TPC Benchmark® C
Full Disclosure Report

HP NetServer LH 6000

using Microsoft SQLServer 7.0 Enterprise Edition
on Microsoft NT 4.0 Enterprise Edition

First Edition
March 6, 2000

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Abstract

Overview

This report documents the methodology and results of the TPC Benchmark® C test conducted on the HP NetServer LH 6000 in a client/server configuration, using Microsoft SQLServer 7.0 Enterprise Edition and Microsoft COM+ Transaction Monitor. The operating system used for the benchmark was Microsoft NT 4.0 Enterprise Edition.

TPC Benchmark® C Metrics

The standard TPC Benchmark ® C metrics, tpmC® (transactions per minute), price per tpmC ® (five year capital cost per measured tpmC®), and the availability date are reported as required by the benchmark specification.

Standard and Executive Summary Statements

The following pages contain the executive summary of the benchmark results for the HP NetServer LH 6000 system. The Standard System Summary is given below.

Company Name	System Name	Database Software	Operating System
Hewlett-Packard Company	HP NetServer LH 6000	Microsoft SQLServer 7.0 Enterprise Edition	Microsoft NT 4.0 Enterprise Edition
Total System Cost	**TPC-C Throughput**	**Price/Performance**	**Availability Date**
$418,141	26359.15 tpmC	$15.86 per tpmC	March 6, 2000

Auditor

The benchmark configuration, environment and methodology used to produce and validate the test results, and the pricing model used to calculate the cost per tpmC® , were audited by Tom Sawyer of Performance Metrics, Inc. to verify compliance with the relevant TPC specifications.

Additional copies of this Full Disclosure Report can be obtained from either the Transaction Processing Performance Council or Hewlett-Packard Company at the following addresses:

Transaction Processing Performance Council (TPC)
c/o Shanley Public Relations
777 North First Street, Suite 600
San Jose, CA 95112, USA
Phone: (408) 295-8894, (408) 295-9768 fax

or

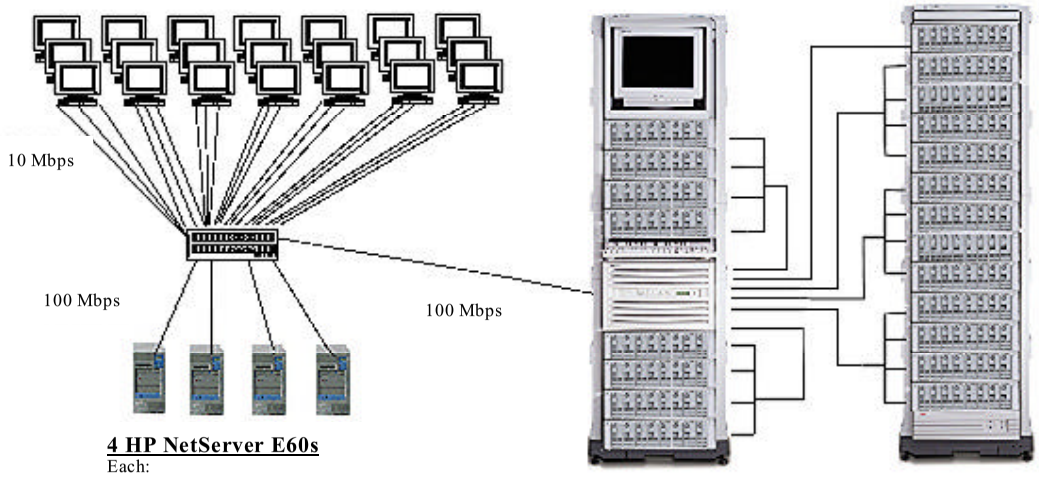
Hewlett-Packard Company
Network Server Division
10955 Tantau Avenue
Cupertino, CA 95014-0770 USA
Attn:Arindam Saha, MS 45NUH

	HP NetServer LH 6000 Client/Server			TPC-C Revision 3.5
Total System Cost	**TPC Throughput**	**Price/Performance**	**Report Date**	**Availability Date**
$418,141	26359.15 tpmC	$15.86 per tpmC	March 6, 2000	March 6, 2000
Processors	**Database Manager**	**Operating System**	**Other Software**	**Number of Users**
4 Intel Pentium III Xeon 550MHz 2 Mbyte L2	Microsoft SQLServer 7.0 Enterprise Edition	Microsoft NT 4.0 Enterprise Edition	Microsoft Visual C++ Microsoft COM+ Transaction Monitor	21000

Total of 21,000 PCs

HP NetServer LH6000
4 x Pentium III Xeon 550 MHz/2MB
4 GB RAM
6 x AMI 1500-H

Storage
HP NetServer Rack Storage



4 HP NetServer E60s
Each:
1 Pentium III Xeon 550 MHz
512MB RAM

System Components	Server		Each Client	
	Qty	Type	Qty	Type
Processors	4	550MHz Intel Pentium III Xeon	1	550MHz Pentium III
Cache Memory	each	2 Mbyte L2 cache	each	512kbyte L2 Cache
Memory	4	Gbyte	512	Mbyte
Disk Controllers	6	AMI 1500-H	1	HP SCSI-2 Controller
Disk Drives	240	HP Hot-swap 9Gbyte 10krpm SCSI	1	9 Gbyte disk
	12	HP Hot-swap 18 Gbyte 10krpm SCSI		
Total Storage	2237.16	Gbyte		
Tape Drives	1	HP SureStore DAT 24i		
Terminals	1	Console Terminal	1	Console Terminal

HEWLETT PACKARD

HP NetServer LH 6000

TPC-C Rev. 3.5

Report Date: March 6, 2000

Description	Part Number	Brand	Price Key	Unit Price	Qty	Extended Price	Maint. Price
LH 6000 with one Pentium III Xeon 550MHz 2MB L2 cache, pedestal. Includes: 256MB PC 133SDRAM, integrated dual channel HP NetRAID controller, integrated 10/100TX NIC, CD ROM, flexible disk drive, hot swap power supplies and fans, integrated HP Remote assistant	D9113AV	HP	2	10,946	1	10946	
Pentium III Xeon 550MHz 2MB Cache	D9335A	HP	2	5590	3	16770	
512 MB DIMM kit	D8267A	HP	1	2090	8	16720	
Rkmt HP Ultra VGA 1280 17" Display	D2818A	HP	1,2	254	1	254	168
HP NetServer mini-DIN keyboard and mouse	D4950B/C3751B	HP	1	79	1	79	
HP 9.1 GB 10K HotSwap Wide Ultra2 SCSI Disk	D6107A	HP	1	508	1	508	
HP Rack System/E41 (41 Units usable space)	J1500A	HP	1	1590	2	3180	
HP Power Distribution Unit 120-240V	E5929A	HP	1	234	4	936	
HP SureStore DAT24i Tape Drive	C1555C	HP	1	805	1	805	
HP NetServer LH 6000 Support: 5 Yrs, M-F 4 Hr Response	H3159E	HP	1	3395	1		3395
				Server Hardware Subtotal		50198	3563
HP NetServer Rack Storage/12 + spares	D5989B	HP	1	1890	23	43470	
HP 9GB, 10krpm Hot-swap disk module + spares	D6107A	HP	1	508	264	134112	
HP 18GB, 10krpm Hot-swap disk module + spares	D7174A			799	14	11186	
AMI MegaRAID 1500H Disk Array Controller + spares	1500-H	AMI	1	1290	8	10320	1592
HP SCSI Cable 2.5m UDHTS 68/HDTS 68	D6020A	HP	1	97	23	2231	
HP Rack Storage/12 Support - includes disk drives $28 per month for 2 yrs	SPN+02L	HP	2	960	23		22080
				Storage Subtotal		201319	23672
Microsoft SQL Server 7.0 Enterprise Ed. Unlimited Clients	810-00217	MS	1	24960	1	24960	10475
Microsoft Windows NT Server 4.0 Enterprise Edition	Z75092	MS	1	3330	1	3330	
				Server Software Subtotal		28290	10475
HP Netserver E60 Pentium III 550MHz	D9124A	HP	1	1790	4	7160	
128MB DRAMs for E60	D7156A	HP	1	229	16	3664	
HP NetServer 10/100TX PCI LAN Adapter	D5013A	HP	1	82	4	328	
HP Ultra VGA 1280 17" Display	D2818A	HP	1,2	213	4	852	672
HP Netserver E60 Support: 5 Yrs, M-F 4 Hr Response	H2819VV	HP	2	1060	4		4240
				Client Hardware Subtotal		12004	4912
Microsoft Windows 2000 Server	C11-0016	MS	1	809	4	3236	
Microsoft Visual C++	716856	MS	1	449	1	449	
				Client Software Subtotal		3685	0
HP Procurve Switch 2424M, Llifetime Warranty + 10% spares	J4093A	HP	1	1089	7	7623	
LANTech 8-port 10baseT hub (8+1 ports) 5 Yr Warranty + 10% spares		Lantech	1	25	2896	72400	
				Connectivity Subtotal		80023	0
					Total	**$375,519**	**$42,622**

Notes: Price key: 1=Software House intl., 2=Price from HP Corporate Price list

5-yr Cost of Ownership:	**$418,141**
tpmC:	**26359.15**
$/tpmC:	**15.86**

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

Numerical Quantities Summary for HP NetServer LH 6000

MQTH, Computed Maximum Qualified Throughput **26359.15 tpmC**

Response Times (in seconds)

	90th %-ile	Maximum	Average
New-Order	0.44s	5.09s	0.33s
Payment	0.30s	2.79s	0.22s
Order-Status	0.33s	5.08s	0.24s
Delivery (interactive portion)	0.12s	0.69s	0.11s
Delivery (deferred portion)	0.61s	1.72s	0.44s
Stock-Level	2.23s	4.11s	1.82s
Menu	0.61s	0.74s	0.11s

Response time delay added for emulated components 0.1 seconds

Transaction Mix, in percent of total transactions

New-Order	44.86%
Payment	43.01%
Order-Status	4.06%
Delivery	4.03%
Stock-Level	4.03%

Keying/Think Times

	Keying Time			Think Time		
	Min	Avg	Max	Min	Avg	Max
New-Order	18s	18.01s	18.02s	0s	12.04s	120.5s
Payment	3s	3.01s	3.04s	0s	12.01s	120.5s
Order-Status	2s	2.01s	2.02s	0s	10.11s	100.49s
Delivery (interactive)	2s	2.01s	2.02s	0s	5.05s	50.5s
Stock-Level	2s	2.01s	2.02s	0s	5.05s	50.5s

Test Duration

Ramp up time	70.25	minutes
Measurement interval	20	minutes
Transactions during measurement interval	1222395	
Ramp down time	39.75	minutes

Checkpointing

Number of checkpoints in measurement interval	1	
Checkpoint Interval	20	minutes

Reproducibility Run

Throughput	26323.85	tpmC
Relative to MQTH	-0.13%	

Preface

Document Structure

This is the full disclosure report for a benchmark test of the HP NetServer LH 6000 using Microsoft SQLServer 7.0 Enterprise Edition. It meets the requirements of the TPC Benchmark ® C Standard Specification, Revision 3.5 dated October 25, 1999. TPC Benchmark® C was developed by the **T**ransaction Processing **P**erformance **C**ouncil (TPC). It is the intent of this group to develop a suite of benchmarks to measure the performance of computer systems executing a wide range of applications. Hewlett-Packard Company and Microsoft, Inc. are active participants in the TPC.

TPC Benchmark® C Overview

TPC Benchmark ® C is an **O**n **L**ine **T**ransaction **P**rocessing (OLTP) workload. It is a mixture of read-only and update intensive transactions that mimic 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 of data access and update

The performance metric reported by TPC-C ® is a "business throughput" measurement of 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.

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 other environments are not recommended.

Hewlett-Packard Company does not warrant or represent that a user can or will achieve performance similar to the benchmark results contained in this report. No warranty of system performance or price/performance is expressed or implied by this report.

System Overview

The hardware configuration used in this TPC-C test was based on the HP NetServer LH 6000. The full configuration was built by adding additional memory, additional disk adapters and drives. The operating system used on the server was Microsoft NT 4.0 Enterprise Edition and the database was Microsoft SQLServer 7.0 Enterprise Edition.

The processor architecture of the HP NetServer LH 6000 was designed for the Intel Pentium III Xeon processor. The HP NetServer LH 6000 used in this test was powered by four 550MHz Intel Pentium III Xeon processors, each with 2MB of 2nd level cache.

This configuration used 4GB of HP RAM. This was achieved with eight 512MB DIMMs.

This configuration used six AMI 1500-H MegaRAID Disk Array Controllers (DACs). The DACs are plugged into the PCI slots on the motherboard.

The operating system, all executables and libraries, the master database, and swap space was contained in one 9GB hard disk, attached to an embedded PCI SCSI controller.

In the measured configuration, the database log drive consisted of 6 pairs of 18GB 10krpm Ultra Wide hard disks attached to one AMI 1500-H DAC. The TPC-C database storage consisted of 240 HP 9.1 GB 10krpm hard drives. The drives on each DAC were equally distributed across the 4 DAC SCSI channels. Each channel was striped using the AMI MegaRAID configuration utility. Controller write-back caching and read ahead were specifically disabled for the PCI DACs.

Each of the clients is a HP NetServer E60 with a single Pentium III 550MHz, 512MB RAM, one 9GB SCSI hard disk, running Microsoft Windows 2000 Server.

The server, clients and the simulated users were networked together via four HP Procurve 2424M 10/100base T switches. Seven remote terminal emulators (RTEs) emulated 21,000 users executing the standard TPC-C workload. The switches are connected to each client machine through 100base T links and to all seven RTEs at 10Mbit/sec. Each client had two LAN adapters, one of which was embedded. On each client, one of the LAN adapters was connected to the server through a 100base T link and the other adapter was connected via another switch to seven RTEs at 10Mbit/sec, half-duplex. Four clients driven through seven network segments each, provided 28 network segments and 750 emulated users per network segment for the 21,000 emulated users.

HP VGA displays were used on the server and each of the clients.

General Items

Test Sponsor

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

The Network Server Division of the Hewlett-Packard Company 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 Section 3.0 entitled Clause 3 Related Items contains a brief discussion of the database design and loading. The database definition statements, distribution across disk drives, loading scripts, and tables are provided in Appendix B.

The program that implements the TPC Benchmark C translation and collects appropriate transaction statistics is referred to as the Remote Terminal Emulator (RTE) or Driver program. We have used the Microsoft BenchCraft RTE program that emulated 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 used the COM+ transaction monitor (TM) to communicate with the database server.

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 the database server through the COM+ TM 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+.

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.*

Appendix C contains all the database and operating system parameters used in this benchmark in addition to all the hardware configuration details.

Appendix D contains the 180 day space calculations.

Configuration Diagrams

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

The measured and priced client/server configurations are shown in Figures 1 and 2.

Figure 1. Measured Configuration

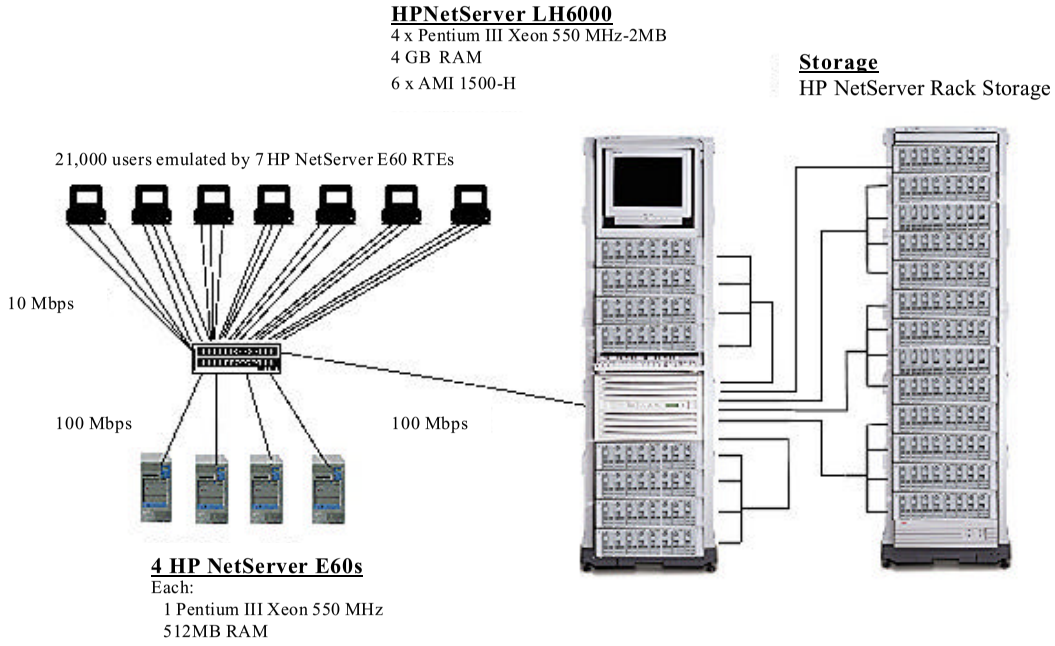


Figure 2. Priced Configuration

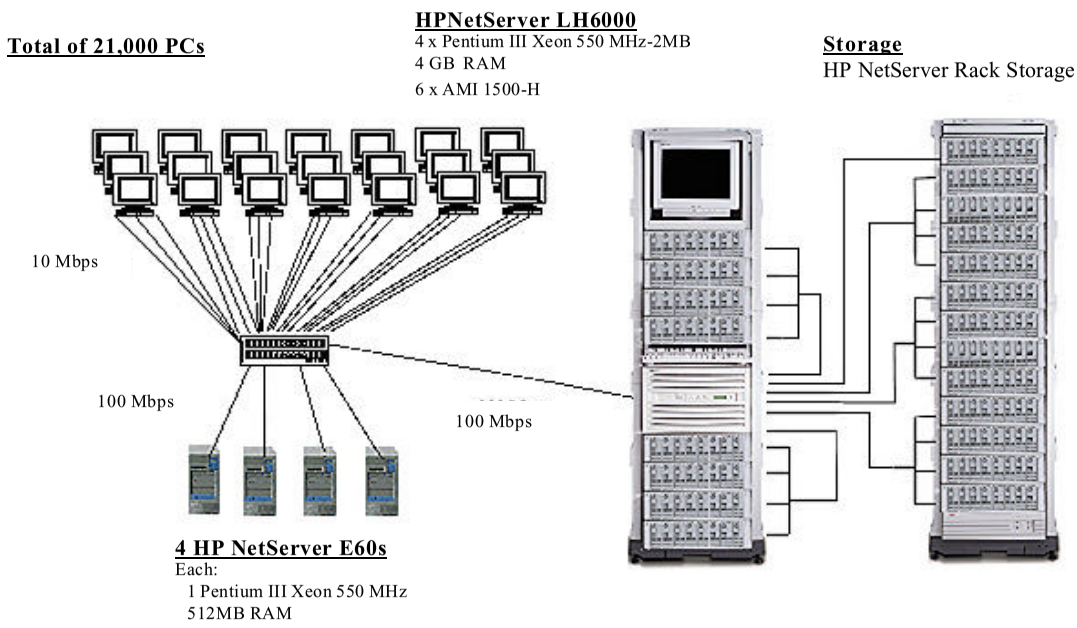


Table of Contents

Chapter 1 Logical Database Design

1.1 Table Definitions

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

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

1.2 Physical Organization of the Database

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

The measured database configuration used a total of 253 disks, which included 240 9GB Hot Swap disk drives for data, 12 18GB drives for logs, and 1 9GB drive for the operating system.

1.3 Insert and Delete Operations

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

All insert and delete functions were fully operational and verified during the entire benchmark.

1.4 Partitioning

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

Partitioning was not used on any table.

1.5 Replication, Duplication or Additions

Replication of tables, if used, must be disclosed. Additional and/or duplicated attributes in any table must be disclosed along with a statement on the impact on performance.

