc1);

          rc = bcp_bind(w_hdbc1, (BYTE *) s_dist_01, 0, S_DIST_LEN, NULL, 0, 0, 4);
          if (rc != SUCCEED)
                    HandleErrorDBC(w_hdbc1);

          rc = bcp_bind(w_hdbc1, (BYTE *) s_dist_02, 0, S_DIST_LEN, NULL, 0, 0, 5);
          if (rc != SUCCEED)
                    HandleErrorDBC(w_hdbc1);

          rc = bcp_bind(w_hdbc1, (BYTE *) s_dist_03, 0, S_DIST_LEN, NULL, 0, 0, 6);
          if (rc != SUCCEED)
                    HandleErrorDBC(w_hdbc1);

          rc = bcp_bind(w_hdbc1, (BYTE *) s_dist_04, 0, S_DIST_LEN, NULL, 0, 0, 7);
          if (rc != SUCCEED)
                    HandleErrorDBC(w_hdbc1);

          rc = bcp_bind(w_hdbc1, (BYTE *) s_dist_05, 0, S_DIST_LEN, NULL, 0, 0, 8);
          if (rc != SUCCEED)
                    HandleErrorDBC(w_hdbc1);

          rc = bcp_bind(w_hdbc1, (BYTE *) s_dist_06, 0, S_DIST_LEN, NULL, 0, 0, 9);
          if (rc != SUCCEED)
                    HandleErrorDBC(w_hdbc1);

          rc = bcp_bind(w_hdbc1, (BYTE *) s_dist_07, 0, S_DIST_LEN, NULL, 0, 0, 10);
          if (rc != SUCCEED)
                    HandleErrorDBC(w_hdbc1);

          rc = bcp_bind(w_hdbc1, (BYTE *) s_dist_08, 0, S_DIST_LEN, NULL, 0, 0, 11);
          if (rc != SUCCEED)
                    HandleErrorDBC(w_hdbc1);

          rc = bcp_bind(w_hdbc1, (BYTE *) s_dist_09, 0, S_DIST_LEN, NULL, 0, 0, 12);
          if (rc != SUCCEED)
                    HandleErrorDBC(w_hdbc1);

          rc = bcp_bind(w_hdbc1, (BYTE *) s_dist_10, 0, S_DIST_LEN, NULL, 0, 0, 13);
          if (rc != SUCCEED)
                    HandleErrorDBC(w_hdbc1);

          rc = bcp_bind(w_hdbc1, (BYTE *) &s_ytd, 0, SQL_VARLEN_DATA, NULL, 0, SQLINT4,
14);
          if (rc != SUCCEED)
                    HandleErrorDBC(w_hdbc1);

          rc = bcp_bind(w_hdbc1, (BYTE *) &s_order_cnt, 0, SQL_VARLEN_DATA, NULL, 0,
SQLINT2, 15);
          if (rc != SUCCEED)
                    HandleErrorDBC(w_hdbc1);

          rc = bcp_bind(w_hdbc1, (BYTE *) &s_remote_cnt, 0, SQL_VARLEN_DATA, NULL, 0,
SQLINT2, 16);
          if (rc != SUCCEED)
                    HandleErrorDBC(w_hdbc1);
```

```
        rc = bcp_bind(w_hdbc1, (BYTE *) s_data, 0, S_DATA_LEN, NULL, 0, 0, 17);
        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 = (short)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(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;
        short                           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];
        // SQLRETURN                                            rc_1;
        // SQLSMALLINT                                          recnum, MsgLen;
        // SQLCHAR                                                      SqlState[6],
Msg[SQL_MAX_MESSAGE_LENGTH];
        // SQLINTEGER                                           NativeError;

        // 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");

        // Initialize bulk copy
        sprintf(name, "%s..%s", aptr->database, "customer");

        rc = bcp_init(c_hdbc1, name, NULL, "logs\\customer.err", 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);
        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 = (short)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");

          // 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, "isql -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\" > logs\\nurand_load.log",
                                        aptr->server,
                                        aptr->user,
                                        aptr->password,
                                        aptr->database,
                                        LOADER_NURAND_C);

          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()
{
          int     i;

          for (i=0;i<customers_per_district;i++)
          {
                    customer_buf[i].c_id = 0;
                    customer_buf[i].c_d_id = 0;
                    customer_buf[i].c_w_id = 0;

                    strcpy(customer_buf[i].c_first,"");
                    strcpy(customer_buf[i].c_middle,"");
                    strcpy(customer_buf[i].c_last,"");
                    strcpy(customer_buf[i].c_street_1,"");
                    strcpy(customer_buf[i].c_street_2,"");
                    strcpy(customer_buf[i].c_city,"");
                    strcpy(customer_buf[i].c_state,"");
                    strcpy(customer_buf[i].c_zip,"");
                    strcpy(customer_buf[i].c_phone,"");
                    strcpy(customer_buf[i].c_credit,"");

                    customer_buf[i].c_credit_lim = 0;
                    customer_buf[i].c_discount = (float) 0;

                    //  fix to avoid ODBC float to numeric conversion problem.
                    //        customer_buf[i].c_balance = 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, int w_id)
{
          long                                    i;
    CUSTOMER_SORT_STRUCT    c[CUSTOMERS_PER_DISTRICT];

          for (i=0;i<customers_per_district;i++)
          {
                    if (i < 1000)
                              LastName(i, c[i].c_last);
                    else
                              LastName(NURand(255,0,999,LOADER_NURAND_C), c[i].c_last);

                    MakeAlphaString(8,16,FIRST_NAME_LEN, c[i].c_first);

                    c[i].c_id = i+1;

          }

          printf("...Loading customer buffer for: d_id = %d, w_id = %d\n",
                              d_id, w_id);

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

                    customer_buf[i].c_d_id = d_id;
                    customer_buf[i].c_w_id = w_id;
                    customer_buf[i].h_amount = 10.0;

                    customer_buf[i].c_ytd_payment  = 10.0;

                    customer_buf[i].c_payment_cnt  = 1;
                    customer_buf[i].c_delivery_cnt = 0;

                    // Generate CUSTOMER and HISTORY data

                    customer_buf[i].c_id = c[i].c_id;

                    strcpy(customer_buf[i].c_first, c[i].c_first);
                    strcpy(customer_buf[i].c_last, c[i].c_last);

                    customer_buf[i].c_middle[0] = 'O';
                    customer_buf[i].c_middle[1] = 'E';

                    MakeAddress(customer_buf[i].c_street_1,
                                        customer_buf[i].c_street_2,
                                        customer_buf[i].c_city,
                                        customer_buf[i].c_state,
                                        customer_buf[i].c_zip);

                    MakeNumberString(16, 16, PHONE_LEN, customer_buf[i].c_phone);

                    if (RandomNumber(1L, 100L) > 10)
                              customer_buf[i].c_credit[0] = 'G';
                    else
                              customer_buf[i].c_credit[0] = 'B';
                    customer_buf[i].c_credit[1] = 'C';

                    customer_buf[i].c_credit_lim = 50000.0;
                    customer_buf[i].c_discount = ((float) RandomNumber(0L, 5000L)) /
10000.0;


                    //  fix to avoid ODBC float to numeric conversion problem.
                    //  customer_buf[i].c_balance = -10.0;
                    strcpy(customer_buf[i].c_balance,"-10.0");
```

```
                    MakeAlphaString(500, 500, C_DATA_LEN, customer_buf[i].c_data);


                    // Generate HISTORY data
                    MakeAlphaString(12, 24, H_DATA_LEN, customer_buf[i].h_data);

          }
}

//====================================================================
//
// Function   : LoadCustomerTable
//
//====================================================================

void LoadCustomerTable(LOADER_TIME_STRUCT *customer_time_start)
{
          int         i;
     long        c_id;
     short       c_d_id;
     short       c_w_id;
     char        c_first[FIRST_NAME_LEN+1];
     char        c_middle[MIDDLE_NAME_LEN+1];
     char        c_last[LAST_NAME_LEN+1];
     char        c_street_1[ADDRESS_LEN+1];
     char        c_street_2[ADDRESS_LEN+1];
     char        c_city[ADDRESS_LEN+1];
     char        c_state[STATE_LEN+1];
     char        c_zip[ZIP_LEN+1];
     char        c_phone[PHONE_LEN+1];
     char        c_credit[CREDIT_LEN+1];
     double      c_credit_lim;
     double      c_discount;

          //  fix to avoid ODBC float to numeric conversion problem.
          //  double                    c_balance;
          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;

     rc = bcp_bind(c_hdbc1, (BYTE *) &c_id, 0, SQL_VARLEN_DATA, NULL, 0, SQLINT4, 1);
          if (rc != SUCCEED)
                    HandleErrorDBC(c_hdbc1);

     rc = bcp_bind(c_hdbc1, (BYTE *) &c_d_id, 0, SQL_VARLEN_DATA, NULL, 0, SQLINT2, 2);
          if (rc != SUCCEED)
                    HandleErrorDBC(c_hdbc1);

          rc = bcp_bind(c_hdbc1, (BYTE *) &c_w_id, 0, SQL_VARLEN_DATA, NULL, 0, SQLINT2,
3);
          if (rc != SUCCEED)
                    HandleErrorDBC(c_hdbc1);

     rc = bcp_bind(c_hdbc1, (BYTE *) c_first, 0, FIRST_NAME_LEN, NULL, 0, 0, 4);
          if (rc != SUCCEED)
                    HandleErrorDBC(c_hdbc1);

     rc = bcp_bind(c_hdbc1, (BYTE *) c_middle, 0, MIDDLE_NAME_LEN,NULL, 0, 0, 5);
          if (rc != SUCCEED)
                    HandleErrorDBC(c_hdbc1);

     rc = bcp_bind(c_hdbc1, (BYTE *) c_last, 0, LAST_NAME_LEN, NULL, 0, 0, 6);
          if (rc != SUCCEED)
                    HandleErrorDBC(c_hdbc1);

     rc = bcp_bind(c_hdbc1, (BYTE *) c_street_1, 0, ADDRESS_LEN, NULL, 0, 0, 7);
          if (rc != SUCCEED)
                    HandleErrorDBC(c_hdbc1);

     rc = bcp_bind(c_hdbc1, (BYTE *) c_street_2, 0, ADDRESS_LEN, NULL,0,0, 8);
          if (rc != SUCCEED)
                    HandleErrorDBC(c_hdbc1);

     rc = bcp_bind(c_hdbc1, (BYTE *) c_city, 0, ADDRESS_LEN, NULL, 0, 0, 9);
          if (rc != SUCCEED)
                    HandleErrorDBC(c_hdbc1);

     rc = bcp_bind(c_hdbc1, (BYTE *) c_state, 0, STATE_LEN, NULL, 0, 0, 10);
          if (rc != SUCCEED)
                    HandleErrorDBC(c_hdbc1);

     rc = bcp_bind(c_hdbc1, (BYTE *) c_zip, 0, ZIP_LEN, NULL, 0, 0, 11);
          if (rc != SUCCEED)
                    HandleErrorDBC(c_hdbc1);

     rc = bcp_bind(c_hdbc1, (BYTE *) c_phone, 0, PHONE_LEN, NULL, 0, 0, 12);
          if (rc != SUCCEED)
                    HandleErrorDBC(c_hdbc1);

          rc = bcp_bind(c_hdbc1, (BYTE *) &c_since, 0, C_SINCE_LEN, NULL, 0,
SQLCHARACTER, 13);
          if (rc != SUCCEED)
                    HandleErrorDBC(c_hdbc1);

     rc = bcp_bind(c_hdbc1, (BYTE *) c_credit, 0, CREDIT_LEN, NULL, 0, 0, 14);
          if (rc != SUCCEED)
                    HandleErrorDBC(c_hdbc1);

     rc = bcp_bind(c_hdbc1, (BYTE *) &c_credit_lim, 0, SQL_VARLEN_DATA, NULL, 0, SQLFLT8,
15);
          if (rc != SUCCEED)
                    HandleErrorDBC(c_hdbc1);

     rc = bcp_bind(c_hdbc1, (BYTE *) &c_discount, 0, SQL_VARLEN_DATA, NULL, 0, SQLFLT8,
16);
          if (rc != SUCCEED)
                    HandleErrorDBC(c_hdbc1);


          //  fix to avoid ODBC float to numeric conversion problem.
     //  rc = bcp_bind(c_hdbc1, (BYTE *) &c_balance, 0, SQL_VARLEN_DATA, NULL, 0, SQLFLT8,
17);
          //  if (rc != SUCCEED)
          //        HandleErrorDBC(c_hdbc1);
     rc = bcp_bind(c_hdbc1, (BYTE *) c_balance, 0, 5, NULL, 0, SQLCHARACTER, 17);
          if (rc != SUCCEED)
                    HandleErrorDBC(c_hdbc1);


     rc = bcp_bind(c_hdbc1, (BYTE *) &c_ytd_payment, 0, SQL_VARLEN_DATA, NULL, 0, SQLFLT8,
18);
```

```
          if (rc != SUCCEED)
                    HandleErrorDBC(c_hdbc1);

    rc = bcp_bind(c_hdbc1, (BYTE *) &c_payment_cnt, 0, SQL_VARLEN_DATA, NULL, 0, SQLINT2,
19);
          if (rc != SUCCEED)
                    HandleErrorDBC(c_hdbc1);

    rc = bcp_bind(c_hdbc1, (BYTE *) &c_delivery_cnt,0, SQL_VARLEN_DATA, NULL, 0, SQLINT2,
20);
          if (rc != SUCCEED)
                    HandleErrorDBC(c_hdbc1);

    rc = bcp_bind(c_hdbc1, (BYTE *) c_data, 0, 500, NULL, 0, 0, 21);
          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;

                    //  fix to avoid ODBC float to numeric conversion problem.

                    //  c_balance = customer_buf[i].c_balance;
                    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)
{
          int         i;
    long        c_id;
    short       c_d_id;
    short       c_w_id;
          double    h_amount;
    char        h_data[H_DATA_LEN+1];
          char                h_date[H_DATE_LEN+1];
          RETCODE             rc;

    rc = bcp_bind(c_hdbc2, (BYTE *) &c_id, 0, SQL_VARLEN_DATA, NULL, 0, SQLINT4, 1);
          if (rc != SUCCEED)
                    HandleErrorDBC(c_hdbc2);

    rc = bcp_bind(c_hdbc2, (BYTE *) &c_d_id, 0, SQL_VARLEN_DATA, NULL, 0, SQLINT2, 2);
          if (rc != SUCCEED)
                    HandleErrorDBC(c_hdbc2);

    rc = bcp_bind(c_hdbc2, (BYTE *) &c_w_id, 0, SQL_VARLEN_DATA, NULL, 0, SQLINT2, 3);
          if (rc != SUCCEED)
                    HandleErrorDBC(c_hdbc2);

    rc = bcp_bind(c_hdbc2, (BYTE *) &c_d_id, 0, SQL_VARLEN_DATA, NULL, 0, SQLINT2, 4);
          if (rc != SUCCEED)
                    HandleErrorDBC(c_hdbc2);

    rc = bcp_bind(c_hdbc2, (BYTE *) &c_w_id, 0, SQL_VARLEN_DATA, NULL, 0, SQLINT2, 5);
          if (rc != SUCCEED)
                    HandleErrorDBC(c_hdbc2);

          rc = bcp_bind(c_hdbc2, (BYTE *) &h_date, 0, H_DATE_LEN, NULL, 0, SQLCHARACTER,
6);
          if (rc != SUCCEED)
                    HandleErrorDBC(c_hdbc2);

    rc = bcp_bind(c_hdbc2, (BYTE *) &h_amount, 0, SQL_VARLEN_DATA, NULL, 0, SQLFLT8, 7);
          if (rc != SUCCEED)
                    HandleErrorDBC(c_hdbc2);

    rc = bcp_bind(c_hdbc2, (BYTE *) h_data, 0, H_DATA_LEN, NULL, 0, 0, 8);
          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;
          short                        w_id;
    short                         d_id;
          DWORD                        dwThreadID[MAX_ORDER_THREADS];
          HANDLE                       hThread[MAX_ORDER_THREADS];
          char                         name[20];
          RETCODE                                        rc;
          char                                           bcphint[128];

          // 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);
          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);
          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);
          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 = (short)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(int d_id, int w_id)
{

          int     cust[ORDERS_PER_DIST+1];
          long    o_id;
          short   ol;

          printf("...Loading Order Buffer for: d_id = %d, w_id = %d\n",
                              d_id, w_id);

          GetPermutation(cust, ORDERS_PER_DIST);

          for (o_id=0;o_id<orders_per_district;o_id++)
          {

                    // Generate ORDER and NEW-ORDER data

                    orders_buf[o_id].o_d_id = d_id;
                    orders_buf[o_id].o_w_id = w_id;
                    orders_buf[o_id].o_id = o_id+1;
                    orders_buf[o_id].o_c_id = cust[o_id+1];
                    orders_buf[o_id].o_ol_cnt = (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 12:00:00.000");

                              }
                    }
          }
}


//================================================================================
//
// Function   : LoadOrdersTable
//
//================================================================================

void LoadOrdersTable(LOADER_TIME_STRUCT *orders_time_start)
{
          int         i;
    long        o_id;
          short     o_d_id;
          short     o_w_id;
    long        o_c_id;
    short       o_carrier_id;
    short       o_ol_cnt;
    short       o_all_local;
          char              o_entry_d[O_ENTRY_D_LEN+1];
          RETCODE           rc;
          DBINT             rcint;

          // bind ORDER data
    rc = bcp_bind(o_hdbc1, (BYTE *) &o_id, 0, SQL_VARLEN_DATA, NULL, 0, SQLINT4, 1);
          if (rc != SUCCEED)
                    HandleErrorDBC(o_hdbc1);

    rc = bcp_bind(o_hdbc1, (BYTE *) &o_d_id, 0, SQL_VARLEN_DATA, NULL, 0, SQLINT2, 2);
          if (rc != SUCCEED)
                    HandleErrorDBC(o_hdbc1);

    rc = bcp_bind(o_hdbc1, (BYTE *) &o_w_id, 0, SQL_VARLEN_DATA, NULL, 0, SQLINT2, 3);
          if (rc != SUCCEED)
                    HandleErrorDBC(o_hdbc1);

    rc = bcp_bind(o_hdbc1, (BYTE *) &o_c_id, 0, SQL_VARLEN_DATA, NULL, 0, SQLINT4, 4);
          if (rc != SUCCEED)
                    HandleErrorDBC(o_hdbc1);

          rc = bcp_bind(o_hdbc1, (BYTE *) &o_entry_d, 0, O_ENTRY_D_LEN, NULL, 0,
SQLCHARACTER, 5);
          if (rc != SUCCEED)
                    HandleErrorDBC(o_hdbc1);

    rc = bcp_bind(o_hdbc1, (BYTE *) &o_carrier_id, 0, SQL_VARLEN_DATA, NULL, 0, SQLINT2,
6);
          if (rc != SUCCEED)
                    HandleErrorDBC(o_hdbc1);
```

```
    rc = bcp_bind(o_hdbc1, (BYTE *) &o_ol_cnt, 0, SQL_VARLEN_DATA, NULL, 0, SQLINT2, 7);
          if (rc != SUCCEED)
                    HandleErrorDBC(o_hdbc1);

    rc = bcp_bind(o_hdbc1, (BYTE *) &o_all_local, 0, SQL_VARLEN_DATA, NULL, 0, SQLINT2,
8);
          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);
    }

          // rcint = bcp_batch(o_hdbc1);
          // if (rcint < 0)
          //        HandleErrorDBC(o_hdbc1);

          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)
{
    int         i;
    long        o_id;
    short       o_d_id;
    short       o_w_id;
          RETCODE             rc;
          DBINT               rcint;

          // Bind NEW-ORDER data

    rc = bcp_bind(o_hdbc2, (BYTE *) &o_id, 0, SQL_VARLEN_DATA, NULL, 0, SQLINT4, 1);
          if (rc != SUCCEED)
                    HandleErrorDBC(o_hdbc2);

    rc = bcp_bind(o_hdbc2, (BYTE *) &o_d_id, 0, SQL_VARLEN_DATA, NULL, 0, SQLINT2, 2);
          if (rc != SUCCEED)
                    HandleErrorDBC(o_hdbc2);

    rc = bcp_bind(o_hdbc2, (BYTE *) &o_w_id, 0, SQL_VARLEN_DATA, NULL, 0, SQLINT2, 3);
          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(o_hdbc2, o_hstmt2, new_order_rows_loaded, "new_order",
&new_order_time_start->time_start);
          }

          // rcint = bcp_batch(o_hdbc2);
          // if (rcint < 0)
          //        HandleErrorDBC(o_hdbc2);

          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)
{
          int         i,j;
    long        o_id;
          short     o_d_id;
          short     o_w_id;
    long        ol;
          long      ol_i_id;
    short       ol_supply_w_id;
    short       ol_quantity;
    double      ol_amount;
    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
    rc = bcp_bind(o_hdbc3, (BYTE *) &o_id, 0, SQL_VARLEN_DATA, NULL, 0, SQLINT4, 1);
          if (rc != SUCCEED)
                    HandleErrorDBC(o_hdbc3);

    rc = bcp_bind(o_hdbc3, (BYTE *) &o_d_id, 0, SQL_VARLEN_DATA, NULL, 0, SQLINT2, 2);
          if (rc != SUCCEED)
                    HandleErrorDBC(o_hdbc3);

    rc = bcp_bind(o_hdbc3, (BYTE *) &o_w_id, 0, SQL_VARLEN_DATA, NULL, 0, SQLINT2, 3);
          if (rc != SUCCEED)
                    HandleErrorDBC(o_hdbc3);

    rc = bcp_bind(o_hdbc3, (BYTE *) &ol, 0, SQL_VARLEN_DATA, NULL, 0, SQLINT4, 4);
          if (rc != SUCCEED)
                    HandleErrorDBC(o_hdbc3);

    rc = bcp_bind(o_hdbc3, (BYTE *) &ol_i_id, 0, SQL_VARLEN_DATA, NULL, 0, SQLINT4, 5);
          if (rc != SUCCEED)
                    HandleErrorDBC(o_hdbc3);

    rc = bcp_bind(o_hdbc3, (BYTE *) &ol_supply_w_id, 0, SQL_VARLEN_DATA, NULL, 0,
SQLINT2, 6);
          if (rc != SUCCEED)
                    HandleErrorDBC(o_hdbc3);

          rc = bcp_bind(o_hdbc3, (BYTE *) &ol_delivery_d, 0, OL_DELIVERY_D_LEN, NULL, 0,
SQLCHARACTER, 7);
          if (rc != SUCCEED)
                    HandleErrorDBC(o_hdbc3);

    rc = bcp_bind(o_hdbc3, (BYTE *) &ol_quantity, 0, SQL_VARLEN_DATA, NULL, 0, SQLINT2,
8);
          if (rc != SUCCEED)
                    HandleErrorDBC(o_hdbc3);

    rc = bcp_bind(o_hdbc3, (BYTE *) &ol_amount, 0, SQL_VARLEN_DATA, NULL, 0, SQLFLT8, 9);
          if (rc != SUCCEED)
                    HandleErrorDBC(o_hdbc3);

    rc = bcp_bind(o_hdbc3, (BYTE *) ol_dist_info, 0, DIST_INFO_LEN, NULL, 0, 0, 10);
          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(o_hdbc3, o_hstmt3, order_line_rows_loaded,
"order_line", &order_line_time_start->time_start);
                    }

          }

          // rcint = bcp_batch(o_hdbc3);
          // if (rcint < 0)
          //        HandleErrorDBC(o_hdbc3);

          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,
                                        int rows_loaded,
                                                  char *table_name,
                                        long *time_start)
{

    long  time_end, time_diff;
          // DBINT  rcint;

    if ( !(rows_loaded % aptr->batch) )
    {

                    // rcint = bcp_batch(hdbc);
                    // if (rcint < 0)
                    //        HandleErrorDBC(hdbc);

                    time_end = (TimeNow() / MILLI);
                    time_diff = time_end - *time_start;

                    printf("-> Loaded %ld rows into %s in %ld sec - Total = %d (%.2f
rps)\n",
                              aptr->batch,
                              table_name,
                                        time_diff,
                              rows_loaded,
                                        (float) aptr->batch / (time_diff ? time_diff :
1L));

                    *time_start = time_end;
    }

    return;
}


//==============================================================================
//
// Function   : OpenConnections
//
//==============================================================================

void OpenConnections()
{

          RETCODE         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)
```

```
                HandleErrorDBC(i_hdbc1);

        // 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)
                HandleErrorDBC(w_hdbc1);

        // 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)
                HandleErrorDBC(c_hdbc1);

        // 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)
                HandleErrorDBC(c_hdbc2);

        // 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)
                HandleErrorDBC(o_hdbc1);

        // 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)
                    HandleErrorDBC(o_hdbc2);

          // 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)
                    HandleErrorDBC(o_hdbc3);

}

//====================================================================
//
// Function name: BuildIndex
//
//====================================================================

void BuildIndex(char          *index_script)
{
          char      cmd[256];

          printf("Starting index creation:  %s\n",index_script);

          sprintf(cmd, "isql -S%s -U%s -P%s -e -i%s\\%s.sql > logs\\%s.log",
                                        aptr->server,
                                        aptr->user,
                                        aptr->password,
                                        aptr->index_script_path,
                                        index_script,
                                        index_script);

          system(cmd);

          printf("Finished index creation:  %s\n",index_script);
}


void HandleErrorDBC (SQLHDBC  hdbc1)
{

          SQLCHAR             SqlState[6], Msg[SQL_MAX_MESSAGE_LENGTH];
          SQLINTEGER  NativeError;
          SQLSMALLINT i, MsgLen;
          SQLRETURN   rc2;
          char                timebuf[128];
          char                datebuf[128];
          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" , datebuf, timebuf, szLastError);

                    fp1 = fopen("logs\\tpccldr.err","w");
                    if (fp1 == NULL)
                              printf("ERROR:  Unable to open errorlog file.\n");
                    else
                    {
                              fprintf(fp1, "[%s : %s] %s\n" , datebuf, timebuf,
szLastError);
                              fclose(fp1);
                    }

                    i++;

          }
}


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;

}
```

getargs.c

```
//        File:               GETARGS.C
//                                    Microsoft TPC-C Kit Ver. 4.00
//                                    Copyright Microsoft, 1996, 1997, 1998
//        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->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 'h':     /* Fall throught */
                case 'H':
                                GetArgsLoaderUsage();
                                break;

                case 'D':
                                pargs->database = ptr+2;
                                break;

                case 'P':
                                pargs->password = ptr+2;
                                break;

                case 'S':
                                pargs->server = ptr+2;
                                break;

                case 'U':
                                pargs->user = ptr+2;
                                break;

                case 'b':
                                pargs->batch = atol(ptr+2);
                                break;

                case 'W':
                                pargs->num_warehouses = atol(ptr+2);
                                break;

                case 's':
                                pargs->starting_warehouse = atol(ptr+2);
                                break;

                case 't':
                                {
                                        pargs->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 '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("-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);
}
```

random.c

```
//        File:               RANDOM.C
//                                  Microsoft TPC-C Kit Ver. 4.00
//                                  Copyright Microsoft, 1996, 1997, 1998
```

```
//        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;
}
```

strings.c

```
//        File:               STRINGS.C
//                                    Microsoft TPC-C Kit Ver. 4.00
//                                    Copyright Microsoft, 1996, 1997, 1998
//        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;
          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)];
          if ( len < z )
                    memset(str+len, ' ', z - len);
          str[len] = 0;

    return len;
}


//====================================================================
//
// Function name: MakeOriginalAlphaString
//
//====================================================================

int MakeOriginalAlphaString(int  x,
                                                                    int  y,
                                                                         int  z,
                                                                    char *str,
                                                                int  percent)
{
    int             len;
    int             val;
    int             start;

#ifdef DEBUG
    printf("[%ld]DBG: Entering MakeOriginalAlphaString()\n", (int) GetCurrentThreadId());
#endif

    // verify prercentage is valid
    if ((percent < 0) || (percent > 100))
    {
                    printf("MakeOrigianlAlphaString: Invalid percentage: %d\n", percent);
                    exit(-1);
    }
```

```
    // verify string is at least 8 chars in length
    if ((x + y) <= 8)
    {
                printf("MakeOriginalAlphaString: string length must be >= 8\n");
                exit(-1);
    }

    // Make Alpha String
    len = MakeAlphaString(x,y, z, str);

    val = RandomNumber(1,100);
    if (val <= percent)
    {
                start = RandomNumber(0, len - 8);
                strncpy(str + start, "ORIGINAL", 8);
    }


#ifdef DEBUG
    printf("[%ld]DBG: MakeOriginalAlphaString: : %s\n",
                            (int) GetCurrentThreadId(), str);
#endif

    return strlen(str);
}


//=============================================================================
//
// Function name: MakeNumberString
//
//=============================================================================
int MakeNumberString(int  x, int  y, int  z, char *str)
{
          char tmp[16];

          //MakeNumberString is always called MakeZipNumberString(16, 16, 16, string)

          memset(str, '0', 16);
          itoa(RandomNumber(0, 99999999), tmp, 10);
          memcpy(str, tmp, strlen(tmp));

          itoa(RandomNumber(0, 99999999), tmp, 10);
          memcpy(str+8, tmp, strlen(tmp));

          str[16] = 0;

    return 16;
}


//=============================================================================
//
// 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;
}
```

time.c

```
//        File:               TIME.C
//                                      Microsoft TPC-C Kit Ver. 4.00
//                                      Copyright Microsoft, 1996, 1997, 1998
//        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;

   return time_now;
}
```

Appendix C - Tunable Parameters

Server Configuration Parameters

Microsoft Windows .NET Enterprise 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 .NET Enterprise 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 2000 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.
-g100	Reserve 100 MB for non-buffer pool allocations

Microsoft SQL Server Stack Size

The default stack size of Microsoft SQL Server was changed using the EDITBIN utility. The EDITBIN utility ships with Microsoft Visual C++ V5.0. The command used was editbin /stack:131072 sqlservr.exe.

Mylex Device Drivers and Firmware

The following device drivers were added:

- Mylex BIOS: 6:00-05
- Mylex Firmware: 6.00-02 bld 127
- Miniport driver : 7.00-14 (dac2w2k.sys)
- Accelerated Driver : 7.00-14 (macxp32.sys)

Microsoft SQL Server 2000 Configuration Parameters

name	minimum	maximum	config_value	run_value
affinity mask	0	2147483647	255	255
allow updates	0	1	1	1
c2 audit mode	0	1	0	0
cost threshold for parallelism	0	32767	5	5
cursor threshold	-1	2147483647	-1	-1
default full-text language	0	2147483647	1033	1033
default language	0	9999	0	0
fill factor (%)	0	100	0	0
index create memory (KB)	704	1600000	0	0
language in cache	3	100	3	3
lightweight pooling	0	1	1	1
locks	5000	2147483647	0	0
max degree of parallelism	0	32	1	1
max server memory (MB)	4	2147483647	15000	15000
max text repl size (B)	0	2147483647	65536	65536
max worker threads	10	1024	320	320
media retention	0	365	0	0
min memory per query (KB)	512	2147483647	1024	1024
min server memory (MB)	0	2147483647	0	0
nested triggers	0	1	1	1
network packet size (B)	512	65535	4096	4096
open objects	0	2147483647	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	56	56
remote access	0	1	0	0
remote login timeout (s)	0	2147483647	5	5
remote proc trans	0	1	0	0
remote query timeout (s)	0	2147483647	0	0
scan for startup procs	0	1	0	0
set working set size	0	1	0	0
show advanced options	0	1	1	1
two digit year cutoff	1753	9999	2049	2049
user connections	0	32767	0	0
user options	0	16383	0	0

Windows .NET Enterprise Server System Information Report For PE6400

```
Windows Directory C:\WINDOWS
Version     5.2.3663  Build 3663
User Name   PE6500\Administrator
Total Virtual Memory    60.06 GB
Total Physical Memory   16,384.00 MB
Time Zone   Central Standard Time
System Type X86-based PC
System Name PE6500
System Model      PowerEdge 6600
System Manufacturer     Dell Computer Corporation
System Directory  C:\WINDOWS\system32
SMBIOS Version    2.3
Processor   x86 Family 15 Model 1 Stepping 1 GenuineIntel ~1592 Mhz
Processor   x86 Family 15 Model 1 Stepping 1 GenuineIntel ~1592 Mhz
Processor   x86 Family 15 Model 1 Stepping 1 GenuineIntel ~1592 Mhz
Processor   x86 Family 15 Model 1 Stepping 1 GenuineIntel ~1592 Mhz
Processor   x86 Family 15 Model 1 Stepping 1 GenuineIntel ~1592 Mhz
Processor   x86 Family 15 Model 1 Stepping 1 GenuineIntel ~1592 Mhz
Processor   x86 Family 15 Model 1 Stepping 1 GenuineIntel ~1592 Mhz
Processor   x86 Family 15 Model 1 Stepping 1 GenuineIntel ~1592 Mhz
Page File Space   44.56 GB
Page File   V:\pagefile.sys
OS Name     Microsoft® Windows® .NET Enterprise Server
OS Manufacturer   Microsoft Corporation
Locale      United States
Hardware Abstraction Layer    Version = "5.2.3663.0 (main.020715-1506)"
Boot Device \Device\HarddiskVolume1
BIOS Version/Date Dell Computer Corporation p25, 10/4/2002
Available Virtual Memory      59.57 GB
Available Physical Memory     15.13 GB

Conflicts/Sharing

Memory Address 0xF0000000-0xF68FFFFF      PCI bus
Memory Address 0xF0000000-0xF68FFFFF      DEC 21154 PCI to PCI bridge
Memory Address 0xF0000000-0xF68FFFFF      Mylex eXtremeRAID 2000 Disk
Array Controller (Accelerated)

Memory Address 0xF7800000-0xF87FFFFF      DEC 21154 PCI to PCI bridge
Memory Address 0xF7800000-0xF87FFFFF      Mylex eXtremeRAID 2000 Disk
Array Controller (Accelerated)

I/O Port 0x0000A000-0x0000AFFF      PCI bus
I/O Port 0x0000A000-0x0000AFFF      DEC 21154 PCI to PCI bridge

I/O Port 0x00000000-0x000003AF      PCI bus
I/O Port 0x00000000-0x000003AF      Direct memory access controller

Memory Address 0xF7000000-0xF88FFFFF      PCI bus
```

```
Memory Address 0xF7000000-0xF88FFFFF      DEC 21154 PCI to PCI bridge
Memory Address 0xF7000000-0xF88FFFFF      Mylex eXtremeRAID 2000 Disk
Array Controller (Accelerated)

Memory Address 0xF9000000-0xFA8FFFFF      PCI bus
Memory Address 0xF9000000-0xFA8FFFFF      DEC 21154 PCI to PCI bridge
Memory Address 0xF9000000-0xFA8FFFFF      Mylex eXtremeRAID 2000 Disk
Array Controller (Accelerated)

I/O Port 0x00009000-0x00009FFF      PCI bus
I/O Port 0x00009000-0x00009FFF      DEC 21154 PCI to PCI bridge

Memory Address 0xFB000000-0xFC8FFFFF      PCI bus
Memory Address 0xFB000000-0xFC8FFFFF      DEC 21154 PCI to PCI bridge
Memory Address 0xFB000000-0xFC8FFFFF      Mylex eXtremeRAID 2000 Disk
Array Controller (Accelerated)

Memory Address 0xF5800000-0xF67FFFFF      DEC 21154 PCI to PCI bridge
Memory Address 0xF5800000-0xF67FFFFF      Mylex eXtremeRAID 2000 Disk
Array Controller (Accelerated)

I/O Port 0x0000B000-0x0000BFFF      PCI bus
I/O Port 0x0000B000-0x0000BFFF      DEC 21154 PCI to PCI bridge

IRQ 15      System board
IRQ 15      Secondary IDE Channel

Memory Address 0xFD000000-0xFE1FFFFF      PCI bus
Memory Address 0xFD000000-0xFE1FFFFF      RAGE XL PCI (Microsoft
Corporation)

Memory Address 0xED000000-0xED7FFFFF      DEC 21154 PCI to PCI bridge
Memory Address 0xED000000-0xED7FFFFF      Mylex eXtremeRAID 2000 Disk
Array Controller (Accelerated)

Memory Address 0xEE800000-0xEF7FFFFF      DEC 21154 PCI to PCI bridge
Memory Address 0xEE800000-0xEF7FFFFF      Mylex eXtremeRAID 2000 Disk
Array Controller (Accelerated)

Memory Address 0xA0000-0xBFFFF      PCI bus
Memory Address 0xA0000-0xBFFFF      RAGE XL PCI (Microsoft Corporation)

I/O Port 0x00007000-0x00008FFF      PCI bus
I/O Port 0x00007000-0x00008FFF      DEC 21154 PCI to PCI bridge

Memory Address 0xF9800000-0xFA7FFFFF      DEC 21154 PCI to PCI bridge
Memory Address 0xF9800000-0xFA7FFFFF      Mylex eXtremeRAID 2000 Disk
Array Controller (Accelerated)

I/O Port 0x000003B0-0x000003DF      PCI bus
I/O Port 0x000003B0-0x000003DF      RAGE XL PCI (Microsoft Corporation)

Memory Address 0xFB800000-0xFC7FFFFF      DEC 21154 PCI to PCI bridge
Memory Address 0xFB800000-0xFC7FFFFF      Mylex eXtremeRAID 2000 Disk
Array Controller (Accelerated)
```

```
Memory Address 0xED800000-0xEE7FFFFF      DEC 21154 PCI to PCI bridge
Memory Address 0xED800000-0xEE7FFFFF      Mylex eXtremeRAID 2000 Disk
Array Controller (Accelerated)

Memory Address 0xEC800000-0xEF8FFFFF      PCI bus
Memory Address 0xEC800000-0xEF8FFFFF      DEC 21154 PCI to PCI bridge
Memory Address 0xEC800000-0xEF8FFFFF      Mylex eXtremeRAID 2000 Disk
Array Controller (Accelerated)

I/O Port 0x0000D000-0x0000DFFF      PCI bus
I/O Port 0x0000D000-0x0000DFFF      DEC 21154 PCI to PCI bridge

DMA
Channel 4   Direct memory access controller     OK
Channel 2   Standard floppy disk controller     OK

IO
0x00000000-0x000003AF   PCI bus     OK
0x00000000-0x000003AF   Direct memory access controller     OK
0x000003B0-0x000003DF   PCI bus     OK
0x000003B0-0x000003DF   RAGE XL PCI (Microsoft Corporation) OK
0x000003E0-0x00000FFF   PCI bus     OK
0x0000E000-0x0000EFFF   PCI bus     OK
0x0000EC00-0x0000ECFF   Adaptec AIC-7892 Ultra160 PCI SCSI Card   OK
0x0000E800-0x0000E8FF   RAGE XL PCI (Microsoft Corporation) OK
0x000003C0-0x000003DF   RAGE XL PCI (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
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
0x00000070-0x0000007F   System CMOS/real time clock   OK
0x00000820-0x0000083F   System board      OK
0x000008A0-0x000008AF   System board      OK
0x00000C00-0x00000CD7   System board      OK
0x00000F50-0x00000F58   System board      OK
0x000008B0-0x000008BF   Standard Dual Channel PCI IDE Controller  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
0x00000A79-0x00000A79   ISAPNP Read Data Port   OK
0x00000279-0x00000279   ISAPNP Read Data Port   OK
0x00000274-0x00000277   ISAPNP Read Data Port   OK
```

```
0x0000D000-0x0000DFFF   PCI bus     OK
0x0000D000-0x0000DFFF   DEC 21154 PCI to PCI bridge   OK
0x0000DC80-0x0000DCFF   Mylex eXtremeRAID 2000 Disk Array Controller
(Accelerated)     OK
0x0000C000-0x0000CFFF   PCI bus     OK
0x0000B000-0x0000BFFF   PCI bus     OK
0x0000B000-0x0000BFFF   DEC 21154 PCI to PCI bridge   OK
0x0000BC80-0x0000BCFF   Mylex eXtremeRAID 2000 Disk Array Controller
(Accelerated)     OK
0x0000A000-0x0000AFFF   PCI bus     OK
0x0000A000-0x0000AFFF   DEC 21154 PCI to PCI bridge   OK
0x0000AC80-0x0000ACFF   Mylex eXtremeRAID 2000 Disk Array Controller
(Accelerated)     OK
0x00009000-0x00009FFF   PCI bus     OK
0x00009000-0x00009FFF   DEC 21154 PCI to PCI bridge   OK
0x00009C80-0x00009CFF   Mylex eXtremeRAID 2000 Disk Array Controller
(Accelerated)     OK
0x00007000-0x00008FFF   PCI bus     OK
0x00007000-0x00008FFF   DEC 21154 PCI to PCI bridge   OK
0x00008000-0x00008FFF   DEC 21154 PCI to PCI bridge   OK
0x00008C80-0x00008CFF   Mylex eXtremeRAID 2000 Disk Array Controller
(Accelerated)     OK
0x00007C80-0x00007CFF   Mylex eXtremeRAID 2000 Disk Array Controller
(Accelerated)     OK

IRQs
IRQ 9 Microsoft ACPI-Compliant System     OK
IRQ 16      Adaptec AIC-7892 Ultra160 PCI SCSI Card   OK
IRQ 13      Numeric data processor  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 8 System CMOS/real time clock   OK
IRQ 15      System board      OK
IRQ 15      Secondary IDE Channel   OK
IRQ 14      Primary IDE Channel     OK
IRQ 3 ServerWorks (RCC) PCI to USB Open Host Controller     OK
IRQ 21      Mylex eXtremeRAID 2000 Disk Array Controller (Accelerated)
      OK
IRQ 17      Broadcom NetXtreme Gigabit Ethernet #2    OK
IRQ 18      Broadcom NetXtreme Gigabit Ethernet OK
IRQ 25      Mylex eXtremeRAID 2000 Disk Array Controller (Accelerated)
      OK
IRQ 23      Mylex eXtremeRAID 2000 Disk Array Controller (Accelerated)
      OK
IRQ 30      Mylex eXtremeRAID 2000 Disk Array Controller (Accelerated)
      OK
IRQ 27      Mylex eXtremeRAID 2000 Disk Array Controller (Accelerated)
      OK
IRQ 28      Mylex eXtremeRAID 2000 Disk Array Controller (Accelerated)
      OK

Memory
```

```
0xA0000-0xBFFFF   PCI bus     OK
0xA0000-0xBFFFF   RAGE XL PCI (Microsoft Corporation) OK
0xD8000-0xE7FFF   PCI bus     OK
0xFD000000-0xFE1FFFFF   PCI bus     OK
0xFD000000-0xFE1FFFFF   RAGE XL PCI (Microsoft Corporation) OK
0xFE102000-0xFE102FFF   Adaptec AIC-7892 Ultra160 PCI SCSI Card   OK
0xFE101000-0xFE101FFF   RAGE XL PCI (Microsoft Corporation) OK
0xFE100000-0xFE100FFF   ServerWorks (RCC) PCI to USB Open Host
Controller  OK
0xFB000000-0xFC8FFFFF   PCI bus     OK
0xFB000000-0xFC8FFFFF   DEC 21154 PCI to PCI bridge   OK
0xFB000000-0xFC8FFFFF   Mylex eXtremeRAID 2000 Disk Array Controller
(Accelerated)     OK
0xFB800000-0xFC7FFFFF   DEC 21154 PCI to PCI bridge   OK
0xFB800000-0xFC7FFFFF   Mylex eXtremeRAID 2000 Disk Array Controller
(Accelerated)     OK
0xFAE00000-0xFAFFFFFF   PCI bus     OK
0xFAF10000-0xFAF1FFFF   Broadcom NetXtreme Gigabit Ethernet #2    OK
0xFAF00000-0xFAF0FFFF   Broadcom NetXtreme Gigabit Ethernet OK
0xF9000000-0xFA8FFFFF   PCI bus     OK
0xF9000000-0xFA8FFFFF   DEC 21154 PCI to PCI bridge   OK
0xF9000000-0xFA8FFFFF   Mylex eXtremeRAID 2000 Disk Array Controller
(Accelerated)     OK
0xF9800000-0xFA7FFFFF   DEC 21154 PCI to PCI bridge   OK
0xF9800000-0xFA7FFFFF   Mylex eXtremeRAID 2000 Disk Array Controller
(Accelerated)     OK
0xF7000000-0xF88FFFFF   PCI bus     OK
0xF7000000-0xF88FFFFF   DEC 21154 PCI to PCI bridge   OK
0xF7000000-0xF88FFFFF   Mylex eXtremeRAID 2000 Disk Array Controller
(Accelerated)     OK
0xF7800000-0xF87FFFFF   DEC 21154 PCI to PCI bridge   OK
0xF7800000-0xF87FFFFF   Mylex eXtremeRAID 2000 Disk Array Controller
(Accelerated)     OK
0xF0000000-0xF68FFFFF   PCI bus     OK
0xF0000000-0xF68FFFFF   DEC 21154 PCI to PCI bridge   OK
0xF0000000-0xF68FFFFF   Mylex eXtremeRAID 2000 Disk Array Controller
(Accelerated)     OK
0xF5800000-0xF67FFFFF   DEC 21154 PCI to PCI bridge   OK
0xF5800000-0xF67FFFFF   Mylex eXtremeRAID 2000 Disk Array Controller
(Accelerated)     OK
0xEC800000-0xEF8FFFFF   PCI bus     OK
0xEC800000-0xEF8FFFFF   DEC 21154 PCI to PCI bridge   OK
0xEC800000-0xEF8FFFFF   Mylex eXtremeRAID 2000 Disk Array Controller
(Accelerated)     OK
0xEE800000-0xEF7FFFFF   DEC 21154 PCI to PCI bridge   OK
0xEE800000-0xEF7FFFFF   Mylex eXtremeRAID 2000 Disk Array Controller
(Accelerated)     OK
0xED000000-0xED7FFFFF   DEC 21154 PCI to PCI bridge   OK
0xED000000-0xED7FFFFF   Mylex eXtremeRAID 2000 Disk Array Controller
(Accelerated)     OK
0xED800000-0xEE7FFFFF   DEC 21154 PCI to PCI bridge   OK
0xED800000-0xEE7FFFFF   Mylex eXtremeRAID 2000 Disk Array Controller
(Accelerated)     OK

Software Environment
```

```
System drivers
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    c:\windows\system32\drivers\adpu160m.sys
      Kernel Driver     Yes   Boot  Running     OK    Normal      No
      Yes
adpu320     adpu320     Not Available     Kernel Driver     No
      Disabled    Stopped     OK    Normal      No    No
afcnt afcnt Not Available     Kernel Driver     No    Disabled
      Stopped     OK    Normal      No    No
afd   AFD Networking Support Environment
      c:\windows\system32\drivers\afd.sys Kernel Driver     Yes   Auto
      Running     OK    Normal      No    Yes
aha154x     Aha154x     Not Available     Kernel Driver     No
      Disabled    Stopped     OK    Normal      No    No
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
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
ati2mpad    ati2mpad    c:\windows\system32\drivers\ati2mpad.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
b57w2k      Broadcom NetXtreme Gigabit Ethernet
      c:\windows\system32\drivers\b57xp32.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
cbidf2k     cbidf2k     c:\windows\system32\drivers\cbidf2k.sys
      Kernel Driver     No    Disabled    Stopped     OK    Normal
      No    No
cd20xrnt    cd20xrnt    Not Available     Kernel Driver     No
      Disabled    Stopped     OK    Normal      No    No
```

```
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
cpqarray    Cpqarray    Not Available     Kernel Driver     No
      Disabled    Stopped     OK    Normal      No    No
cpqarry2    cpqarry2    Not Available     Kernel Driver     No
      Disabled    Stopped     OK    Normal      No    No
cpqcissm    cpqcissm    Not Available     Kernel Driver     No
      Disabled    Stopped     OK    Normal      No    No
cpqfcalm    cpqfcalm    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
dac2w2k     dac2w2k     c:\windows\system32\drivers\dac2w2k.sys
      Kernel Driver     Yes   Boot  Running     OK    Normal      No
      Yes
dac960nt    dac960nt    Not Available     Kernel Driver     No
      Disabled    Stopped     OK    Normal      No    No
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
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
```

```
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
hpn   hpn   Not Available     Kernel Driver     No    Disabled
      Stopped     OK    Normal      No    No
hpt3xx      hpt3xx      Not Available     Kernel Driver     No
      Disabled    Stopped     OK    Normal      No    No
http  HTTP  c:\windows\system32\drivers\http.sys      Kernel Driver
      No    Manual      Stopped     OK    Normal      No    No
i2omgmt     i2omgmt     Not Available     Kernel Driver     No
      System      Stopped     OK    Normal      No    No
i2omp i2omp Not Available     Kernel Driver     No    Disabled
      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
imapi CD-Burning Filter Driver
      c:\windows\system32\drivers\imapi.sys     Kernel Driver     No
      System      Stopped     OK    Normal      No    No
intelide    IntelIde    Not Available     Kernel Driver     No
      Disabled    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
ipsraidn    ipsraidn    Not Available     Kernel Driver     No
      Disabled    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
lp6nds35    lp6nds35    Not Available     Kernel Driver     No
      Disabled    Stopped     OK    Normal      No    No
macxp32     macxp32     c:\windows\system32\drivers\macxp32.sys
      Kernel Driver     Yes   Boot  Running     OK    Normal      No
      Yes
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    Not Available     Kernel Driver     No
      Disabled    Stopped     OK    Normal      No    No
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
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     Parport     c:\windows\system32\drivers\parport.sys
      Kernel Driver     No    Manual      Stopped     OK    Ignore
      No    No
partmgr     Partition Manager c:\windows\system32\drivers\partmgr.sys
      Kernel Driver     Yes   Boot  Running     OK    Normal      No
      Yes
```

```
parvdm      ParVdm      c:\windows\system32\drivers\parvdm.sys
      Kernel Driver     No    Auto  Stopped     OK    Ignore      No
      No
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
perc2 perc2 Not Available     Kernel Driver     No    Disabled
      Stopped     OK    Normal      No    No
perc2hib    perc2hib    Not Available     Kernel Driver     No
      Disabled    Stopped     OK    Normal      No    No
pptpminiport      WAN Miniport (PPTP)
      c:\windows\system32\drivers\raspptp.sys   Kernel Driver     Yes
      Manual      Running     OK    Normal      No    Yes
processor   Processor Driver  c:\windows\system32\drivers\processr.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
ql1080      ql1080      Not Available     Kernel Driver     No
      Disabled    Stopped     OK    Normal      No    No
ql10wnt     Ql10wnt     Not Available     Kernel Driver     No
      Disabled    Stopped     OK    Normal      No    No
ql12160     ql12160     Not Available     Kernel Driver     No
      Disabled    Stopped     OK    Normal      No    No
ql1240      ql1240      Not Available     Kernel Driver     No
      Disabled    Stopped     OK    Normal      No    No
ql1280      ql1280      Not Available     Kernel Driver     No
      Disabled    Stopped     OK    Normal      No    No
ql2100      ql2100      Not Available     Kernel Driver     No
      Disabled    Stopped     OK    Normal      No    No
ql2200      ql2200      Not Available     Kernel Driver     No
      Disabled    Stopped     OK    Normal      No    No
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      Secdrv      c:\windows\system32\drivers\secdrv.sys
      Kernel Driver     No    Manual      Stopped     OK    Normal
      No    No
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
sparrow     Sparrow     Not Available     Kernel Driver     No
      Disabled    Stopped     OK    Normal      No    No
srv   Srv   c:\windows\system32\drivers\srv.sys File System Driver
      Yes   Manual      Running     OK    Normal      No    Yes
swenum      Software Bus Driver
      c:\windows\system32\drivers\swenum.sys    Kernel Driver     Yes
      Manual      Running     OK    Normal      No    Yes
symc810     symc810     Not Available     Kernel Driver     No
      Disabled    Stopped     OK    Normal      No    No
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
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
usbhub      USB2 Enabled Hub  c:\windows\system32\drivers\usbhub.sys
      Kernel Driver     Yes   Manual      Running     OK    Normal
      No    Yes
usbohci     Microsoft USB Open Host Controller Miniport Driver
      c:\windows\system32\drivers\usbohci.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     VolSnap     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