No replications, duplications or additional attributes were used.

Chapter 2 Transaction and Terminal Profiles

2.1 Random Number Generation

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

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

2.2 Input/Output Screen Layout

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

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.

2.3 Priced Terminal Feature 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).

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

2.4 Transaction Statistics

The transaction profiles must be disclosed as per Clauses 8.1.3.5 through 8.1.3.10.

Table 1 shows the transaction statistics.

Table 1. Transaction Statistics.

Type	Item	Value
New Order	Home warehouse items	99.00%
	Remote warehouse items	1.00%
	Rolled back transactions	1.00%
	Average items per order	10.00
Payment	Home warehouse	85.00%
	Remote warehouse	15.00%
	Non primary key access	60.11%
Order Status	Non primary key access	60.10%
Delivery	Skipped transactions	0
Transaction Mix	New Order	44.86%
	Payment	43.01%
	Order Status	4.06%
	Delivery	4.03%
	Stock Level	4.03%

2.5 Presentation Manager or Intelligent Terminal

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

Application code running on the client implemented the TPC-C® user interface. 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.

2.6 Queuing Mechanism

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

The application creates a semaphore-based 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.

Chapter 3 Transaction and System Properties

3.1 Transaction System Properties (ACID Tests)

Results of the ACID test must describe how the requirements were met. This includes disclosing which case was followed for the execution of Isolation Test 7.

The TPC Benchmark C standard specification defines a set of transaction processing system properties that a System Under Test (SUT) must support during the execution of the benchmark. Those properties are Atomicity, Consistency, Isolation and Durability (ACID). The following subsections will define each of these properties and describe the series of tests that were performed by HP to demonstrate that the properties were met.

All of the specified ACID tests were successfully performed on the HP NetServer LH 6000. A fully scaled database was used except for the durability tests of durable media failure. The test was performed on a database scaled to 10 warehouses, using the standard driving mechanism. However a fully scaled database under a full load would also pass this durability test.

3.2 Atomicity Tests

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

3.2.1 COMMIT Transaction

The following steps were followed to demonstrate the COMMIT property of Atomicity:

A row was randomly selected from the Warehouse, District and Customer tables, and the present balances noted. The standard payment transaction was started against the above identifiers using a known amount. The transaction was committed and the rows were verified to contain the correct updated balances.

3.2.2 ROLLBACK Transaction

The following steps were followed to demonstrate the COMMIT property of Atomicity:

A row was randomly selected from the Warehouse, District and Customer tables, and the present balances noted. The standard payment transaction was started against the above identifiers using a known amount. The transaction was rolled back and the rows were verified to contain the original balances.

3.3 Consistency Tests

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

Consistency conditions 1 through 4 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 performance run was executed at rated speed. The shell script was executed again. The result of the same queries verified that the database remained consistent after the run.

3.4 Isolation Tests

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

This property is commonly called serializability. Sufficient conditions must be enabled at either the system or application level to ensure serializability of transactions under any mix of arbitrary transactions.

We ran a total of nine isolation tests. Seven of these tests are detailed in the TPC-C specification (clause 3.4.2.1to 3.4.2.7). The additional two are to fully comply with the isolation requirements that are not directly specified in the TPC-C specification. These two tests are known as Phantom Protection One and Two. They demonstrate that the applications are protected from phantom inserts.

3.5 Durability Tests

The tested system must guarantee the ability to preserve the effects of committed transactions and insure database consistency after recovery from any one of the failures listed in clause 3.5.3.1, 3.5.3.2, and 3.5.3.3.

There 3 types of failures were tested to ensure the durability of the database: Loss of Data, Loss of Log, and Loss of System/Memory.

A fully scaled database was used for the Loss of System/Memory test while a 10 warehouse database was used for the Loss of Data and Loss of Log tests. With this exception of scaling, all other aspects of the configurations on the 10 warehouse database were identical to the fully scaled database configuration, including the use of the standard RTE drivers. Given this, the Loss of Data and Loss of Log tests would pass in a fully scaled database configuration.

3.5.1 Loss of Data / Loss of Log

Loss of data was demonstrated on a 10 warehouse database for convenience. The standard driving mechanism was used to generate the transaction load of 100 users for the test. To demonstrate recovery from a permanent failure of durable media containing TPC-C tables, the following steps were executed:

1. A 10 warehouse database was built having similar characteristics to fully scaled database.
2. The database was backed up using SQLServer backup facilities.
3. A sum of D_NEXT_O_ID was taken.
4. 100 users were logged in to the database and ran transactions.
5. One (mirrored) log disk drive was removed with no effect on NT or SQLServer.
6. After 5 minutes, one data disk drive was removed causing SQLServer errors.
7. The RTE was allowed to continue running. Completed transactions enroute from the clients were recorded. Error messages started appearing on the RTE screen.
8. All users were paused and stopped from the RTE.
9. SQLServer was stopped and restarted and a dump of the transaction log was taken.
10. SQLServer was stopped , NT was shutdown, and the machine was powered off.
11. The failed disks were replaced and the controller configuration utility was run to make the two disks ‘online’.
12. The machine was powered up, NT and SQLServer were started.
13. The TPC-C database was dropped and restored from the backup.
14. The transaction log was restored and transactions rolled forward.
15. A new count of D_NEXT_O_ID was taken.
16. This number was compared with the number of new orders reported by the RTE.

3.5.2 Loss of System / Memory

This was demonstrated on the full database with 2100 warehouses in a single test. The standard driving mechanism was used to generate the transaction load of 21,000 users for this test. To demonstrate recovery the following steps were followed:

1. The full database was used.
2. A sum of D_NEXT_O_ID was taken.
3. 21,000 users were logged in to the database and ran transactions.
4. The system ran for 5 minutes after all the users were activated. Then a checkpoint was issued.
5. 2 minutes after the checkpoint completed, the server machine was powered off.
6. The RTE continued running and completed transactions enroute from the clients were recorded. Error messages began appearing on the RTE screen.
7. The RTE was stopped.
8. The server machine was powered on.
9. A new count of D_NEXT_O_ID was taken.
10. This number was compared with the number of new orders reported by the RTE

Chapter 4 Scaling and Database Population

4.1 Database Layout

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

The measured (tested) and priced systems have one Ultra-2 embedded SCSI PCI Disk controllers and 6 AMI 1500-H 4-channel PCI Disk Array Controllers (DACs). These cards plugged into PCI slots on the motherboard.

One hard disk was attached to the embedded PCI SCSI controllers. This drive was used for the operating system.

For the measured configuration, the database was built with 253 disks – 240 9GB for data, 12 18GB for log, and 1 9GB for the OS and application software. The priced configuration required two additional 18GB disks for the data. The data drives were all configured as hardware RAID 0. Logs were configured as hardware RAID 1. DACs 1, 2, 3, 4, and 5 were configured with 8 disk drives per RAID stripe and 6 spans for a total of 48 disk drives per data controller. DAC 6, although present in our system, was not used at all. DAC 7 was configured with 2 disk drives (mirrored) per RAID stripe and 6 spans for a total of 12 log drives. Write caching was disabled on both the controller and on all the physical drives.

Table 2 shows the complete data distribution.

Table 2: Data Distribution

AMI 1500-H CONFIGURATION						NT DISK ADMINISTRATION		
Controller #1						Disk #0: 416496MB		
The six spans are shown in six different shadings	SCSI ID	Channels				Partitions		
		0	1	2	3	1	2	3
	0	A0-1	A1-5	A3-1	A4-5	F: CS1 Unknown 32000MB	M: MISC1 Unknown 15400MB	Free 369096MB
	1	A0-2	A1-6	A3-2	A4-6			
	2	A0-3	A1-7	A3-3	A4-7			
	3	A0-4	A1-8	A3-4	A4-8			
	8	A0-5	A2-1	A3-5	A5-1			
	9	A0-6	A2-2	A3-6	A5-2			
	10	A0-7	A2-3	A3-7	A5-3			
	11	A0-8	A2-4	A3-8	A5-4			
	12	A1-1	A2-5	A4-1	A5-5			
	13	A1-2	A2-6	A4-2	A5-6			
	14	A1-3	A2-7	A4-3	A5-7			
	15	A1-4	A2-8	A4-4	A5-8			

AMI 1500-H CONFIGURATION						NT DISK ADMINISTRATION		
Controller #2						Disk #1: 416496MB		
The six spans are shown in six different shadings	SCSI ID	Channels				Partitions		
		0	1	2	3	1	2	3
	0	A0-1	A1-5	A3-1	A4-5	G: CS2 Unknown 32000MB	N: MISC2 Unknown 15400MB	Free 369096MB
	1	A0-2	A1-6	A3-2	A4-6			
	2	A0-3	A1-7	A3-3	A4-7			
	3	A0-4	A1-8	A3-4	A4-8			
	8	A0-5	A2-1	A3-5	A5-1			
	9	A0-6	A2-2	A3-6	A5-2			
	10	A0-7	A2-3	A3-7	A5-3			
	11	A0-8	A2-4	A3-8	A5-4			
	12	A1-1	A2-5	A4-1	A5-5			
	13	A1-2	A2-6	A4-2	A5-6			
	14	A1-3	A2-7	A4-3	A5-7			
	15	A1-4	A2-8	A4-4	A5-8			

AMI 1500-H CONFIGURATION						NT DISK ADMINISTRATION			
Controller #3						Disk #2: 416496MB			
The six spans are shown in six different shadings	SCSI ID	Channels				Partitions			
		0	1	2	3	1	2	3	4
	0	A0-1	A1-5	A3-1	A4-5	H: CS3 Unknown 32000MB	O: MISC3 Unknown 15400MB	Free 12700MB	X: Backup NTFS 356396MB
	1	A0-2	A1-6	A3-2	A4-6				
	2	A0-3	A1-7	A3-3	A4-7				
	3	A0-4	A1-8	A3-4	A4-8				
	8	A0-5	A2-1	A3-5	A5-1				
	9	A0-6	A2-2	A3-6	A5-2				
	10	A0-7	A2-3	A3-7	A5-3				
	11	A0-8	A2-4	A3-8	A5-4				
	12	A1-1	A2-5	A4-1	A5-5				
	13	A1-2	A2-6	A4-2	A5-6				
	14	A1-3	A2-7	A4-3	A5-7				
	15	A1-4	A2-8	A4-4	A5-8				

AMI 1500-H CONFIGURATION						NT DISK ADMINISTRATION			
Controller #4						Disk #3: 416496MB			
The six spans are shown in six different shadings	SCSI ID	Channels				Partitions			
		0	1	2	3	1	2	3	4
	0	A0-1	A1-5	A3-1	A4-5	I: CS4 Unknown 32000MB	P: MISC4 Unknown 15400MB	Free 12700MB	Y: Backup NTFS 356396MB
	1	A0-2	A1-6	A3-2	A4-6				
	2	A0-3	A1-7	A3-3	A4-7				
	3	A0-4	A1-8	A3-4	A4-8				
	8	A0-5	A2-1	A3-5	A5-1				
	9	A0-6	A2-2	A3-6	A5-2				
	10	A0-7	A2-3	A3-7	A5-3				
	11	A0-8	A2-4	A3-8	A5-4				
	12	A1-1	A2-5	A4-1	A5-5				
	13	A1-2	A2-6	A4-2	A5-6				
	14	A1-3	A2-7	A4-3	A5-7				
	15	A1-4	A2-8	A4-4	A5-8				

AMI 1500-H CONFIGURATION						NT DISK ADMINISTRATION			
Controller #5						Disk #4: 416496MB			
The six spans are shown in six different shadings	SCSI ID	Channels				Partitions			
		0	1	2	3	1	2	3	4
	0	A0-1	A1-5	A3-1	A4-5	J: CS5 Unknown 32000MB	Q: MISC5 Unknown 15400MB	Free 12700MB	V: Backup NTFS 356396MB
	1	A0-2	A1-6	A3-2	A4-6				
	2	A0-3	A1-7	A3-3	A4-7				
	3	A0-4	A1-8	A3-4	A4-8				
	8	A0-5	A2-1	A3-5	A5-1				
	9	A0-6	A2-2	A3-6	A5-2				
	10	A0-7	A2-3	A3-7	A5-3				
	11	A0-8	A2-4	A3-8	A5-4				
	12	A1-1	A2-5	A4-1	A5-5				
	13	A1-2	A2-6	A4-2	A5-6				
	14	A1-3	A2-7	A4-3	A5-7				
	15	A1-4	A2-8	A4-4	A5-8				

Controller #6, although present in the system was never used. Please see the auditor's attestation letter for clarification.

AMI 1500-H CONFIGURATION						NT DISK ADMINISTRATION
Controller #7						Disk #6: 104190MB
The six spans are shown in six different shadings	SCSI ID	Channels				Partitions
		1	2	3	4	
	0	A0-1				E: LOG Unknown 104190MB
	1	A0-2				
	2	A1-1				
	3	A1-2				
	8	A2-1				
	9	A2-2				
	10	A3-1				
	11	A3-2				
	12	A4-1				
	13	A4-2				
	14	A5-1				
	15	A5-2				

4.2 Initial Cardinality of Tables

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

Table 3 shows the cardinality of the various tables.

Table 3: Table Cardinality

Table	Occurrences
Warehouse	2,100
District	21,000
Customer	63,000,000
History	63,000,000
Orders	63,000,000
New Orders	18,900,000
Order Line	468,001,833
Stock	100,000
Item	210,000,000

No rows were deleted for the benchmark runs.

4.3 180 Day Space

Details of the 180 day space computations along with proof that the database is configured to sustain 8 hours of growth for the dynamic tables must be disclosed.

4.3.1 Transaction Log Space Requirements

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 free space on the logfile was queried using **dbcc sqlperf(logspace)**.
2. Transactions were run against the database with a full load of users.
3. The free space was again queried using **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 space used per NEW-ORDER transaction.
7. The space used per transaction was multiplied by the measured tpmC rate times 480 minutes.

The result of the above steps yielded a requirement of 64,8167 GB (including mirror) to sustain the log for 8 hours. Space available for the transaction log was 101.75 GB (including mirror), indicating that enough storage was configured to hold 8 hours of growth.

The same methodology was used to calculate the growth requirements for the other dynamic tables Order, Order-Line and History. The details of the 180 day growth calculation are shown in Appendix D.

4.4 Type of Database Used

A statement must be provided that describes 1) the data model implemented by DBMS used and 2) the database interface and access language

Microsoft SQLServer 7.0 Enterprise Edition is a relational DBMS.

The interface was SQL Server stored procedures accessed with library calls embedded in C code.

4.5 Database Mapping

The mapping of database partitions and replications must be described.

The database was divided into 2 file groups MSSQL70_cs_fg and MSSQL70_misc_fg. MSSQL70_cs_fg consist of 5 partitions at 32000 MB each and MSSQL70_misc_fg consist of 5 partitions at 15400 MB each as shown in the disk administrator. The log was configured with 104190 MB.

Chapter 5 Performance Metrics and Response Time

5.1 Throughput

Measured tpmC® must be reported.

The measured tpmC® was 26,359.15

5.2 Response Times

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

Table 4 shows the response times for all transaction types.

Table 4: Transaction Response Times

Response Times	Average	90th %-ile	Maximum
New-Order	0.33s	0.44s	5.09s
Payment	0.22s	0.30s	2.79s
Order-Status	0.24s	0.33s	5.08s
Delivery (interactive portion)	0.11s	0.12s	0.69s
Delivery (deferred portion)	0.44s	0.61s	1.72s
Stock-Level	1.82s	2.23s	4.11s
Menu	0.11s	0.61s	0.74s

5.3 Keying and Think Times

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

Tables 5 and 6 show the key times and think times for all transaction types.

Table 5: Transaction Key Times

Keying Times	Minimum	Average	Maximum
New Order	18s	18.01s	18.02s
Payment	3s	3.01s	3.04s
Order Status	2s	2.01s	2.02s
Interactive Delivery	2s	2.01s	2.02s
Stock Level	2s	2.01s	2.02s

Table 6: Transaction Think Times

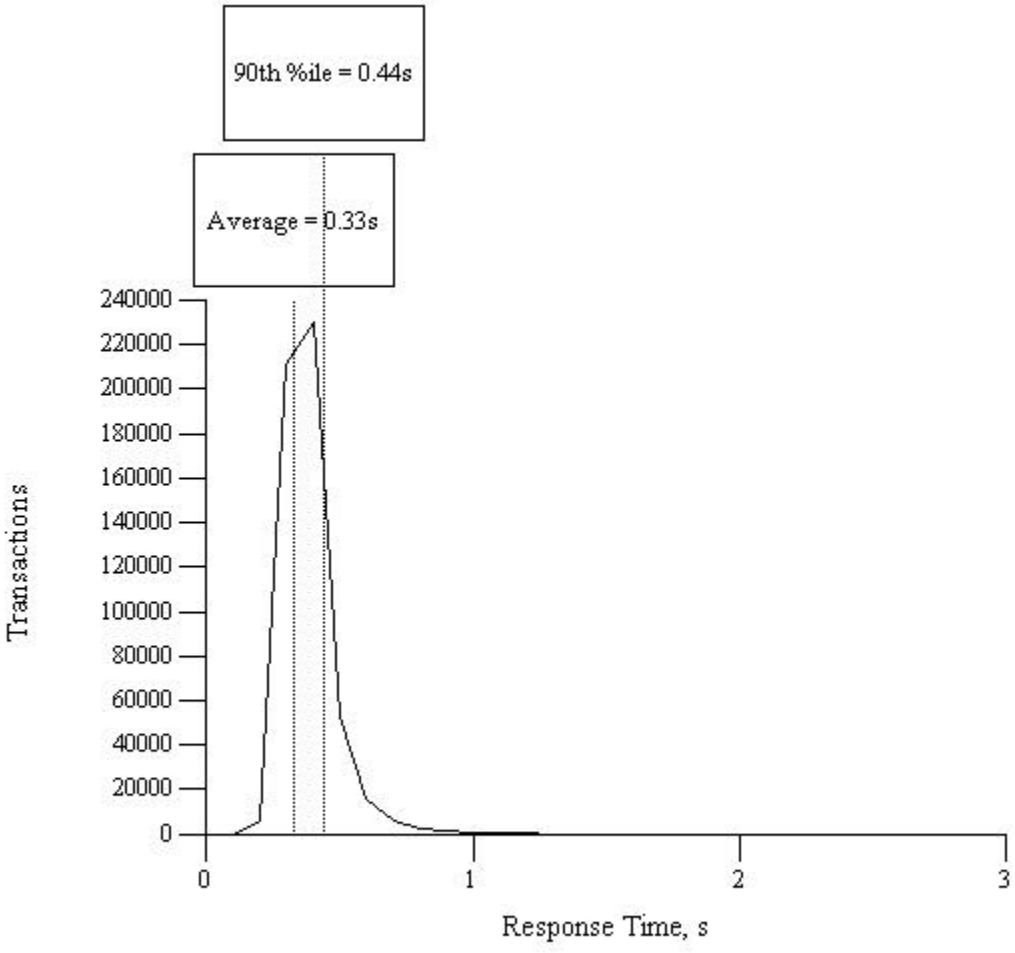
Think Times	Minimum	Average	Maximum
New Order	0s	12.04s	120.5s
Payment	0s	12.01s	120.5s
Order Status	0s	10.11s	100.49s
Interactive Delivery	0s	5.05s	50.5s
Stock Level	0s	5.05s	50.5s

5.4 Response Time Frequency

Response Time frequency distribution curves (see Clause 5.6.1) must be reported for each transaction type. The performance curve for response times versus throughput (see Clause 5.6.2) must be reported for the New-Order transaction. Think Time frequency distribution curves (see Clause 5.6.3) must be reported for each transaction type. Keying Time frequency distribution curves (see Clause5.6.4) must be reported for each transaction type. A graph of throughput versus elapsed time (see Clause 5.6.5) must be reported for the New-Order transaction.