Services
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
Windows Audio     AudioSrv    Stopped     Disabled    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     Manual      Share Process
      c:\windows\system32\cisvc.exe Normal      LocalSystem 0
ClipBook    ClipSrv     Stopped     Disabled    Own Process
      c:\windows\system32\clipsrv.exe     Normal      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     Disabled    Share
Process     c:\windows\system32\svchost.exe -k netsvcs      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    Running     Auto  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 netsvcs      Ignore
      LocalSystem 0
Event Log   Eventlog    Running     Auto  Share Process
      c:\windows\system32\services.exe    Normal      LocalSystem 0
COM+ Event System EventSystem Running     Manual      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  Stopped     Manual      Share Process
      c:\windows\system32\lsass.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      Running     Auto  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     Manual      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
Windows Installer MSIServer   Stopped     Manual      Share Process
      c:\windows\system32\msiexec.exe /v  Normal      LocalSystem 0
MSSQLSERVER MSSQLSERVER Stopped     Manual      Own Process
      c:\progra~1\micros~1\mssql\binn\sqlservr.exe    Normal
      LocalSystem 0
MSSQLServerADHelper     MSSQLServerADHelper     Stopped     Manual
      Own Process c:\program files\microsoft sql
server\80\tools\binn\sqladhlp.exe   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   Stopped     Disabled    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     Stopped     Disabled
      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
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 -k rpcss      Normal      LocalSystem
      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     Manual      Share
Process     c:\windows\system32\svchost.exe -k netsvcs      Normal
      LocalSystem 0
Internet Connection Firewall (ICF) / Internet Connection Sharing (ICS)
      SharedAccess      Stopped     Disabled    Share Process
      c:\windows\system32\svchost.exe -k netsvcs      Normal
      LocalSystem 0
Shell Hardware Detection      ShellHWDetection  Stopped     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
SQLSERVERAGENT    SQLSERVERAGENT    Stopped     Manual      Own Process
      c:\progra~1\micros~1\mssql\binn\sqlagent.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     Auto  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\LOCAL SERVICE 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
Upload Manager    uploadmgr   Stopped     Disabled    Share Process
      c:\windows\system32\svchost.exe -k netsvcs      Normal
      LocalSystem 0
Uninterruptible Power Supply  UPS   Stopped     Manual      Own Process
      c:\windows\system32\ups.exe   Normal      LocalSystem 0
Virtual Disk Service    vds   Stopped     Disabled    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 netsvcs      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     Auto  Share
Process     c:\windows\system32\svchost.exe -k netsvcs      Ignore
      LocalSystem 0
Portable Media Serial Number  WmdmPmSp    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    Running     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
```

Client Configuration Parameters

COM+ Settings

TPCC.AllTxns:

- Activation:
  - Enable Object Pooling selected
  - Minimum Pool Size: 60
  - Maximum Pool Size: 60
  - Creation Timeout: 60,000
  - Enable Object Construction
  - Enable Just in Time Activation
- Concurrency:
  - Concurrency Required

TPCC Application Registry Parameters

```
Windows Registry Editor Version 5.00

[HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft\TPCC]
"Path"="c:\\inetpub\\wwwroot\\"
"NumberOfDeliveryThreads"=dword:0000000e
"MaxConnections"=dword:00002ee0
"MaxPendingDeliveries"=dword:000005dc
"DB_Protocol"="DBLIB"
"TxnMonitor"="COM"
"DbServer"="pe6500"
"DbName"="tpcc"
"DbUser"="sa"
"DbPassword"=""
"COM_SinglePool"="YES"
```

Microsoft Internet Information Server Registry Parameters

```
[HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Services\InetInfo]

[HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Services\InetInfo\Parameters]
"ListenBackLog"=dword:00000019
"DispatchEntries"=hex(7):4c,00,44,00,41,00,50,00,53,00,56,00,43,00,00,00,00,00
"PoolThreadLimit"=dword:000000be
"ThreadTimeout"=dword:00015180

[HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Services\InetInfo\Performance]
"Library"="infoctrs.dll"
"Open"="OpenINFOPerformanceData"
"Close"="CloseINFOPerformanceData"
"Collect"="CollectINFOPerformanceData"
"Last Counter"=dword:00000842
"Last Help"=dword:00000843
"First Counter"=dword:00000802
"First Help"=dword:00000803
"Library Validation Code"=hex:de,fc,ed,18,0a,98,c0,01,10,25,00,00,00,00,00,00
"WbemAdapFileTime"=hex:00,60,4e,96,aa,40,bf,01
"WbemAdapFileSize"=dword:00002510
"WbemAdapStatus"=dword:00000000
```

World Wide Web Service Registry Parameters

```
Windows Registry Editor Version 5.00

[HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Services\W3SVC]
"Type"=dword:00000020
"Start"=dword:00000002
"ErrorControl"=dword:00000001
"ImagePath"=hex(2):43,00,3a,00,5c,00,57,00,49,00,4e,00,4e,00,54,00,5c,00,53,00,\
  79,00,73,00,74,00,65,00,6d,00,33,00,32,00,5c,00,69,00,6e,00,65,00,74,00,73,\
  00,72,00,76,00,5c,00,69,00,6e,00,65,00,74,00,69,00,6e,00,66,00,6f,00,2e,00,\
  65,00,78,00,65,00,00,00
"DisplayName"="World Wide Web Publishing Service"
"DependOnService"=hex(7):49,00,49,00,53,00,41,00,44,00,4d,00,49,00,4e,00,00,00,\
  00,00
"DependOnGroup"=hex(7):00,00
"ObjectName"="LocalSystem"
"Description"="Provides Web connectivity and administration through the Internet Information
Services snap-in."

[HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Services\W3SVC\ASP]
"NOTE"="This is for backward compatibility only."

[HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Services\W3SVC\ASP\Parameters]

[HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Services\W3SVC\Parameters]
"MajorVersion"=dword:00000005
"MinorVersion"=dword:00000000
"InstallPath"="C:\\WINNT\\System32\\inetsrv"
"CertMapList"="C:\\WINNT\\System32\\inetsrv\\iiscrmap.dll"
"AccessDeniedMessage"="Error: Access is Denied."
"Filter DLLs"=""
"LogFileDirectory"="C:\\WINNT\\System32\\LogFiles"
"AcceptExOutstanding"=dword:00000028

[HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Services\W3SVC\Parameters\ADCLaun
ch]
```

[HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Services\W3SVC\Parameters\ADCLaunch\AdvancedDataFactory]

[HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Services\W3SVC\Parameters\ADCLaunch\RDSServer.DataFactory]

[HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Services\W3SVC\Parameters\ScriptMap]

[HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Services\W3SVC\Parameters\VirtualRoots]
"/"="c:\\inetpub\\wwwroot,,205"
"/Scripts"="c:\\inetpub\\scripts,,204"
"/IISHelp"="c:\\winnt\\help\\iishelp,,201"
"/IISAdmin"="C:\\WINNT\\System32\\inetsrv\\iisadmin,,201"
"/IISSamples"="c:\\inetpub\\iissamples,,201"
"/MSADC"="c:\\program files\\common files\\system\\msadc,,205"
"/_vti_bin"="C:\\Program Files\\Common Files\\Microsoft Shared\\Web Server Extensions\\40\\isapi,,205"
"/Rpc"="C:\\WINNT\\System32\\RpcProxy,,4"
"/Printers"="C:\\WINNT\\web\\printers,,201"

[HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Services\W3SVC\Performance]
"Library"="w3ctrs.dll"
"Open"="OpenW3PerformanceData"
"Close"="CloseW3PerformanceData"
"Collect"="CollectW3PerformanceData"
"Last Counter"=dword:000008e6
"Last Help"=dword:000008e7
"First Counter"=dword:00000844
"First Help"=dword:00000845
"Library Validation Code"=hex:86,2b,a6,1b,0a,98,c0,01,10,3d,00,00,00,00,00,00
"WbemAdapFileTime"=hex:00,60,4e,96,aa,40,bf,01
"WbemAdapFileSize"=dword:00003d10
"WbemAdapStatus"=dword:00000000

[HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Services\W3SVC\Security]
"Security"=hex:01,00,14,80,a0,00,00,00,ac,00,00,00,14,00,00,00,30,00,00,00,02,\
  00,1c,00,01,00,00,00,02,80,14,00,ff,01,0f,00,01,01,00,00,00,00,00,01,00,00,\
  00,00,02,00,70,00,04,00,00,00,00,00,18,00,fd,01,02,00,01,01,00,00,00,00,00,\
  05,12,00,00,00,74,00,6f,00,00,00,1c,00,ff,01,0f,00,01,02,00,00,00,00,00,05,\
  20,00,00,00,20,02,00,00,72,00,73,00,00,00,18,00,8d,01,02,00,01,01,00,00,00,\
  00,00,05,0b,00,00,00,20,02,00,00,00,00,1c,00,fd,01,02,00,01,02,00,00,00,00,\
  00,05,20,00,00,00,23,02,00,00,72,00,73,00,01,01,00,00,00,00,00,05,12,00,00,\
  00,01,01,00,00,00,00,00,05,12,00,00,00

[HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Services\W3SVC\Enum]
"0"="Root\\LEGACY_W3SVC\\0000"
"Count"=dword:00000001
"NextInstance"=dword:00000001

Appendix C – Tunable Parameters

Microsoft Windows 2000 Server System Information Report for PE1500

```
System Information report written at: 10/28/2002 03:05:07 PM
[System Information]

[ Following are sub-categories of this main category ]

[System Summary]

Item  Value
OS Name     Microsoft Windows 2000 Server
Version     5.0.2195 Service Pack 1 Build 2195
OS Manufacturer   Microsoft Corporation
System Name CLIENT1
System Manufacturer     Dell Computer Corporation
System Model      PowerEdge 1500SC
System Type X86-based PC
Processor   x86 Family 6 Model 11 Stepping 1 GenuineIntel ~1130 Mhz
BIOS Version      Phoenix ROM BIOS PLUS Version 1.10 A02
Windows Directory C:\WINNT
System Directory  C:\WINNT\System32
Boot Device \Device\Harddisk0\Partition1
Locale      United States
User Name   CLIENT1\Administrator
Time Zone   Central Standard Time
Total Physical Memory   523,764 KB
Available Physical Memory     339,064 KB
Total Virtual Memory    1,802,064 KB
Available Virtual Memory      1,454,844 KB
Page File Space   1,278,300 KB
Page File   C:\pagefile.sys

[Hardware Resources]

[ Following are sub-categories of this main category ]

[Conflicts/Sharing]

Resource    Device
IRQ 11      Standard OpenHCD USB Host Controller
IRQ 11      PCI standard host CPU bridge

[DMA]

Channel     Device      Status
4     Direct memory access controller     OK
2     Standard floppy disk controller     OK

[Forced Hardware]

Device      PNP Device ID
No Forced Hardware

[I/O]

Address Range     Device      Status
```

```
0x0000-0x03AF     PCI bus     OK
0x0000-0x03AF     Direct memory access controller     OK
0x03B0-0x03DF     PCI bus     OK
0x03B0-0x03DF     ATI Technologies Inc. RAGE XL PCI   OK
0x03E0-0x0FFF     PCI bus     OK
0xE000-0xEFFF     PCI bus     OK
0xECC0-0xECFF     Intel(R) PRO/100 S Server Adapter   OK
0xEC80-0xECBF     Intel(R) PRO/100 S Server Adapter #2      OK
0xE800-0xE8FF     ATI Technologies Inc. RAGE XL PCI   OK
0x03C0-0x03DF     ATI Technologies Inc. RAGE XL PCI   OK
0x0A79-0x0A79     ISAPNP Read Data Port   OK
0x0279-0x0279     ISAPNP Read Data Port   OK
0x02F4-0x02F7     ISAPNP Read Data Port   OK
0x0080-0x009F     Direct memory access controller     OK
0x00C0-0x00DF     Direct memory access controller     OK
0x00F0-0x00FF     Numeric data processor  OK
0x0020-0x003F     Programmable interrupt controller   OK
0x00A0-0x00BF     Programmable interrupt controller   OK
0x04D0-0x04D1     Programmable interrupt controller   OK
0x0061-0x0061     System speaker    OK
0x0040-0x005F     System timer      OK
0x03F0-0x03F5     Standard floppy disk controller     OK
0x03F7-0x03F7     Standard floppy disk controller     OK
0x0060-0x0060     Standard 101/102-Key or Microsoft Natural PS/2
Keyboard    OK
0x0064-0x0064     Standard 101/102-Key or Microsoft Natural PS/2
Keyboard    OK
0x03F8-0x03FF     Communications Port (COM1)    OK
0x0378-0x037F     ECP Printer Port (LPT1) OK
0x0778-0x077F     ECP Printer Port (LPT1) OK
0x0070-0x007F     System CMOS/real time clock   OK
0x0814-0x085B     System board      OK
0x0820-0x083F     System board      OK
0x0580-0x058F     System board      OK
0x0C00-0x0CD7     System board      OK
0x0F50-0x0F58     System board      OK
0x00E0-0x00EF     System board      OK
0x08B0-0x08BF     Standard Dual Channel PCI IDE Controller  OK
0x08C0-0x08C3     Standard Dual Channel PCI IDE Controller  OK
0x01F0-0x01F7     Primary IDE Channel     OK
0x03F6-0x03F6     Primary IDE Channel     OK
0x0170-0x0177     Secondary IDE Channel   OK
0x0376-0x0376     Secondary IDE Channel   OK
0xD000-0xDFFF     PCI bus     OK
0xDC00-0xDCFF     Adaptec AIC-7899 Ultra160/m PCI SCSI Card OK
0xD800-0xD8FF     Adaptec AIC-7899 Ultra160/m PCI SCSI Card OK
0xC000-0xCFFF     PCI bus     OK

[IRQs]

IRQ Number  Device
9     Microsoft ACPI-Compliant System
17    Intel(R) PRO/100 S Server Adapter
20    Intel(R) PRO/100 S Server Adapter #2
13    Numeric data processor
```

```
6     Standard floppy disk controller
1     Standard 101/102-Key or Microsoft Natural PS/2 Keyboard
12    PS/2 Compatible Mouse
4     Communications Port (COM1)
8     System CMOS/real time clock
14    Primary IDE Channel
11    Standard OpenHCD USB Host Controller
11    PCI standard host CPU bridge
29    Adaptec AIC-7899 Ultra160/m PCI SCSI Card
30    Adaptec AIC-7899 Ultra160/m PCI SCSI Card

[Memory]

Range Device      Status
0xA0000-0xBFFFF   PCI bus     OK
0xA0000-0xBFFFF   ATI Technologies Inc. RAGE XL PCI   OK
0xD0000-0xE7FFF   PCI bus     OK
0xFD000000-0xFE1FFFFF   PCI bus     OK
0xFD000000-0xFE1FFFFF   ATI Technologies Inc. RAGE XL PCI   OK
0xFE143000-0xFE143FFF   Intel(R) PRO/100 S Server Adapter   OK
0xFE120000-0xFE13FFFF   Intel(R) PRO/100 S Server Adapter   OK
0xFE142000-0xFE142FFF   Intel(R) PRO/100 S Server Adapter #2      OK
0xFE100000-0xFE11FFFF   Intel(R) PRO/100 S Server Adapter #2      OK
0xFE141000-0xFE141FFF   ATI Technologies Inc. RAGE XL PCI   OK
0xFE140000-0xFE140FFF   Standard OpenHCD USB Host Controller      OK
0xFEA00000-0xFEBFFFFF   PCI bus     OK
0xFEB01000-0xFEB01FFF   Adaptec AIC-7899 Ultra160/m PCI SCSI Card OK
0xFEB00000-0xFEB00FFF   Adaptec AIC-7899 Ultra160/m PCI SCSI Card OK
0xFE800000-0xFE9FFFFF   PCI bus     OK
0x0000-0x9FFFF    System board      OK
0x100000-0x1FFFFFFF     System board      OK
0xF0000-0xFFFFF   System board      OK
0xFEC00000-0xFEC0FFFF   System board      OK
0xFEE00000-0xFEE0FFFF   System board      OK
0xFFE00000-0xFFFFFFFF   System board      OK

[Components]

[ Following are sub-categories of this main category ]

[Multimedia]

[ Following are sub-categories of this main category ]

[Audio Codecs]

Codec Manufacturer      Description Status      File  Version     Size
      Creation Date
c:\winnt\system32\iac25_32.ax Intel Corporation Indeo® audio software
      OK    C:\WINNT\System32\IAC25_32.AX 2.05.53     195.00 KB
(199,680 bytes)   7/26/2000 7:00:00 AM
c:\winnt\system32\msg723.acm  Microsoft Corporation         OK
      C:\WINNT\System32\MSG723.ACM  4.4.3385    106.77 KB (109,328
bytes)      3/29/2002 12:38:55 PM
```

```
c:\winnt\system32\lhacm.acm   Microsoft Corporation         OK
      C:\WINNT\System32\LHACM.ACM   4.4.3385    33.27 KB (34,064 bytes)
      3/29/2002 12:38:55 PM
c:\winnt\system32\tssoft32.acm      DSP GROUP, INC.         OK
      C:\WINNT\System32\TSSOFT32.ACM      1.01  9.27 KB (9,488 bytes)
      7/26/2000 7:00:00 AM
c:\winnt\system32\msgsm32.acm Microsoft Corporation         OK
      C:\WINNT\System32\MSGSM32.ACM 5.00.2134.1 22.27 KB (22,800 bytes)
      7/26/2000 7:00:00 AM
c:\winnt\system32\msg711.acm  Microsoft Corporation         OK
      C:\WINNT\System32\MSG711.ACM  5.00.2134.1 10.27 KB (10,512 bytes)
      7/26/2000 7:00:00 AM
c:\winnt\system32\msadp32.acm Microsoft Corporation         OK
      C:\WINNT\System32\MSADP32.ACM 5.00.2134.1 14.77 KB (15,120 bytes)
      7/26/2000 7:00:00 AM
c:\winnt\system32\imaadp32.acm      Microsoft Corporation         OK
      C:\WINNT\System32\IMAADP32.ACM      5.00.2134.1 16.27 KB (16,656
bytes)      7/26/2000 7:00:00 AM

[Video Codecs]

Codec Manufacturer      Description Status      File  Version     Size
      Creation Date
c:\winnt\system32\ir50_32.dll Intel Corporation Indeo® video 5.10 OK
      C:\WINNT\System32\IR50_32.DLL R.5.10.15.2.55    737.50 KB
(755,200 bytes)   7/26/2000 7:00:00 AM
c:\winnt\system32\msh261.drv  Microsoft Corporation         OK
      C:\WINNT\System32\MSH261.DRV  4.4.3385    163.77 KB (167,696
bytes)      3/29/2002 12:38:55 PM
c:\winnt\system32\msh263.drv  Microsoft Corporation         OK
      C:\WINNT\System32\MSH263.DRV  4.4.3385    252.27 KB (258,320
bytes)      3/29/2002 12:38:34 PM
c:\winnt\system32\msvidc32.dll      Microsoft Corporation         OK
      C:\WINNT\System32\MSVIDC32.DLL      5.00.2134.1 27.27 KB (27,920
bytes)      7/26/2000 7:00:00 AM
c:\winnt\system32\msrle32.dll Microsoft Corporation         OK
      C:\WINNT\System32\MSRLE32.DLL 5.00.2134.1 10.77 KB (11,024 bytes)
      7/26/2000 7:00:00 AM
c:\winnt\system32\ir32_32.dll Intel(R) Corporation          OK
      C:\WINNT\System32\IR32_32.DLL Not Available     194.50 KB
(199,168 bytes)   7/26/2000 7:00:00 AM
c:\winnt\system32\iccvid.dll  Radius Inc.       OK
      C:\WINNT\System32\ICCVID.DLL  1.10.0.6    108.00 KB (110,592
bytes)      7/26/2000 7:00:00 AM

[CD-ROM]

Item  Value
Drive D:
Description CD-ROM Drive
Media Loaded      True
Media Type  CD-ROM
Name  LG CD-ROM CRD-8482B
Manufacturer      (Standard CD-ROM drives)
Status      OK
```

```
Transfer Rate     Not Available
SCSI Target ID    0
PNP Device ID     IDE\CDROMLG_CD-ROM_CRD-
8482B_____________________1.05____\5&129881D0&0&0.0.0


[Sound Device]

Item  Value
No sound devices

[Display]

Item  Value
Name  ATI Technologies Inc. RAGE XL PCI
PNP Device ID
      PCI\VEN_1002&DEV_4752&SUBSYS_011C1028&REV_27\3&13C0B0C5&0&70
Adapter Type      ATI RAGE XL PCI, ATI Technologies Inc. compatible
Adapter Description     ATI Technologies Inc. RAGE XL PCI
Adapter RAM 4.00 MB (4,194,304 bytes)
Installed Drivers atidrab.dll
Driver Version    5.00.2179.1
INF File    display.inf (atirage3 section)
Color Planes      1
Color Table Entries     256
Resolution  1024 x 768 x 60 hertz
Bits/Pixel  8


[Infrared]

Item  Value
No infrared devices

[Input]

[ Following are sub-categories of this main category ]

[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&639D4DC&0
NumberOfFunctionKeys    12


[Pointing Device]

Item  Value
Hardware Type     PS/2 Compatible Mouse
Number of Buttons 3
Status      OK
PNP Device ID     ACPI\PNP0F13\4&639D4DC&0
```

```
Power Management Supported    False
Double Click Threshold  6
Handedness  Right Handed Operation


[Modem]

Item  Value
No modems

[Network]

[ Following are sub-categories of this main category ]

[Adapter]

Item  Value
Name  [00000000] RAS Async Adapter
Adapter Type      Not Available
Product Name      RAS Async Adapter
Installed   True
PNP Device ID     Not Available
Last Reset  10/25/2002 4:01:29 AM
Index 0
Service Name      AsyncMac
IP Address  Not Available
IP Subnet   Not Available
Default IP Gateway      Not Available
DHCP Enabled      False
DHCP Server Not Available
DHCP Lease Expires      Not Available
DHCP Lease Obtained     Not Available
MAC Address Not Available
Service Name      Not Available

Name  [00000001] WAN Miniport (L2TP)
Adapter Type      Not Available
Product Name      WAN Miniport (L2TP)
Installed   True
PNP Device ID     ROOT\MS_L2TPMINIPORT\0000
Last Reset  10/25/2002 4:01:29 AM
Index 1
Service Name      Rasl2tp
IP Address  Not Available
IP Subnet   Not Available
Default IP Gateway      Not Available
DHCP Enabled      False
DHCP Server Not Available
DHCP Lease Expires      Not Available
DHCP Lease Obtained     Not Available
MAC Address Not Available
Service Name      Rasl2tp
Driver      c:\winnt\system32\drivers\rasl2tp.sys (50800, 5.00.2179.1)

Name  [00000002] WAN Miniport (PPTP)
```

```
Adapter Type      Wide Area Network (WAN)
Product Name      WAN Miniport (PPTP)
Installed   True
PNP Device ID     ROOT\MS_PPTPMINIPORT\0000
Last Reset  10/25/2002 4:01:29 AM
Index 2
Service Name      PptpMiniport
IP Address  Not Available
IP Subnet   Not Available
Default IP Gateway      Not Available
DHCP Enabled      False
DHCP Server Not Available
DHCP Lease Expires      Not Available
DHCP Lease Obtained     Not Available
MAC Address 50:50:54:50:30:30
Service Name      PptpMiniport
Driver      c:\winnt\system32\drivers\raspptp.sys (47856, 5.00.2160.1)

Name  [00000003] Direct Parallel
Adapter Type      Not Available
Product Name      Direct Parallel
Installed   True
PNP Device ID     ROOT\MS_PTIMINIPORT\0000
Last Reset  10/25/2002 4:01:29 AM
Index 3
Service Name      Raspti
IP Address  Not Available
IP Subnet   Not Available
Default IP Gateway      Not Available
DHCP Enabled      False
DHCP Server Not Available
DHCP Lease Expires      Not Available
DHCP Lease Obtained     Not Available
MAC Address Not Available
Service Name      Raspti
Driver      c:\winnt\system32\drivers\raspti.sys (16880, 5.00.2146.1)

Name  [00000004] WAN Miniport (IP)
Adapter Type      Not Available
Product Name      WAN Miniport (IP)
Installed   True
PNP Device ID     ROOT\MS_NDISWANIP\0000
Last Reset  10/25/2002 4:01:29 AM
Index 4
Service Name      NdisWan
IP Address  Not Available
IP Subnet   Not Available
Default IP Gateway      Not Available
DHCP Enabled      False
DHCP Server Not Available
DHCP Lease Expires      Not Available
DHCP Lease Obtained     Not Available
MAC Address Not Available
Service Name      NdisWan
Driver      c:\winnt\system32\drivers\ndiswan.sys (90768, 5.00.2184.1)
```

```
Name  [00000005] Intel 82544EI-based XT Gigabit Adapter
Adapter Type      Not Available
Product Name      Intel 82544EI-based XT Gigabit Adapter
Installed   True
PNP Device ID
      PCI\VEN_8086&DEV_1008&SUBSYS_011C1028&REV_02\3&29E81982&0&10
Last Reset  10/25/2002 4:01:29 AM
Index 5
Service Name      E1000
IP Address  Not Available
IP Subnet   Not Available
Default IP Gateway      Not Available
DHCP Enabled      True
DHCP Server Not Available
DHCP Lease Expires      Not Available
DHCP Lease Obtained     Not Available
MAC Address Not Available
Service Name      E1000
Driver      c:\winnt\system32\drivers\e1000nt5.sys (73696,
3.40.340.0000)

Name  [00000006] Intel(R) PRO/100 S Server Adapter
Adapter Type      Ethernet 802.3
Product Name      Intel(R) PRO/100 S Server Adapter
Installed   True
PNP Device ID
      PCI\VEN_8086&DEV_1229&SUBSYS_10508086&REV_0D\3&13C0B0C5&0&20
Last Reset  10/25/2002 4:01:29 AM
Index 6
Service Name      E100B
IP Address  192.1.10.100
IP Subnet   255.255.255.0
Default IP Gateway      Not Available
DHCP Enabled      False
DHCP Server Not Available
DHCP Lease Expires      Not Available
DHCP Lease Obtained     Not Available
MAC Address 00:02:B3:89:63:82
Service Name      E100B
IRQ Number  17
I/O Port    0xECC0-0xECFF
Driver      c:\winnt\system32\drivers\e100bnt5.sys (123152,
5.41.27.0000)

Name  [00000007] Intel(R) PRO/100 S Server Adapter
Adapter Type      Ethernet 802.3
Product Name      Intel(R) PRO/100 S Server Adapter
Installed   True
PNP Device ID
      PCI\VEN_8086&DEV_1229&SUBSYS_10508086&REV_0D\3&13C0B0C5&0&30
Last Reset  10/25/2002 4:01:29 AM
Index 7
Service Name      E100B
IP Address  192.1.1.1
```

```
IP Subnet   255.255.255.0
Default IP Gateway      Not Available
DHCP Enabled      False
DHCP Server Not Available
DHCP Lease Expires      Not Available
DHCP Lease Obtained     Not Available
MAC Address 00:02:B3:8C:F2:98
Service Name      E100B
IRQ Number  20
I/O Port    0xEC80-0xECBF
Driver      c:\winnt\system32\drivers\e100bnt5.sys (123152,
5.41.27.0000)


[Protocol]

Item  Value
Name  MSAFD Tcpip [TCP/IP]
ConnectionlessService   False
GuaranteesDelivery      True
GuaranteesSequencing    True
MaximumAddressSize      16 bytes
MaximumMessageSize      0 bytes
MessageOriented   False
MinimumAddressSize      16 bytes
PseudoStreamOriented    False
SupportsBroadcasting    False
SupportsConnectData     False
SupportsDisconnectData  False
SupportsEncryption      False
SupportsExpeditedData   True
SupportsGracefulClosing True
SupportsGuaranteedBandwidth   False
SupportsMulticasting    False

Name  MSAFD Tcpip [UDP/IP]
ConnectionlessService   True
GuaranteesDelivery      False
GuaranteesSequencing    False
MaximumAddressSize      16 bytes
MaximumMessageSize      65467 bytes
MessageOriented   True
MinimumAddressSize      16 bytes
PseudoStreamOriented    False
SupportsBroadcasting    True
SupportsConnectData     False
SupportsDisconnectData  False
SupportsEncryption      False
SupportsExpeditedData   False
SupportsGracefulClosing False
SupportsGuaranteedBandwidth   False
SupportsMulticasting    True

Name  RSVP UDP Service Provider
ConnectionlessService   True
```

```
GuaranteesDelivery      False
GuaranteesSequencing    False
MaximumAddressSize      16 bytes
MaximumMessageSize      65467 bytes
MessageOriented   True
MinimumAddressSize      16 bytes
PseudoStreamOriented    False
SupportsBroadcasting    True
SupportsConnectData     False
SupportsDisconnectData  False
SupportsEncryption      True
SupportsExpeditedData   False
SupportsGracefulClosing False
SupportsGuaranteedBandwidth   False
SupportsMulticasting    True

Name  RSVP TCP Service Provider
ConnectionlessService   False
GuaranteesDelivery      True
GuaranteesSequencing    True
MaximumAddressSize      16 bytes
MaximumMessageSize      0 bytes
MessageOriented   False
MinimumAddressSize      16 bytes
PseudoStreamOriented    False
SupportsBroadcasting    False
SupportsConnectData     False
SupportsDisconnectData  False
SupportsEncryption      True
SupportsExpeditedData   True
SupportsGracefulClosing True
SupportsGuaranteedBandwidth   False
SupportsMulticasting    False

Name  MSAFD NetBIOS [\Device\NetBT_Tcpip_{3E4E49AF-0B8F-46D4-AD06-
B595EC94A4C3}] SEQPACKET 4
ConnectionlessService   False
GuaranteesDelivery      True
GuaranteesSequencing    True
MaximumAddressSize      20 bytes
MaximumMessageSize      64000 bytes
MessageOriented   True
MinimumAddressSize      20 bytes
PseudoStreamOriented    False
SupportsBroadcasting    False
SupportsConnectData     False
SupportsDisconnectData  False
SupportsEncryption      False
SupportsExpeditedData   False
SupportsGracefulClosing False
SupportsGuaranteedBandwidth   False
SupportsMulticasting    False

Name  MSAFD NetBIOS [\Device\NetBT_Tcpip_{3E4E49AF-0B8F-46D4-AD06-
B595EC94A4C3}] DATAGRAM 4
```

```
ConnectionlessService   True
GuaranteesDelivery      False
GuaranteesSequencing    False
MaximumAddressSize      20 bytes
MaximumMessageSize      64000 bytes
MessageOriented   True
MinimumAddressSize      20 bytes
PseudoStreamOriented    False
SupportsBroadcasting    True
SupportsConnectData     False
SupportsDisconnectData  False
SupportsEncryption      False
SupportsExpeditedData   False
SupportsGracefulClosing False
SupportsGuaranteedBandwidth   False
SupportsMulticasting    False

Name  MSAFD NetBIOS [\Device\NetBT_Tcpip_{3C8CADDF-D7E4-4BA8-B1D9-
969B42211330}] SEQPACKET 3
ConnectionlessService   False
GuaranteesDelivery      True
GuaranteesSequencing    True
MaximumAddressSize      20 bytes
MaximumMessageSize      64000 bytes
MessageOriented   True
MinimumAddressSize      20 bytes
PseudoStreamOriented    False
SupportsBroadcasting    False
SupportsConnectData     False
SupportsDisconnectData  False
SupportsEncryption      False
SupportsExpeditedData   False
SupportsGracefulClosing False
SupportsGuaranteedBandwidth   False
SupportsMulticasting    False

Name  MSAFD NetBIOS [\Device\NetBT_Tcpip_{3C8CADDF-D7E4-4BA8-B1D9-
969B42211330}] DATAGRAM 3
ConnectionlessService   True
GuaranteesDelivery      False
GuaranteesSequencing    False
MaximumAddressSize      20 bytes
MaximumMessageSize      64000 bytes
MessageOriented   True
MinimumAddressSize      20 bytes
PseudoStreamOriented    False
SupportsBroadcasting    True
SupportsConnectData     False
SupportsDisconnectData  False
SupportsEncryption      False
SupportsExpeditedData   False
SupportsGracefulClosing False
SupportsGuaranteedBandwidth   False
SupportsMulticasting    False
```

```
Name  MSAFD NetBIOS [\Device\NetBT_Tcpip_{67D62213-4A1D-4A86-9ADF-
EF52C0C1F8DF}] SEQPACKET 0
ConnectionlessService   False
GuaranteesDelivery      True
GuaranteesSequencing    True
MaximumAddressSize      20 bytes
MaximumMessageSize      64000 bytes
MessageOriented   True
MinimumAddressSize      20 bytes
PseudoStreamOriented    False
SupportsBroadcasting    False
SupportsConnectData     False
SupportsDisconnectData  False
SupportsEncryption      False
SupportsExpeditedData   False
SupportsGracefulClosing False
SupportsGuaranteedBandwidth   False
SupportsMulticasting    False

Name  MSAFD NetBIOS [\Device\NetBT_Tcpip_{67D62213-4A1D-4A86-9ADF-
EF52C0C1F8DF}] DATAGRAM 0
ConnectionlessService   True
GuaranteesDelivery      False
GuaranteesSequencing    False
MaximumAddressSize      20 bytes
MaximumMessageSize      64000 bytes
MessageOriented   True
MinimumAddressSize      20 bytes
PseudoStreamOriented    False
SupportsBroadcasting    True
SupportsConnectData     False
SupportsDisconnectData  False
SupportsEncryption      False
SupportsExpeditedData   False
SupportsGracefulClosing False
SupportsGuaranteedBandwidth   False
SupportsMulticasting    False

Name  MSAFD NetBIOS [\Device\NetBT_Tcpip_{6457AAC4-5D98-4B79-8F6C-
8D234A496C87}] SEQPACKET 1
ConnectionlessService   False
GuaranteesDelivery      True
GuaranteesSequencing    True
MaximumAddressSize      20 bytes
MaximumMessageSize      64000 bytes
MessageOriented   True
MinimumAddressSize      20 bytes
PseudoStreamOriented    False
SupportsBroadcasting    False
SupportsConnectData     False
SupportsDisconnectData  False
SupportsEncryption      False
SupportsExpeditedData   False
SupportsGracefulClosing False
SupportsGuaranteedBandwidth   False
```

```
SupportsMulticasting    False

Name  MSAFD NetBIOS [\Device\NetBT_Tcpip_{6457AAC4-5D98-4B79-8F6C-
8D234A496C87}] DATAGRAM 1
ConnectionlessService   True
GuaranteesDelivery      False
GuaranteesSequencing    False
MaximumAddressSize      20 bytes
MaximumMessageSize      64000 bytes
MessageOriented   True
MinimumAddressSize      20 bytes
PseudoStreamOriented    False
SupportsBroadcasting    True
SupportsConnectData     False
SupportsDisconnectData  False
SupportsEncryption      False
SupportsExpeditedData   False
SupportsGracefulClosing False
SupportsGuaranteedBandwidth   False
SupportsMulticasting    False

Name  MSAFD NetBIOS [\Device\NetBT_Tcpip_{0630F94E-070D-4D57-8C49-
676CC7BF20DE}] SEQPACKET 2
ConnectionlessService   False
GuaranteesDelivery      True
GuaranteesSequencing    True
MaximumAddressSize      20 bytes
MaximumMessageSize      64000 bytes
MessageOriented   True
MinimumAddressSize      20 bytes
PseudoStreamOriented    False
SupportsBroadcasting    False
SupportsConnectData     False
SupportsDisconnectData  False
SupportsEncryption      False
SupportsExpeditedData   False
SupportsGracefulClosing False
SupportsGuaranteedBandwidth   False
SupportsMulticasting    False

Name  MSAFD NetBIOS [\Device\NetBT_Tcpip_{0630F94E-070D-4D57-8C49-
676CC7BF20DE}] DATAGRAM 2
ConnectionlessService   True
GuaranteesDelivery      False
GuaranteesSequencing    False
MaximumAddressSize      20 bytes
MaximumMessageSize      64000 bytes
MessageOriented   True
MinimumAddressSize      20 bytes
PseudoStreamOriented    False
SupportsBroadcasting    True
SupportsConnectData     False
SupportsDisconnectData  False
SupportsEncryption      False
SupportsExpeditedData   False
```

```
SupportsGracefulClosing False
SupportsGuaranteedBandwidth   False
SupportsMulticasting    False


[WinSock]

Item  Value
File  c:\winnt\system32\winsock.dll
Version     3.10
Size  2.80 KB (2,864 bytes)

File  c:\winnt\system32\wsock32.dll
Version     5.00.2195.1207
Size  21.27 KB (21,776 bytes)


[Ports]

[ Following are sub-categories of this main category ]

[Serial]

Item  Value
Name  COM1
Status      OK
PNP Device ID     ACPI\PNP0501\1
Maximum Input Buffer Size     Not Available
Maximum Output Buffer Size    Not Available
Settable Baud Rate      Not Available
Settable Data Bits      Not Available
Settable Flow Control   Not Available
Settable Parity   Not Available
Settable Parity Check   Not Available
Settable Stop Bits      Not Available
Settable RLSD     Not Available
Supports RLSD     Not Available
Supports 16 Bit Mode    Not Available
Supports Special Characters   Not Available
Baud Rate   9600
Bits/Byte   8
Stop Bits   1
Parity      None
Busy  -1
Abort Read/Write on Error     Not Available
Binary Mode Enabled     Not Available
Continue XMit on XOff   Not Available
CTS Outflow Control     Not Available
Discard NULL Bytes      Not Available
DSR Outflow Control     Not Available
DSR Sensitivity   Not Available
DTR Flow Control Type   Not Available
EOF Character     Not Available
Error Replace Character Not Available
Error Replacement Enabled     Not Available
```

```
Event Character   Not Available
Parity Check Enabled    -1
RTS Flow Control Type   Not Available
XOff Character    19
XOffXMit Threshold      512
XOn Character     17
XOnXMit Threshold 2048
XOnXOff InFlow Control  Not Available
XOnXOff OutFlow Control Not Available
IRQ Number  4
I/O Port    0x03F8-0x03FF
Driver      c:\winnt\system32\drivers\serial.sys (62448, 5.00.2134.1)


[Parallel]

Item  Value
Name  LPT1
PNP Device ID     ACPI\PNP0401\4&639D4DC&0


[Storage]

[ Following are sub-categories of this main category ]

[Drives]

Item  Value
Drive A:
Description 3 1/2 Inch Floppy Drive

Drive C:
Description Local Fixed Disk
Compressed  False
File System NTFS
Size  16.95 GB (18,202,509,312 bytes)
Free Space  14.42 GB (15,484,764,160 bytes)
Volume Name
Volume Serial Number    309C10C1
Partition   Disk #0, Partition #0
Partition Size    16.95 GB (18,202,512,384 bytes)
Starting Offset   32256 bytes
Drive Description Disk drive
Drive Manufacturer      (Standard disk drives)
Drive Model SEAGATE ST318203LC SCSI Disk Device
Drive BytesPerSector    512
Drive MediaLoaded True
Drive MediaType   Fixed hard disk media
Drive Partitions  1
Drive SCSIBus     0
Drive SCSILogicalUnit   0
Drive SCSIPort    2
Drive SCSITargetId      0
Drive SectorsPerTrack   63
Drive Size  18202544640 bytes
```

```
Drive TotalCylinders    2213
Drive TotalSectors      35551845
Drive TotalTracks 564315
Drive TracksPerCylinder 255

Drive E:
Description Network Connection
Provider Name     \\client1\c$


[SCSI]

Item  Value
Name  Adaptec AIC-7899 Ultra160/m PCI SCSI Card
Caption     Adaptec AIC-7899 Ultra160/m PCI SCSI Card
Driver      adpu160m
Status      OK
PNP Device ID
      PCI\VEN_9005&DEV_00CF&SUBSYS_011C1028&REV_01\3&1070020&0&10
Device ID   PCI\VEN_9005&DEV_00CF&SUBSYS_011C1028&REV_01\3&1070020&0&10
Device Map  Not Available
Index Not Available
Max Number Controlled   Not Available
IRQ Number  29
I/O Port    0xDC00-0xDCFF
Driver      c:\winnt\system32\drivers\adpu160m.sys (64432, v3.10a)

Name  Adaptec AIC-7899 Ultra160/m PCI SCSI Card
Caption     Adaptec AIC-7899 Ultra160/m PCI SCSI Card
Driver      adpu160m
Status      OK
PNP Device ID
      PCI\VEN_9005&DEV_00CF&SUBSYS_011C1028&REV_01\3&1070020&0&11
Device ID   PCI\VEN_9005&DEV_00CF&SUBSYS_011C1028&REV_01\3&1070020&0&11
Device Map  Not Available
Index Not Available
Max Number Controlled   Not Available
IRQ Number  30
I/O Port    0xD800-0xD8FF
Driver      c:\winnt\system32\drivers\adpu160m.sys (64432, v3.10a)


[Printing]

Name  Port Name   Server Name
No printing information

[Problem Devices]

Device      PNP Device ID     Error Code
Intel 82544EI-based XT Gigabit Adapter
      PCI\VEN_8086&DEV_1008&SUBSYS_011C1028&REV_02\3&29E81982&0&10
      22

[USB]
```

```
Device      PNP Device ID
Standard OpenHCD USB Host Controller
      PCI\VEN_1166&DEV_0220&SUBSYS_02201166&REV_05\3&13C0B0C5&0&7A
USB Root Hub      USB\ROOT_HUB\4&1A0F8909&0

[Software Environment]

[ Following are sub-categories of this main category ]

[Drivers]

Name  Description File  Type  Started     Start Mode  State Status
      Error Control     Accept Pause      Accept Stop
abiosdsk    Abiosdsk    Not Available     Kernel Driver     False
      Disabled    Stopped     OK    Ignore      False False
abp480n5    abp480n5    Not Available     Kernel Driver     False
      Disabled    Stopped     OK    Normal      False False
acpi  Microsoft ACPI Driver   c:\winnt\system32\drivers\acpi.sys
      Kernel Driver     True  Boot  Running     OK    Normal      False
      True
acpiec      ACPIEC      c:\winnt\system32\drivers\acpiec.sys
      Kernel Driver     False Disabled    Stopped     OK    Normal
      False False
adpu160m    adpu160m    c:\winnt\system32\drivers\adpu160m.sys
      Kernel Driver     True  Boot  Running     OK    Normal      False
      True
afd   AFD Networking Support Environment
      c:\winnt\system32\drivers\afd.sys   Kernel Driver     True  Auto
      Running     OK    Normal      False True
aha154x     Aha154x     Not Available     Kernel Driver     False
      Disabled    Stopped     OK    Normal      False False
aic116x     aic116x     Not Available     Kernel Driver     False
      Disabled    Stopped     OK    Normal      False False
aic78u2     aic78u2     Not Available     Kernel Driver     False
      Disabled    Stopped     OK    Normal      False False
aic78xx     aic78xx     Not Available     Kernel Driver     False
      Disabled    Stopped     OK    Normal      False False
ami0nt      ami0nt      Not Available     Kernel Driver     False
      Disabled    Stopped     OK    Normal      False False
amsint      amsint      Not Available     Kernel Driver     False
      Disabled    Stopped     OK    Normal      False False
asc   asc   Not Available     Kernel Driver     False Disabled
      Stopped     OK    Normal      False False
asc3350p    asc3350p    Not Available     Kernel Driver     False
      Disabled    Stopped     OK    Normal      False False
asc3550     asc3550     Not Available     Kernel Driver     False
      Disabled    Stopped     OK    Normal      False False
asyncmac    RAS Asynchronous Media Driver
      c:\winnt\system32\drivers\asyncmac.sys    Kernel Driver     False
      Manual      Stopped     OK    Normal      False False
atapi Standard IDE/ESDI Hard Disk Controller
      c:\winnt\system32\drivers\atapi.sys Kernel Driver     True  Boot
      Running     OK    Normal      False True
```

```
atdisk      Atdisk      Not Available     Kernel Driver     False
      Disabled    Stopped     OK    Ignore      False False
atirage3    atirage3    c:\winnt\system32\drivers\atimpab.sys
      Kernel Driver     True  Manual      Running     OK    Ignore
      False True
atmarpc     ATM ARP Client Protocol
      c:\winnt\system32\drivers\atmarpc.sys     Kernel Driver     False
      Manual      Stopped     OK    Normal      False False
audstub     Audio Stub Driver c:\winnt\system32\drivers\audstub.sys
      Kernel Driver     True  Manual      Running     OK    Normal
      False True
beep  Beep  c:\winnt\system32\drivers\beep.sys  Kernel Driver     True
      System      Running     OK    Normal      False True
buslogic    BusLogic    Not Available     Kernel Driver     False
      Disabled    Stopped     OK    Normal      False False
cd20xrnt    cd20xrnt    Not Available     Kernel Driver     False
      Disabled    Stopped     OK    Normal      False False
cdaudio     Cdaudio     c:\winnt\system32\drivers\cdaudio.sys
      Kernel Driver     False System      Stopped     OK    Ignore
      False False
cdfs  Cdfs  c:\winnt\system32\drivers\cdfs.sys  File System Driver
      True  Disabled    Running     OK    Normal      False True
cdrom CD-ROM Driver     c:\winnt\system32\drivers\cdrom.sys Kernel
Driver      True  System      Running     OK    Normal      False True
changer     Changer     Not Available     Kernel Driver     False
      System      Stopped     OK    Ignore      False False
cpqarray    Cpqarray    Not Available     Kernel Driver     False
      Disabled    Stopped     OK    Normal      False False
cpqarry2    cpqarry2    Not Available     Kernel Driver     False
      Disabled    Stopped     OK    Normal      False False
cpqfcalm    cpqfcalm    Not Available     Kernel Driver     False
      Disabled    Stopped     OK    Normal      False False
cpqfws2e    cpqfws2e    Not Available     Kernel Driver     False
      Disabled    Stopped     OK    Normal      False False
dac960nt    dac960nt    Not Available     Kernel Driver     False
      Disabled    Stopped     OK    Normal      False False
deckzpsx    deckzpsx    Not Available     Kernel Driver     False
      Disabled    Stopped     OK    Normal      False False
dfsdriver   DfsDriver   c:\winnt\system32\drivers\dfs.sys   File System
Driver      True  Boot  Running     OK    Normal      False True
disk  Disk Driver c:\winnt\system32\drivers\disk.sys  Kernel Driver
      True  Boot  Running     OK    Normal      False True
diskperf    Diskperf    c:\winnt\system32\drivers\diskperf.sys
      Kernel Driver     True  Boot  Running     OK    Normal      False
      True
dmboot      dmboot      c:\winnt\system32\drivers\dmboot.sys
      Kernel Driver     False Disabled    Stopped     OK    Normal
      False False
dmio  Logical Disk Manager Driver   c:\winnt\system32\drivers\dmio.sys
      Kernel Driver     True  Boot  Running     OK    Normal      False
      True
dmload      dmload      c:\winnt\system32\drivers\dmload.sys
      Kernel Driver     True  Boot  Running     OK    Normal      False
      True
```

```
e1000 Intel(R) PRO/1000 Adapter Driver
      c:\winnt\system32\drivers\e1000nt5.sys    Kernel Driver     False
      Manual      Stopped     OK    Normal      False False
e100b Intel(R) PRO Adapter Driver
      c:\winnt\system32\drivers\e100bnt5.sys    Kernel Driver     True
      Manual      Running     OK    Normal      False True
efs   EFS   c:\winnt\system32\drivers\efs.sys   File System Driver
      True  Disabled    Running     OK    Normal      False True
fastfat     Fastfat     c:\winnt\system32\drivers\fastfat.sys     File
System Driver     True  Disabled    Running     OK    Normal      False
      True
fd16_700    Fd16_700    Not Available     Kernel Driver     False
      Disabled    Stopped     OK    Normal      False False
fdc   Floppy Disk Controller Driver c:\winnt\system32\drivers\fdc.sys
      Kernel Driver     True  Manual      Running     OK    Normal
      False True
fireport    fireport    Not Available     Kernel Driver     False
      Disabled    Stopped     OK    Normal      False False
flashpnt    flashpnt    Not Available     Kernel Driver     False
      Disabled    Stopped     OK    Normal      False False
flpydisk    Floppy Disk Driver
      c:\winnt\system32\drivers\flpydisk.sys    Kernel Driver     True
      Manual      Running     OK    Normal      False True
ftdisk      Volume Manager Driver
      c:\winnt\system32\drivers\ftdisk.sys      Kernel Driver     True
      Boot  Running     OK    Normal      False True
gpc   Generic Packet Classifier     c:\winnt\system32\drivers\msgpc.sys
      Kernel Driver     True  Manual      Running     OK    Normal
      False True
i8042prt    i8042 Keyboard and PS/2 Mouse Port Driver
      c:\winnt\system32\drivers\i8042prt.sys    Kernel Driver     True
      System      Running     OK    Normal      False True
ini910u     ini910u     Not Available     Kernel Driver     False
      Disabled    Stopped     OK    Normal      False False
intelide    IntelIde    Not Available     Kernel Driver     False
      Disabled    Stopped     OK    Normal      False False
ipfilterdriver    IP Traffic Filter Driver
      c:\winnt\system32\drivers\ipfltdrv.sys    Kernel Driver     False
      Manual      Stopped     OK    Normal      False False
ipinip      IP in IP Tunnel Driver
      c:\winnt\system32\drivers\ipinip.sys      Kernel Driver     False
      Manual      Stopped     OK    Normal      False False
ipnat IP Network Address Translator c:\winnt\system32\drivers\ipnat.sys
      Kernel Driver     False Manual      Stopped     OK    Normal
      False False
ipsec IPSEC driver      c:\winnt\system32\drivers\ipsec.sys Kernel
Driver      False Manual      Stopped     OK    Normal      False False
ipsraidn    ipsraidn    Not Available     Kernel Driver     False
      Disabled    Stopped     OK    Normal      False False
isapnp      PnP ISA/EISA Bus Driver
      c:\winnt\system32\drivers\isapnp.sys      Kernel Driver     True
      Boot  Running     OK    Critical    False True
kbdclass    Keyboard Class Driver
      c:\winnt\system32\drivers\kbdclass.sys    Kernel Driver     True
      System      Running     OK    Normal      False True
```