5.4.1 New Order Response Time

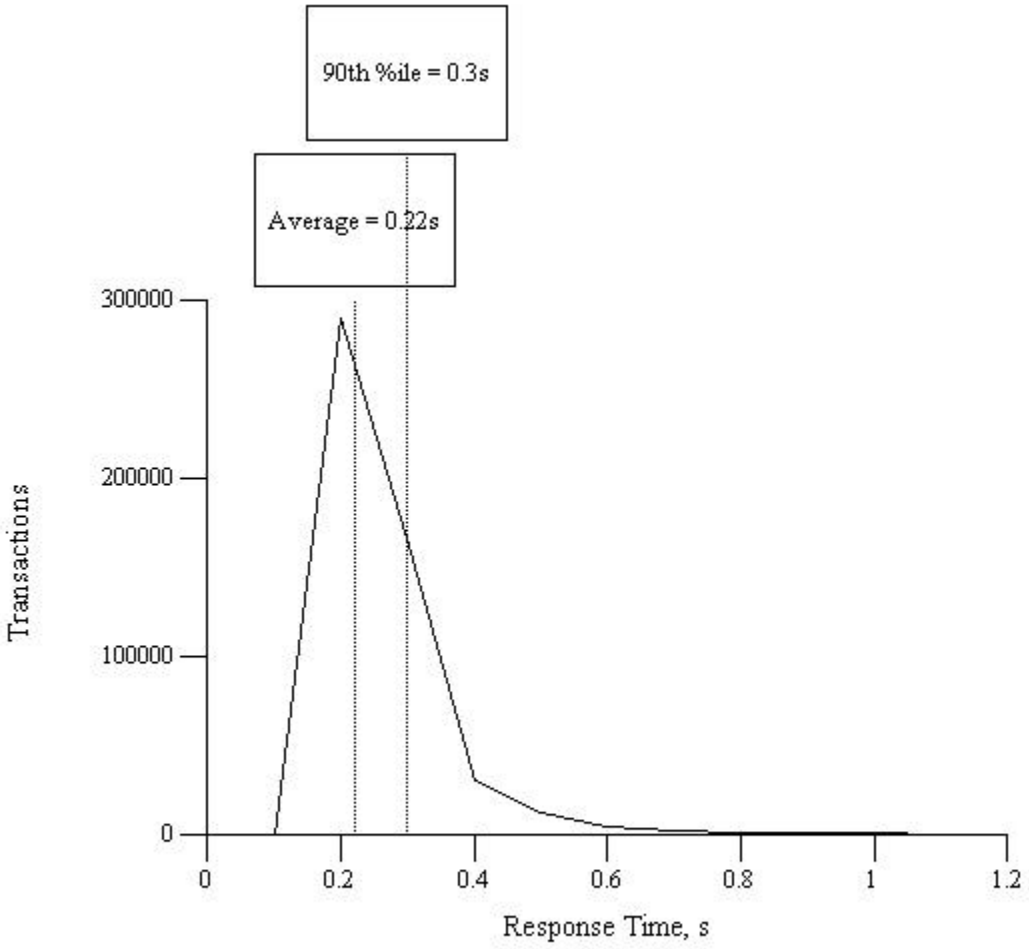
Figure 3: New Order Response Time Distribution



Response time frequency distribution for New Order transaction

5.4.2 Payment Response Time Distribution

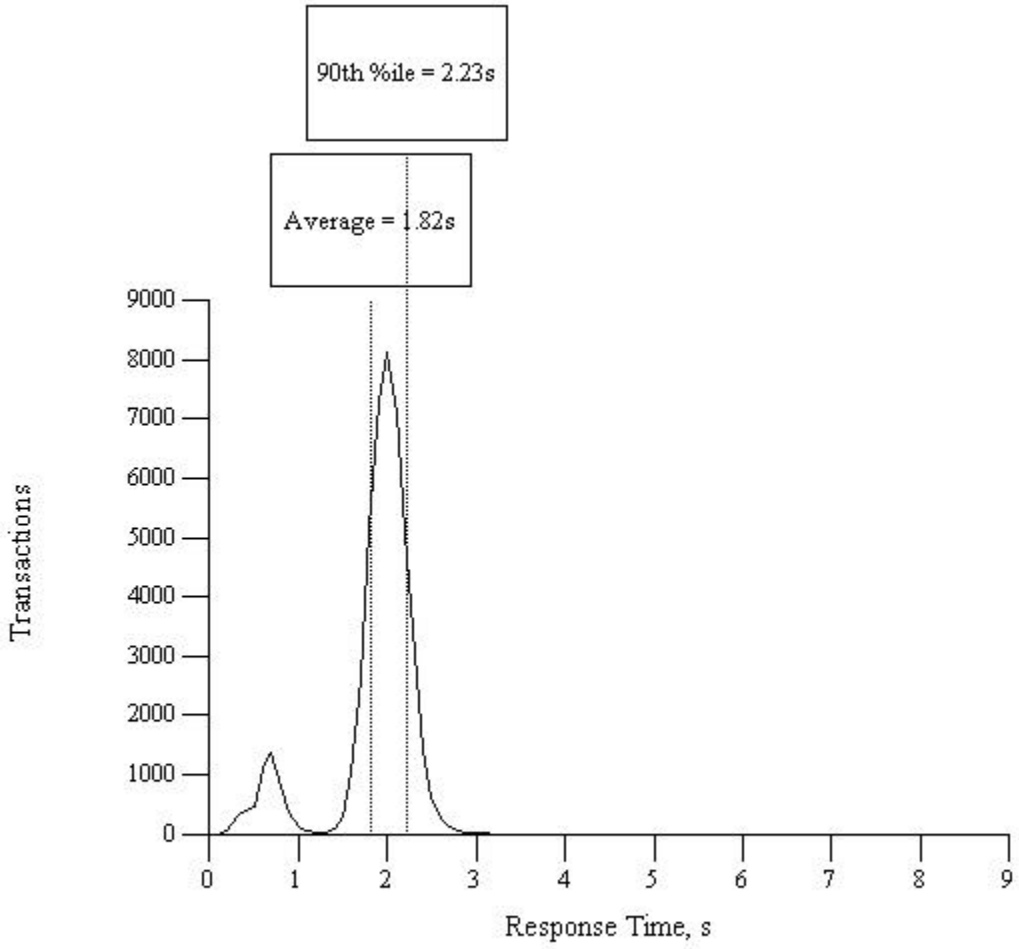
Figure 4: Payment Response Time Distribution



Response time frequency distribution for Payment transaction

5.4.3 Order Status Response Time

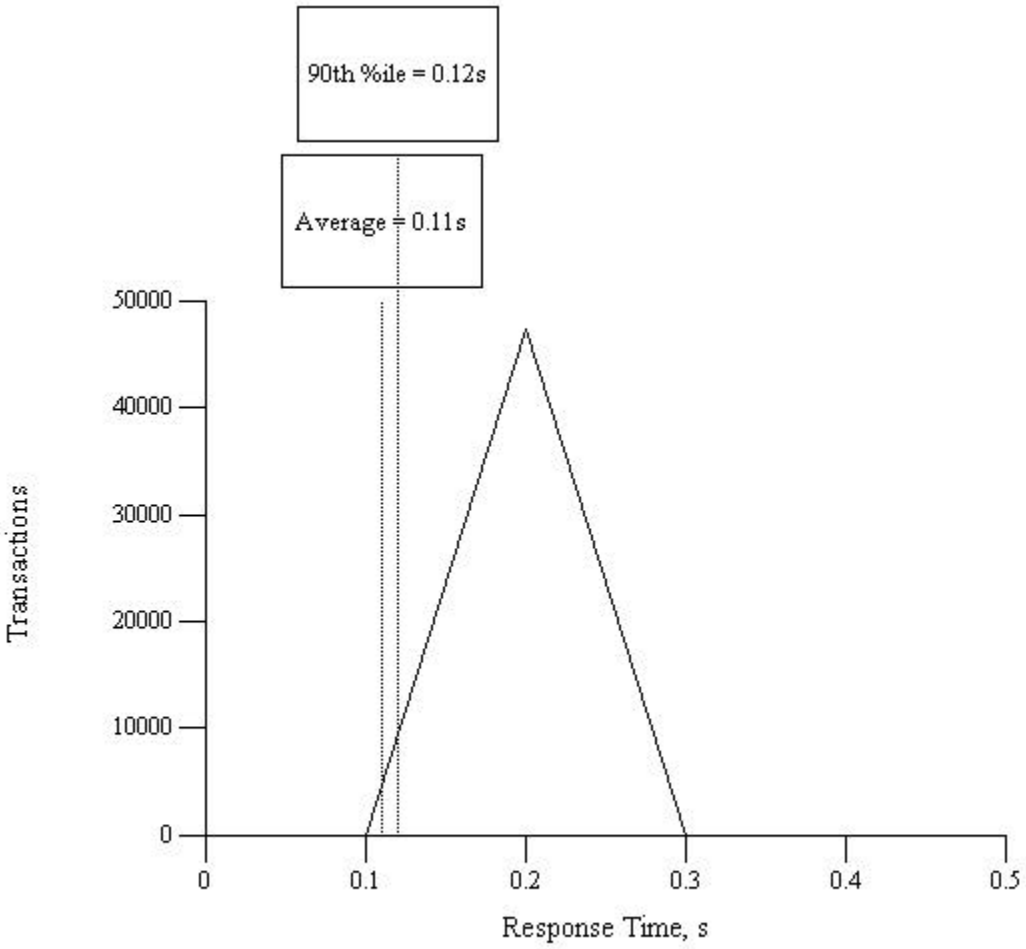
Figure 5: Order Status Response Time Distribution



Response time frequency distribution for Stock Level transaction

5.4.4 Delivery Response Time Distribution

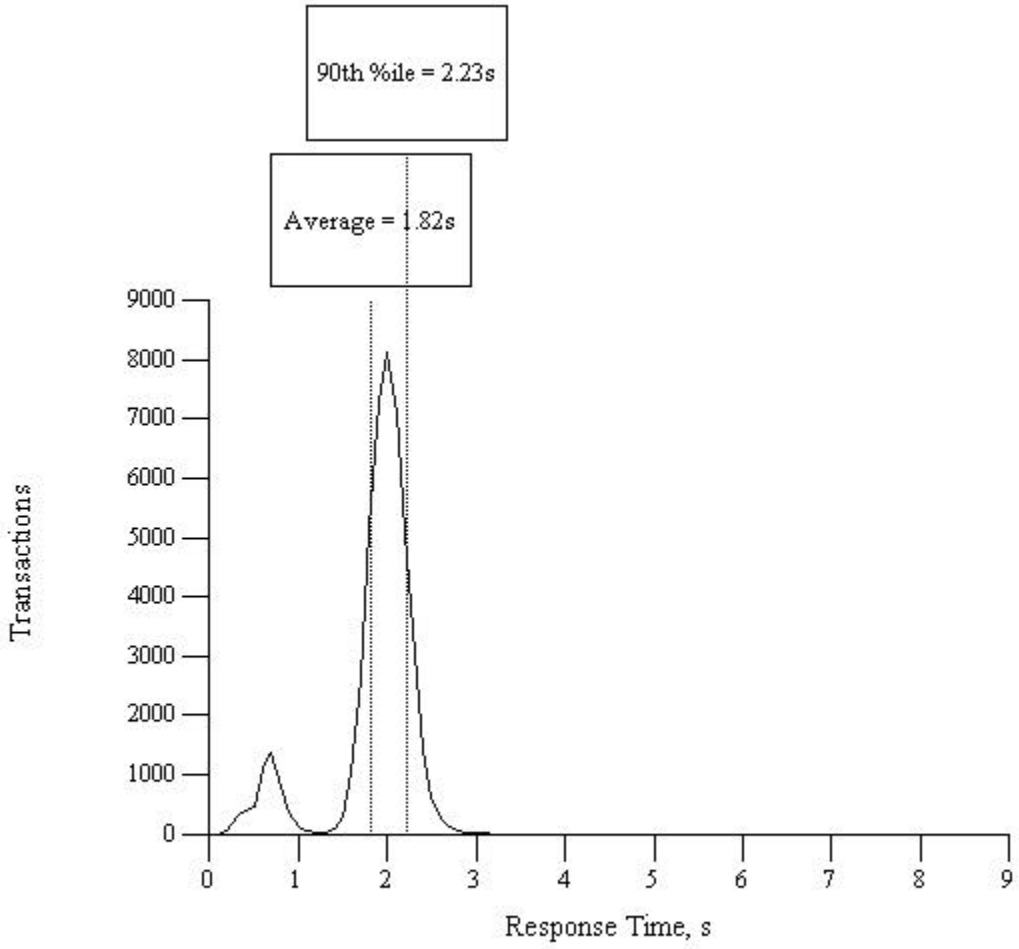
Figure 6: Delivery Response Time Distribution



Response time frequency distribution for Delivery transaction

5.4.5 Stock Level Response Time

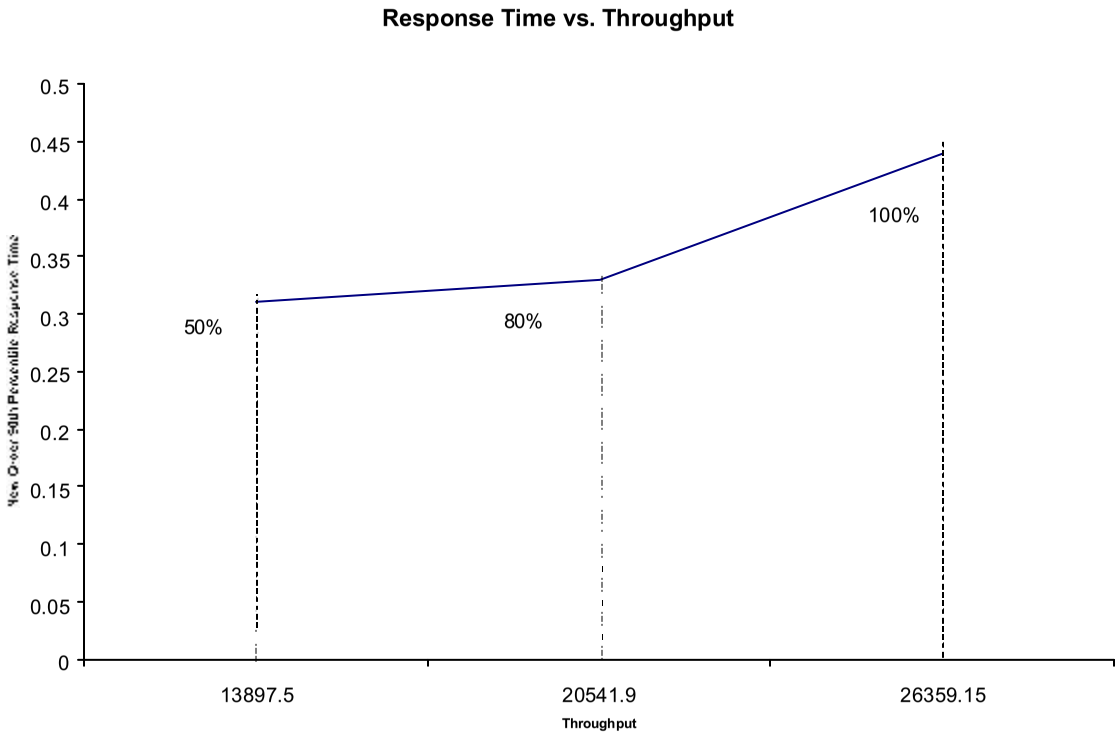
Figure 7: Stock Level Response Time Distribution



Response time frequency distribution for Stock Level transaction

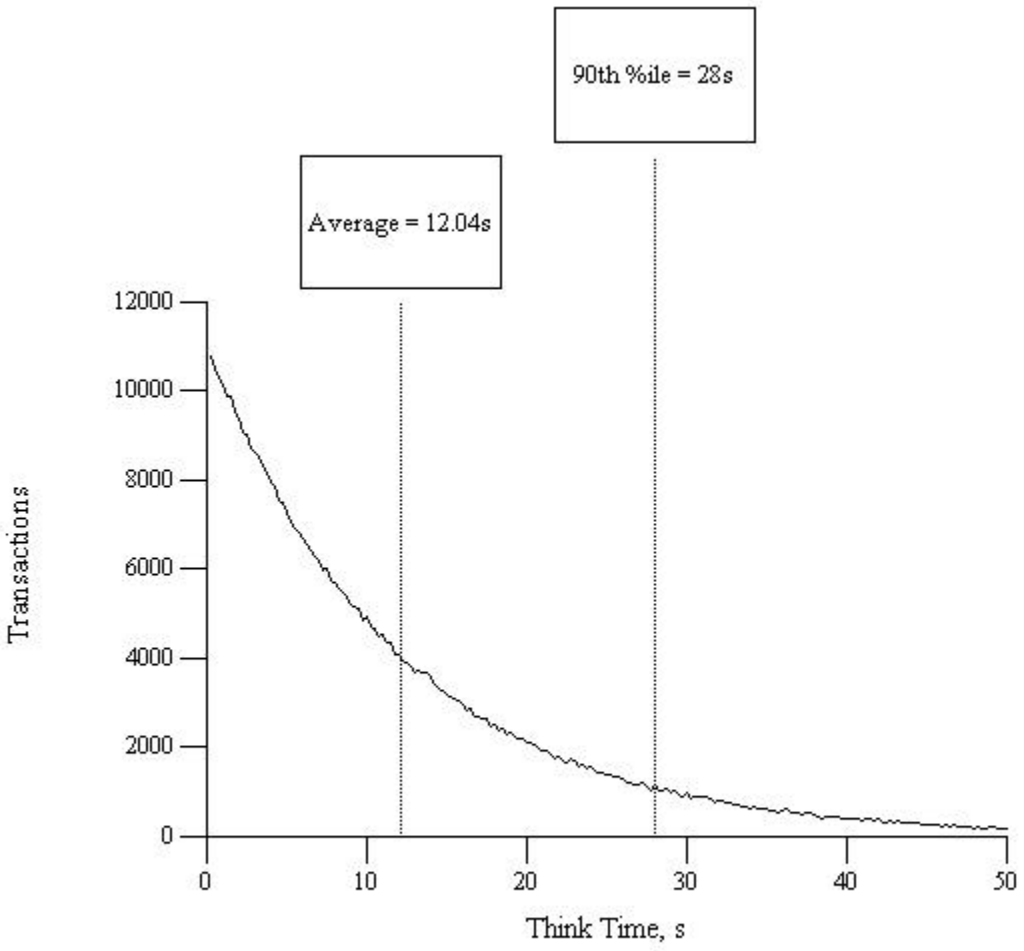
5.4.6 Response Time Versus Throughput

Figure 8: New Order Response Time Distribution



5.4.7 New Order Think Time Distribution

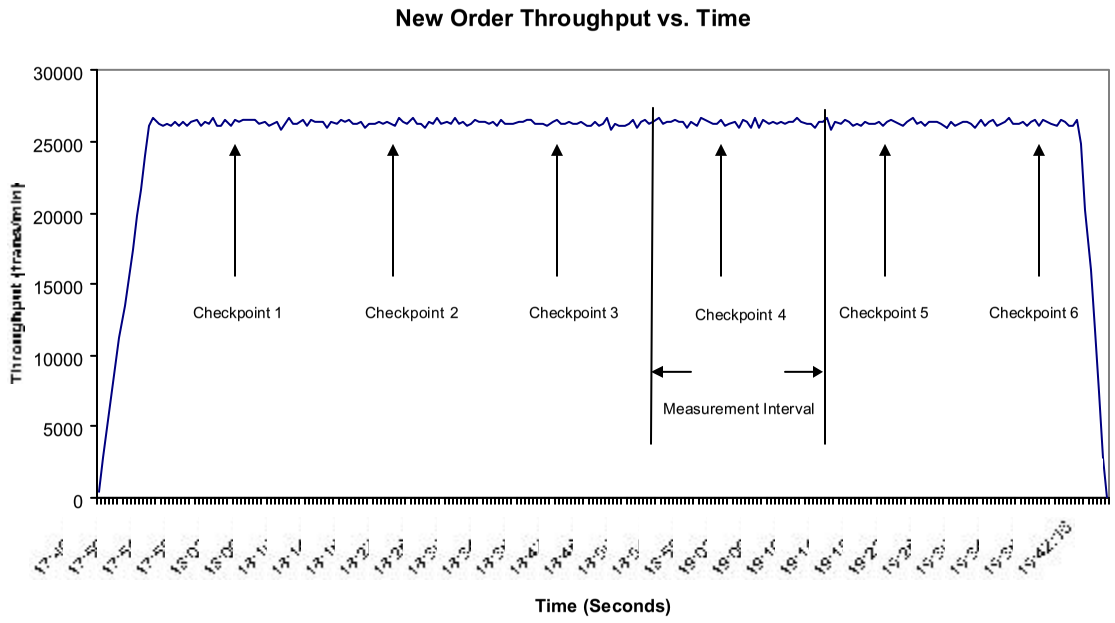
Figure 9: New Order Think Time Distribution



Think time frequency distribution for New Order transaction

5.4.8 Throughput Versus Time Distribution

Figure 10: New Order Throughput versus Time



5.5 Steady State Determination

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

The transaction throughput rate (tpmC®) and response time were relatively constant after the initial 'ramp up' period. The throughput and response time behaviors were determined by examining data reported for each interval over the duration of the benchmark. The corresponding graph is in Figure 10.

5.6 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.

The RTEs generated the required input data to choose a transaction from the menu. This data was timestamped. The menu response time 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 and starting another transaction.

5.6.1 Checkpoint

The checkpoint mechanism is an automatic means for guaranteeing that completed transactions are regularly written from SQL Server's disk cache to the database device. A checkpoint writes all "dirty pages"-cached pages that have been modified since the last checkpoint-to the database device.

5.6.2 Checkpoint Conditions

There are two types of checkpoints:

1. Checkpoints that are executed automatically by SQL Server.

2. Checkpoints that are forced by database owners with the CHECKPOINT statement.

Forcing dirty pages onto the database device means that all completed transactions are written out. By calling all completed transactions to be written out, the checkpoint shortens the time it takes to recover, since the database pages are current and there are no transactions that need to be rolled forward.

5.6.3 Checkpoint Implementation

For each benchmark measurement after all users are active, an NT command script issued a checkpoint. A background process slept and performed another checkpoint every 20 minutes. The recovery interval (used to control the checkpoints executed automatically by SQL Server) was large enough such that no other checkpoints occur during the measurement.

5.7 Reproducibility

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

A second measurement achieved a throughput of 26,323.85 tpmC® during a 20-minute, steady state interval.

5.8 Measurement Period Duration

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

The measurement interval was 20 minutes.

5.9 Regulation of Transaction Mix

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

The weighted average method of *Clause 5.2.4.1* was used. The weights were not adjusted during the run.

5.10 Transaction Mix

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

Table 7: Transaction Mix

Type	Percentage
New Order	44.86%
Payment	43.01%
Order Status	4.06%
Delivery	4.03%
Stock Level	4.03%

5.11 Transaction Statistics

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

Table 1contains the required items.

5.12 Checkpoint Count and Location

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

The measurement interval is 20 minutes. There is one checkpoint within the measurement interval. This checkpoint starts 632 seconds into the measurement interval. The checkpoint interval (time between starts of two consecutive checkpoints) is also 20 minutes. Each checkpoint took approximately 183 seconds to complete. In conformance with Clause 5.5.2.2, the checkpoint occurs outside the guard zones.

Chapter 6 SUT, Driver and Communications Definition

6.1 RTE Description

If the RTE is commercially available, then its inputs must be specified. Otherwise, a description must be supplied of that input (e.g., scripts) to the RTE had been used. The RTE input parameters, code fragments, functions, et cetera used to generate each transaction input filed must be disclosed.

The RTE used is Microsoft BenchCraft and is commercially available. The RTE input parameters are listed in Appendix C – Tunable Parameters.

6.2 Emulated Components

It must be demonstrated that the functionality and performance of the components being used in the Driver System are equivalent to that of the priced system.

No components were emulated.

6.3 Functional Diagram

A complete functional diagram of the hardware and software of the benchmark configuration including the driver must be provided. the sponsor must list all hardware and software functionality of the driver and its interface to the SUT.

Functional diagrams of the measured and priced systems are included in the "General Items" section at the beginning of this report.

6.4 Networks

The network configuration of both the tested and proposed services which are being represented and a thorough explanation of exactly which parts are being replaced with the Driver System must be disclosed.

The "General Items" section includes diagrams of the network configurations of the benchmark and configured systems, and represent the driver connected via LAN replacing the workstations and hubs connected via LANs.

The bandwidth of the networks used in the tested/priced configurations must be disclosed.

The bandwidth of the measured and priced configurations were:

- 10base T (10Mbit/sec) network segments between RTEs and the switches.
- 100base T (100Mbit/sec) network segments between the clients and the server.

Chapter 7 Pricing

7.1 System Pricing

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 data. 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 and effective date(s) of price(s) must also be reported.

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

The details of the hardware, software and maintenance components of this system are reported in the front of this report as part of the executive summary.

All 3rd party quotations are included at the end of this report in Appendix E.

7.2 General Availability, Throughput and Price Performance

The committed delivery date for general availability (availability date) of products used in the price calculation 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.

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

Table 8: Throughput, Price Performance and Availability

Maximum qualified throughput:	26359.15 tpmC
Price per tpmC:	$15.86
Availability:	March 6, 2000

7.3 Country Specific Pricing

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

The system is being priced for the United States of America.

7.4 Usage Pricing

For any usage pricing, the sponsor must disclose: Usage level at which the component was priced, a statement of the company policy allowing such pricing.

The component pricing based on usage is shown below:

- 1 Microsoft SQLServer 7.0 Enterprise Edition license.
- 1 Microsoft Windows NT Server 4.0 Enterprise Edition license.
- 4 Microsoft Windows 200 Server licenses.
- 1 Microsoft Visual C++ 32bit Edition.
- 5 year support for hardware components

Chapter 8 Audit

8.1 Auditor's Information

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.

The test methodology and results of this TPC Benchmark C were audited by:

Performance Metrics, Inc.
137 Yankton St., Suite 101
Folsom, CA 95630
U.S.A.
Phone: 916 985-1131
Fax: 916 985-1185

The auditor was Tom Sawyer..

Requests for this Full Disclosure Report (FDR) should sent to:

Hewlett-Packard Company
Network Server Division
10955 Tantau Avenue
Cupertino, CA 95014-0770 USA
Attn:Arindam Saha, MS 45NUH

A copy of the attestation letter received from the auditor follows.

PERFORMANCE METRICS INC.
TPC Certified Auditors

March 1, 2000

Mr. Arindam Saha
Project Manager, Performance Engineering
Network Server Division
Hewlett-Packard Company
10955 Tantau Avenue
Cupertino, CA 95014

I have verified the TPC Benchmark™ C client/server for the following configuration:

Platform:	Hewlett-Packard NetServer LH 6000
Database Manager:	Microsoft SQL Server 7.0 (SP2) Enterprise Edition
Operating System:	Microsoft Windows NT Server 4.0 (SP5)
Transaction Manager:	Microsoft Com+

Server: Hewlett-Packard NetServer LH 6000				
CPU's	Memory	Disks	90% Response	tpmC
4 Pentium III Xeon @ 550 MHz	Main: 4 GB Cache: 2MB each	12 @ 18GB 241 @ 9GB	**0.44 sec.**	**26,359.15**
4 Clients: Hewlett-Packard NetServer E60				
1 Pentium III @ 550 MHz	Main: 512 MB Cache: 512 KB	1 @ 9GB	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.

137 Yankton St. Suite 101, Folsom 95630
(916) 985-1131 fax: (916) 985-1185 email: Lorna@PerfMetrics.com

- The database was properly scaled with 2,170 warehouses of which 2,100 were used in the measurement. I verified that w_ytd and d_next_o_id did not change during the measurement.
- There were 21,000 emulated users present for the measurement
- The ACID properties were met.
- The Durability tests were performed on the measured database except the loss-of-data-disk test which was performed on a 10-warehouse database.
- The ACI tests were performed on a larger system with identical hardware/software and 6 CPUs.
- Input data was generated according to the specified percentages.
- Eight hours of durable log space was present on the tested system.
- Space for eight hours of growth in dynamic tables was present on the tested system.
- The data for the 180-day space calculation was verified.
- The steady state portion of the test was 20 minutes.
- One checkpoint was taken before the measured interval.
- One checkpoint was taken during the measured interval.
- The checkpoints were verified to be clear of the guard zone.
- The system pricing was checked for major components and maintenance.

Auditor Notes:

The measured system had one extra disk controller and associated disks which were used for backup. I verified that these components were not active during the measurement.

Sincerely,

Tom Sawyer

Tom Sawyer
Auditor

137 Yankton St. Suite 101, Folsom 95630
(916) 985-1131 fax: (916) 985-1185 email: Lorna@PerfMetrics.com

Appendix A Application Source

A.1 Client Front End

tpcc.def

```
LIBRARY TPCC.DLL

EXPORTS

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

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;
                };

                WEBERRORm_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_WARNING6              //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);
```

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
```

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"

// 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];

        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_CONNkeep 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 );
            delete e;

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

        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>"
                        "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,
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                        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>"<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;
}
```

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
```

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 szDbServer[32];
        char szDbName[32];
        char szDbUser[32];
        char szDbPassword[32];
} TPCCREGISTRYDATA, *PTPCCREGISTRYDATA;

BOOL ReadTPCCRegistrySettings( TPCCREGISTRYDATA *pReg );
```

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;
}
```

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
 */

#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
#define ERR_TYPE_TXNLOG                                         16
                //delivery server error
                //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

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);
        }

        ~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,
    };

    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 "";}         // TODO: need to code error
text
};

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

        int ErrorType() { return ERR_TYPE_MEMORY;}
        int ErrorNum() { return 0;}
        char *ErrorText() { return "";}         // TODO: need to code error
text
};
```

trans.h

```
/*      FILE:           TRANS.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 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_STRUCTo_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_STRUCTol_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;
```

txn_base.h

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

```
 */
#pragma once

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

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

                virtual PNEW_ORDER_DATA         BuffAddr_NewOrder()
        = 0;
                virtual PPAYMENT_DATA           BuffAddr_Payment()
        = 0;
                virtual PDELIVERY_DATA          BuffAddr_Delivery()
        = 0;
                virtual PSTOCK_LEVEL_DATABuffAddr_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;
};
```

tpcc_dlib.cpp

```
/*      FILE:           TPCC_DBLIB.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: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;
}
```

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_DATAStockLevel;
                        ORDER_STATUS_DATA       OrderStatus;

                } u;

        } *m_pTxn;

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_DATABuffAddr_StockLevel()   { return
&m_pTxn->u.StockLevel;  };
        inline PORDER_STATUS_DATABuffAddr_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.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;

        m_bSinglePool = bSinglePool;

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

        m_pTxn = (COM_DATA*)CoTaskMemAlloc(sizeof(COM_DATA));
        if (!m_pTxn)
                throw new CCOMERR( E_FAIL );

        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)
                CoTaskMemFree(m_pTxn);

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

void CTPCC_COM::NewOrder()
{
        int iSize = sizeof(COM_DATA);

        HRESULT hr = m_pNewOrder->NewOrder(&iSize, (unsigned char**)&m_pTxn);
        if (FAILED(hr))
                throw new CCOMERR( hr );

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

void CTPCC_COM::Payment()
{
        int iSize = sizeof(COM_DATA);

        HRESULT hr = m_pPayment->Payment(&iSize, (unsigned char**)&m_pTxn);
        if (FAILED(hr))
                throw new CCOMERR( hr );

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

void CTPCC_COM::StockLevel()
{
        int iSize = sizeof(COM_DATA);

        HRESULT hr = m_pStockLevel->StockLevel(&iSize, (unsigned
char**)&m_pTxn);
        if (FAILED(hr))
                throw new CCOMERR( hr );

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

void CTPCC_COM::OrderStatus()
{
        int iSize = sizeof(COM_DATA);

        HRESULT hr = m_pOrderStatus->OrderStatus(&iSize, (unsigned
char**)&m_pTxn);
        if (FAILED(hr))
                throw new CCOMERR( hr );

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

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(             int* iSize, UCHAR** txn);
        HRESULT __stdcall Payment(              int* iSize, UCHAR** txn);
        HRESULT __stdcall Delivery(             int* iSize, UCHAR** txn)
{return E_NOTIMPL;}
        HRESULT __stdcall StockLevel(   int* iSize, UCHAR** txn);

        HRESULT __stdcall OrderStatus(  int* iSize, UCHAR** txn);
```

```
        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_DATAStockLevel;
                        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(             int* iSize, UCHAR** txn)
{return E_NOTIMPL;}
        HRESULT __stdcall Payment(              int* iSize, UCHAR** txn)
{return E_NOTIMPL;}
        HRESULT __stdcall StockLevel(   int* iSize, UCHAR** txn) {return
E_NOTIMPL;}
        HRESULT __stdcall OrderStatus(  int* iSize, UCHAR** txn) {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(             int* iSize, UCHAR** txn)
{return E_NOTIMPL;}
        HRESULT __stdcall Payment(              int* iSize, UCHAR** txn)
{return E_NOTIMPL;}
        HRESULT __stdcall StockLevel(   int* iSize, UCHAR** txn) {return
E_NOTIMPL;}
//      HRESULT __stdcall OrderStatus(  int* iSize, UCHAR** txn) {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(             int* iSize, UCHAR** txn)
{return E_NOTIMPL;}
//      HRESULT __stdcall Payment(              int* iSize, UCHAR** txn)
{return E_NOTIMPL;}
        HRESULT __stdcall StockLevel(   int* iSize, UCHAR** txn) {return
E_NOTIMPL;}
        HRESULT __stdcall OrderStatus(  int* iSize, UCHAR** txn) {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(             int* iSize, UCHAR** txn)
{return E_NOTIMPL;}
        HRESULT __stdcall Payment(              int* iSize, UCHAR** txn)
{return E_NOTIMPL;}
//      HRESULT __stdcall StockLevel(   int* iSize, UCHAR** txn) {return
E_NOTIMPL;}
        HRESULT __stdcall OrderStatus(  int* iSize, UCHAR** txn) {return
E_NOTIMPL;}
};
```

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.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 5.02.0235 */
/* at Fri Aug 13 18:56:24 1999
 */
/* 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.cpp

```
/*      FILE:           TPCC_COM_ALL.CPP
 *                              Microsoft TPC-C Kit Ver. 4.20.000
 *                              Copyright Microsoft, 1999
 *              All Rights Reserved
 *
 *                              Version 4.10.000 audited by Richard Gimarc,
Performance Metrics, 3/17/99
 *
 *      PURPOSE:Implementation for TPC-C Tuxedo class.
 *      Contact:Charles Levine (clevine@microsoft.com)
 *
 *  Change history:
 *              4.20.000 - updated rev number to match kit
 */

#define STRICT
#define _WIN32_WINNT 0x0400
#define _ATL_APARTMENT_THREADED

#include <stdio.h>
#include <atlbase.h>
//You may derive a class from CComModule and use it if you want to override
//something, but do not change the name of _Module
extern CComModule _Module;

#include <atlcom.h>
#include <initguid.h>
#include <transact.h>
#include <atlimpl.cpp>
#include <comsvcs.h>

#include <sqltypes.h>
#include <sql.h>
#include <sqlext.h>

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

#include "..\..\db_odbc_dll\src\tpcc_odbc.h"            // ODBC
implementation of TPC-C txns


#include "resource.h"
#include "tpcc_com_all.h"
#include "tpcc_com_all_i.c"
#include "Methods.h"
#include "..\..\tpcc_com_ps\src\tpcc_com_ps_i.c"
#include "..\..\common\src\ReadRegistry.cpp"


CComModule _Module;

BEGIN_OBJECT_MAP(ObjectMap)
        OBJECT_ENTRY(CLSID_TPCC, CTPCC)
        OBJECT_ENTRY(CLSID_NewOrder, CNewOrder)
        OBJECT_ENTRY(CLSID_OrderStatus, COrderStatus)
        OBJECT_ENTRY(CLSID_Payment, CPayment)
        OBJECT_ENTRY(CLSID_StockLevel, CStockLevel)
END_OBJECT_MAP()


// configuration settings from registry
TPCCREGISTRYDATAReg;
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(int* iSize, UCHAR **txn)
{
        PNEW_ORDER_DATA pNewOrder;
        COM_DATA        *pData;

        try
        {
                pData = (COM_DATA*)*txn;
                pNewOrder = m_pTxn->BuffAddr_NewOrder();

                memcpy(pNewOrder, &pData->u.NewOrder, sizeof(NEW_ORDER_DATA));
                m_pTxn->NewOrder();
                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(int* iSize, UCHAR** txn)
{
        PPAYMENT_DATA   pPayment;
        COM_DATA        *pData;

        try
        {
                pData = (COM_DATA*)*txn;
                pPayment = m_pTxn->BuffAddr_Payment();

                memcpy(pPayment, &pData->u.Payment, sizeof(PAYMENT_DATA) );
                m_pTxn->Payment();
                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(int* iSize, UCHAR** txn)
{
        PSTOCK_LEVEL_DATA       pStockLevel;
        COM_DATA                *pData;

        try
        {
                pData = (COM_DATA*)*txn;
                pStockLevel = m_pTxn->BuffAddr_StockLevel();

                memcpy(pStockLevel, &pData->u.StockLevel,
sizeof(STOCK_LEVEL_DATA) );
                m_pTxn->StockLevel();
                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(int* iSize, UCHAR** txn)
{
        PORDER_STATUS_DATA      pOrderStatus;
        COM_DATA                *pData;

        try
        {
                pData = (COM_DATA*)*txn;
                pOrderStatus = m_pTxn->BuffAddr_OrderStatus();


                memcpy(pOrderStatus, &pData->u.OrderStatus,
sizeof(ORDER_STATUS_DATA) );
                m_pTxn->OrderStatus();
                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.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.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.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_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 5.02.0235 */
/* at Fri Aug 13 18:56:24 1999
 */
/* 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,0xE0,0
x8B);

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,0xE0,0x
8B);

#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 5.02.0235 */
/* at Fri Aug 13 18:56:25 1999
 */
/* Compiler settings for .\src\tpcc_com_all.idl:
    Oicf (OptLev=i2), W1, Zp8, env=Win64 (32b run,appending), 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,0xE0,0
x8B);


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,0xE0,0x
8B);