```
ksecdd      KSecDD      c:\winnt\system32\drivers\ksecdd.sys
      Kernel Driver     True  Boot  Running     OK    Normal      False
      True
lbrtfdc     lbrtfdc     Not Available     Kernel Driver     False
      System      Stopped     OK    Ignore      False False
lp6nds35    lp6nds35    Not Available     Kernel Driver     False
      Disabled    Stopped     OK    Normal      False False
mnmdd mnmdd c:\winnt\system32\drivers\mnmdd.sys Kernel Driver     True
      System      Running     OK    Ignore      False True
modem Modem c:\winnt\system32\drivers\modem.sys Kernel Driver     False
      Manual      Stopped     OK    Ignore      False False
mouclass    Mouse Class Driver
      c:\winnt\system32\drivers\mouclass.sys    Kernel Driver     True
      System      Running     OK    Normal      False True
mountmgr    MountMgr    c:\winnt\system32\drivers\mountmgr.sys
      Kernel Driver     True  Boot  Running     OK    Normal      False
      True
mraid35x    mraid35x    Not Available     Kernel Driver     False
      Disabled    Stopped     OK    Normal      False False
mrxsmb      MRXSMB      c:\winnt\system32\drivers\mrxsmb.sys      File
System Driver     True  System      Running     OK    Normal      False
      True
msfs  Msfs  c:\winnt\system32\drivers\msfs.sys  File System Driver
      True  System      Running     OK    Normal      False True
mskssrv     Microsoft Streaming Service Proxy
      c:\winnt\system32\drivers\mskssrv.sys     Kernel Driver     False
      Manual      Stopped     OK    Normal      False False
mspclock    Microsoft Streaming Clock Proxy
      c:\winnt\system32\drivers\mspclock.sys    Kernel Driver     False
      Manual      Stopped     OK    Normal      False False
mspqm Microsoft Streaming Quality Manager Proxy
      c:\winnt\system32\drivers\mspqm.sys Kernel Driver     False
      Manual      Stopped     OK    Normal      False False
mup   Mup   c:\winnt\system32\drivers\mup.sys   File System Driver
      True  Boot  Running     OK    Normal      False True
ncrc710     Ncrc710     Not Available     Kernel Driver     False
      Disabled    Stopped     OK    Normal      False False
ndis  NDIS System Driver      c:\winnt\system32\drivers\ndis.sys
      Kernel Driver     True  Boot  Running     OK    Normal      False
      True
ndistapi    Remote Access NDIS TAPI Driver
      c:\winnt\system32\drivers\ndistapi.sys    Kernel Driver     True
      Manual      Running     OK    Normal      False True
ndiswan     Remote Access NDIS WAN Driver
      c:\winnt\system32\drivers\ndiswan.sys     Kernel Driver     True
      Manual      Running     OK    Normal      False True
ndproxy     NDIS Proxy  c:\winnt\system32\drivers\ndproxy.sys
      Kernel Driver     True  Manual      Running     OK    Normal
      False True
netbios     NetBIOS Interface c:\winnt\system32\drivers\netbios.sys
      File System Driver      True  System      Running     OK
      Normal      False True
netbt NetBios over Tcpip      c:\winnt\system32\drivers\netbt.sys
      Kernel Driver     True  System      Running     OK    Normal
      False True
```

```
netdetect   NetDetect   c:\winnt\system32\drivers\netdtect.sys
      Kernel Driver     False Manual      Stopped     OK    Normal
      False False
npfs  Npfs  c:\winnt\system32\drivers\npfs.sys  File System Driver
      True  System      Running     OK    Normal      False True
ntfs  Ntfs  c:\winnt\system32\drivers\ntfs.sys  File System Driver
      True  Disabled    Running     OK    Normal      False True
null  Null  c:\winnt\system32\drivers\null.sys  Kernel Driver     True
      System      Running     OK    Normal      False True
nwlnkflt    IPX Traffic Filter Driver
      c:\winnt\system32\drivers\nwlnkflt.sys    Kernel Driver     False
      Manual      Stopped     OK    Normal      False False
nwlnkfwd    IPX Traffic Forwarder Driver
      c:\winnt\system32\drivers\nwlnkfwd.sys    Kernel Driver     False
      Manual      Stopped     OK    Normal      False False
openhci     Microsoft USB Open Host Controller Driver
      c:\winnt\system32\drivers\openhci.sys     Kernel Driver     True
      Manual      Running     OK    Normal      False True
parallel    Parallel class driver
      c:\winnt\system32\drivers\parallel.sys    Kernel Driver     True
      Manual      Running     OK    Normal      False True
parport     Parallel port driver
      c:\winnt\system32\drivers\parport.sys     Kernel Driver     True
      System      Running     OK    Ignore      False True
partmgr     PartMgr     c:\winnt\system32\drivers\partmgr.sys
      Kernel Driver     True  Boot  Running     OK    Normal      False
      True
parvdm      ParVdm      c:\winnt\system32\drivers\parvdm.sys
      Kernel Driver     True  Auto  Running     OK    Ignore      False
      True
pci   PCI Bus Driver    c:\winnt\system32\drivers\pci.sys   Kernel
Driver      True  Boot  Running     OK    Critical    False True
pcidump     PCIDump     Not Available     Kernel Driver     False
      System      Stopped     OK    Ignore      False False
pciide      PCIIde      c:\winnt\system32\drivers\pciide.sys
      Kernel Driver     True  Boot  Running     OK    Normal      False
      True
pcmcia      Pcmcia      c:\winnt\system32\drivers\pcmcia.sys
      Kernel Driver     False Disabled    Stopped     OK    Normal
      False False
pdcomp      PDCOMP      Not Available     Kernel Driver     False
      Manual      Stopped     OK    Ignore      False False
pdframe     PDFRAME     Not Available     Kernel Driver     False
      Manual      Stopped     OK    Ignore      False False
pdreli      PDRELI      Not Available     Kernel Driver     False
      Manual      Stopped     OK    Ignore      False False
pdrframe    PDRFRAME    Not Available     Kernel Driver     False
      Manual      Stopped     OK    Ignore      False False
pptpminiport      WAN Miniport (PPTP)
      c:\winnt\system32\drivers\raspptp.sys     Kernel Driver     True
      Manual      Running     OK    Normal      False True
ptilink     Direct Parallel Link Driver
      c:\winnt\system32\drivers\ptilink.sys     Kernel Driver     True
      Manual      Running     OK    Normal      False True
```

```
ql1080      ql1080      Not Available     Kernel Driver     False
      Disabled    Stopped     OK    Normal      False False
ql10wnt     Ql10wnt     Not Available     Kernel Driver     False
      Disabled    Stopped     OK    Normal      False False
ql1240      ql1240      Not Available     Kernel Driver     False
      Disabled    Stopped     OK    Normal      False False
ql2100      ql2100      Not Available     Kernel Driver     False
      Disabled    Stopped     OK    Normal      False False
rasacd      Remote Access Auto Connection Driver
      c:\winnt\system32\drivers\rasacd.sys      Kernel Driver     True
      System      Running     OK    Normal      False True
rasl2tp     WAN Miniport (L2TP)
      c:\winnt\system32\drivers\rasl2tp.sys     Kernel Driver     True
      Manual      Running     OK    Normal      False True
raspti      Direct Parallel   c:\winnt\system32\drivers\raspti.sys
      Kernel Driver     True  Manual      Running     OK    Normal
      False True
rca   Microsoft Streaming Network Raw Channel Access
      c:\winnt\system32\drivers\rca.sys   Kernel Driver     False
      Manual      Stopped     OK    Normal      False False
rdbss Rdbss c:\winnt\system32\drivers\rdbss.sys File System Driver
      True  System      Running     OK    Normal      False True
rdpwd RDPWD c:\winnt\system32\drivers\rdpwd.sys Kernel Driver     False
      Manual      Stopped     OK    Ignore      False False
redbook     Digital CD Audio Playback Filter Driver
      c:\winnt\system32\drivers\redbook.sys     Kernel Driver     False
      System      Stopped     OK    Normal      False False
serenum     Serenum Filter Driver
      c:\winnt\system32\drivers\serenum.sys     Kernel Driver     True
      Manual      Running     OK    Normal      False True
serial      Serial port driver
      c:\winnt\system32\drivers\serial.sys      Kernel Driver     True
      System      Running     OK    Ignore      False True
sfloppy     Sfloppy     c:\winnt\system32\drivers\sfloppy.sys
      Kernel Driver     False System      Stopped     OK    Ignore
      False False
sglfb sglfb Not Available     Kernel Driver     False System
      Stopped     OK    Normal      False False
simbad      Simbad      Not Available     Kernel Driver     False
      Disabled    Stopped     OK    Normal      False False
sparrow     Sparrow     Not Available     Kernel Driver     False
      Disabled    Stopped     OK    Normal      False False
spud  Special Purpose Utility Driver
      c:\winnt\system32\drivers\spud.sys  Kernel Driver     True
      Manual      Running     OK    Normal      False True
srv   Srv   c:\winnt\system32\drivers\srv.sys   File System Driver
      True  Manual      Running     OK    Normal      False True
swenum      Software Bus Driver
      c:\winnt\system32\drivers\swenum.sys      Kernel Driver     True
      Manual      Running     OK    Normal      False True
symc810     symc810     Not Available     Kernel Driver     False
      Disabled    Stopped     OK    Normal      False False
symc8xx     symc8xx     Not Available     Kernel Driver     False
      Disabled    Stopped     OK    Normal      False False
```

```
sym_hi      sym_hi      Not Available     Kernel Driver     False
      Disabled    Stopped     OK    Normal      False False
tcpip TCP/IP Protocol Driver  c:\winnt\system32\drivers\tcpip.sys
      Kernel Driver     True  System      Running     OK    Normal
      False True
tdasync     TDASYNC     c:\winnt\system32\drivers\tdasync.sys
      Kernel Driver     False Manual      Stopped     OK    Ignore
      False False
tdipx TDIPX c:\winnt\system32\drivers\tdipx.sys Kernel Driver     False
      Manual      Stopped     OK    Ignore      False False
tdnetb      TDNETB      c:\winnt\system32\drivers\tdnetb.sys
      Kernel Driver     False Manual      Stopped     OK    Ignore
      False False
tdpipe      TDPIPE      c:\winnt\system32\drivers\tdpipe.sys
      Kernel Driver     False Manual      Stopped     OK    Ignore
      False False
tdspx TDSPX c:\winnt\system32\drivers\tdspx.sys Kernel Driver     False
      Manual      Stopped     OK    Ignore      False False
tdtcp TDTCP c:\winnt\system32\drivers\tdtcp.sys Kernel Driver     False
      Manual      Stopped     OK    Ignore      False False
termdd      Terminal Device Driver
      c:\winnt\system32\drivers\termdd.sys      Kernel Driver     False
      Disabled    Stopped     OK    Normal      False False
tga   tga   Not Available     Kernel Driver     False System
      Stopped     OK    Ignore      False False
udfs  Udfs  c:\winnt\system32\drivers\udfs.sys  File System Driver
      False Disabled    Stopped     OK    Normal      False False
ultra66     ultra66     Not Available     Kernel Driver     False
      Disabled    Stopped     OK    Normal      False False
update      Microcode Update Driver
      c:\winnt\system32\drivers\update.sys      Kernel Driver     True
      Manual      Running     OK    Normal      False True
usbhub      Microsoft USB Standard Hub Driver
      c:\winnt\system32\drivers\usbhub.sys      Kernel Driver     True
      Manual      Running     OK    Normal      False True
vgasave     VgaSave     c:\winnt\system32\drivers\vga.sys   Kernel
Driver      True  System      Running     OK    Ignore      False True
wanarp      Remote Access IP ARP Driver
      c:\winnt\system32\drivers\wanarp.sys      Kernel Driver     True
      Manual      Running     OK    Normal      False True
wdica WDICA Not Available     Kernel Driver     False Manual
      Stopped     OK    Ignore      False False

[Environment Variables]

Variable    Value User Name
ComSpec     %SystemRoot%\system32\cmd.exe <SYSTEM>
HOME  C:/   <SYSTEM>
NUMBER_OF_PROCESSORS    1     <SYSTEM>
OS    Windows_NT  <SYSTEM>
Os2LibPath  %SystemRoot%\system32\os2\dll;      <SYSTEM>
Path
      C:\mksnt;C:\WINNT\system32;C:\WINNT;C:\WINNT\System32\Wbem;C:\SQL
_2K_STD\x86\binn;.;     <SYSTEM>
```

```
PATHEXT     .COM;.EXE;.BAT;.CMD;.VBS;.VBE;.JS;.JSE;.WSF;.WSH
      <SYSTEM>
PROCESSOR_ARCHITECTURE  x86   <SYSTEM>
PROCESSOR_IDENTIFIER    x86 Family 6 Model 11 Stepping 1, GenuineIntel
      <SYSTEM>
PROCESSOR_LEVEL   6     <SYSTEM>
PROCESSOR_REVISION      0b01  <SYSTEM>
ROOTDIR     C:/   <SYSTEM>
SHELL C:/mksnt/sh.exe   <SYSTEM>
TEMP  %SystemRoot%\TEMP <SYSTEM>
TMP   %SystemRoot%\TEMP <SYSTEM>
TMPDIR      C:/WINNT/TEMP     <SYSTEM>
windir      %SystemRoot%      <SYSTEM>
TEMP  %USERPROFILE%\Local Settings\Temp   CLIENT1\Administrator
TMP   %USERPROFILE%\Local Settings\Temp   CLIENT1\Administrator

[Jobs]

[ Following are sub-categories of this main category ]

[Print]

Document    Size  Owner Notify      Status      Time Submitted    Start
Time  Until Time  Elapsed Time      Pages Printed     Job ID
      Priority    Parameters  Driver Name Print Processor   Host Print
Queue Data Type   Name
Unknown     Unknown     Unknown     Unknown     Unknown     Unknown
      Unknown     Unknown     Unknown     Unknown     Unknown
      Unknown     Unknown     Unknown     Unknown     Unknown
      Unknown     Unknown

[Network Connections]

Local Name  Remote Name Type  Status      User Name
E:    \\client1\c$      Disk  OK    CLIENT1\administrator

[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     Unknown     Unknown
      Unknown
system      Not Available     8     8     0     1413120     Not
Available   Unknown     Unknown     Unknown
smss.exe    c:\winnt\system32\smss.exe    160   11    204800
      1413120     10/25/2002 9:01:48 AM   5.00.2195.31      44.27 KB
(45,328 bytes)    7/26/2000 7:00:00 AM
csrss.exe   Not Available     184   13    Not Available     Not
Available   10/25/2002 9:01:51 AM   Unknown     Unknown     Unknown
winlogon.exe      c:\winnt\system32\winlogon.exe      204   13
      204800      1413120     10/25/2002 9:01:52 AM   5.00.2195.1600
      172.77 KB (176,912 bytes)     7/26/2000 7:00:00 AM
```

```
services.exe      c:\winnt\system32\services.exe      232   9
      204800      1413120     10/25/2002 9:01:53 AM   5.00.2134.1 86.77
KB (88,848 bytes) 7/26/2000 7:00:00 AM
lsass.exe   c:\winnt\system32\lsass.exe   244   13    204800
      1413120     10/25/2002 9:01:53 AM   5.00.2195.1620    32.77 KB
(33,552 bytes)    7/26/2000 7:00:00 AM
svchost.exe c:\winnt\system32\svchost.exe 400   8     204800
      1413120     10/25/2002 9:01:56 AM   5.00.2134.1 7.77 KB (7,952
bytes)      7/26/2000 7:00:00 AM
msdtc.exe   c:\winnt\system32\msdtc.exe   428   8     204800
      1413120     10/25/2002 9:01:56 AM   1999.9.3421.3     6.77 KB
(6,928 bytes)     3/29/2002 6:39:39 AM
svchost.exe c:\winnt\system32\svchost.exe 532   8     204800
      1413120     10/25/2002 9:01:57 AM   5.00.2134.1 7.77 KB (7,952
bytes)      7/26/2000 7:00:00 AM
regsvc.exe  c:\winnt\system32\regsvc.exe  556   8     204800
      1413120     10/25/2002 9:01:58 AM   5.00.2195.31      65.27 KB
(66,832 bytes)    7/26/2000 7:00:00 AM
mstask.exe  c:\winnt\system32\mstask.exe  572   8     204800
      1413120     10/25/2002 9:01:58 AM   4.71.2137.1 115.27 KB
(118,032 bytes)   3/29/2002 12:38:49 PM
winmgmt.exe c:\winnt\system32\wbem\winmgmt.exe  608   8     204800
      1413120     10/25/2002 9:01:59 AM   1.50.1085.0009    192.08 KB
(196,685 bytes)   7/26/2000 7:00:00 AM
inetinfo.exe      c:\winnt\system32\inetsrv\inetinfo.exe    660   8
      204800      1413120     10/25/2002 9:01:59 AM   5.00.0984   14.27
KB (14,608 bytes) 3/29/2002 6:39:28 AM
explorer.exe      c:\winnt\explorer.exe   844   8     204800
      1413120     10/25/2002 9:02:10 AM   5.00.3103.1000    237.27 KB
(242,960 bytes)   7/26/2000 7:00:00 AM
svchost.exe c:\winnt\system32\svchost.exe 1012  8     204800
      1413120     10/25/2002 9:02:40 AM   5.00.2134.1 7.77 KB (7,952
bytes)      7/26/2000 7:00:00 AM
dllhost.exe Not Available     668   8     Not Available     Not
Available   10/25/2002 9:06:22 AM   Unknown     Unknown     Unknown
dllhost.exe Not Available     936   8     Not Available     Not
Available   10/25/2002 9:06:24 AM   Unknown     Unknown     Unknown
sh.exe      c:\mksnt\sh.exe   956   8     204800      1413120
      10/25/2002 9:06:47 AM   5.2 build 64      271.50 KB (278,016
bytes)      3/29/2002 1:25:12 PM
mmc.exe     c:\winnt\system32\mmc.exe     928   8     204800
      1413120     10/28/2002 3:04:09 PM   5.00.2153.1 589.27 KB
(603,408 bytes)   7/26/2000 7:00:00 AM
rsvp.exe    c:\winnt\system32\rsvp.exe    2060  8     204800
      1413120     10/28/2002 3:04:51 PM   5.00.2167.1 172.77 KB
(176,912 bytes)   7/26/2000 7:00:00 AM

[Loaded Modules]

Name  Version     Size  File Date   Manufacturer      Path
traffic.dll 5.00.2139.1 30.77 KB (31,504 bytes) 7/26/2000 7:00:00 AM
      Microsoft Corporation   c:\winnt\system32\traffic.dll
rsvp.exe    5.00.2167.1 172.77 KB (176,912 bytes)     7/26/2000 7:00:00
AM    Microsoft Corporation   c:\winnt\system32\rsvp.exe
```

```
wbemprox.dll      1.50.1085.0015    40.08 KB (41,040 bytes) 7/26/2000
7:00:00 AM  Microsoft Corporation   c:\winnt\system32\wbem\wbemprox.dll
mlang.dll   5.00.3103.1000    510.77 KB (523,024 bytes)     7/26/2000
7:00:00 AM  Microsoft Corporation   c:\winnt\system32\mlang.dll
rassapi.dll 5.00.2188.1 14.27 KB (14,608 bytes) 7/26/2000 7:00:00 AM
      Microsoft Corporation   c:\winnt\system32\rassapi.dll
adsnt.dll   5.00.2195.1600    194.27 KB (198,928 bytes)     7/26/2000
7:00:00 AM  Microsoft Corporation   c:\winnt\system32\adsnt.dll
dbghelp.dll 5.00.2195.1 159.27 KB (163,088 bytes)     7/26/2000 7:00:00
AM    Microsoft Corporation   c:\winnt\system32\dbghelp.dll
localsec.dll      5.00.2195.1340    227.27 KB (232,720 bytes)
      7/26/2000 7:00:00 AM    Microsoft Corporation
      c:\winnt\system32\localsec.dll
devmgr.dll  5.00.2166.1 215.77 KB (220,944 bytes)     7/26/2000 7:00:00
AM    Microsoft Corporation   c:\winnt\system32\devmgr.dll
filemgmt.dll      5.00.2134.1 287.27 KB (294,160 bytes)     7/26/2000
7:00:00 AM  Microsoft Corporation   c:\winnt\system32\filemgmt.dll
pdh.dll     5.00.2195.1600    143.27 KB (146,704 bytes)     7/26/2000
7:00:00 AM  Microsoft Corporation   c:\winnt\system32\pdh.dll
smlogcfg.dll      5.00.2163.1 273.27 KB (279,824 bytes)     7/26/2000
7:00:00 AM  Microsoft Corporation   c:\winnt\system32\smlogcfg.dll
cabinet.dll 5.00.2147.1 54.77 KB (56,080 bytes) 7/26/2000 7:00:00 AM
      Microsoft Corporation   c:\winnt\system32\cabinet.dll
msinfo32.dll      5.00.2177.1 312.27 KB (319,760 bytes)     3/29/2002
12:38:52 PM Microsoft Corporation   c:\program files\common
files\microsoft shared\msinfo\msinfo32.dll
riched20.dll      5.30.23.1203      421.27 KB (431,376 bytes)
      7/26/2000 7:00:00 AM    Microsoft Corporation
      c:\winnt\system32\riched20.dll
riched32.dll      5.00.2134.1 3.77 KB (3,856 bytes)   7/26/2000 7:00:00
AM    Microsoft Corporation   c:\winnt\system32\riched32.dll
els.dll     5.00.2175.1 151.27 KB (154,896 bytes)     7/26/2000 7:00:00
AM    Microsoft Corporation   c:\winnt\system32\els.dll
ntmsmgr.dll 1,0,0,1     427.77 KB (438,032 bytes)     7/26/2000 7:00:00
AM    Microsoft Corporation and HighGround Systems, Inc.
      c:\winnt\system32\ntmsmgr.dll
mmfutil.dll 1.50.1085.0000    32.06 KB (32,829 bytes) 7/26/2000 7:00:00
AM    Microsoft Corporation   c:\winnt\system32\mmfutil.dll
logdrive.dll      1.50.1085.0000    200.06 KB (204,863 bytes)
      7/26/2000 7:00:00 AM    Microsoft Corporation
      c:\winnt\system32\logdrive.dll
dfrgres.dll 5.00.2150.1 27.50 KB (28,160 bytes) 7/26/2000 7:00:00 AM
      Executive Software International, Inc.
      c:\winnt\system32\dfrgres.dll
dfrgsnap.dll      5.00.2195.31      41.77 KB (42,768 bytes) 7/26/2000
7:00:00 AM  Executive Software International, Inc.
      c:\winnt\system32\dfrgsnap.dll
dmdskres.dll      2191.1.296.2      119.00 KB (121,856 bytes)
      7/26/2000 7:00:00 AM    Microsoft Corp., VERITAS Software
      c:\winnt\system32\dmdskres.dll
dmutil.dll  2195.23.297.2     42.27 KB (43,280 bytes) 7/26/2000 7:00:00
AM    VERITAS Software Corp.  c:\winnt\system32\dmutil.dll
ntmsapi.dll 5.00.1948.1 50.27 KB (51,472 bytes) 7/26/2000 7:00:00 AM
      Microsoft Corporation   c:\winnt\system32\ntmsapi.dll
```

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dmdskmgr.dll      2195.1600.297.3   160.27 KB (164,112 bytes)
      7/26/2000 7:00:00 AM    Microsoft Corp., VERITAS Software
      c:\winnt\system32\dmdskmgr.dll
mycomput.dll      5.00.2134.1 107.77 KB (110,352 bytes)     7/26/2000
7:00:00 AM  Microsoft Corporation   c:\winnt\system32\mycomput.dll
mmcndmgr.dll      5.00.2178.1 815.27 KB (834,832 bytes)     7/26/2000
7:00:00 AM  Microsoft Corporation   c:\winnt\system32\mmcndmgr.dll
mfc42u.dll  6.00.8665.0 972.05 KB (995,384 bytes)     7/26/2000 7:00:00
AM    Microsoft Corporation   c:\winnt\system32\mfc42u.dll
mmc.exe     5.00.2153.1 589.27 KB (603,408 bytes)     7/26/2000 7:00:00
AM    Microsoft Corporation   c:\winnt\system32\mmc.exe
sh.exe      5.2 build 64      271.50 KB (278,016 bytes)     3/29/2002
1:25:12 PM  Mortice Kern Systems Inc.     c:\mksnt\sh.exe
tapisrv.dll 5.00.2186.1 168.77 KB (172,816 bytes)     7/26/2000 7:00:00
AM    Microsoft Corporation   c:\winnt\system32\tapisrv.dll
mydocs.dll  5.00.2920.0000    55.77 KB (57,104 bytes) 7/26/2000 7:00:00
AM    Microsoft Corporation   c:\winnt\system32\mydocs.dll
wininet.dll 5.00.3103.1000    456.77 KB (467,728 bytes)     7/26/2000
7:00:00 AM  Microsoft Corporation   c:\winnt\system32\wininet.dll
shdoclc.dll 5.00.3103.1000    324.50 KB (332,288 bytes)     7/26/2000
7:00:00 AM  Microsoft Corporation   c:\winnt\system32\shdoclc.dll
actxprxy.dll      5.00.3103.800     70.27 KB (71,952 bytes) 7/26/2000
7:00:00 AM  Microsoft Corporation   c:\winnt\system32\actxprxy.dll
msi.dll     1.11.1314.0 1.72 MB (1,798,928 bytes)     7/26/2000 7:00:00
AM    Microsoft Corporation   c:\winnt\system32\msi.dll
urlmon.dll  5.00.3103.1000    440.77 KB (451,344 bytes)     7/26/2000
7:00:00 AM  Microsoft Corporation   c:\winnt\system32\urlmon.dll
faxshell.dll      5.00.2134.1 8.27 KB (8,464 bytes)   7/26/2000 7:00:00
AM    Microsoft Corporation   c:\winnt\system32\faxshell.dll
msacm32.dll 5.00.2134.1 65.27 KB (66,832 bytes) 7/26/2000 7:00:00 AM
      Microsoft Corporation   c:\winnt\system32\msacm32.dll
avifil32.dll      5.00.2134.1 76.27 KB (78,096 bytes) 7/26/2000 7:00:00
AM    Microsoft Corporation   c:\winnt\system32\avifil32.dll
msvfw32.dll 5.00.2134.1 113.77 KB (116,496 bytes)     7/26/2000 7:00:00
AM    Microsoft Corporation   c:\winnt\system32\msvfw32.dll
docprop2.dll      5.00.2178.1 297.77 KB (304,912 bytes)     7/26/2000
7:00:00 AM  Microsoft Corporation   c:\winnt\system32\docprop2.dll
ntshrui.dll 5.00.2134.1 46.77 KB (47,888 bytes) 7/26/2000 7:00:00 AM
      Microsoft Corporation   c:\winnt\system32\ntshrui.dll
linkinfo.dll      5.00.2134.1 15.77 KB (16,144 bytes) 7/26/2000 7:00:00
AM    Microsoft Corporation   c:\winnt\system32\linkinfo.dll
browselc.dll      5.00.3103.1000    34.50 KB (35,328 bytes) 7/26/2000
7:00:00 AM  Microsoft Corporation   c:\winnt\system32\browselc.dll
powrprof.dll      5.00.3103.1000    13.27 KB (13,584 bytes) 7/26/2000
7:00:00 AM  Microsoft Corporation   c:\winnt\system32\powrprof.dll
batmeter.dll      5.00.2920.0000    20.27 KB (20,752 bytes) 7/26/2000
7:00:00 AM  Microsoft Corporation   c:\winnt\system32\batmeter.dll
stobject.dll      5.00.2195.1387    79.27 KB (81,168 bytes) 7/26/2000
7:00:00 AM  Microsoft Corporation   c:\winnt\system32\stobject.dll
webcheck.dll      5.00.3103.1000    251.77 KB (257,808 bytes)
      7/26/2000 7:00:00 AM    Microsoft Corporation
      c:\winnt\system32\webcheck.dll
browseui.dll      5.00.3103.1000    788.77 KB (807,696 bytes)
      7/26/2000 7:00:00 AM    Microsoft Corporation
      c:\winnt\system32\browseui.dll
```