#undef MIDL_DEFINE_GUID

#ifdef __cplusplus
}
#endif



#endif /* defined(_M_IA64) || defined(_M_AXP64)*/
```

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_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_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 5.02.0235 */
/* at Fri Aug 13 18:56:17 1999
 */
/* 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 * );

#ifndef __ITPCC_INTERFACE_DEFINED__
#define __ITPCC_INTERFACE_DEFINED__

/* interface ITPCC */
/*  [unique][helpstring][uuid][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(
            /* [out][in] */ int __RPC_FAR *iSize,
            /* [size_is][size_is][out][in] */ unsigned char __RPC_FAR
*__RPC_FAR *txn) = 0;

        virtual HRESULT __stdcall Payment(
            /* [out][in] */ int __RPC_FAR *iSize,
            /* [size_is][size_is][out][in] */ unsigned char __RPC_FAR
*__RPC_FAR *txn) = 0;


        virtual HRESULT __stdcall Delivery(
```

```
            /* [in] */ int __RPC_FAR *iSize,
            /* [size_is][size_is][in] */ unsigned char __RPC_FAR *__RPC_FAR
*txn) = 0;

        virtual HRESULT __stdcall StockLevel(
            /* [out][in] */ int __RPC_FAR *iSize,
            /* [size_is][size_is][out][in] */ unsigned char __RPC_FAR
*__RPC_FAR *txn) = 0;

        virtual HRESULT __stdcall OrderStatus(
            /* [out][in] */ int __RPC_FAR *iSize,
            /* [size_is][size_is][out][in] */ unsigned char __RPC_FAR
*__RPC_FAR *txn) = 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,
            /* [out][in] */ int __RPC_FAR *iSize,
            /* [size_is][size_is][out][in] */ unsigned char __RPC_FAR
*__RPC_FAR *txn);

        HRESULT ( __stdcall __RPC_FAR *Payment )(
            ITPCC __RPC_FAR * This,
            /* [out][in] */ int __RPC_FAR *iSize,
            /* [size_is][size_is][out][in] */ unsigned char __RPC_FAR
*__RPC_FAR *txn);

        HRESULT ( __stdcall __RPC_FAR *Delivery )(
            ITPCC __RPC_FAR * This,
            /* [in] */ int __RPC_FAR *iSize,
            /* [size_is][size_is][in] */ unsigned char __RPC_FAR *__RPC_FAR
*txn);

        HRESULT ( __stdcall __RPC_FAR *StockLevel )(
            ITPCC __RPC_FAR * This,
            /* [out][in] */ int __RPC_FAR *iSize,
            /* [size_is][size_is][out][in] */ unsigned char __RPC_FAR
*__RPC_FAR *txn);

        HRESULT ( __stdcall __RPC_FAR *OrderStatus )(
            ITPCC __RPC_FAR * This,
            /* [out][in] */ int __RPC_FAR *iSize,
            /* [size_is][size_is][out][in] */ unsigned char __RPC_FAR
*__RPC_FAR *txn);

        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,iSize,txn)  \
    (This)->lpVtbl -> NewOrder(This,iSize,txn)

#define ITPCC_Payment(This,iSize,txn)   \
    (This)->lpVtbl -> Payment(This,iSize,txn)

#define ITPCC_Delivery(This,iSize,txn)  \
    (This)->lpVtbl -> Delivery(This,iSize,txn)

#define ITPCC_StockLevel(This,iSize,txn)\
    (This)->lpVtbl -> StockLevel(This,iSize,txn)

#define ITPCC_OrderStatus(This,iSize,txn)\
    (This)->lpVtbl -> OrderStatus(This,iSize,txn)

#define ITPCC_CallSetComplete(This)     \
    (This)->lpVtbl -> CallSetComplete(This)

#endif /* COBJMACROS */


#endif  /* C style interface */



HRESULT __stdcall ITPCC_NewOrder_Proxy(
    ITPCC __RPC_FAR * This,
    /* [out][in] */ int __RPC_FAR *iSize,
    /* [size_is][size_is][out][in] */ unsigned char __RPC_FAR *__RPC_FAR *txn);


void __RPC_STUB ITPCC_NewOrder_Stub(
    IRpcStubBuffer *This,
    IRpcChannelBuffer *_pRpcChannelBuffer,
    PRPC_MESSAGE _pRpcMessage,
    DWORD *_pdwStubPhase);


HRESULT __stdcall ITPCC_Payment_Proxy(
    ITPCC __RPC_FAR * This,
    /* [out][in] */ int __RPC_FAR *iSize,
    /* [size_is][size_is][out][in] */ unsigned char __RPC_FAR *__RPC_FAR *txn);


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] */ int __RPC_FAR *iSize,
    /* [size_is][size_is][in] */ unsigned char __RPC_FAR *__RPC_FAR *txn);


void __RPC_STUB ITPCC_Delivery_Stub(
    IRpcStubBuffer *This,
    IRpcChannelBuffer *_pRpcChannelBuffer,
    PRPC_MESSAGE _pRpcMessage,
    DWORD *_pdwStubPhase);


HRESULT __stdcall ITPCC_StockLevel_Proxy(
    ITPCC __RPC_FAR * This,
    /* [out][in] */ int __RPC_FAR *iSize,

    /* [size_is][size_is][out][in] */ unsigned char __RPC_FAR *__RPC_FAR *txn);


void __RPC_STUB ITPCC_StockLevel_Stub(
    IRpcStubBuffer *This,
    IRpcChannelBuffer *_pRpcChannelBuffer,
    PRPC_MESSAGE _pRpcMessage,
    DWORD *_pdwStubPhase);


HRESULT __stdcall ITPCC_OrderStatus_Proxy(
    ITPCC __RPC_FAR * This,
```

```
    /* [out] [in] */ int __RPC_FAR *iSize,
    [size_is][size_is][out][in] */ unsigned char __RPC_FAR *__RPC_FAR *txn);


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 */

/* end of Additional Prototypes */

#ifdef __cplusplus
}
#endif

#endif
```

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_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.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.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 5.02.0235 */
/* at Fri Aug 13 18:56:17 1999
 */
/* 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 * );

#ifndef __ITPCC_INTERFACE_DEFINED__
#define __ITPCC_INTERFACE_DEFINED__

/* interface ITPCC */
/* [unique][helpstring][uuid][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(
            /* [out][in] */ int __RPC_FAR *iSize,
            /* [size_is][size_is][out][in] */ unsigned char __RPC_FAR
*__RPC_FAR *txn) = 0;

        virtual HRESULT __stdcall Payment(
            /* [out][in] */ int __RPC_FAR *iSize,
            /* [size_is][size_is][out][in] */ unsigned char __RPC_FAR
*__RPC_FAR *txn) = 0;

        virtual HRESULT __stdcall Delivery(
            /* [in] */ int __RPC_FAR *iSize,
            /* [size_is][size_is][in] */ unsigned char __RPC_FAR *__RPC_FAR
*txn) = 0;

        virtual HRESULT __stdcall StockLevel(
            /* [out][in] */ int __RPC_FAR *iSize,
            /* [size_is][size_is][out][in] */ unsigned char __RPC_FAR
*__RPC_FAR *txn) = 0;

        virtual HRESULT __stdcall OrderStatus(
            /* [out][in] */ int __RPC_FAR *iSize,
            /* [size_is][size_is][out][in] */ unsigned char __RPC_FAR
*__RPC_FAR *txn) = 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,
            /* [out][in] */ int __RPC_FAR *iSize,
            /* [size_is][size_is][out][in] */ unsigned char __RPC_FAR
*__RPC_FAR *txn);

        HRESULT ( __stdcall __RPC_FAR *Payment )(
            ITPCC __RPC_FAR * This,
            /* [out][in] */ int __RPC_FAR *iSize,
            /* [size_is][size_is][out][in] */ unsigned char __RPC_FAR
*__RPC_FAR *txn);

        HRESULT ( __stdcall __RPC_FAR *Delivery )(
            ITPCC __RPC_FAR * This,
            /* [in] */ int __RPC_FAR *iSize,
            /* [size_is][size_is][in] */ unsigned char __RPC_FAR *__RPC_FAR
*txn);

        HRESULT ( __stdcall __RPC_FAR *StockLevel )(
            ITPCC __RPC_FAR * This,
            /* [out][in] */ int __RPC_FAR *iSize,
```

```
            /* [size_is][size_is][out][in] */ unsigned char __RPC_FAR
*__RPC_FAR *txn);
        HRESULT ( __stdcall __RPC_FAR *OrderStatus )(
            ITPCC __RPC_FAR * This,
            /* [out][in] */ int __RPC_FAR *iSize,
            /* [size_is][size_is][out][in] */ unsigned char __RPC_FAR
*__RPC_FAR *txn);

        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,iSize,txn)  \
    (This)->lpVtbl -> NewOrder(This,iSize,txn)

#define ITPCC_Payment(This,iSize,txn)   \
    (This)->lpVtbl -> Payment(This,iSize,txn)

#define ITPCC_Delivery(This,iSize,txn)  \
    (This)->lpVtbl -> Delivery(This,iSize,txn)

#define ITPCC_StockLevel(This,iSize,txn)\
    (This)->lpVtbl -> StockLevel(This,iSize,txn)

#define ITPCC_OrderStatus(This,iSize,txn)\
    (This)->lpVtbl -> OrderStatus(This,iSize,txn)

#define ITPCC_CallSetComplete(This)     \
    (This)->lpVtbl -> CallSetComplete(This)

#endif /* COBJMACROS */



#endif  /* C style interface */



HRESULT __stdcall ITPCC_NewOrder_Proxy(
    ITPCC __RPC_FAR * This,
    /* [out][in] */ int __RPC_FAR *iSize,
    /* [size_is][size_is][out][in] */ unsigned char __RPC_FAR *__RPC_FAR *txn);


void __RPC_STUB ITPCC_NewOrder_Stub(
    IRpcStubBuffer *This,
    IRpcChannelBuffer *_pRpcChannelBuffer,
    PRPC_MESSAGE _pRpcMessage,
    DWORD *_pdwStubPhase);


HRESULT __stdcall ITPCC_Payment_Proxy(
    ITPCC __RPC_FAR * This,
    /* [out][in] */ int __RPC_FAR *iSize,
    /* [size_is][size_is][out][in] */ unsigned char __RPC_FAR *__RPC_FAR *txn);


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] */ int __RPC_FAR *iSize,
    /* [size_is][size_is][in] */ unsigned char __RPC_FAR *__RPC_FAR *txn);


void __RPC_STUB ITPCC_Delivery_Stub(
    IRpcStubBuffer *This,
    IRpcChannelBuffer *_pRpcChannelBuffer,
    PRPC_MESSAGE _pRpcMessage,
    DWORD *_pdwStubPhase);


HRESULT __stdcall ITPCC_StockLevel_Proxy(
    ITPCC __RPC_FAR * This,
    /* [out][in] */ int __RPC_FAR *iSize,
    /* [size_is][size_is][out][in] */ unsigned char __RPC_FAR *__RPC_FAR *txn);


void __RPC_STUB ITPCC_StockLevel_Stub(
    IRpcStubBuffer *This,
    IRpcChannelBuffer *_pRpcChannelBuffer,
    PRPC_MESSAGE _pRpcMessage,
    DWORD *_pdwStubPhase);


HRESULT __stdcall ITPCC_OrderStatus_Proxy(
    ITPCC __RPC_FAR * This,
    /* [out][in] */ int __RPC_FAR *iSize,
    /* [size_is][size_is][out][in] */ unsigned char __RPC_FAR *__RPC_FAR *txn);


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 */

/* end of Additional Prototypes */

#ifdef __cplusplus
}
#endif

#endif
```

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,
                uuid(FEEE6AA2-84B1-11d2-BA47-00C04FBFE08B),
                helpstring("ITPCC Interface"),
                pointer_default(unique)
        ]
        interface ITPCC : IUnknown
        {

        HRESULT _stdcall NewOrder
                                                (
                                                [in, out] int* iSize,
                                                [in, out, size_is( , *iSize)]
char** txn
                                                );

        HRESULT _stdcall Payment
                                                (
                                                [in, out] int* iSize,
                                                [in, out, size_is( , *iSize)]
char** txn
                                                );

        HRESULT _stdcall Delivery
                                                (
                                                [in] int* iSize,
                                                [in, size_is( , *iSize)]
char** txn
                                                );

        HRESULT _stdcall StockLevel
                                                (
                                                [in, out] int* iSize,
                                                [in, out, size_is( , *iSize)]
char** txn
                                                );

        HRESULT _stdcall OrderStatus
                                                (
                                                [in, out] int* iSize,
                                                [in, out, size_is( , *iSize)]
char** txn
                                                );

        HRESULT _stdcall CallSetComplete
                                                (
                                                );

    };  // interface ITPCC
```