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shdocvw.dll 5.00.3103.1000    1.05 MB (1,104,144 bytes)     7/26/2000
7:00:00 AM  Microsoft Corporation   c:\winnt\system32\shdocvw.dll
explorer.exe      5.00.3103.1000    237.27 KB (242,960 bytes)
      7/26/2000 7:00:00 AM    Microsoft Corporation
      c:\winnt\explorer.exe
tpcc_com_all.dll  1, 0, 0, 1  80.00 KB (81,920 bytes) 3/29/2002 1:34:10
PM          c:\inetpub\wwwroot\tpcc_c~2.dll
dbnetlib.dll      2000.080.0194.00  84.06 KB (86,082 bytes) 3/29/2002
1:07:13 PM  Microsoft Corporation   c:\winnt\system32\dbnetlib.dll
ntwdblib.dll      2000.080.0194.00  268.06 KB (274,489 bytes)
      3/29/2002 1:07:29 PM    Microsoft Corporation
      c:\winnt\system32\ntwdblib.dll
tpcc_dblib.dll    Not Available     28.00 KB (28,672 bytes) 3/29/2002
1:34:08 PM  Not Available     c:\inetpub\wwwroot\tpcc_dblib.dll
tpcc_com.dll      Not Available     24.00 KB (24,576 bytes) 3/29/2002
1:34:09 PM  Not Available     c:\inetpub\wwwroot\tpcc_com.dll
tpcc.dll    0, 4, 0, 0  92.00 KB (94,208 bytes) 3/29/2002 1:34:08 PM
      Microsoft   c:\inetpub\wwwroot\tpcc.dll
iwrps.dll   5.00.2182.1 8.77 KB (8,976 bytes)   3/29/2002 6:39:35 AM
      Microsoft Corporation   c:\winnt\system32\inetsrv\iwrps.dll
wamps.dll   5.00.2159.1 7.27 KB (7,440 bytes)   3/29/2002 6:39:35 AM
      Microsoft Corporation   c:\winnt\system32\inetsrv\wamps.dll
wshom.ocx   5.1.0.4615  72.05 KB (73,776 bytes) 7/26/2000 7:00:00 AM
      Microsoft Corporation   c:\winnt\system32\wshom.ocx
wamregps.dll      5.00.2159.1 7.27 KB (7,440 bytes)   3/29/2002 6:39:34
AM    Microsoft Corporation   c:\winnt\system32\wamregps.dll
scrrun.dll  5.1.0.5010  144.05 KB (147,512 bytes)     7/26/2000 7:00:00
AM    Microsoft Corporation   c:\winnt\system32\scrrun.dll
iisext.dll  5.00.2195.1613    41.77 KB (42,768 bytes) 3/29/2002 6:39:29
AM    Microsoft Corporation   c:\winnt\system32\iisext.dll
adsiis.dll  5.00.2195.1613    238.77 KB (244,496 bytes)     3/29/2002
6:39:29 AM  Microsoft Corporation   c:\winnt\system32\adsiis.dll
vbscript.dll      5.1.0.5010  428.06 KB (438,330 bytes)     7/26/2000
7:00:00 AM  Microsoft Corporation   c:\winnt\system32\vbscript.dll
asptxn.dll  5.00.0954   29.77 KB (30,480 bytes) 3/29/2002 6:39:31 AM
      Microsoft Corporation   c:\winnt\system32\inetsrv\asptxn.dll
asp.dll     5.00.0984   322.27 KB (330,000 bytes)     3/29/2002 6:39:31
AM    Microsoft Corporation   c:\winnt\system32\inetsrv\asp.dll
mfc42.dll   6.00.8665.0 972.05 KB (995,383 bytes)     7/26/2000 7:00:00
AM    Microsoft Corporation   c:\winnt\system32\mfc42.dll
wam.dll     5.00.0984   70.77 KB (72,464 bytes) 3/29/2002 6:39:33 AM
      Microsoft Corporation   c:\winnt\system32\inetsrv\wam.dll
odbcint.dll 3.520.6526.0      88.00 KB (90,112 bytes) 3/29/2002 1:07:09
PM    Microsoft Corporation   c:\winnt\system32\odbcint.dll
odbc32.dll  3.520.6526.0      216.27 KB (221,456 bytes)     3/29/2002
1:07:08 PM  Microsoft Corporation   c:\winnt\system32\odbc32.dll
comsvcs.dll 2000.2.3449.0     1.22 MB (1,277,712 bytes)     3/29/2002
6:39:25 AM  Microsoft Corporation   c:\winnt\system32\comsvcs.dll
iislog.dll  5.00.0984   75.77 KB (77,584 bytes) 3/29/2002 6:39:28 AM
      Microsoft Corporation   c:\winnt\system32\inetsrv\iislog.dll
httpext.dll 0.9.3940.2  418.27 KB (428,304 bytes)     3/29/2002 6:39:28
AM    Microsoft Corporation   c:\winnt\system32\inetsrv\httpext.dll
fpexedll.dll      4.0.2.4022  20.06 KB (20,541 bytes) 3/29/2002 6:39:24
AM    Microsoft Corporation   c:\program files\common files\microsoft
shared\web server extensions\40\bin\fpexedll.dll
```

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md5filt.dll 5.00.0984   32.77 KB (33,552 bytes) 3/29/2002 6:39:32 AM
      Microsoft Corporation   c:\winnt\system32\inetsrv\md5filt.dll
gzip.dll    5.00.0984   30.27 KB (30,992 bytes) 3/29/2002 6:39:32 AM
      Microsoft Corporation   c:\winnt\system32\inetsrv\gzip.dll
compfilt.dll      5.00.0984   22.27 KB (22,800 bytes) 3/29/2002 6:39:31
AM    Microsoft Corporation   c:\winnt\system32\inetsrv\compfilt.dll
sspifilt.dll      5.00.0984   43.27 KB (44,304 bytes) 3/29/2002 6:39:32
AM    Microsoft Corporation   c:\winnt\system32\inetsrv\sspifilt.dll
iscomlog.dll      5.00.0984   24.77 KB (25,360 bytes) 3/29/2002 6:39:28
AM    Microsoft Corporation   c:\winnt\system32\inetsrv\iscomlog.dll
lonsint.dll 5.00.0984   11.77 KB (12,048 bytes) 3/29/2002 6:39:29 AM
      Microsoft Corporation   c:\winnt\system32\inetsrv\lonsint.dll
inetsloc.dll      5.00.0984   20.27 KB (20,752 bytes) 3/29/2002 6:39:29
AM    Microsoft Corporation   c:\winnt\system32\inetsloc.dll
iisfecnv.dll      5.00.0984   7.27 KB (7,440 bytes)   3/29/2002 6:39:34
AM    Microsoft Corporation   c:\winnt\system32\inetsrv\iisfecnv.dll
isatq.dll   5.00.0984   60.27 KB (61,712 bytes) 3/29/2002 6:39:30 AM
      Microsoft Corporation   c:\winnt\system32\inetsrv\isatq.dll
infocomm.dll      5.00.0984   229.77 KB (235,280 bytes)     3/29/2002
6:39:28 AM  Microsoft Corporation
      c:\winnt\system32\inetsrv\infocomm.dll
w3svc.dll   5.00.0984   342.77 KB (350,992 bytes)     3/29/2002 6:39:33
AM    Microsoft Corporation   c:\winnt\system32\inetsrv\w3svc.dll
security.dll      5.00.2154.1 5.77 KB (5,904 bytes)   7/26/2000 7:00:00
AM    Microsoft Corporation   c:\winnt\system32\security.dll
svcext.dll  5.00.0984   39.77 KB (40,720 bytes) 3/29/2002 6:39:29 AM
      Microsoft Corporation   c:\winnt\system32\inetsrv\svcext.dll
admexs.dll  5.00.0984   27.77 KB (28,432 bytes) 3/29/2002 6:39:28 AM
      Microsoft Corporation   c:\winnt\system32\inetsrv\admexs.dll
wamreg.dll  5.00.0984   45.77 KB (46,864 bytes) 3/29/2002 6:39:33 AM
      Microsoft Corporation   c:\winnt\system32\inetsrv\wamreg.dll
metadata.dll      5.00.0984   68.27 KB (69,904 bytes) 3/29/2002 6:39:29
AM    Microsoft Corporation   c:\winnt\system32\inetsrv\metadata.dll
iismap.dll  5.00.0984   55.77 KB (57,104 bytes) 3/29/2002 6:39:29 AM
      Microsoft Corporation   c:\winnt\system32\iismap.dll
nsepm.dll   5.00.0984   43.27 KB (44,304 bytes) 3/29/2002 6:39:29 AM
      Microsoft Corporation   c:\winnt\system32\inetsrv\nsepm.dll
admwprox.dll      5.00.0984   31.77 KB (32,528 bytes) 3/29/2002 6:39:34
AM    Microsoft Corporation   c:\winnt\system32\admwprox.dll
coadmin.dll 5.00.0984   39.27 KB (40,208 bytes) 3/29/2002 6:39:30 AM
      Microsoft Corporation   c:\winnt\system32\inetsrv\coadmin.dll
iisadmin.dll      5.00.0984   15.27 KB (15,632 bytes) 3/29/2002 6:39:28
AM    Microsoft Corporation   c:\winnt\system32\inetsrv\iisadmin.dll
rpcref.dll  5.00.0984   4.27 KB (4,368 bytes)   3/29/2002 6:39:29 AM
      Microsoft Corporation   c:\winnt\system32\inetsrv\rpcref.dll
iisrtl.dll  5.00.0984   120.27 KB (123,152 bytes)     3/29/2002 6:39:29
AM    Microsoft Corporation   c:\winnt\system32\iisrtl.dll
inetinfo.exe      5.00.0984   14.27 KB (14,608 bytes) 3/29/2002 6:39:28
AM    Microsoft Corporation   c:\winnt\system32\inetsrv\inetinfo.exe
wshnetbs.dll      5.00.2134.1 7.77 KB (7,952 bytes)   7/26/2000 7:00:00
AM    Microsoft Corporation   c:\winnt\system32\wshnetbs.dll
rapilib.dll 5.00.2167.1 25.27 KB (25,872 bytes) 7/26/2000 7:00:00 AM
      Microsoft Corporation   c:\winnt\system32\rapilib.dll
rsvpsp.dll  5.00.2167.1 74.77 KB (76,560 bytes) 7/26/2000 7:00:00 AM
      Microsoft Corporation   c:\winnt\system32\rsvpsp.dll
```

```
ntmarta.dll 5.00.2158.1 98.77 KB (101,136 bytes)      7/26/2000 7:00:00
AM    Microsoft Corporation   c:\winnt\system32\ntmarta.dll
provthrd.dll      1.50.1085.0000    68.07 KB (69,708 bytes) 3/29/2002
12:38:49 PM Microsoft Corporation   c:\winnt\system32\wbem\provthrd.dll
ntevt.dll   1.50.1085.0000    192.06 KB (196,669 bytes)     7/26/2000
7:00:00 AM  Microsoft Corporation   c:\winnt\system32\wbem\ntevt.dll
perfos.dll  5.00.2155.1 21.27 KB (21,776 bytes) 7/26/2000 7:00:00 AM
      Microsoft Corporation   c:\winnt\system32\perfos.dll
psapi.dll   5.00.2134.1 28.27 KB (28,944 bytes) 7/26/2000 7:00:00 AM
      Microsoft Corporation   c:\winnt\system32\psapi.dll
framedyn.dll      1.50.1085.0000    164.05 KB (167,992 bytes)
      7/26/2000 7:00:00 AM    Microsoft Corporation
      c:\winnt\system32\wbem\framedyn.dll
cimwin32.dll      1.50.1085.0016    1.02 MB (1,073,232 bytes)
      7/26/2000 7:00:00 AM    Microsoft Corporation
      c:\winnt\system32\wbem\cimwin32.dll
wbemsvc.dll 1.50.1085.0007    40.07 KB (41,036 bytes) 7/26/2000 7:00:00
AM    Microsoft Corporation   c:\winnt\system32\wbem\wbemsvc.dll
wbemess.dll 1.50.1085.0007    364.07 KB (372,804 bytes)     7/26/2000
7:00:00 AM  Microsoft Corporation   c:\winnt\system32\wbem\wbemess.dll
fastprox.dll      1.50.1085.0007    144.08 KB (147,536 bytes)
      7/26/2000 7:00:00 AM    Microsoft Corporation
      c:\winnt\system32\wbem\fastprox.dll
wbemcore.dll      1.50.1085.0008    628.07 KB (643,140 bytes)
      7/26/2000 7:00:00 AM    Microsoft Corporation
      c:\winnt\system32\wbem\wbemcore.dll
wbemcomn.dll      1.50.1085.0007    692.07 KB (708,675 bytes)
      7/26/2000 7:00:00 AM    Microsoft Corporation
      c:\winnt\system32\wbem\wbemcomn.dll
winmgmt.exe 1.50.1085.0009    192.08 KB (196,685 bytes)     7/26/2000
7:00:00 AM  Microsoft Corporation   c:\winnt\system32\wbem\winmgmt.exe
msidle.dll  5.00.2920.0000    6.27 KB (6,416 bytes)   7/26/2000 7:00:00
AM    Microsoft Corporation   c:\winnt\system32\msidle.dll
mstask.exe  4.71.2137.1 115.27 KB (118,032 bytes)     3/29/2002
12:38:49 PM Microsoft Corporation   c:\winnt\system32\mstask.exe
regsvc.exe  5.00.2195.31      65.27 KB (66,832 bytes) 7/26/2000 7:00:00
AM    Microsoft Corporation   c:\winnt\system32\regsvc.exe
rasdlg.dll  5.00.2194.1 514.27 KB (526,608 bytes)     7/26/2000 7:00:00
AM    Microsoft Corporation   c:\winnt\system32\rasdlg.dll
netcfgx.dll 5.00.2195.1618    533.77 KB (546,576 bytes)     7/26/2000
7:00:00 AM  Microsoft Corporation   c:\winnt\system32\netcfgx.dll
rasmans.dll 5.00.2195.27      146.77 KB (150,288 bytes)     7/26/2000
7:00:00 AM  Microsoft Corporation   c:\winnt\system32\rasmans.dll
wmi.dll     5.00.2191.1 6.27 KB (6,416 bytes)   7/26/2000 7:00:00 AM
      Microsoft Corporation   c:\winnt\system32\wmi.dll
netshell.dll      5.00.2195.1600    456.77 KB (467,728 bytes)
      7/26/2000 7:00:00 AM    Microsoft Corporation
      c:\winnt\system32\netshell.dll
netman.dll  5.00.2195.1600    89.27 KB (91,408 bytes) 7/26/2000 7:00:00
AM    Microsoft Corporation   c:\winnt\system32\netman.dll
sens.dll    5.00.2163.1 36.77 KB (37,648 bytes) 7/26/2000 7:00:00 AM
      Microsoft Corporation   c:\winnt\system32\sens.dll
es.dll      1999.9.3422.21    231.77 KB (237,328 bytes)     7/26/2000
7:00:00 AM  Microsoft Corporation   c:\winnt\system32\es.dll
```

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mtxoci.dll  1999.9.3421.3     109.27 KB (111,888 bytes)     3/29/2002
6:39:39 AM  Microsoft Corporation   c:\winnt\system32\mtxoci.dll
resutils.dll      5.00.2195.1613    39.77 KB (40,720 bytes) 7/26/2000
7:00:00 AM  Microsoft Corporation   c:\winnt\system32\resutils.dll
clusapi.dll 5.00.2195.1613    54.27 KB (55,568 bytes) 7/26/2000 7:00:00
AM    Microsoft Corporation   c:\winnt\system32\clusapi.dll
msvcp50.dll 5.00.7051   552.50 KB (565,760 bytes)     7/26/2000 7:00:00
AM    Microsoft Corporation   c:\winnt\system32\msvcp50.dll
xolehlp.dll 1999.9.3421.3     17.27 KB (17,680 bytes) 3/29/2002 6:39:39
AM    Microsoft Corporation   c:\winnt\system32\xolehlp.dll
msdtclog.dll      1999.9.3421.3     89.77 KB (91,920 bytes) 3/29/2002
6:39:39 AM  Microsoft Corporation   c:\winnt\system32\msdtclog.dll
mtxclu.dll  1999.9.3421.3     50.27 KB (51,472 bytes) 7/26/2000 7:00:00
AM    Microsoft Corporation   c:\winnt\system32\mtxclu.dll
msdtcprx.dll      2000.2.3449.0     625.77 KB (640,784 bytes)
      3/29/2002 6:39:27 AM    Microsoft Corporation
      c:\winnt\system32\msdtcprx.dll
txfaux.dll  1999.9.3422.24    341.27 KB (349,456 bytes)     3/29/2002
6:39:39 AM  Microsoft Corporation   c:\winnt\system32\txfaux.dll
msdtctm.dll 2000.2.3449.0     1.07 MB (1,120,528 bytes)     3/29/2002
6:39:26 AM  Microsoft Corporation   c:\winnt\system32\msdtctm.dll
msdtc.exe   1999.9.3421.3     6.77 KB (6,928 bytes)   3/29/2002 6:39:39
AM    Microsoft Corporation   c:\winnt\system32\msdtc.exe
rasadhlp.dll      5.00.2168.1 7.27 KB (7,440 bytes)   7/26/2000 7:00:00
AM    Microsoft Corporation   c:\winnt\system32\rasadhlp.dll
winrnr.dll  5.00.2160.1 18.77 KB (19,216 bytes) 7/26/2000 7:00:00 AM
      Microsoft Corporation   c:\winnt\system32\winrnr.dll
rnr20.dll   5.00.2195.1207    35.77 KB (36,624 bytes) 7/26/2000 7:00:00
AM    Microsoft Corporation   c:\winnt\system32\rnr20.dll
wshtcpip.dll      5.00.2134.1 17.27 KB (17,680 bytes) 7/26/2000 7:00:00
AM    Microsoft Corporation   c:\winnt\system32\wshtcpip.dll
dhcpcsvc.dll      5.00.2153.1 88.77 KB (90,896 bytes) 7/26/2000 7:00:00
AM    Microsoft Corporation   c:\winnt\system32\dhcpcsvc.dll
tapi32.dll  5.00.2182.1 123.27 KB (126,224 bytes)     7/26/2000 7:00:00
AM    Microsoft Corporation   c:\winnt\system32\tapi32.dll
rasman.dll  5.00.2188.1 54.77 KB (56,080 bytes) 7/26/2000 7:00:00 AM
      Microsoft Corporation   c:\winnt\system32\rasman.dll
rasapi32.dll      5.00.2188.1 189.77 KB (194,320 bytes)     7/26/2000
7:00:00 AM  Microsoft Corporation   c:\winnt\system32\rasapi32.dll
iphlpapi.dll      5.00.2173.2 67.77 KB (69,392 bytes) 7/26/2000 7:00:00
AM    Microsoft Corporation   c:\winnt\system32\iphlpapi.dll
msafd.dll   5.00.2195.1614    102.77 KB (105,232 bytes)     7/26/2000
7:00:00 AM  Microsoft Corporation   c:\winnt\system32\msafd.dll
rpcss.dll   5.00.2195.1600    229.27 KB (234,768 bytes)     7/26/2000
7:00:00 AM  Microsoft Corporation   c:\winnt\system32\rpcss.dll
svchost.exe 5.00.2134.1 7.77 KB (7,952 bytes)   7/26/2000 7:00:00 AM
      Microsoft Corporation   c:\winnt\system32\svchost.exe
iissuba.dll 5.00.0984   9.77 KB (10,000 bytes)  7/26/2000 7:00:00 AM
      Microsoft Corporation   c:\winnt\system32\iissuba.dll
scecli.dll  5.00.2191.1 105.27 KB (107,792 bytes)     7/26/2000 7:00:00
AM    Microsoft Corporation   c:\winnt\system32\scecli.dll
atl.dll     3.00.8449   57.56 KB (58,938 bytes) 7/26/2000 7:00:00 AM
      Microsoft Corporation   c:\winnt\system32\atl.dll
certcli.dll 5.00.2175.1 132.27 KB (135,440 bytes)     7/26/2000 7:00:00
AM    Microsoft Corporation   c:\winnt\system32\certcli.dll
```

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esent.dll   6.0.3940.4  1.08 MB (1,135,888 bytes)     7/26/2000 7:00:00
AM    Microsoft Corporation   c:\winnt\system32\esent.dll
mswsock.dll 5.00.2195.1207    62.77 KB (64,272 bytes) 7/26/2000 7:00:00
AM    Microsoft Corporation   c:\winnt\system32\mswsock.dll
ntdsatq.dll 5.00.2195.1284    31.27 KB (32,016 bytes) 7/26/2000 7:00:00
AM    Microsoft Corporation   c:\winnt\system32\ntdsatq.dll
ntdsa.dll   5.00.2195.1600    987.27 KB (1,010,960 bytes)   7/26/2000
7:00:00 AM  Microsoft Corporation   c:\winnt\system32\ntdsa.dll
kdcsvc.dll  5.00.2195.1284    133.77 KB (136,976 bytes)     7/26/2000
7:00:00 AM  Microsoft Corporation   c:\winnt\system32\kdcsvc.dll
sfmapi.dll  5.00.2134.1 38.77 KB (39,696 bytes) 7/26/2000 7:00:00 AM
      Microsoft Corporation   c:\winnt\system32\sfmapi.dll
rtutils.dll 5.00.2168.1 43.77 KB (44,816 bytes) 7/26/2000 7:00:00 AM
      Microsoft Corporation   c:\winnt\system32\rtutils.dll
adsldpc.dll 5.00.2195.1600    125.77 KB (128,784 bytes)     7/26/2000
7:00:00 AM  Microsoft Corporation   c:\winnt\system32\adsldpc.dll
activeds.dll      5.00.2172.1 172.77 KB (176,912 bytes)     7/26/2000
7:00:00 AM  Microsoft Corporation   c:\winnt\system32\activeds.dll
mprapi.dll  5.00.2181.1 79.27 KB (81,168 bytes) 7/26/2000 7:00:00 AM
      Microsoft Corporation   c:\winnt\system32\mprapi.dll
rassfm.dll  5.00.2195.1179    21.27 KB (21,776 bytes) 7/26/2000 7:00:00
AM    Microsoft Corporation   c:\winnt\system32\rassfm.dll
schannel.dll      5.00.2195.1163    137.27 KB (140,560 bytes)
      7/26/2000 7:00:00 AM    Microsoft Corporation
      c:\winnt\system32\schannel.dll
netlogon.dll      5.00.2195.1600    348.27 KB (356,624 bytes)
      7/26/2000 7:00:00 AM    Microsoft Corporation
      c:\winnt\system32\netlogon.dll
msv1_0.dll  5.00.2195.1620    92.77 KB (94,992 bytes) 7/26/2000 7:00:00
AM    Microsoft Corporation   c:\winnt\system32\msv1_0.dll
kerberos.dll      5.00.2195.1378    197.77 KB (202,512 bytes)
      7/26/2000 7:00:00 AM    Microsoft Corporation
      c:\winnt\system32\kerberos.dll
msprivs.dll 5.00.2154.1 41.50 KB (42,496 bytes) 7/26/2000 7:00:00 AM
      Microsoft Corporation   c:\winnt\system32\msprivs.dll
samsrv.dll  5.00.2195.1609    343.27 KB (351,504 bytes)     7/26/2000
7:00:00 AM  Microsoft Corporation   c:\winnt\system32\samsrv.dll
lsasrv.dll  5.00.2195.1620    475.27 KB (486,672 bytes)     7/26/2000
7:00:00 AM  Microsoft Corporation   c:\winnt\system32\lsasrv.dll
lsass.exe   5.00.2195.1620    32.77 KB (33,552 bytes) 7/26/2000 7:00:00
AM    Microsoft Corporation   c:\winnt\system32\lsass.exe
wmicore.dll 5.00.2178.1 70.77 KB (72,464 bytes) 7/26/2000 7:00:00 AM
      Microsoft Corporation   c:\winnt\system32\wmicore.dll
xactsrv.dll 5.00.2134.1 90.27 KB (92,432 bytes) 7/26/2000 7:00:00 AM
      Microsoft Corporation   c:\winnt\system32\xactsrv.dll
ntlsapi.dll 5.00.2134.1 6.77 KB (6,928 bytes)   7/26/2000 7:00:00 AM
      Microsoft Corporation   c:\winnt\system32\ntlsapi.dll
browser.dll 5.00.2142.1 48.27 KB (49,424 bytes) 7/26/2000 7:00:00 AM
      Microsoft Corporation   c:\winnt\system32\browser.dll
seclogon.dll      5.00.2135.1 15.77 KB (16,144 bytes) 7/26/2000 7:00:00
AM    Microsoft Corporation   c:\winnt\system32\seclogon.dll
psbase.dll  5.00.2195.1600    111.77 KB (114,448 bytes)     7/26/2000
7:00:00 AM  Microsoft Corporation   c:\winnt\system32\psbase.dll
cryptsvc.dll      5.00.2181.1 61.77 KB (63,248 bytes) 7/26/2000 7:00:00
AM    Microsoft Corporation   c:\winnt\system32\cryptsvc.dll
```

```
cryptdll.dll      5.00.2135.1 41.27 KB (42,256 bytes) 7/26/2000 7:00:00
AM    Microsoft Corporation   c:\winnt\system32\cryptdll.dll
wkssvc.dll  5.00.2195.1175    95.27 KB (97,552 bytes) 7/26/2000 7:00:00
AM    Microsoft Corporation   c:\winnt\system32\wkssvc.dll
srvsvc.dll  5.00.2178.1 79.27 KB (81,168 bytes) 7/26/2000 7:00:00 AM
      Microsoft Corporation   c:\winnt\system32\srvsvc.dll
cfgmgr32.dll      5.00.2134.1 16.77 KB (17,168 bytes) 7/26/2000 7:00:00
AM    Microsoft Corporation   c:\winnt\system32\cfgmgr32.dll
dmserver.dll      2195.23.297.2     11.77 KB (12,048 bytes) 7/26/2000
7:00:00 AM  VERITAS Software Corp.  c:\winnt\system32\dmserver.dll
winsta.dll  5.00.2195.32      36.27 KB (37,136 bytes) 7/26/2000 7:00:00
AM    Microsoft Corporation   c:\winnt\system32\winsta.dll
icmp.dll    5.00.2134.1 7.27 KB (7,440 bytes)   7/26/2000 7:00:00 AM
      Microsoft Corporation   c:\winnt\system32\icmp.dll
lmhsvc.dll  5.00.2134.1 9.27 KB (9,488 bytes)   7/26/2000 7:00:00 AM
      Microsoft Corporation   c:\winnt\system32\lmhsvc.dll
eventlog.dll      5.00.2178.1 43.77 KB (44,816 bytes) 7/26/2000 7:00:00
AM    Microsoft Corporation   c:\winnt\system32\eventlog.dll
ntdsapi.dll 5.00.2160.1 56.27 KB (57,616 bytes) 7/26/2000 7:00:00 AM
      Microsoft Corporation   c:\winnt\system32\ntdsapi.dll
scesrv.dll  5.00.2188.1 225.77 KB (231,184 bytes)     7/26/2000 7:00:00
AM    Microsoft Corporation   c:\winnt\system32\scesrv.dll
umpnpmgr.dll      5.00.2182.1 86.27 KB (88,336 bytes) 7/26/2000 7:00:00
AM    Microsoft Corporation   c:\winnt\system32\umpnpmgr.dll
services.exe      5.00.2134.1 86.77 KB (88,848 bytes) 7/26/2000 7:00:00
AM    Microsoft Corporation   c:\winnt\system32\services.exe
clbcatq.dll 2000.2.3449.0     496.27 KB (508,176 bytes)     3/29/2002
6:39:25 AM  Microsoft Corporation   c:\winnt\system32\clbcatq.dll
oleaut32.dll      2.40.4514   600.27 KB (614,672 bytes)     7/26/2000
7:00:00 AM  Microsoft Corporation   c:\winnt\system32\oleaut32.dll
netmsg.dll  5.00.2137.1 152.50 KB (156,160 bytes)     7/26/2000 7:00:00
AM    Microsoft Corporation   c:\winnt\system32\netmsg.dll
comdlg32.dll      5.00.3103.1000    236.77 KB (242,448 bytes)
      7/26/2000 7:00:00 AM    Microsoft Corporation
      c:\winnt\system32\comdlg32.dll
netui2.dll  5.00.2134.1 280.27 KB (286,992 bytes)     7/26/2000 7:00:00
AM    Microsoft Corporation   c:\winnt\system32\netui2.dll
mprui.dll   5.00.2134.1 54.77 KB (56,080 bytes) 7/26/2000 7:00:00 AM
      Microsoft Corporation   c:\winnt\system32\mprui.dll
netui1.dll  5.00.2134.1 210.27 KB (215,312 bytes)     7/26/2000 7:00:00
AM    Microsoft Corporation   c:\winnt\system32\netui1.dll
netui0.dll  5.00.2134.1 70.27 KB (71,952 bytes) 7/26/2000 7:00:00 AM
      Microsoft Corporation   c:\winnt\system32\netui0.dll
ntlanman.dll      5.00.2157.1 35.27 KB (36,112 bytes) 7/26/2000 7:00:00
AM    Microsoft Corporation   c:\winnt\system32\ntlanman.dll
mpr.dll     5.00.2195.1340    53.27 KB (54,544 bytes) 7/26/2000 7:00:00
AM    Microsoft Corporation   c:\winnt\system32\mpr.dll
cscui.dll   5.00.2195.1387    227.27 KB (232,720 bytes)     7/26/2000
7:00:00 AM  Microsoft Corporation   c:\winnt\system32\cscui.dll
winspool.drv      5.00.2195.1340    109.77 KB (112,400 bytes)
      7/26/2000 7:00:00 AM    Microsoft Corporation
      c:\winnt\system32\winspool.drv
winscard.dll      5.00.2134.1 77.27 KB (79,120 bytes) 7/26/2000 7:00:00
AM    Microsoft Corporation   c:\winnt\system32\winscard.dll
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wlnotify.dll      5.00.2195.1163    53.27 KB (54,544 bytes) 7/26/2000
7:00:00 AM  Microsoft Corporation   c:\winnt\system32\wlnotify.dll
cscdll.dll  5.00.2195.1600    98.27 KB (100,624 bytes)      7/26/2000
7:00:00 AM  Microsoft Corporation   c:\winnt\system32\cscdll.dll
lz32.dll    5.00.2134.1 9.77 KB (10,000 bytes)  7/26/2000 7:00:00 AM
      Microsoft Corporation   c:\winnt\system32\lz32.dll
version.dll 5.00.2134.1 15.77 KB (16,144 bytes) 7/26/2000 7:00:00 AM
      Microsoft Corporation   c:\winnt\system32\version.dll
rsabase.dll 5.00.2195.1391    129.27 KB (132,368 bytes)     7/26/2000
7:00:00 AM  Microsoft Corporation   c:\winnt\system32\rsabase.dll
mscat32.dll 5.131.2134.1      7.77 KB (7,952 bytes)   7/26/2000 7:00:00
AM    Microsoft Corporation   c:\winnt\system32\mscat32.dll
ole32.dll   5.00.2195.1607    965.27 KB (988,432 bytes)     7/26/2000
7:00:00 AM  Microsoft Corporation   c:\winnt\system32\ole32.dll
imagehlp.dll      5.00.2195.1 125.27 KB (128,272 bytes)     7/26/2000
7:00:00 AM  Microsoft Corporation   c:\winnt\system32\imagehlp.dll
msasn1.dll  5.00.2134.1 51.27 KB (52,496 bytes) 7/26/2000 7:00:00 AM
      Microsoft Corporation   c:\winnt\system32\msasn1.dll
crypt32.dll 5.131.2195.1340   464.77 KB (475,920 bytes)     7/26/2000
7:00:00 AM  Microsoft Corporation   c:\winnt\system32\crypt32.dll
wintrust.dll      5.131.2143.1      162.27 KB (166,160 bytes)
      7/26/2000 7:00:00 AM    Microsoft Corporation
      c:\winnt\system32\wintrust.dll
setupapi.dll      5.00.2195.1608    552.77 KB (566,032 bytes)
      7/26/2000 7:00:00 AM    Microsoft Corporation
      c:\winnt\system32\setupapi.dll
winmm.dll   5.00.2161.1 184.77 KB (189,200 bytes)     7/26/2000 7:00:00
AM    Microsoft Corporation   c:\winnt\system32\winmm.dll
comctl32.dll      5.81  537.77 KB (550,672 bytes)     7/26/2000 7:00:00
AM    Microsoft Corporation   c:\winnt\system32\comctl32.dll
shlwapi.dll 5.00.3103.1000    282.27 KB (289,040 bytes)     7/26/2000
7:00:00 AM  Microsoft Corporation   c:\winnt\system32\shlwapi.dll
shell32.dll 5.00.3103.1000    2.25 MB (2,358,032 bytes)     7/26/2000
7:00:00 AM  Microsoft Corporation   c:\winnt\system32\shell32.dll
msgina.dll  5.00.2195.1600    323.27 KB (331,024 bytes)     7/26/2000
7:00:00 AM  Microsoft Corporation   c:\winnt\system32\msgina.dll
wsock32.dll 5.00.2195.1207    21.27 KB (21,776 bytes) 7/26/2000 7:00:00
AM    Microsoft Corporation   c:\winnt\system32\wsock32.dll
dnsapi.dll  5.00.2195.1600    127.77 KB (130,832 bytes)     7/26/2000
7:00:00 AM  Microsoft Corporation   c:\winnt\system32\dnsapi.dll
wldap32.dll 5.00.2195.1175    155.27 KB (158,992 bytes)     7/26/2000
7:00:00 AM  Microsoft Corporation   c:\winnt\system32\wldap32.dll
ws2help.dll 5.00.2134.1 17.77 KB (18,192 bytes) 7/26/2000 7:00:00 AM
      Microsoft Corporation   c:\winnt\system32\ws2help.dll
ws2_32.dll  5.00.2195.1340    68.77 KB (70,416 bytes) 7/26/2000 7:00:00
AM    Microsoft Corporation   c:\winnt\system32\ws2_32.dll
samlib.dll  5.00.2160.1 46.27 KB (47,376 bytes) 7/26/2000 7:00:00 AM
      Microsoft Corporation   c:\winnt\system32\samlib.dll
netrap.dll  5.00.2134.1 11.27 KB (11,536 bytes) 7/26/2000 7:00:00 AM
      Microsoft Corporation   c:\winnt\system32\netrap.dll
netapi32.dll      5.00.2195.1600    303.27 KB (310,544 bytes)
      7/26/2000 7:00:00 AM    Microsoft Corporation
      c:\winnt\system32\netapi32.dll
profmap.dll 5.00.2181.1 29.27 KB (29,968 bytes) 7/26/2000 7:00:00 AM
      Microsoft Corporation   c:\winnt\system32\profmap.dll
```

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secur32.dll 5.00.2195.1600    47.27 KB (48,400 bytes) 7/26/2000 7:00:00
AM    Microsoft Corporation   c:\winnt\system32\secur32.dll
sfc.dll     5.00.2195.1618    90.05 KB (92,216 bytes) 7/26/2000 7:00:00
AM    Microsoft Corporation   c:\winnt\system32\sfc.dll
nddeapi.dll 5.00.2137.1 15.27 KB (15,632 bytes) 7/26/2000 7:00:00 AM
      Microsoft Corporation   c:\winnt\system32\nddeapi.dll
userenv.dll 5.00.2195.1600    359.27 KB (367,888 bytes)     7/26/2000
7:00:00 AM  Microsoft Corporation   c:\winnt\system32\userenv.dll
user32.dll  5.00.2195.1600    392.77 KB (402,192 bytes)     7/26/2000
7:00:00 AM  Microsoft Corporation   c:\winnt\system32\user32.dll
gdi32.dll   5.00.2195.1340    228.77 KB (234,256 bytes)     7/26/2000
7:00:00 AM  Microsoft Corporation   c:\winnt\system32\gdi32.dll
rpcrt4.dll  5.00.2195.1615    436.27 KB (446,736 bytes)     7/26/2000
7:00:00 AM  Microsoft Corporation   c:\winnt\system32\rpcrt4.dll
advapi32.dll      5.00.2195.1600    349.27 KB (357,648 bytes)
      7/26/2000 7:00:00 AM    Microsoft Corporation
      c:\winnt\system32\advapi32.dll
kernel32.dll      5.00.2195.1600    713.27 KB (730,384 bytes)
      7/26/2000 7:00:00 AM    Microsoft Corporation
      c:\winnt\system32\kernel32.dll
msvcrt.dll  6.10.8637.0 288.09 KB (295,000 bytes)     7/26/2000 7:00:00
AM    Microsoft Corporation   c:\winnt\system32\msvcrt.dll
winlogon.exe      5.00.2195.1600    172.77 KB (176,912 bytes)
      7/26/2000 7:00:00 AM    Microsoft Corporation
      c:\winnt\system32\winlogon.exe
sfcfiles.dll      5.00.2195.1 973.27 KB (996,624 bytes)     7/26/2000
7:00:00 AM  Microsoft Corporation   c:\winnt\system32\sfcfiles.dll
ntdll.dll   5.00.2195.1600    475.27 KB (486,672 bytes)     7/26/2000
7:00:00 AM  Microsoft Corporation   c:\winnt\system32\ntdll.dll
smss.exe    5.00.2195.31      44.27 KB (45,328 bytes) 7/26/2000 7:00:00
AM    Microsoft Corporation   c:\winnt\system32\smss.exe

[Services]

Display Name      Name  State Start Mode  Service Type      Path  Error
Control     Start Name  Tag ID
Alerter     Alerter     Stopped     Manual      Share Process
      c:\winnt\system32\services.exe      Normal      LocalSystem 0
Application Management  AppMgmt     Stopped     Manual      Share
Process     c:\winnt\system32\services.exe      Normal      LocalSystem
      0
Computer Browser  Browser     Running     Auto  Share Process
      c:\winnt\system32\services.exe      Normal      LocalSystem 0
Indexing Service  cisvc Stopped     Manual      Share Process
      c:\winnt\system32\cisvc.exe   Normal      LocalSystem 0
ClipBook    ClipSrv     Stopped     Manual      Own Process
      c:\winnt\system32\clipsrv.exe Normal      LocalSystem 0
Distributed File System Dfs   Stopped     Manual      Own Process
      c:\winnt\system32\dfssvc.exe  Normal      LocalSystem 0
DHCP Client Dhcp  Stopped     Manual      Share Process
      c:\winnt\system32\services.exe      Normal      LocalSystem 0
Logical Disk Manager Administrative Service     dmadmin     Stopped
      Manual      Share Process     c:\winnt\system32\dmadmin.exe /com
      Normal      LocalSystem 0
```

```
Logical Disk Manager    dmserver    Running     Auto  Share Process
      c:\winnt\system32\services.exe      Normal      LocalSystem 0
DNS Client  Dnscache    Stopped     Manual      Share Process
      c:\winnt\system32\services.exe      Normal      LocalSystem 0
Event Log   Eventlog    Running     Auto  Share Process
      c:\winnt\system32\services.exe      Normal      LocalSystem 0
COM+ Event System EventSystem Running     Manual      Share Process
      c:\winnt\system32\svchost.exe -k netsvcs  Normal      LocalSystem
      0
Fax Service Fax   Stopped     Manual      Own Process
      c:\winnt\system32\faxsvc.exe  Normal      LocalSystem 0
IIS Admin Service IISADMIN    Running     Auto  Share Process
      c:\winnt\system32\inetsrv\inetinfo.exe    Normal      LocalSystem
      0
Intersite Messaging     IsmServ     Stopped     Disabled    Own Process
      c:\winnt\system32\ismserv.exe Normal      LocalSystem 0
Kerberos Key Distribution Center    kdc   Stopped     Disabled    Share
Process     c:\winnt\system32\lsass.exe   Normal      LocalSystem 0
Server      lanmanserver      Running     Auto  Share Process
      c:\winnt\system32\services.exe      Normal      LocalSystem 0
Workstation lanmanworkstation Running     Auto  Share Process
      c:\winnt\system32\services.exe      Normal      LocalSystem 0
License Logging Service LicenseService    Stopped     Manual      Own
Process     c:\winnt\system32\llssrv.exe  Normal      LocalSystem 0
TCP/IP NetBIOS Helper Service LmHosts     Running     Auto  Share
Process     c:\winnt\system32\services.exe      Normal      LocalSystem
      0
Messenger   Messenger   Stopped     Manual      Share Process
      c:\winnt\system32\services.exe      Normal      LocalSystem 0
NetMeeting Remote Desktop Sharing   mnmsrvc     Stopped     Manual
      Own Process c:\winnt\system32\mnmsrvc.exe Normal      LocalSystem
      0
Distributed Transaction Coordinator MSDTC Running     Auto  Own Process
      c:\winnt\system32\msdtc.exe   Normal      LocalSystem 0
Windows Installer MSIServer   Stopped     Manual      Share Process
      c:\winnt\system32\msiexec.exe /v    Normal      LocalSystem 0
Network DDE NetDDE      Stopped     Manual      Share Process
      c:\winnt\system32\netdde.exe  Normal      LocalSystem 0
Network DDE DSDM  NetDDEdsdm  Stopped     Manual      Share Process
      c:\winnt\system32\netdde.exe  Normal      LocalSystem 0
Net Logon   Netlogon    Stopped     Manual      Share Process
      c:\winnt\system32\lsass.exe   Normal      LocalSystem 0
Network Connections     Netman      Running     Manual      Share
Process     c:\winnt\system32\svchost.exe -k netsvcs  Normal
      LocalSystem 0
File Replication  NtFrs Stopped     Manual      Own Process
      c:\winnt\system32\ntfrs.exe   Ignore      LocalSystem 0
NT LM Security Support Provider     NtLmSsp     Stopped     Manual
      Share Process     c:\winnt\system32\lsass.exe   Normal
      LocalSystem 0
Removable Storage NtmsSvc     Stopped     Manual      Share Process
      c:\winnt\system32\svchost.exe -k netsvcs  Normal      LocalSystem
      0
Plug and Play     PlugPlay    Running     Auto  Share Process
      c:\winnt\system32\services.exe      Normal      LocalSystem 0
```

```
IPSEC Policy Agent      PolicyAgent Stopped     Manual      Share
Process     c:\winnt\system32\lsass.exe   Normal      LocalSystem 0
Protected Storage ProtectedStorage  Running     Auto  Share Process
      c:\winnt\system32\services.exe      Normal      LocalSystem 0
Remote Access Auto Connection Manager     RasAuto     Stopped
      Manual      Share Process     c:\winnt\system32\svchost.exe -k
netsvcs     Normal      LocalSystem 0
Remote Access Connection Manager    RasMan      Stopped     Manual
      Share Process     c:\winnt\system32\svchost.exe -k netsvcs
      Normal      LocalSystem 0
Routing and Remote Access     RemoteAccess      Stopped     Disabled
      Share Process     c:\winnt\system32\svchost.exe -k netsvcs
      Normal      LocalSystem 0
Remote Registry Service RemoteRegistry    Running     Auto  Own Process
      c:\winnt\system32\regsvc.exe  Normal      LocalSystem 0
Remote Command Service  RMSYS Stopped     Manual      Own Process
      c:\benchcrf\rsys.exe    Normal      LocalSystem 0
Remote Procedure Call (RPC) Locator RpcLocator  Stopped     Manual
      Own Process c:\winnt\system32\locator.exe Normal      LocalSystem
      0
Remote Procedure Call (RPC)   RpcSs Running     Auto  Share Process
      c:\winnt\system32\svchost -k rpcss  Normal      LocalSystem 0
QoS RSVP    RSVP  Running     Manual      Own Process
      c:\winnt\system32\rsvp.exe -s Normal      LocalSystem 0
Security Accounts Manager     SamSs Running     Auto  Share Process
      c:\winnt\system32\lsass.exe   Normal      LocalSystem 0
Smart Card Helper SCardDrv    Stopped     Manual      Share Process
      c:\winnt\system32\scardsvr.exe      Ignore      LocalSystem 0
Smart Card  SCardSvr    Stopped     Manual      Share Process
      c:\winnt\system32\scardsvr.exe      Ignore      LocalSystem 0
Task Scheduler    Schedule    Running     Auto  Share Process
      c:\winnt\system32\mstask.exe  Normal      LocalSystem 0
RunAs Service     seclogon    Running     Auto  Share Process
      c:\winnt\system32\services.exe      Ignore      LocalSystem 0
System Event Notification     SENS  Running     Auto  Share Process
      c:\winnt\system32\svchost.exe -k netsvcs  Normal      LocalSystem
      0
Internet Connection Sharing   SharedAccess      Stopped     Manual
      Share Process     c:\winnt\system32\svchost.exe -k netsvcs
      Normal      LocalSystem 0
Print Spooler     Spooler     Stopped     Manual      Own Process
      c:\winnt\system32\spoolsv.exe Normal      LocalSystem 0
Performance Logs and Alerts   SysmonLog   Stopped     Manual      Own
Process     c:\winnt\system32\smlogsvc.exe      Normal      LocalSystem
      0
Telephony   TapiSrv     Running     Manual      Share Process
      c:\winnt\system32\svchost.exe -k tapisrv  Normal      LocalSystem
      0
Terminal Services TermService Stopped     Disabled    Own Process
      c:\winnt\system32\termsrv.exe Normal      LocalSystem 0
Telnet      TlntSvr     Stopped     Manual      Own Process
      c:\winnt\system32\tlntsvr.exe Normal      LocalSystem 0
Distributed Link Tracking Server    TrkSvr      Stopped     Manual
      Share Process     c:\winnt\system32\services.exe      Normal
      LocalSystem 0
```

```
Distributed Link Tracking Client    TrkWks      Stopped     Manual
      Share Process     c:\winnt\system32\services.exe      Normal
      LocalSystem 0
Uninterruptible Power Supply  UPS   Stopped     Manual      Own Process
      c:\winnt\system32\ups.exe     Normal      LocalSystem 0
Utility Manager   UtilMan     Stopped     Manual      Own Process
      c:\winnt\system32\utilman.exe Normal      LocalSystem 0
Windows Time      W32Time     Stopped     Manual      Share Process
      c:\winnt\system32\services.exe      Normal      LocalSystem 0
World Wide Web Publishing Service   W3SVC Running     Auto  Share
Process     c:\winnt\system32\inetsrv\inetinfo.exe    Normal
      LocalSystem 0
Windows Management Instrumentation  WinMgmt     Running     Auto  Own
Process     c:\winnt\system32\wbem\winmgmt.exe  Ignore      LocalSystem
      0
Windows Management Instrumentation Driver Extensions  Wmi   Running
      Manual      Share Process     c:\winnt\system32\services.exe
      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
Accessories\System Tools      Default User:Accessories\System Tools
      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\Games All Users:Accessories\Games   All Users
Accessories\System Tools      All Users:Accessories\System Tools  All
Users
Administrative Tools    All Users:Administrative Tools      All Users
Microsoft SQL Server    All Users:Microsoft SQL Server      All Users
MKS Toolkit All Users:MKS Toolkit   All Users
Startup     All Users:Startup All Users
Accessories CLIENT1\Administrator:Accessories   CLIENT1\Administrator
Accessories\Accessibility
      CLIENT1\Administrator:Accessories\Accessibility
      CLIENT1\Administrator
Accessories\Entertainment
      CLIENT1\Administrator:Accessories\Entertainment
      CLIENT1\Administrator
Accessories\System Tools      CLIENT1\Administrator:Accessories\System
Tools CLIENT1\Administrator
Administrative Tools    CLIENT1\Administrator:Administrative Tools
      CLIENT1\Administrator
```

```
Startup     CLIENT1\Administrator:Startup CLIENT1\Administrator

[Startup Programs]

Program     Command     User Name   Location
No startup program information

[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
Image Document    "C:\Program Files\Windows
NT\Accessories\ImageVue\KodakImg.exe"
WordPad Document  "%ProgramFiles%\Windows NT\Accessories\WORDPAD.EXE"
Windows Media Services DRM Storage object Not Available
Bitmap Image      mspaint.exe

[Internet Explorer 5]

[ Following are sub-categories of this main category ]

[Summary]

Item  Value
Version     5.00.3103.1000
Build 53103.1000
Product ID  51876-OEM-0001501-00000
Application Path  C:\Program Files\Internet Explorer
Language    English (United States)
Active Printer    Not Available

Cipher Strength   56-bit
Content Advisor   Disabled
IEAK Install      No

[File Versions]

File  Version     Size  Date  Path  Company
advapi32.dll      5.0.2195.1600     349 KB      7/26/2000 6:00:00 AM
      C:\WINNT\system32 Microsoft Corporation
advapi32.dll      5.0.2195.1600     349 KB      7/26/2000 6:00:00 AM
      .     Microsoft Corporation
advpack.dll 5.0.3103.1000     87 KB 7/26/2000 6:00:00 AM
      C:\WINNT\system32 Microsoft Corporation
advpack.dll 5.0.3103.1000     87 KB 7/26/2000 6:00:00 AM    .
      Microsoft Corporation
browselc.dll      5.0.3103.1000     35 KB 7/26/2000 6:00:00 AM
      C:\WINNT\system32 Microsoft Corporation
browselc.dll      5.0.3103.1000     35 KB 7/26/2000 6:00:00 AM    .
      Microsoft Corporation
```