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 5.02.0235 */
/* at Fri Aug 13 18:56:17 1999
 */
/* 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 5.02.0235 */
/* at Fri Aug 13 18:56:18 1999
 */
/* Compiler settings for .\src\tpcc_com_ps.idl:
    Oicf (OptLev=i2), W1, Zp8, env=Win64 (32b run,appending), 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)*/
```

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 5.02.0235 */
/* at Fri Aug 13 18:56:17 1999
 */
/* 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   33
#define PROC_FORMAT_STRING_SIZE   193
#define TRANSMIT_AS_TABLE_SIZE    0
#define WIRE_MARSHAL_TABLE_SIZE   0

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;


/* 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[-3],
    &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
};

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,
    0x50200eb, /* MIDL Version 5.2.235 */
    0,
    0,
    0,  /* notify & notify_flag routine table */
    1,  /* Flags */
    0,  /* Reserved3 */
    0,  /* Reserved4 */
    0   /* Reserved5 */
    };

#pragma data_seg(".rdata")


#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.
#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_
/*  8 */NdrFcShort( 0x10 ),     /* x86, MIPS, PPC Stack size/offset = 16 */
#else
                        NdrFcShort( 0x20 ),     /* Alpha Stack size/offset =
32 */
#endif
/* 10 */NdrFcShort( 0x8 ),      /* 8 */
/* 12 */NdrFcShort( 0x10 ),     /* 16 */
/* 14 */0x7,            /* Oi2 Flags:  srv must size, clt must size, has
return, */
                        0x3,            /* 3 */

        /* Parameter iSize */

/* 16 */NdrFcShort( 0x158 ),    /* Flags:  in, out, base type, simple ref, */
#ifndef _ALPHA_

/* 18 */NdrFcShort( 0x4 ),      /* x86, MIPS, PPC Stack size/offset = 4 */
#else
                        NdrFcShort( 0x8 ),      /* Alpha Stack size/offset =
8 */
#endif
/* 20 */0x8,            /* FC_LONG */
                        0x0,            /* 0 */

        /* Parameter txn */

/* 22 */NdrFcShort( 0x201b ),   /* Flags:  must size, must free, in, out, srv
alloc size=8 */
#ifndef _ALPHA_
/* 24 */NdrFcShort( 0x8 ),      /* x86, MIPS, PPC Stack size/offset = 8 */
#else
                        NdrFcShort( 0x10 ),     /* Alpha Stack size/offset =
16 */
#endif
/* 26 */NdrFcShort( 0x6 ),      /* Type Offset=6 */

        /* Return value */

/* 28 */NdrFcShort( 0x70 ),     /* Flags:  out, return, base type, */
#ifndef _ALPHA_
/* 30 */NdrFcShort( 0xc ),      /* x86, MIPS, PPC Stack size/offset = 12 */
#else
                        NdrFcShort( 0x18 ),     /* Alpha Stack size/offset =
24 */
#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_
/* 42 */NdrFcShort( 0x10 ),     /* x86, MIPS, PPC Stack size/offset = 16 */

#else
                        NdrFcShort( 0x20 ),     /* Alpha Stack size/offset =
32 */
#endif
/* 44 */NdrFcShort( 0x8 ),      /* 8 */
/* 46 */NdrFcShort( 0x10 ),     /* 16 */
/* 48 */0x7,            /* Oi2 Flags:  srv must size, clt must size, has
return, */
                        0x3,            /* 3 */

        /* Parameter iSize */

/* 50 */NdrFcShort( 0x158 ),    /* Flags:  in, out, base type, simple ref, */
#ifndef _ALPHA_
/* 52 */NdrFcShort( 0x4 ),      /* x86, MIPS, PPC Stack size/offset = 4 */
#else
```

```
                        NdrFcShort( 0x8 ),      /* Alpha Stack size/offset =
8 */
#endif
/* 54 */0x8,            /* FC_LONG */
                        0x0,            /* 0 */

        /* Parameter txn */

/* 56 */NdrFcShort( 0x201b ),   /* Flags:  must size, must free, in, out, srv
alloc size=8 */
#ifndef _ALPHA_
/* 58 */NdrFcShort( 0x8 ),      /* x86, MIPS, PPC Stack size/offset = 8 */
#else
                        NdrFcShort( 0x10 ),     /* Alpha Stack size/offset =
16 */
#endif
/* 60 */NdrFcShort( 0x6 ),      /* Type Offset=6 */

        /* Return value */

/* 62 */NdrFcShort( 0x70 ),     /* Flags:  out, return, base type, */
#ifndef _ALPHA_
/* 64 */NdrFcShort( 0xc ),      /* x86, MIPS, PPC Stack size/offset = 12 */
#else
                        NdrFcShort( 0x18 ),     /* Alpha Stack size/offset =
24 */
#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_
/* 76 */NdrFcShort( 0x10 ),     /* x86, MIPS, PPC Stack size/offset = 16 */
#else
                        NdrFcShort( 0x20 ),     /* Alpha Stack size/offset =
32 */
#endif
/* 78 */NdrFcShort( 0x8 ),      /* 8 */
/* 80 */NdrFcShort( 0x8 ),      /* 8 */
/* 82 */0x6,            /* Oi2 Flags:  clt must size, has return, */
                        0x3,            /* 3 */

        /* Parameter iSize */

/* 84 */NdrFcShort( 0x148 ),    /* Flags:  in, base type, simple ref, */
#ifndef _ALPHA_
/* 86 */NdrFcShort( 0x4 ),      /* x86, MIPS, PPC Stack size/offset = 4 */
#else
                        NdrFcShort( 0x8 ),      /* Alpha Stack size/offset =
8 */
#endif
/* 88 */0x8,            /* FC_LONG */
                        0x0,            /* 0 */

        /* Parameter txn */

/* 90 */NdrFcShort( 0x200b ),   /* Flags:  must size, must free, in, srv alloc
size=8 */
#ifndef _ALPHA_

/* 92 */NdrFcShort( 0x8 ),      /* x86, MIPS, PPC Stack size/offset = 8 */
#else
                        NdrFcShort( 0x10 ),     /* Alpha Stack size/offset =
16 */
#endif
/* 94 */NdrFcShort( 0x18 ),     /* Type Offset=24 */

        /* Return value */

/* 96 */NdrFcShort( 0x70 ),     /* Flags:  out, return, base type, */
#ifndef _ALPHA_
/* 98 */NdrFcShort( 0xc ),      /* x86, MIPS, PPC Stack size/offset = 12 */
#else
                        NdrFcShort( 0x18 ),     /* Alpha Stack size/offset =
24 */
#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_
/* 110 */       NdrFcShort( 0x10 ),     /* x86, MIPS, PPC Stack size/offset =
16 */
#else
                        NdrFcShort( 0x20 ),     /* Alpha Stack size/offset =
32 */
#endif
/* 112 */       NdrFcShort( 0x8 ),      /* 8 */
/* 114 */       NdrFcShort( 0x10 ),     /* 16 */
/* 116 */       0x7,            /* Oi2 Flags:  srv must size, clt must size,
has return, */
                        0x3,            /* 3 */

        /* Parameter iSize */


/* 118 */       NdrFcShort( 0x158 ),    /* Flags:  in, out, base type, simple
ref, */
#ifndef _ALPHA_
/* 120 */       NdrFcShort( 0x4 ),      /* x86, MIPS, PPC Stack size/offset =
4 */
#else
                        NdrFcShort( 0x8 ),      /* Alpha Stack size/offset =
8 */
#endif
/* 122 */       0x8,            /* FC_LONG */
                        0x0,            /* 0 */

        /* Parameter txn */

/* 124 */       NdrFcShort( 0x201b ),   /* Flags:  must size, must free, in,
out, srv alloc size=8 */
#ifndef _ALPHA_
/* 126 */       NdrFcShort( 0x8 ),      /* x86, MIPS, PPC Stack size/offset =
8 */
#else
                        NdrFcShort( 0x10 ),     /* Alpha Stack size/offset =
16 */
#endif
/* 128 */       NdrFcShort( 0x6 ),      /* Type Offset=6 */

        /* Return value */

/* 130 */       NdrFcShort( 0x70 ),     /* Flags:  out, return, base type, */
#ifndef _ALPHA_
/* 132 */       NdrFcShort( 0xc ),      /* x86, MIPS, PPC Stack size/offset =
12 */
#else
                        NdrFcShort( 0x18 ),     /* Alpha Stack size/offset =
24 */
#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_
/* 144 */       NdrFcShort( 0x10 ),     /* x86, MIPS, PPC Stack size/offset =
16 */
#else
                        NdrFcShort( 0x20 ),     /* Alpha Stack size/offset =
32 */
#endif
/* 146 */       NdrFcShort( 0x8 ),      /* 8 */
/* 148 */       NdrFcShort( 0x10 ),     /* 16 */
/* 150 */       0x7,            /* Oi2 Flags:  srv must size, clt must size,
has return, */
                        0x3,            /* 3 */

        /* Parameter iSize */

/* 152 */       NdrFcShort( 0x158 ),    /* Flags:  in, out, base type, simple
ref, */
#ifndef _ALPHA_
/* 154 */       NdrFcShort( 0x4 ),      /* x86, MIPS, PPC Stack size/offset =
4 */
```

```
#else                   NdrFcShort( 0x8 ),      /* Alpha Stack size/offset =
8 */
#endif
/* 156 */       0x8,            /* FC_LONG */
                        0x0,            /* 0 */

        /* Parameter txn */

/* 158 */       NdrFcShort( 0x201b ),   /* Flags:  must size, must free, in,
out, srv alloc size=8 */
#ifndef _ALPHA_
/* 160 */       NdrFcShort( 0x8 ),      /* x86, MIPS, PPC Stack size/offset =
8 */
#else
                        NdrFcShort( 0x10 ),     /* Alpha Stack size/offset =
16 */

#endif
/* 162 */       NdrFcShort( 0x6 ),      /* Type Offset=6 */

        /* Return value */

/* 164 */       NdrFcShort( 0x70 ),     /* Flags:  out, return, base type, */
#ifndef _ALPHA_
/* 166 */       NdrFcShort( 0xc ),      /* x86, MIPS, PPC Stack size/offset =
12 */
#else
                        NdrFcShort( 0x18 ),     /* Alpha Stack size/offset =
24 */
#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 */
                        0x11, 0x8,      /* FC_RP [simple_pointer] */
/*  4 */0x8,            /* FC_LONG */
                        0x5c,           /* FC_PAD */
/*  6 */
                        0x11, 0x14,     /* FC_RP [alloced_on_stack]
[pointer_deref] */
/*  8 */NdrFcShort( 0x2 ),      /* Offset= 2 (10) */
/* 10 */
                        0x13, 0x0,      /* FC_OP */
/* 12 */NdrFcShort( 0x2 ),      /* Offset= 2 (14) */
```

```
/* 14 */                0x1b,           /* FC_CARRAY */
                        0x0,            /* 0 */
/* 16 */NdrFcShort( 0x1 ),      /* 1 */
/* 18 */0x28,           /* Corr desc:  parameter, FC_LONG */
                        0x54,           /* FC_DEREFERENCE */
#ifndef _ALPHA_
/* 20 */NdrFcShort( 0x4 ),      /* x86, MIPS, PPC Stack size/offset = 4 */
#else
                        NdrFcShort( 0x8 ),      /* Alpha Stack size/offset =
8 */
#endif

/* 22 */0x2,            /* FC_CHAR */
                        0x5b,           /* FC_END */
/* 24 */
                        0x11, 0x14,     /* FC_RP [alloced_on_stack]
[pointer_deref] */
/* 26 */NdrFcShort( 0x2 ),      /* Offset= 2 (28) */
/* 28 */
                        0x12, 0x0,      /* FC_UP */
/* 30 */NdrFcShort( 0xfffffff0 ),/* Offset= -16 (14) */

                        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 5.02.0235 */
```

```
/*/at Fri Aug 13 18:56:18 1999
/* Compiler settings for .\src\tpcc_com_ps.idl:
    Oicf (OptLev=i2), W1, Zp8, env=Win64 (32b run,appending), 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   33
#define PROC_FORMAT_STRING_SIZE   193
#define TRANSMIT_AS_TABLE_SIZE    0
#define WIRE_MARSHAL_TABLE_SIZE   0

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;


/* 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
};


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,
    0x50200eb, /* MIDL Version 5.2.235 */
    0,
    0,
    0,  /* notify & notify_flag routine table */
    1,  /* Flags */
    0,  /* Reserved3 */
    0,  /* Reserved4 */
    0   /* Reserved5 */
    };

#pragma data_seg(".rdata")

#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 */
/*  8 */NdrFcShort( 0x20 ),     /* ia64, axp64 Stack size/offset = 32 */
/* 10 */NdrFcShort( 0x8 ),      /* 8 */
/* 12 */NdrFcShort( 0x10 ),     /* 16 */
```

```
/* 14 */0x7,            /* Oi2 Flags:  srv must size, clt must size, has
return, */
                        0x3,            /* 3 */

        /* Parameter iSize */

/* 16 */NdrFcShort( 0x158 ),    /* Flags:  in, out, base type, simple ref, */
/* 18 */NdrFcShort( 0x8 ),      /* ia64, axp64 Stack size/offset = 8 */
/* 20 */0x8,            /* FC_LONG */
                        0x0,            /* 0 */

        /* Parameter txn */

/* 22 */NdrFcShort( 0x201b ),   /* Flags:  must size, must free, in, out, srv
alloc size=8 */
/* 24 */NdrFcShort( 0x10 ),     /* ia64, axp64 Stack size/offset = 16 */
/* 26 */NdrFcShort( 0x6 ),      /* Type Offset=6 */

        /* Return value */

/* 28 */NdrFcShort( 0x70 ),     /* Flags:  out, return, base type, */
/* 30 */NdrFcShort( 0x18 ),     /* ia64, axp64 Stack size/offset = 24 */
/* 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 */
/* 42 */NdrFcShort( 0x20 ),     /* ia64, axp64 Stack size/offset = 32 */
/* 44 */NdrFcShort( 0x8 ),      /* 8 */
/* 46 */NdrFcShort( 0x10 ),     /* 16 */
/* 48 */0x7,            /* Oi2 Flags:  srv must size, clt must size, has
return, */
                        0x3,            /* 3 */

        /* Parameter iSize */

/* 50 */NdrFcShort( 0x158 ),    /* Flags:  in, out, base type, simple ref, */
/* 52 */NdrFcShort( 0x8 ),      /* ia64, axp64 Stack size/offset = 8 */
/* 54 */0x8,            /* FC_LONG */
                        0x0,            /* 0 */

        /* Parameter txn */

/* 56 */NdrFcShort( 0x201b ),   /* Flags:  must size, must free, in, out, srv
alloc size=8 */
/* 58 */NdrFcShort( 0x10 ),     /* ia64, axp64 Stack size/offset = 16 */
/* 60 */NdrFcShort( 0x6 ),      /* Type Offset=6 */

        /* Return value */

/* 62 */NdrFcShort( 0x70 ),     /* Flags:  out, return, base type, */
/* 64 */NdrFcShort( 0x18 ),     /* ia64, axp64 Stack size/offset = 24 */
/* 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 */
/* 76 */NdrFcShort( 0x20 ),     /* ia64, axp64 Stack size/offset = 32 */
/* 78 */NdrFcShort( 0x8 ),      /* 8 */
/* 80 */NdrFcShort( 0x8 ),      /* 8 */
/* 82 */0x6,            /* Oi2 Flags:  clt must size, has return, */
                        0x3,            /* 3 */

        /* Parameter iSize */

/* 84 */NdrFcShort( 0x148 ),    /* Flags:  in, base type, simple ref, */
/* 86 */NdrFcShort( 0x8 ),      /* ia64, axp64 Stack size/offset = 8 */
/* 88 */0x8,            /* FC_LONG */
                        0x0,            /* 0 */

        /* Parameter txn */

/* 90 */NdrFcShort( 0x200b ),   /* Flags:  must size, must free, in, srv alloc
size=8 */

/* 92 */NdrFcShort( 0x10 ),     /* ia64, axp64 Stack size/offset = 16 */
```

```
/* 94 */NdrFcShort( 0x18 ),     /* Type Offset=24 */
        /* Return value */

/* 96 */NdrFcShort( 0x70 ),     /* Flags:  out, return, base type, */
/* 98 */NdrFcShort( 0x18 ),     /* ia64, axp64 Stack size/offset = 24 */
/* 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 */
/* 110 */       NdrFcShort( 0x20 ),     /* ia64, axp64 Stack size/offset = 32
*/
/* 112 */       NdrFcShort( 0x8 ),      /* 8 */
/* 114 */       NdrFcShort( 0x10 ),     /* 16 */
/* 116 */       0x7,            /* Oi2 Flags:  srv must size, clt must size,
has return, */
                        0x3,            /* 3 */


        /* Parameter iSize */

/* 118 */       NdrFcShort( 0x158 ),    /* Flags:  in, out, base type, simple
ref, */
/* 120 */       NdrFcShort( 0x8 ),      /* ia64, axp64 Stack size/offset = 8
*/
/* 122 */       0x8,            /* FC_LONG */
                        0x0,            /* 0 */


        /* Parameter txn */

/* 124 */       NdrFcShort( 0x201b ),   /* Flags:  must size, must free, in,
out, srv alloc size=8 */
/* 126 */       NdrFcShort( 0x10 ),     /* ia64, axp64 Stack size/offset = 16
*/
/* 128 */       NdrFcShort( 0x6 ),      /* Type Offset=6 */


        /* Return value */

/* 130 */       NdrFcShort( 0x70 ),     /* Flags:  out, return, base type, */
/* 132 */       NdrFcShort( 0x18 ),     /* ia64, axp64 Stack size/offset = 24
*/
/* 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 */
/* 144 */       NdrFcShort( 0x20 ),     /* ia64, axp64 Stack size/offset = 32
*/
/* 146 */       NdrFcShort( 0x8 ),      /* 8 */
/* 148 */       NdrFcShort( 0x10 ),     /* 16 */
/* 150 */       0x7,            /* Oi2 Flags:  srv must size, clt must size,
has return, */
                        0x3,            /* 3 */


        /* Parameter iSize */

/* 152 */       NdrFcShort( 0x158 ),    /* Flags:  in, out, base type, simple
ref, */
/* 154 */       NdrFcShort( 0x8 ),      /* ia64, axp64 Stack size/offset = 8
*/
/* 156 */       0x8,            /* FC_LONG */
                        0x0,            /* 0 */


        /* Parameter txn */

/* 158 */       NdrFcShort( 0x201b ),   /* Flags:  must size, must free, in,
out, srv alloc size=8 */
/* 160 */       NdrFcShort( 0x10 ),     /* ia64, axp64 Stack size/offset = 16
*/
/* 162 */       NdrFcShort( 0x6 ),      /* Type Offset=6 */


        /* Return value */

/* 164 */       NdrFcShort( 0x70 ),     /* Flags:  out, return, base type, */
/* 166 */       NdrFcShort( 0x18 ),     /* ia64, axp64 Stack size/offset = 24
*/
/* 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 */
/* 178 */       NdrFcShort( 0x10 ),     /* ia64, axp64 Stack size/offset = 16
*/
/* 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, */
/* 188 */       NdrFcShort( 0x8 ),      /* ia64, axp64 Stack size/offset = 8
*/
/* 190 */       0x8,            /* FC_LONG */
                        0x0,            /* 0 */

                        0x0
        }
    };

static const MIDL_TYPE_FORMAT_STRING __MIDL_TypeFormatString =
    {
        0,
        {
                        NdrFcShort( 0x0 ),      /* 0 */
/*  2 */
                        0x11, 0x8,      /* FC_RP [simple_pointer] */
/*  4 */0x8,            /* FC_LONG */
                        0x5c,           /* FC_PAD */
/*  6 */
                        0x11, 0x14,     /* FC_RP [alloced_on_stack]
[pointer_deref] */
/*  8 */NdrFcShort( 0x2 ),      /* Offset= 2 (10) */
/* 10 */
                        0x13, 0x0,      /* FC_OP */
/* 12 */NdrFcShort( 0x2 ),      /* Offset= 2 (14) */
/* 14 */                0x1b,           /* FC_CARRAY */
                        0x0,            /* 0 */
/* 16 */NdrFcShort( 0x1 ),      /* 1 */
/* 18 */0x28,           /* Corr desc:  parameter, FC_LONG */
                        0x54,           /* FC_DEREFERENCE */
/* 20 */NdrFcShort( 0x8 ),      /* ia64, axp64 Stack size/offset = 8 */
/* 22 */0x2,            /* FC_CHAR */
                        0x5b,           /* FC_END */
/* 24 */
                        0x11, 0x14,     /* FC_RP [alloced_on_stack]
[pointer_deref] */
/* 26 */NdrFcShort( 0x2 ),      /* Offset= 2 (28) */
/* 28 */
                        0x12, 0x0,      /* FC_UP */
/* 30 */NdrFcShort( 0xfffffff0 ),/* Offset= -16 (14) */

                        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)*/
```

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 */
```

Appendix B Database Design

B.1 Create, backup and restore

SETUP.CMD

```
::ECHO OFF
@ECHO
********************************************************************************
@ECHO *
*
@ECHO *  Microsoft TPC-C V3 Benchmark Kit Ver. 4.20
*
@ECHO *
*
@ECHO
********************************************************************************

@if '%1'=='' goto usage
@if '%2'=='' goto usage
@if '%3'=='' goto usage
@if not '%4'=='' if not '%4' == 'normal' if not '%4' == 'scale_down' 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

:Verify_Installation
@isql -Usa -P -S%1 -b -iscripts\utility\verify_msg.sql                  >nul
@isql -Usa -P -S%1 -b -iscripts\utility\verify_build.sql          >nul
@isql -Usa -P -S%1 -b -iscripts\utility\verify_sort.sql                 >nul
@isql -Usa -P -S%1 -b -Q"ms_verify_build"                         >nul
@if errorlevel 1 goto BAD_BUILD
@isql -Usa -P -S%1 -b -Q"ms_verify_sort"                          >nul
@if errorlevel 1 goto BAD_SORT

:builddb
@@if exist logs\db.log del logs\db.log                                  >nul
@ECHO Removing any existing TPCC database and backup devices...
@isql -Usa -P -S%1 -e < scripts\%2.war\database\removedb.sql             >
logs\db.log
@ECHO Creating Backup Device(s)...
@isql -Usa -P -S%1 -e < scripts\%2.war\database\backupdev.sql            >>
logs\db.log
@if errorlevel 1 goto CREATE_ERROR
@ECHO Building database files and database...
@isql -Usa -P -S%1 -b -e < scripts\%2.war\database\createdb.sql          >>
logs\db.log
@if errorlevel 1 goto CREATE_ERROR
@ECHO Database build complete.
@if  '%3'=='full' goto objects
goto end

:objects
@if exist logs\objects.log del logs\objects.log                         >nul
@ECHO Creating TPC-C database tables...
@isql -Usa -P -S%1 -b -e < scripts\%2.war\ddl\tables.sql          >
logs\objects.log
@if errorlevel 1 goto TABLES_ERROR
```

```
@ECHO Creating database objects...
@isql -Usa -P -S%1 -b -e < scripts\dml\neword.sql                >>
logs\objects.log
@if errorlevel 1 goto NEWORDER_ERROR
@isql -Usa -P -S%1 -b -e < scripts\dml\payment.sql               >>
logs\objects.log
@if errorlevel 1 goto PAYMENT_ERROR
@isql -Usa -P -S%1 -b -e < scripts\dml\ordstat.sql               >>
logs\objects.log
@if errorlevel 1 goto ORDERSTATUS_ERROR
@isql -Usa -P -S%1 -b -e < scripts\dml\delivery.sql                    >>
logs\objects.log
@if errorlevel 1 goto DELIVERY_ERROR
@isql -Usa -P -S%1 -b -e < scripts\dml\stocklev.sql                    >>
logs\objects.log
@if errorlevel 1 goto STOCKLEVEL_ERROR
@isql -Usa -P -S%1 -e < scripts\dml\version.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 Setting database options before load...
@isql -Usa -P -S%1 -b -e < scripts\utility\dbopt1.sql                   >>
logs\objects.log
@if errorlevel 1 goto DBOPT1_ERROR
@ECHO Beginning data load and index creation...
@if '%4'==''      loader\%PROCESSOR_ARCHITECTURE%\bin\tpccldr -S%1 -W%2 -
flogs\bulkload.log -dscripts\%2.war\ddl -c0
@if errorlevel 1 goto END
@if '%4'=='normal' loader\%PROCESSOR_ARCHITECTURE%\bin\tpccldr -S%1 -W%2 -
flogs\bulkload.log -dscripts\%2.war\ddl -c0
@if errorlevel 1 goto END
@if '%4'=='scale_down' loader\%PROCESSOR_ARCHITECTURE%\bin\tpccldr -S%1 -W%2 -
flogs\bulkload.log -dscripts\%2.war\ddl -c1
@if errorlevel 1 goto END
goto bulkloaddone

:bulkloaddone
@ECHO Setting database options after load.
@isql -Usa -P -S%1 -b -e < scripts\utility\dbopt2.sql                   >>
logs\bulkload.log
@if errorlevel 1 goto DBOPT2_ERROR
@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 -b -e < scripts\%2.war\database\backup.sql           >
logs\backup.log
@if errorlevel 1 goto BACKUP_ERROR
@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 -b -e < scripts\utility\verifytpccload.sql    >
logs\verifyload.log
@if errorlevel 1 goto VERIFY_ERROR
@ECHO Check logs\verifyload.log to verify database load.

:complete
@ECHO
*********************************************************************
@ECHO *
*
@ECHO *  Full TPC-C V3 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 *     DBTYPE  = normal or scale_down                               *
@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                                     *
@ECHO *                                                                  *
@ECHO *  NOTE 1: 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 *  NOTE 2: The TPC-C setup program supports both Intel and Alpha   *
@ECHO *  systems.  It queries the %PROCESSOR_ARCHITECTURE% environment    *
@ECHO *  variable and runs the appropriate executables.                  *
@ECHO *                                                                  *
@ECHO ********************************************************************
@goto end


:CREATE_ERROR
@echo.
@echo BUILD ABORTED!
@echo.
@echo There was an error in the database/backup device creation.
@echo.
@echo Check your CREATEDB.SQL, BACKUPDEV.SQL, LOGS\DB.LOG, and the
@echo SQL Server errorlog (MSSQL7\LOG\ERRORLOG) for details.
@echo.
@goto END

:TABLES_ERROR
@echo.
@echo BUILD ABORTED!
@echo.
@echo There was an error in the table creation.
@echo.
@echo Verify that the FileGroup names specified in CREATEDB.SQL
@echo match those specified in SCRIPTS\DDL\TABLES.SQL.
@echo.
@goto END

:NEWORDER_ERROR
@echo.
@echo BUILD ABORTED!
@echo.
@echo There was an error in the creation of the New Order stored procedure.
@echo.
@echo Check your LOGS\OBJECTS.LOG, SCRIPTS\DML\NEWORD.SQL and the
@echo SQL Server errorlog (MSSQL7\LOG\ERRORLOG) for details.
@echo.
@goto END

:PAYMENT_ERROR
@echo.
@echo BUILD ABORTED!
@echo.
@echo There was an error in the creation of the Payment stored procedure.
@echo.
```

```
@echo Check your LOGS\OBJECTS.LOG, SCRIPTS\DML\PAYMENT.SQL and the
@echo SQL Server errorlog (MSSQL7\LOG\ERRORLOG) for details.
@echo.
@goto END

:ORDERSTATUS_ERROR
@echo.
@echo BUILD ABORTED!
@echo.
@echo There was an error in the creation of the Order Status stored procedure.
@echo.
@echo Check your LOGS\OBJECTS.LOG, SCRIPTS\DML\ORDSTAT.SQL and the
@echo SQL Server errorlog (MSSQL7\LOG\ERRORLOG) for details.
@echo.
@goto END

:DELIVERY_ERROR
@echo.
@echo BUILD ABORTED!
@echo.
@echo There was an error in the creation of the Delivery stored procedure.
@echo.
@echo Check your LOGS\OBJECTS.LOG, SCRIPTS\DML\DELIVERY.SQL and the
@echo SQL Server errorlog (MSSQL7\LOG\ERRORLOG) for details.
@echo.
@goto END

:STOCKLEVEL_ERROR
@echo.
@echo BUILD ABORTED!
@echo.
@echo There was an error in the creation of the Stock Level stored procedure.
@echo.
@echo Check your LOGS\OBJECTS.LOG, SCRIPTS\DML\STOCKLEV.SQL and the
@echo SQL Server errorlog (MSSQL7\LOG\ERRORLOG) for details.
@echo.
@goto END

:DBOPT1_ERROR
@echo.
@echo BUILD ABORTED!
@echo.
@echo There was an error setting the database options before load.
@echo.
@echo Check your LOGS\OBJECTS.LOG and the SQL Server errorlog
@echo (MSSQL7\LOG\ERRORLOG) for details.
@echo.
@goto END

:DBOPT2_ERROR
@echo.
@echo BUILD ABORTED!
@echo.
@echo There was an error setting the database options after load.
@echo.
@echo Check your LOGS\OBJECTS.LOG and the SQL Server errorlog
@echo (MSSQL7\LOG\ERRORLOG) for details.
@echo.
@goto END

:BACKUP_ERROR
@echo.
@echo BUILD ABORTED!
@echo.
@echo There was an error backing up the database after load.
@echo.
@echo Check your LOGS\BACKUP.LOG and the SQL Server errorlog
@echo (MSSQL7\LOG\ERRORLOG) for details.
@echo.
@goto END

:VERIFY_ERROR
@echo.
@echo BUILD ABORTED!
@echo.
@echo There was an error performing TPC-C database verification.
@echo.
@echo Check your LOGS\VERIFYLOAD.LOG and the SQL Server errorlog
@echo (MSSQL7\LOG\ERRORLOG) for details.
@echo.

@goto END

:BAD_BUILD
@echo.
@echo BUILD ABORTED!
```

```
@echo Incorrect SQL Server Version.  You must run Microsoft SQL Server
@echo Version 7.00.623 or newer to use this kit.  Please uninstall this
@echo version and re-install an appropriate version of SQL Server.
@echo.
@goto END

:BAD_SORT
@echo.
@echo BUILD ABORTED!
@echo.
@echo Incorrect SQL Server Sort Order.  For performance and compatibility
@echo issues, you must run SQL Server with the Binary Sort Order.  Please
@echo re-install SQL Server and specify the Binary Sort Order.
@echo.
@goto END
:end

echo on
```

CREATEDB.SQL

```
--  File:     CREATEDB.SQL
--            Microsoft TPC-C Benchmark Kit Ver. 4.10
--            Copyright Microsoft, 1999
--  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= "D:\MSSQL70_tpcc_root.mdf",
        SIZE            = 8MB,
        FILEGROWTH      =0),
FILEGROUP       MSSQL70_misc_fg
(       NAME            = MSSQL70_misc1,
        FILENAME= "M:",
        SIZE            = 11972MB,
        FILEGROWTH      = 0),
(       NAME            = MSSQL70_misc2,
        FILENAME= "N:",
        SIZE            = 11972MB,
        FILEGROWTH      = 0),
(       NAME            = MSSQL70_misc3,
        FILENAME= "O:",
        SIZE            = 11972MB,
        FILEGROWTH      = 0),
(       NAME            = MSSQL70_misc4,
        FILENAME= "P:",
        SIZE            = 11972MB,
        FILEGROWTH      = 0),
(       NAME            = MSSQL70_misc5,
        FILENAME= "Q:",
        SIZE            = 11972MB,
        FILEGROWTH      = 0),
```

```
FILEGROUP       MSSQL70_cs_fg
(       NAME            = MSSQL70_cs1,
        FILENAME= "F:",
        SIZE            = 24820MB,
        FILEGROWTH      = 0),
(       NAME            = MSSQL70_cs2,
        FILENAME= "G:",
        SIZE            = 24820MB,
        FILEGROWTH      = 0),
(       NAME            = MSSQL70_cs3,
        FILENAME= "H:",
        SIZE            = 24820MB,
        FILEGROWTH      = 0),
(       NAME            = MSSQL70_cs4,
        FILENAME= "I:",
        SIZE            = 24820MB,
        FILEGROWTH      = 0),
(       NAME            = MSSQL70_cs5,
        FILENAME= "J:",
        SIZE            = 24820MB,
        FILEGROWTH      = 0)
LOG ON
(       NAME            =MSSQL70_tpcc_log,
        FILENAME="E:",
        SIZE            =66000MB,
        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
```

BACKUP.SQL

```
--  File:     BACKUP.SQL
--            Microsoft TPC-C Benchmark Kit Ver. 4.10
--            Copyright Microsoft, 1999
--  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 tpccback_x1, tpccback_x2, tpccback_x3, tpccback_y1,
tpccback_y2, tpccback_y3 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. 4.10
--            Copyright Microsoft, 1999
--  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 tpccback_x1, tpccback_x2, tpccback_x3, tpccback_y1,
tpccback_y2, tpccback_y3 with stats = 5

select @enddate = getdate()
```

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

go
```

B.2 Build indices

IDXCUSCL.SQL

```
--  File:     IDXCUSCL.SQL
--            Microsoft TPC-C Benchmark Kit Ver. 4.10
--            Copyright Microsoft, 1999
--  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. 4.10
--            Copyright Microsoft, 1999
--  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. 4.10
--            Copyright Microsoft, 1999
--  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. 4.10
--            Copyright Microsoft, 1999
--  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. 4.10
--            Copyright Microsoft, 1999
--  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:     IDXODLCL.SQL
--            Microsoft TPC-C Benchmark Kit Ver. 4.10
--            Copyright Microsoft, 1999
--  Purpose:  Creates clustered index on order_line 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 = 'order_line_c1' )
        drop index order_line.order_line_c1

create unique clustered index order_line_c1 on order_line(ol_w_id, ol_d_id,
ol_o_id, ol_number)
        on 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. 4.10
--            Copyright Microsoft, 1999
--  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
```

IDXORDNC.SQL

```
--  File:     IDXORDNC.SQL
--            Microsoft TPC-C Benchmark Kit Ver. 4.10
--            Copyright Microsoft, 1999
--  Purpose:  Creates non-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_nc1' )
        drop index orders.orders_nc1

create index orders_nc1 on orders(o_w_id, o_d_id, o_c_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. 4.10
--            Copyright Microsoft, 1999
--  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. 4.10
--            Copyright Microsoft, 1999
--  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
```

B.3 Database Options

DBOPT1.SQL

```
--  File:     DBOPT1.SQL
--            Microsoft TPC-C Benchmark Kit Ver. 4.20
--            Copyright Microsoft, 1999
--  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. 4.20
--            Copyright Microsoft, 1999
--  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',   'AllowRowLocks',FALSE
go
sp_indexoption  'orders',       'AllowRowLocks',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-specified 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
```

B.4 Table definitions

TABLES.SQL

```
--  File:     TABLES.SQL
--            Microsoft TPC-C Benchmark Kit Ver. 4.10
--            Copyright Microsoft, 1999
--  Purpose:  Creates TPC-C tables


use tpcc
go

--
--  Remove all existing TPC-C tables
--

if exists ( select name from sysobjects where name = 'warehouse' )
        drop table warehouse
go
if exists ( select name from sysobjects where name = 'district' )
        drop table district
go
if exists ( select name from sysobjects where name = 'customer' )
        drop table customer
go
if exists ( select name from sysobjects where name = 'history' )
        drop table history
go
if exists ( select name from sysobjects where name = 'new_order' )
        drop table new_order
go
if exists ( select name from sysobjects where name = 'orders' )
        drop table orders
go
if exists ( select name from sysobjects where name = 'order_line' )
        drop table order_line
go
if exists ( select name from sysobjects where name = 'item' )
        drop table item
go
if exists ( select name from sysobjects where name = 'stock' )
        drop table stock
go


--
```

```
==  Create new tables

create table warehouse
(
        w_id                    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

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

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

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

create table new_order
(
        no_o_id                 int,
        no_d_id                 tinyint,
        no_w_id                 smallint
) on MSSQL70_misc_fg
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

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

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

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
```

B.5 Stored Procedures

NEWORD.SQL

```
--  File:     NEWORD.SQL
--            Microsoft TPC-C Benchmark Kit Ver. 4.20.000
--            Copyright Microsoft, 1999
--  Purpose:  Creates new order transaction stored procedure
--
--      Interface Level: 4.10.000

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,
```

```
0, @ol_qty1  smallint = 0,
0, @ol_qty2  smallint = 0,
0, @ol_qty3  smallint = 0,
0, @ol_qty4  smallint = 0,
0, @ol_qty5  smallint = 0,
0, @ol_qty6  smallint = 0,
0, @ol_qty7  smallint = 0,
0, @ol_qty8  smallint = 0,
0, @ol_qty9  smallint = 0,
0, @ol_qty10 smallint = 0,
0, @ol_qty11 smallint = 0,
0, @ol_qty12 smallint = 0,
0, @ol_qty13 smallint = 0,
0, @ol_qty14 smallint = 0,
0, @ol_qty15 smallint = 0
```

```
@o_ol_cnt    tinyint,
@o_all_local tinyint,
@i_id1  int = 0, @s_w_id1  smallint =
@i_id2  int = 0, @s_w_id2  smallint =
@i_id3  int = 0, @s_w_id3  smallint =
@i_id4  int = 0, @s_w_id4  smallint =
@i_id5  int = 0, @s_w_id5  smallint =
@i_id6  int = 0, @s_w_id6  smallint =
@i_id7  int = 0, @s_w_id7  smallint =
@i_id8  int = 0, @s_w_id8  smallint =
@i_id9  int = 0, @s_w_id9  smallint =
@i_id10 int = 0, @s_w_id10 smallint =
@i_id11 int = 0, @s_w_id11 smallint =
@i_id12 int = 0, @s_w_id12 smallint =
@i_id13 int = 0, @s_w_id13 smallint =
@i_id14 int = 0, @s_w_id14 smallint =
@i_id15 int = 0, @s_w_id15 smallint =
```

```
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
```

```
                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
```

DELIVERY.SQL

```
--  File:     DELIVERY.SQL
--            Microsoft TPC-C Benchmark Kit Ver. 4.20.000
--            Copyright Microsoft, 1999
--  Purpose:  Creates delivery transaction stored procedure
--
--      Interface Level: 4.10.000

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
```

ORDSTAT.SQL

```
--  File:     ORDSTAT.SQL
--            Microsoft TPC-C Benchmark Kit Ver. 4.20.000
--            Copyright Microsoft, 1999
--  Purpose:  Creates order status transaction stored procedure
--
--      Interface Level: 4.10.000

use tpcc
go

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

create proc tpcc_orderstatus    @w_id   smallint,
```

```
                                @d_id   tinyint,
                                @c_id   int,
                                @c_last char(16) = ""

as

declare @c_balance              numeric(12,2),
        @c_first        char(16),
        @c_middle               char(2),
        @o_id                   int,
        @o_entry_d              datetime,
        @o_carrier_id           smallint,
        @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

--  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
```

PAYMENT.SQL

```
--  File:     PAYMENT.SQL
--            Microsoft TPC-C Benchmark Kit Ver. 4.20.000
--            Copyright Microsoft, 1999
--  Purpose:  Creates payment transaction stored procedure
--
--      Interface Level: 4.10.000

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
```

STOCKLEV.SQL

```
--  File:     STOCKLEV.SQL
--            Microsoft TPC-C Benchmark Kit Ver. 4.20.000
--            Copyright Microsoft, 1999
--  Purpose:  Creates stock level transaction stored procedure
--
--      Interface Level: 4.10.000

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
```