```
browseui.dll      5.0.3103.1000     789 KB      7/26/2000 6:00:00 AM
      C:\WINNT\system32 Microsoft Corporation
browseui.dll      5.0.3103.1000     789 KB      7/26/2000 6:00:00 AM
      .     Microsoft Corporation
ckcnv.exe   5.0.2189.1  9 KB  7/26/2000 6:00:00 AM    C:\WINNT\system32
      Microsoft Corporation
ckcnv.exe   5.0.2189.1  9 KB  7/26/2000 6:00:00 AM    .     Microsoft
Corporation
comctl32.dll      5.81.3103.1000    538 KB      7/26/2000 6:00:00 AM
      C:\WINNT\system32 Microsoft Corporation
comctl32.dll      5.81.3103.1000    538 KB      7/26/2000 6:00:00 AM
      .     Microsoft Corporation
crypt32.dll 5.131.2195.1340   465 KB      7/26/2000 6:00:00 AM
      C:\WINNT\system32 Microsoft Corporation
crypt32.dll 5.131.2195.1340   465 KB      7/26/2000 6:00:00 AM    .
      Microsoft Corporation
enhsig.dll  <File Missing>    Not Available     Not Available     Not
Available   Not Available
iemigrat.dll      <File Missing>    Not Available     Not Available
      Not Available     Not Available
iesetup.dll 5.0.3103.1000     57 KB 7/26/2000 6:00:00 AM
      C:\WINNT\system32 Microsoft Corporation
iesetup.dll 5.0.3103.1000     57 KB 7/26/2000 6:00:00 AM    .
      Microsoft Corporation
iexplore.exe      5.0.2920.0  59 KB 7/26/2000 6:00:00 AM    C:\Program
Files\Internet Explorer Microsoft Corporation
imagehlp.dll      5.0.2195.1  125 KB      7/26/2000 6:00:00 AM
      C:\WINNT\system32 Microsoft Corporation
imagehlp.dll      5.0.2195.1  125 KB      7/26/2000 6:00:00 AM    .
      Microsoft Corporation
imghelp.dll <File Missing>    Not Available     Not Available     Not
Available   Not Available
inseng.dll  5.0.3103.1000     72 KB 7/26/2000 6:00:00 AM
      C:\WINNT\system32 Microsoft Corporation
inseng.dll  5.0.3103.1000     72 KB 7/26/2000 6:00:00 AM    .
      Microsoft Corporation
jobexec.dll 5.0.0.1     47 KB 7/26/2000 6:00:00 AM    C:\WINNT\system32
      Microsoft Corporation
jobexec.dll 5.0.0.1     47 KB 7/26/2000 6:00:00 AM    .     Microsoft
Corporation
jscript.dll 5.1.0.5010  476 KB      7/26/2000 6:00:00 AM
      C:\WINNT\system32 Microsoft Corporation
jscript.dll 5.1.0.5010  476 KB      7/26/2000 6:00:00 AM    .
      Microsoft Corporation
jsproxy.dll 5.0.2920.0  13 KB 7/26/2000 6:00:00 AM    C:\WINNT\system32
      Microsoft Corporation
jsproxy.dll 5.0.2920.0  13 KB 7/26/2000 6:00:00 AM    .     Microsoft
Corporation
msaahtml.dll      <File Missing>    Not Available     Not Available
      Not Available     Not Available
mshtml.dll  5.0.3103.1000     2292 KB     7/26/2000 6:00:00 AM
      C:\WINNT\system32 Microsoft Corporation
mshtml.dll  5.0.3103.1000     2292 KB     7/26/2000 6:00:00 AM    .
      Microsoft Corporation
```

```
msjava.dll  5.0.3310.0  922 KB      7/26/2000 6:00:00 AM
      C:\WINNT\system32 Microsoft Corporation
msjava.dll  5.0.3310.0  922 KB      7/26/2000 6:00:00 AM    .
      Microsoft Corporation
msoss.dll   <File Missing>    Not Available     Not Available     Not
Available   Not Available
msxml.dll   8.0.5226.0  506 KB      7/26/2000 6:00:00 AM
      C:\WINNT\system32 Microsoft Corporation
msxml.dll   8.0.5226.0  506 KB      7/26/2000 6:00:00 AM    .
      Microsoft Corporation
occache.dll 5.0.3103.1000     86 KB 7/26/2000 6:00:00 AM
      C:\WINNT\system32 Microsoft Corporation
occache.dll 5.0.3103.1000     86 KB 7/26/2000 6:00:00 AM    .
      Microsoft Corporation
ole32.dll   5.0.2195.1607     965 KB      7/26/2000 6:00:00 AM
      C:\WINNT\system32 Microsoft Corporation
ole32.dll   5.0.2195.1607     965 KB      7/26/2000 6:00:00 AM    .
      Microsoft Corporation
oleaut32.dll      2.40.4514.1 600 KB      7/26/2000 6:00:00 AM
      C:\WINNT\system32 Microsoft Corporation
oleaut32.dll      2.40.4514.1 600 KB      7/26/2000 6:00:00 AM    .
      Microsoft Corporation
olepro32.dll      5.0.4514.1  160 KB      7/26/2000 6:00:00 AM
      C:\WINNT\system32 Microsoft Corporation
olepro32.dll      5.0.4514.1  160 KB      7/26/2000 6:00:00 AM    .
      Microsoft Corporation
rsabase.dll 5.0.2195.1391     129 KB      7/26/2000 6:00:00 AM
      C:\WINNT\system32 Microsoft Corporation
rsabase.dll 5.0.2195.1391     129 KB      7/26/2000 6:00:00 AM    .
      Microsoft Corporation
rsaenh.dll  <File Missing>    Not Available     Not Available     Not
Available   Not Available
rsapi32.dll <File Missing>    Not Available     Not Available     Not
Available   Not Available
rsasig.dll  <File Missing>    Not Available     Not Available     Not
Available   Not Available
schannel.dll      5.0.2195.0  137 KB      7/26/2000 6:00:00 AM
      C:\WINNT\system32 Microsoft Corporation
schannel.dll      5.0.2195.0  137 KB      7/26/2000 6:00:00 AM    .
      Microsoft Corporation
shdoc401.dll      <File Missing>    Not Available     Not Available
      Not Available     Not Available
shdocvw.dll 5.0.3103.1000     1078 KB     7/26/2000 6:00:00 AM
      C:\WINNT\system32 Microsoft Corporation
shdocvw.dll 5.0.3103.1000     1078 KB     7/26/2000 6:00:00 AM    .
      Microsoft Corporation
shell32.dll 5.0.3103.1000     2303 KB     7/26/2000 6:00:00 AM
      C:\WINNT\system32 Microsoft Corporation
shell32.dll 5.0.3103.1000     2303 KB     7/26/2000 6:00:00 AM    .
      Microsoft Corporation
shlwapi.dll 5.0.3103.1000     282 KB      7/26/2000 6:00:00 AM
      C:\WINNT\system32 Microsoft Corporation
shlwapi.dll 5.0.3103.1000     282 KB      7/26/2000 6:00:00 AM    .
      Microsoft Corporation
```

```
url.dll     5.0.2920.0  82 KB 7/26/2000 6:00:00 AM    C:\WINNT\system32
      Microsoft Corporation
url.dll     5.0.2920.0  82 KB 7/26/2000 6:00:00 AM    .     Microsoft
Corporation
urlmon.dll  5.0.3103.1000     441 KB      7/26/2000 6:00:00 AM
      C:\WINNT\system32 Microsoft Corporation
urlmon.dll  5.0.3103.1000     441 KB      7/26/2000 6:00:00 AM    .
      Microsoft Corporation
vbscript.dll      5.1.0.5010  428 KB      7/26/2000 6:00:00 AM
      C:\WINNT\system32 Microsoft Corporation
vbscript.dll      5.1.0.5010  428 KB      7/26/2000 6:00:00 AM    .
      Microsoft Corporation
webcheck.dll      5.0.3103.1000     252 KB      7/26/2000 6:00:00 AM
      C:\WINNT\system32 Microsoft Corporation
webcheck.dll      5.0.3103.1000     252 KB      7/26/2000 6:00:00 AM
      .     Microsoft Corporation
win.com     5.0.2134.1  24 KB 7/26/2000 6:00:00 AM    C:\WINNT\system32
      Microsoft Corporation
win.com     5.0.2134.1  24 KB 7/26/2000 6:00:00 AM    .     Microsoft
Corporation
wininet.dll 5.0.3103.1000     457 KB      7/26/2000 6:00:00 AM
      C:\WINNT\system32 Microsoft Corporation
wininet.dll 5.0.3103.1000     457 KB      7/26/2000 6:00:00 AM    .
      Microsoft Corporation
winsock.dll 3.10.0.103  3 KB  7/26/2000 6:00:00 AM    C:\WINNT\system32
      Microsoft Corporation
winsock.dll 3.10.0.103  3 KB  7/26/2000 6:00:00 AM    .     Microsoft
Corporation
wintrust.dll      5.131.2143.1      162 KB      7/26/2000 6:00:00 AM
      C:\WINNT\system32 Microsoft Corporation
wintrust.dll      5.131.2143.1      162 KB      7/26/2000 6:00:00 AM
      .     Microsoft Corporation
wsock.vxd   <File Missing>    Not Available     Not Available     Not
Available   Not Available
wsock32.dll 5.0.2195.1207     21 KB 7/26/2000 6:00:00 AM
      C:\WINNT\system32 Microsoft Corporation
wsock32.dll 5.0.2195.1207     21 KB 7/26/2000 6:00:00 AM    .
      Microsoft Corporation
wsock32n.dll      <File Missing>    Not Available     Not Available
      Not Available     Not Available

[Connectivity]

Item  Value
Connection Preference   Never dial
EnableHttp1.1     1
ProxyHttp1.1      0

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  17359 MB
Available Disk Space    14767 MB
Maximum Cache Size      542 MB
Available Cache Size    542 MB

[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
Administrator     Administrator     3/29/2002 to 3/5/2102   sha1RSA

[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
Local intranet    Medium-low
Trusted sites     Low
Internet    Medium
Restricted sites  High
```

Appendix C – Tunable Parameters

RTE Input Parameters

BenchCraft Configuration File

Profile: 4100_20_6_01
File Path: C:\benchcrf_421\4100_20_6_01.pro
Version: 1.0.1

Number of Engines: 10

Name: DRIVER2A
Description: RTE2A
Directory: c:\tpcclog\rte2a.log
Machine: RTE2A
Parameter Set: PARAM2
Index: 0
Seed: 98176
Configured Users: 4100
Pipe Name: DRIVER43501360
Connect Rate: 2000
Start Rate: 500
CLIENT_NURAND: 208
CPU: 0

Name: DRIVER2B
Description: RTE2B
Directory: c:\tpcclog\rte2b.log
Machine: RTE2B
Parameter Set: PARAM2
Index: 100000000
Seed: 98176
Configured Users: 4100
Pipe Name: DRIVER40641161
Connect Rate: 2000
Start Rate: 500
CLIENT_NURAND: 208
CPU: 0

Name: DRIVER3A
Description: RTE3A
Directory: c:\tpcclog\rte3a.log
Machine: RTE3A
Parameter Set: PARAM2
Index: 200000000
Seed: 98176
Configured Users: 4100
Pipe Name: DRIVER371721555
Connect Rate: 2000
Start Rate: 500
CLIENT_NURAND: 208
CPU: 0

Name: DRIVER3B
Description: RTE3B
Directory: c:\tpcclog\rte3b.log
Machine: RTE3B
Parameter Set: PARAM2
Index: 300000000
Seed: 98176
Configured Users: 4100
Pipe Name: DRIVER341837462
Connect Rate: 2000
Start Rate: 500
CLIENT_NURAND: 208
CPU: 0

Name: DRIVER4A
Description: RTE4A
Directory: c:\tpcclog\rte4a.log
Machine: RTE4A
Parameter Set: PARAM2
Index: 400000000
Seed: 98176
Configured Users: 4100
Pipe Name: DRIVER311984373
Connect Rate: 2000
Start Rate: 500
CLIENT_NURAND: 208
CPU: 0

Name: DRIVER4B
Description: RTE4B
Directory: c:\tpcclog\rte4b.log
Machine: RTE4B
Parameter Set: PARAM2
Index: 500000000
Seed: 98176
Configured Users: 4100
Pipe Name: DRIVER282107740
Connect Rate: 2000
Start Rate: 500
CLIENT_NURAND: 208
CPU: 0

Name: DRIVER5A
Description: RTE5A
Directory: c:\tpcclog\rte5a.log
Machine: RTE5A
Parameter Set: PARAM2
Index: 600000000
Seed: 98176
Configured Users: 4100
Pipe Name: DRIVER252204459
Connect Rate: 2000
Start Rate: 500
CLIENT_NURAND: 208

CPU: 0

Name: DRIVER5B
Description: RTE5B
Directory: c:\tpcclog\rte5b.log
Machine: RTE5B
Parameter Set: PARAM2
Index: 700000000
Seed: 98176
Configured Users: 4100
Pipe Name: DRIVER222420160
Connect Rate: 2000
Start Rate: 500
CLIENT_NURAND: 208
CPU: 0

Name: DRIVER6A
Description: RTE6A
Directory: c:\tpcclog\rte6a.log
Machine: RTE6A
Parameter Set: PARAM2
Index: 800000000
Seed: 98176
Configured Users: 4100
Pipe Name: DRIVER9187699227
Connect Rate: 2000
Start Rate: 500
CLIENT_NURAND: 233
CPU: 0

Name: DRIVER6B
Description: RTE6B
Directory: c:\tpcclog\rte6b.log
Machine: RTE6B
Parameter Set: PARAM2
Index: 900000000
Seed: 98176
Configured Users: 4100
Pipe Name: DRIVER10187759864
Connect Rate: 2000
Start Rate: 500
CLIENT_NURAND: 233
CPU: 0

Number of User groups: 20

Driver Engine: DRIVER2A
IIS Server: CLIENT1_1
SQL Server: PE6500
User: sa
Protocol: Html
w_id Range: 1 - 205
w_id Max Warehouse: 4100
Scale: Normal
User Count: 2050

District id: 1
Scale Down: No

Driver Engine: DRIVER4A
IIS Server: CLIENT3_1
SQL Server: PE6500
User: sa
Protocol: Html
w_id Range: 206 - 410
w_id Max Warehouse: 4100
Scale: Normal
User Count: 2050
District id: 1
Scale Down: No

Driver Engine: DRIVER4B
IIS Server: CLIENT7_1
SQL Server: PE6500
User: sa
Protocol: Html
w_id Range: 411 - 615
w_id Max Warehouse: 4100
Scale: Normal
User Count: 2050
District id: 1
Scale Down: No

Driver Engine: DRIVER4B
IIS Server: CLIENT7_1
SQL Server: PE6500
User: sa
Protocol: Html
w_id Range: 616 - 820
w_id Max Warehouse: 4100
Scale: Normal
User Count: 2050
District id: 1
Scale Down: No

Driver Engine: DRIVER5A
IIS Server: CLIENT1_1
SQL Server: PE6500
User: sa
Protocol: Html
w_id Range: 821 - 1025
w_id Max Warehouse: 4100
Scale: Normal
User Count: 2050
District id: 1
Scale Down: No

Driver Engine: DRIVER5A
IIS Server: CLIENT1_1
SQL Server: PE6500
User: sa

Protocol: Html
w_id Range: 1026 - 1230
w_id Max Warehouse: 4100
Scale: Normal
User Count: 2050
District id: 1
Scale Down: No

Driver Engine: DRIVER5B
IIS Server: CLIENT5_1
SQL Server: PE6500
User: sa
Protocol: Html
w_id Range: 1231 - 1435
w_id Max Warehouse: 4100
Scale: Normal
User Count: 2050
District id: 1
Scale Down: No

Driver Engine: DRIVER5B
IIS Server: CLIENT5_1
SQL Server: PE6500
User: sa
Protocol: Html
w_id Range: 1436 - 1640
w_id Max Warehouse: 4100
Scale: Normal
User Count: 2050
District id: 1
Scale Down: No

Driver Engine: DRIVER6A
IIS Server: CLIENT2_1
SQL Server: PE6500
User: sa
Protocol: Html
w_id Range: 1641 - 1845
w_id Max Warehouse: 4100
Scale: Normal
User Count: 2050
District id: 1
Scale Down: No

Driver Engine: DRIVER6A
IIS Server: CLIENT2_1
SQL Server: PE6500
User: sa
Protocol: Html
w_id Range: 1846 - 2050
w_id Max Warehouse: 4100
Scale: Normal
User Count: 2050
District id: 1
Scale Down: No

Driver Engine: DRIVER6B
IIS Server: CLIENT6_1
SQL Server: PE6500
User: sa
Protocol: Html
w_id Range: 2051 - 2255
w_id Max Warehouse: 4100
Scale: Normal
User Count: 2050
District id: 1
Scale Down: No

Driver Engine: DRIVER2A
IIS Server: CLIENT1_1
SQL Server: PE6500
User: sa
Protocol: Html
w_id Range: 2256 - 2460
w_id Max Warehouse: 4100
Scale: Normal
User Count: 2050
District id: 1
Scale Down: No

Driver Engine: DRIVER6B
IIS Server: CLIENT6_1
SQL Server: PE6500
User: sa
Protocol: Html
w_id Range: 2461 - 2665
w_id Max Warehouse: 4100
Scale: Normal
User Count: 2050
District id: 1
Scale Down: No

Driver Engine: DRIVER2B
IIS Server: CLIENT5_1
SQL Server: PE6500
User: sa
Protocol: Html
w_id Range: 2666 - 2870
w_id Max Warehouse: 4100
Scale: Normal
User Count: 2050
District id: 1
Scale Down: No

Driver Engine: DRIVER2B
IIS Server: CLIENT5_1
SQL Server: PE6500
User: sa
Protocol: Html
w_id Range: 2871 - 3075

w_id Max Warehouse: 4100
Scale: Normal
User Count: 2050
District id: 1
Scale Down: No

Driver Engine: DRIVER3A
IIS Server: CLIENT2_1
SQL Server: PE6500
User: sa
Protocol: Html
w_id Range: 3076 - 3280
w_id Max Warehouse: 4100
Scale: Normal
User Count: 2050
District id: 1
Scale Down: No

Driver Engine: DRIVER3A
IIS Server: CLIENT2_1
SQL Server: PE6500
User: sa
Protocol: Html
w_id Range: 3281 - 3485
w_id Max Warehouse: 4100
Scale: Normal
User Count: 2050
District id: 1
Scale Down: No

Driver Engine: DRIVER3B
IIS Server: CLIENT6_1
SQL Server: PE6500
User: sa
Protocol: Html
w_id Range: 3486 - 3690
w_id Max Warehouse: 4100
Scale: Normal
User Count: 2050
District id: 1
Scale Down: No

Driver Engine: DRIVER3B
IIS Server: CLIENT6_1
SQL Server: PE6500
User: sa
Protocol: Html
w_id Range: 3691 - 3895
w_id Max Warehouse: 4100
Scale: Normal
User Count: 2050
District id: 1
Scale Down: No

Driver Engine: DRIVER4A

Appendix C – Tunable Parameters

IIS Server: CLIENT3_1
SQL Server: PE6500
User: sa
Protocol: Html
w_id Range: 3896 - 4100
w_id Max Warehouse: 4100
Scale: Normal
User Count: 2050
District id: 1
Scale Down: No

Number of Parameter Sets: 2

PARAM2
Slightly tweaked parameter set

	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	4.04		5.04	2.02	0.10	5.00	0.10
Stock Level	4.04		5.04	2.02	0.10	20.00	0.10
Order Status	4.04		10.04	2.02	0.10	5.00	0.10

~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

Appendix D – Disk Storage

TPC-C 60 Day Space Requirements						
Warehouses	**4500**				**TpmC**	**51,069.87**
Table	**Rows**	**Data KB**	**Index KB**	**Extra 5% KB**	**8hr Space**	**Total Space KB**
Warehouse	4500	488	48	27		563
District	45000	5008	48	253		5309
Customer	135000000	98181824	5854368	5,201,810		109238002
History	135000000	7500008	40		1,361,865	7500048
NewOrder	40500000	640320	1480			641800
Orders	135000000	4137936	1881672		751,374	6019608
OrderLine	1350004843	84375304	178592		15,321,016	84553896
Item	100000	9528	64	480		10072
Stock	450000000	144000008	268992	7,213,450		151482450
Total		338,850,424	8,185,304	12,416,019	17,434,255	359,451,747

	MB	
Dynamic Space	93,763	Sum of Data for Order, Orderline and History
Static Space	257,264	Sum of Data+Index+5%-Dynamic Space
Free Space	na	Total Allocated Spac - (Dynamic + Static Space)
Daily Growth	17,026	(Dynamic Space/(W*62.5))*tpmc
Daily Spread	-	(Free Space -1.5*Daily Growth) Zero Assumed

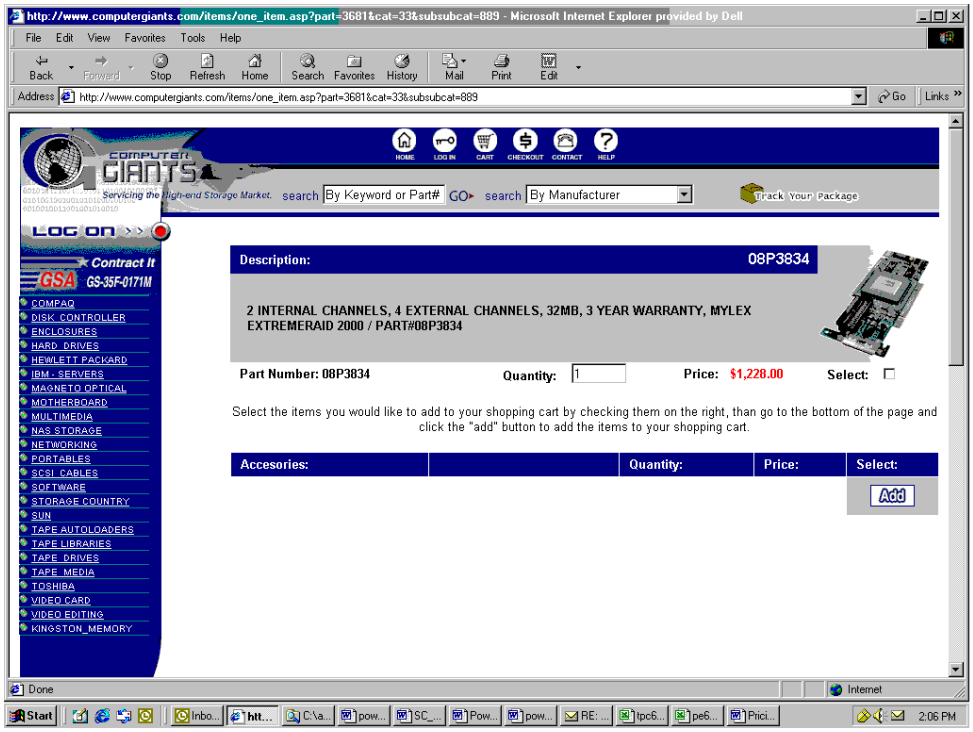
60 Day Space MB	1,278,803					
60 Day Space GB	**1,248.83**	**GB**				
Log Size	137,200	MB				
KB Per New Order	5.7218	KB				
8 hr log MB	136,974	MB				
8 hr log GB	**133.7635**	**GB**				

Space Usage	**GB Needed**	**Disks Measured**	**GB Priced**	**Disk Size**	**Formatted Size**	
60 Day Space DB	1,248.83	220	3686.68	18GB	16.758	
		0	0.00	9GB	8.195	
		0	0.00	4GB	3.999	
Total DB		**220.00**	**3686.68**	**9GB**		
8-hr log + mirror	267.5271	16	268.12	36GB	33.895	
OS, Swap	3	1	16.758	18GB		
Total Storage	**1,519.36**	**GB**	**3,971.56**	**GB**		

Log Space OK 2,452.20 1,519.36
Total Space OK

Appendix E - Price Quotations

Mylex ExtremeRAID 2000 Quotation



Microsoft Corporation
One Microsoft Way
Redmond, WA 98052-6399

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Microsoft

October 24, 2002

Dell Computer Corporation
Nicholas Wakou
RR5
One Dell Way
Round Rock, TX 78682

Mr. Wakou:

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 2000 Enterprise Edition 32-bit** *Per processor licensing* *Discount Schedule: Open Program Level C* *Unit Price reflects a 17% discount from the retail unit price of $19,999.*	$16,541	4	$66,164
C11-00821	**Windows 2000 Server 32-bit** *Server license only - No CALs* *Discount Schedule: Open Program - No Level* *Unit Price reflects a 8% discount from the retail unit price of $799.*	$738	6	$4,428
N/A	**.Net Enteprise Server 2003 32-bit** *Server license only - No CALs* *Discount Schedule: Open Program - No Level* *Unit Price reflects a 18% discount from the retail unit price of $3,299.*	$2,699	1	$2,699
048-00317	**Visual C++ Professional 6.0 Win32** *No discounts applied*	$549	1	$549
PRO-PRORS-16U-01	**Database Server Support Package** *1 Year Term*	$1,950	3	$5,850

Some products may not be currently orderable but will be available through Microsoft's normal distribution channels by December 31, 2002.

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: PCniwa0224104931
Please include this Reference ID in any correspondence regarding this price quote.