B.6 Loader Source Code

TPCC.H

```
//      File:           TPCC.H
//                              Microsoft TPC-C Kit Ver. 4.20
//                              Copyright Microsoft, 1996, 1997, 1998, 1999
//      Purpose:Header file for TPC-C database loader


// Build number of TPC Benchmark Kit
#define TPCKIT_VER      "4.20"

// 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 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. 4.20
//                              Copyright Microsoft, 1996, 1997, 1998, 1999
//      Purpose:Source file for TPC-C database loader


// Includes
#include "tpcc.h"
#include "search.h"

// Defines
#define MAXITEMS                100000
#define CUSTOMERS_PER_DISTRICT  3000    100
#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);

void CheckSQL();
void CheckDataBase();

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      char                            c_balance[6];

    double                              c_ytd_payment;
        short                           c_payment_cnt;
        short                           c_delivery_cnt;
        char                            c_data[C_DATA_LEN+1];
        double                          h_amount;
    char                        h_data[H_DATA_LEN+1];
} CUSTOMER_STRUCT;

typedef struct
{
        char                            c_last[LAST_NAME_LEN+1];
        char                            c_first[FIRST_NAME_LEN+1];
    long                        c_id;
} CUSTOMER_SORT_STRUCT;

typedef struct
{
    long                time_start;
} LOADER_TIME_STRUCT;


// Global variables


char    szLastError[300];

HENV    henv;

HDBC    v_hdbc;                                         // for SQL Server
version verification
HDBC    i_hdbc1;                                // for ITEM table
HDBC    w_hdbc1;                                // for WAREHOUSE, DISTRICT,
STOCK
HDBC    c_hdbc1;                                // for CUSTOMER
HDBC    c_hdbc2;                                // for HISTORY
HDBC    o_hdbc1;                                // for ORDERS
HDBC    o_hdbc2;                                // for NEW-ORDER

HDBC    o_hdbc3;                                // for ORDER-LINE
```

```
HSTMT   v_hstmt;                                // for SQL Server version
verification
HSTMT   i_hstmt1;
HSTMT   w_hstmt1;
HSTMT   c_hstmt1, c_hstmt2;
HSTMT   o_hstmt1, o_hstmt2, o_hstmt3;

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);

        // verify correct SQL Server version in use
        // you must be using SQL Server 7.00.623 or better to load


        CheckSQL();

        // verify database and tables exist before attempting to load

        CheckDataBase();

        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;
    charw_name[W_NAME_LEN+1];
    charw_street_1[ADDRESS_LEN+1];
    charw_street_2[ADDRESS_LEN+1];
    charw_city[ADDRESS_LEN+1];
    charw_state[STATE_LEN+1];
    charw_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;
    chard_name[D_NAME_LEN+1];
    chard_street_1[ADDRESS_LEN+1];
    chard_street_2[ADDRESS_LEN+1];
    chard_city[ADDRESS_LEN+1];
    chard_state[STATE_LEN+1];
    chard_zip[ZIP_LEN+1];
    double      d_tax;
    double      d_ytd;
```

```
    long d_next_o_id;
    char    name[20];
    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()
{
    longs_i_id;
    short       s_w_id;
    short       s_quantity;
    chars_dist_01[S_DIST_LEN+1];
    chars_dist_02[S_DIST_LEN+1];
    chars_dist_03[S_DIST_LEN+1];
    chars_dist_04[S_DIST_LEN+1];
    chars_dist_05[S_DIST_LEN+1];
    chars_dist_06[S_DIST_LEN+1];
    chars_dist_07[S_DIST_LEN+1];
    chars_dist_08[S_DIST_LEN+1];
    chars_dist_09[S_DIST_LEN+1];
    chars_dist_10[S_DIST_LEN+1];
    longs_ytd;
    short       s_order_cnt;
    short       s_remote_cnt;
    chars_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(300, 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;   dwThreadID[MAX_ORDER_THREADS];
        DWORD
        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_DISTRICT+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_district);

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

                // Generate ORDER and NEW-ORDER data

                orders_buf[o_id].o_d_id = d_id;
                orders_buf[o_id].o_w_id = w_id;
                orders_buf[o_id].o_id = o_id+1;
```

```
                orders_buf[o_id].o_c_id = cust[o_id+1];
                orders_buf[o_id].o_ol_cnt = (short)RandomNumber(5L, 15L);

                if (o_id < first_new_order)
                {
                        orders_buf[o_id].o_carrier_id =
(short)RandomNumber(1L, 10L);
                        orders_buf[o_id].o_all_local  = 1;
                }
                else
                {
                        orders_buf[o_id].o_carrier_id = 0;
                        orders_buf[o_id].o_all_local  = 1;
                }

                for (ol=0; ol<orders_buf[o_id].o_ol_cnt; ol++)
                {

                        orders_buf[o_id].o_ol[ol].ol = ol+1;
                        orders_buf[o_id].o_ol[ol].ol_i_id = RandomNumber(1L,
max_items);
                        orders_buf[o_id].o_ol[ol].ol_supply_w_id = w_id;
                        orders_buf[o_id].o_ol[ol].ol_quantity = 5;
                        MakeAlphaString(24, 24, OL_DIST_INFO_LEN,
&orders_buf[o_id].o_ol[ol].ol_dist_info);

                        // Generate ORDER-LINE data
                        if (o_id < first_new_order)
                        {
                                orders_buf[o_id].o_ol[ol].ol_amount = 0;
                                // Added to insure ol_delivery_d set properly
during load


        FormatDate(&orders_buf[o_id].o_ol[ol].ol_delivery_d);

                        }
                        else
                        {
                                orders_buf[o_id].o_ol[ol].ol_amount =
RandomNumber(1,999999)/100.0;
                                // Added to insure ol_delivery_d set properly
during load
                                // odbc datetime format

        strcpy(orders_buf[o_id].o_ol[ol].ol_delivery_d,"1899-12-31
00:00:00.000");

                        }
                }
        }
}


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

void LoadOrdersTable(LOADER_TIME_STRUCT *orders_time_start)
{
        int         i;
    long        o_id;
        short   o_d_id;
        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           i;

        // 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)
{

    longtime_end, time_diff;
        // DBINTrcint;

    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->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 HandleErrorSTMT (HSTMT  hstmt1)
{

        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_STMT , hstmt1, 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;

}


//=====================================================================
//
// Function   : CheckSQL
//=====================================================================

void CheckSQL()
{

        RETCODE         rc;

        char                    szDriverString[300];
        char                    szDriverStringOut[1024];
        int                             SQLBuildFlag;

        SQLSMALLINT             cbDriverStringOut;
        SQLCHAR                 SQLVersion[19];
        SQLINTEGER              SQLVersionInd;



        SQLAllocHandle(SQL_HANDLE_ENV, SQL_NULL_HANDLE, &henv );

        SQLSetEnvAttr(henv, SQL_ATTR_ODBC_VERSION, (void*)SQL_OV_ODBC3, 0 );

        SQLAllocHandle(SQL_HANDLE_DBC, henv , &v_hdbc);

        SQLSetConnectAttr(v_hdbc, SQL_COPT_SS_BCP, (void *)SQL_BCP_ON,
SQL_IS_INTEGER );

        // Open connection to SQL Server

        sprintf( szDriverString , "DRIVER={SQL Server};SERVER=%s;UID=%s;PWD=%s"
,
                                                aptr->server,
                                                aptr->user,
                                                aptr->password );

        if ( SQLSetConnectAttr( v_hdbc, SQL_ATTR_PACKET_SIZE, (SQLPOINTER)aptr-
>pack_size, SQL_IS_UINTEGER ) != SQL_SUCCESS )
                HandleErrorDBC(v_hdbc);

        rc = SQLDriverConnect ( v_hdbc,
                                                NULL,
```

```
                                        (SQLCHAR*)&szDriverString[0]
,                                       SQL_NTS,

        (SQLCHAR*)&szDriverStringOut[0],
                                        sizeof(szDriverStringOut),
                                        &cbDriverStringOut,
                                        SQL_DRIVER_NOPROMPT );

        if ((rc != SQL_SUCCESS) && (rc != SQL_SUCCESS_WITH_INFO))
                HandleErrorDBC(v_hdbc);

        if ( SQLAllocHandle(SQL_HANDLE_STMT, v_hdbc , &v_hstmt) != SQL_SUCCESS
)
                HandleErrorSTMT(v_hstmt);

        rc = SQLBindCol(v_hstmt, 4, SQL_C_CHAR, &SQLVersion,
sizeof(SQLVersion), &SQLVersionInd);

        // issue SQL Server extended stored procedure (xp_msver) to determine
installed version
        rc = SQLExecDirect(v_hstmt, "EXECUTE xp_msver ProductVersion",
SQL_NTS);

        if ((rc != SQL_SUCCESS) && (rc != SQL_SUCCESS_WITH_INFO))
                HandleErrorSTMT(v_hstmt);

        rc = SQLFetch(v_hstmt);

        if (rc != SQL_SUCCESS)
                HandleErrorDBC(v_hdbc);

        // Check build number to ensure 7.00.623 or higher

        SQLBuildFlag = 1;

        if ( SQLVersion[0] == 55 )
        {
                if ( SQLVersion[2] == 48 )
                {
                        if ( SQLVersion[5] == 56 )
                        {
                                if ( (SQLVersion[6] >= 48) &  (SQLVersion[7]
>= 53) )
                                {
                                        SQLBuildFlag = 0;
                                        printf("You are using SQL Server
version = %9s\n\n", SQLVersion);
                                }
                                else
                                {
                                        SQLBuildFlag = 1;
                                }
                        }
                        else
                        {
                                if ( SQLVersion[5] >= 54 )
                                {

                                        if ( (SQLVersion[6] >= 50) &
(SQLVersion[7] >= 51) )
                                        {
                                                SQLBuildFlag = 0;
                                                printf("You are using SQL
Server version = %9s\n\n", SQLVersion);
                                        }
                                        else
                                        {
                                                SQLBuildFlag = 1;
                                        }
                                }
                                else
                                {
                                        if ( SQLVersion[5] >= 55 )
                                        {
                                                if ( (SQLVersion[6] >= 48) &
(SQLVersion[7] >= 48) )
                                                {
                                                        SQLBuildFlag = 0;
                                                        printf("You are
using SQL Server version = %9s\n\n", SQLVersion);
                                                }
                                                else
                                                {
                                                        SQLBuildFlag = 1;
```

```
                                        }       }
                                }

                        }
                }
                else
                {
                        if ( SQLVersion[5] >= 49 )
                        {
                                if ( (SQLVersion[6] >= 52) & (SQLVersion[7] >=
48) )
                                {
                                        SQLBuildFlag = 0;
                                        printf("You are using SQL Server
version = %9s\n\n", SQLVersion);
                                }
                                else
                                {
                                        SQLBuildFlag = 1;
                                }
                        }
                        else
                        {
                                SQLBuildFlag = 1;
                        }
                }
        }
        else
        {
                SQLBuildFlag = 1;
        }


        if ( SQLBuildFlag == 1 )
        {
                printf("ERROR.  The SQL Server version you are using is not
supported\n");
                printf("for TPC-C benchmarking.  You currently have SQL Server
version %9s\n",SQLVersion);
                printf("installed.  Please upgrade to Microsoft SQL Server
7.00.623 or better.\n");
                printf("and re-run the SETUP program.\n\n");
        }       exit(1);

        SQLFreeHandle(SQL_HANDLE_STMT, v_hstmt);
        SQLDisconnect(v_hdbc);
        SQLFreeHandle(SQL_HANDLE_DBC, v_hdbc);

        return;

}


//=============================================================================
//
// Function   : CheckDataBase
//
//=============================================================================

void CheckDataBase()
{

        RETCODE         rc;

        char                    szDriverString[300];
        char                    szDriverStringOut[1024];
        char                    TablesBitMap[9] = {"000000000"};
        int                             i, ExitFlag;

        SQLSMALLINT             cbDriverStringOut;
        SQLCHAR                 TabName[10];
        SQLINTEGER              TabNameInd, TabCount, TabCountInd;


        ExitFlag = 0;

        SQLAllocHandle(SQL_HANDLE_ENV, SQL_NULL_HANDLE, &henv );

        SQLSetEnvAttr(henv, SQL_ATTR_ODBC_VERSION, (void*)SQL_OV_ODBC3, 0 );

        SQLAllocHandle(SQL_HANDLE_DBC, henv , &v_hdbc);

        SQLSetConnectAttr(v_hdbc, SQL_COPT_SS_BCP, (void *)SQL_BCP_ON,
SQL_IS_INTEGER );
```

```
        // Open connection to SQL Server

        sprintf( szDriverString , "DRIVER={SQL
Server};SERVER=%s;UID=%s;PWD=%s;DATABASE=%s" ,
                                                aptr->server,
                                                aptr->user,
                                                aptr->password,
                                                aptr->database );

        rc = SQLSetConnectAttr( v_hdbc, SQL_ATTR_PACKET_SIZE, (SQLPOINTER)aptr-
>pack_size, SQL_IS_UINTEGER );
        if (rc != SQL_SUCCESS)
                HandleErrorDBC(v_hdbc);

        rc = SQLDriverConnect ( v_hdbc,
                                            NULL,
                                                (SQLCHAR*)&szDriverString[0]
,
                                                SQL_NTS,

        (SQLCHAR*)&szDriverStringOut[0],
                                                sizeof(szDriverStringOut),
                                                &cbDriverStringOut,
                                                SQL_DRIVER_NOPROMPT );

        // if the rc is SQL_ERROR, the the TPCC database probably does not
exist
        if (rc == SQL_ERROR)
        {
                printf("The database TPCC does not appear to exist!\n");
                printf("\nCheck LOGS\\ directory for database creation
errors.\n");

                // cleanup database connections and handles
                SQLFreeHandle(SQL_HANDLE_STMT, v_hstmt);
                SQLDisconnect(v_hdbc);
                SQLFreeHandle(SQL_HANDLE_DBC, v_hdbc);

                // since there is not a database, exit back to SETUP.CMD
                exit(1);
        }

        if ( SQLAllocHandle(SQL_HANDLE_STMT, v_hdbc , &v_hstmt) != SQL_SUCCESS
)
                HandleErrorDBC(v_hdbc);

        if ( SQLBindCol(v_hstmt, 1, SQL_C_ULONG, &TabCount, 0, &TabCountInd) !=
SQL_SUCCESS )
                HandleErrorSTMT(v_hstmt);


        // count the number of user tables from sysobjects

        rc = SQLExecDirect(v_hstmt, "select count(*) from sysobjects where
xtype = \'U\'", SQL_NTS);
        if ((rc != SQL_SUCCESS) && (rc != SQL_SUCCESS_WITH_INFO))
                HandleErrorSTMT(v_hstmt);

        if ( SQLFetch(v_hstmt) != SQL_SUCCESS )
                HandleErrorSTMT(v_hstmt);

        // if the number of tables is less than 9, select all the user tables
in TPCC
        if (TabCount != 9)
        {
                SQLFreeHandle(SQL_HANDLE_STMT, v_hstmt);

                SQLAllocHandle(SQL_HANDLE_STMT, v_hdbc , &v_hstmt);

                if ( SQLBindCol(v_hstmt, 1, SQL_C_CHAR, &TabName,
sizeof(TabName), &TabNameInd) != SQL_SUCCESS )
                        HandleErrorSTMT(v_hstmt);

                // select the list of user tables into a result set
                rc = SQLExecDirect(v_hstmt, "select * from sysobjects where
xtype = \'U\'", SQL_NTS);
                if ((rc != SQL_SUCCESS) && (rc != SQL_SUCCESS_WITH_INFO))
                        HandleErrorSTMT(v_hstmt);

                // go through the result set and set the bitmap for each found
table
                // set the bitmap to '1' if the table name is found

                while ((rc = SQLFetch(v_hstmt)) != SQL_NO_DATA)
                {
                        switch( TabName[0] )
```

```
                {
                case 'w':
                        TablesBitMap[0] = '1';
                        break;
                case 'd':
                        TablesBitMap[1] = '1';
                        break;
                case 'c':
                        TablesBitMap[2] = '1';
                        break;
                case 'h':
                        TablesBitMap[3] = '1';
                        break;
                case 'n':
                        TablesBitMap[4] = '1';
                        break;
                case 'o':
                        if (TabName[5] = 's')
                                TablesBitMap[5] = '1';
                        if (TabName[5] = '_')
                                TablesBitMap[6] = '1';
                        break;
                case 'i':
                        TablesBitMap[7] = '1';
                        break;
                case 's':
                        TablesBitMap[8] = '1';
                        break;
                }
        }

        // a '0' ExitFlag means do NOT exit the loader early, a '1'
means exit the loader early
        ExitFlag = 0;

        // interate through the bitmap to display which table(s) is
actually missing
        for (i = 0; i <= 8; i++)
        {
                switch(i)
                {
                case 0:
                        if (TablesBitMap[i] == '0')
                        {       printf("The Warehouse table is
missing or damaged.\n");
                                ExitFlag = 1;
                        }
                        break;
                case 1:
                        if (TablesBitMap[i] == '0')
                        {
                                printf("The District table is missing
or damaged.\n");
                                ExitFlag = 1;
                        }
                        break;
                case 2:
                        if (TablesBitMap[i] == '0')
                        {
                                printf("The Customer table is missing
or damaged.\n");
                                ExitFlag = 1;
                        }
                        break;
                case 3:
                        if (TablesBitMap[i] == '0')
                        {
                                printf("The History table is missing
or damaged.\n");
                                ExitFlag = 1;
                        }
                        break;
                case 4:
                        if (TablesBitMap[i] == '0')
                        {
                                printf("The New_Order table is
missing or damaged.\n");
                                ExitFlag = 1;
                        }
                        break;
                case 5:
                        if (TablesBitMap[i] == '0')
                        {
```

```
                                        printf("The Orders table is missing
or damaged.\n");
                                        ExitFlag = 1;
                                }
                                break;
                        case 6:
                                if (TablesBitMap[i] == '0')
                                {
                                        printf("The Order_Line table is
missing or damaged.\n");
                                        ExitFlag = 1;
                                }
                                break;
                        case 7:
                                if (TablesBitMap[i] == '0')
                                {
                                        printf("The Item table is missing or
damaged.\n");
                                        ExitFlag = 1;
                                }
                                break;
                        case 8:
                                if (TablesBitMap[i] == '0')
                                {
                                        printf("The Stock table is missing or
damaged.\n");
                                        ExitFlag = 1;
                                }
                                break;
                        }
                }

                // if one or more tables are missing, display message and exit
the loader
                if (ExitFlag = 1)
                {
                        printf("\nExiting TPC-C Loader!\n");
                        printf("\nCheck LOGS\\ directory for database\n");
                        printf("or table creation errors.\n");

                        // cleanup database connections and handles
                        SQLFreeHandle(SQL_HANDLE_STMT, v_hstmt);
                        SQLDisconnect(v_hdbc);
                        SQLFreeHandle(SQL_HANDLE_DBC, v_hdbc);

                        exit(1);
                }
        }

        // cleanup database connections and handles
        SQLFreeHandle(SQL_HANDLE_STMT, v_hstmt);
        SQLDisconnect(v_hdbc);
        SQLFreeHandle(SQL_HANDLE_DBC, v_hdbc);

        return;
}
```

GETARGS.C

```
//      File:           GETARGS.C
//                              Microsoft TPC-C Kit Ver. 4.20
//                              Copyright Microsoft, 1996, 1997, 1998, 1999
//      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. 4.20
//                              Copyright Microsoft, 1996, 1997, 1998, 1999
//      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. 4.20
//                              Copyright Microsoft, 1996, 1997, 1998, 1999
//      Purpose:Source file for database loader string functions


// Includes
#include "tpcc.h"
#include <string.h>
#include <ctype.h>

//===============================================================================
//
// Function name: MakeAddress
//
//===============================================================================

void MakeAddress(char *street_1,
                                 char *street_2,
                                 char *city,
                                 char *state,
                                 char *zip)
{

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

    MakeAlphaString (10, 20, ADDRESS_LEN, street_1);
    MakeAlphaString (10, 20, ADDRESS_LEN, street_2);
    MakeAlphaString (10, 20, ADDRESS_LEN, city);
    MakeAlphaString ( 2,  2, STATE_LEN, state);
    MakeZipNumberString( 9,  9, ZIP_LEN, zip);


#ifdef DEBUG
```

```
    printf("[%ld]DBG: MakeAddress: street_1: %s, street_2: %s, city: %s, state:
%s, zip: %s\n",         (int) GetCurrentThreadId(), street_1, street_2, city,
state, zip);
#endif

    return;

}


//=========================================================================
//
// Function name: LastName
//
//=========================================================================

void LastName(int  num,
                      char *name)
{
    static char *n[] =
    {
                "BAR" , "OUGHT", "ABLE" , "PRI"  , "PRES",
                "ESE" , "ANTI" , "CALLY", "ATION", "EING"
    };

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

    if ((num >= 0) && (num < 1000))
    {
                strcpy(name, n[(num/100)%10]);
                strcat(name, n[(num/10)%10]);
                strcat(name, n[(num/1)%10]);

                if (strlen(name) < LAST_NAME_LEN)
                {
                        PaddString(LAST_NAME_LEN, name);

                }

    }
    else
    {
                printf("\nError in LastName()... num <%ld> out of range
(0,999)\n", num);
                exit(-1);
    }


#ifdef DEBUG
    printf("[%ld]DBG: LastName: num = [%d] ==> [%d][%d][%d]\n",
                        (int) GetCurrentThreadId(), num, num/100, (num/10)%10,
num%10);
        printf("[%ld]DBG: LastName: String = %s\n", (int) GetCurrentThreadId(),
name);
#endif

    return;

}


//=========================================================================
//
// Function name: MakeAlphaString
//
//=========================================================================

//philipdu 08/13/96 Changed MakeAlphaString to use A-Z, a-z, and 0-9 in
//accordance with spec see below:
//The spec says:
//4.3.2.2       The notation random a-string [x .. y]
//(respectively, n-string [x .. y]) represents a string of random alphanumeric
//(respectively, numeric) characters of a random length of minimum x, maximum
y,
//and mean (y+x)/2. Alphanumerics are A..Z, a..z, and 0..9.  The only other
//requirement is that the character set used "must be able to represent a
minimum
//of 128 different characters".  We are using 8-bit chars, so this is a non
issue.
//It is completely unreasonable to stuff non-printing chars into the text
fields.

//-CLevine 08/13/96
```

```
int MakeAlphaString( int  x, int  y, int  z, char *str)
{
        int             len;
        int             i;
    char    cc = 'a';
        static  char chArray[] =
"0123456789ABCDEFGHIJKLMNOPQRSTUVWXYZabcdefghijklmnopqrstuvwxyz";
        static  int     chArrayMax = 61;

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

        len= RandomNumber(x, y);

        for (i=0; i<len; i++)
        {
                cc = chArray[RandomNumber(0, chArrayMax)];
        str[i] = cc;
    }
        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         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(ber, 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. 4.20
//                              Copyright Microsoft, 1996, 1997, 1998, 1999
//      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

C.1 Server Windows NT Configuration Parameters

The following services were disabled in the Windows NT Control Panel/Services:

- Alerter
- Computer Browser
- Gopher Publishing Service
- FTP Publishing Service
- License Logging Service
- TCP/IP NetBIOS Helper

- Messenger
- NT LM Security Support Provider
- Plug and Play
- Spooler
- World Wide Web Publishing Service
- schedule

C.2 Server System Configuration Parameters

```
Microsoft Diagnostics Report For \\PRF_SUT6
------------------------------------------------------------------------

OS Version Report
------------------------------------------------------------------------
Microsoft (R) Windows NT (TM) Server
Version 4.0 (Build 1381: Service Pack 5) x86 Multiprocessor Free
Registered Owner: tpc, nsd
Product Number: 70234-111-1111111-60677
------------------------------------------------------------------------

System Report
------------------------------------------------------------------------
System: AT/AT COMPATIBLE
Hardware Abstraction Layer: MPS 1.4 - APIC platform
BIOS Date: 01/27/00
BIOS Version: <unavailable>

Processor list:
   0:  x86 Family 6 Model 7 Stepping 3 GenuineIntel ~550 Mhz
   1:  x86 Family 6 Model 7 Stepping 3 GenuineIntel ~550 Mhz
   2:  x86 Family 6 Model 7 Stepping 3 GenuineIntel ~550 Mhz
   3:  x86 Family 6 Model 7 Stepping 3 GenuineIntel ~550 Mhz
------------------------------------------------------------------------

Video Display Report
------------------------------------------------------------------------
BIOS Date: <unavailable>
Adapter:
   Setting: 640 x 480 x 16
            Hardware Default Refresh
   Type: vga compatible display adapter
   String: <unavailable>
   Memory:
   Chip Type: <unavailable>
   DAC Type: <unavailable>
Driver:
```

```
   Vendor: Microsoft Corporation
   File(s): vga.sys, vgacdi
   Version: 4.00, 4.0.0


Drives Report
-----------------------------------------------------------------------
C:\  (Local - FAT)  Total: 2,047,936 KB, Free: 656,256 KB
   Serial Number: D837 - 4E9C
   Bytes per cluster: 512
   Sectors per cluster: 64
   Filename length: 255
D:\  (Local - NTFS)  Total: 6,835,656 KB, Free: 2,269,144 KB
   Serial Number: 34A9 - B19C
   Bytes per cluster: 512
   Sectors per cluster: 8
   Filename length: 255
V:\  (Local - NTFS)  Total: 364,949,500 KB, Free: 219,571,300 KB
   Serial Number: B809 - 4FB9
   Bytes per cluster: 512
   Sectors per cluster: 8
   Filename length: 255
W:\  (Local - NTFS)  Total: 373,704,700 KB, Free: 262,011,312 KB
   Serial Number: C835 - BF26
   Bytes per cluster: 512
   Sectors per cluster: 8
   Filename length: 255
X:\  (Local - NTFS)  Total: 364,949,500 KB, Free: 364,541,748 KB
   Serial Number: DCE9 - 2705
   Bytes per cluster: 512
   Sectors per cluster: 8
   Filename length: 255
Y:\  (Local - NTFS)  Total: 364,949,500 KB, Free: 364,527,116 KB
   Serial Number: A8FA - 93E3
   Bytes per cluster: 512
   Sectors per cluster: 8
   Filename length: 255

Memory Report
-----------------------------------------------------------------------

Handles: 3,293
Threads: 139
Processes: 17
Physical Memory (K)
   Total: 3,931,492
   Available: 779,488
   File Cache: 15,764

Kernel Memory (K)
   Total: 14,020
   Paged: 9,088
   Nonpaged: 4,932

Commit Charge (K)
   Total: 3,001,132
   Limit: 7,972,988
   Peak: 3,003,124

Pagefile Space (K)
   Total: 4,195,328
   Total in use: 5,572
   Peak: 5,684

   C:\pagefile.sys
      Total: 2,048
      Total in use: 1,876
      Peak: 1,976

   D:\pagefile.sys
      Total: 4,193,280
      Total in use: 3,696
      Peak: 3,708



Services Report
-----------------------------------------------------------------------
Alerter                                          Stopped   (Manual)
   C:\WINNT\System32\services.exe

   Service Account Name: LocalSystem
   Error Severity: Normal
   Service Flags: Shared Process
   Service Dependencies:
```

```
LanmanWorkstation
Ataman TCP Remote Logon Services                Stopped   (Disabled)
   C:\atrls2\ATRLS.EXE
   Service Account Name: LocalSystem
   Error Severity: Normal
   Service Flags: Own Process
Computer Browser                                Stopped   (Manual)
   C:\WINNT\System32\services.exe
   Service Account Name: LocalSystem
   Error Severity: Normal
   Service Flags: Shared Process
   Service Dependencies:
      LanmanWorkstation
      LanmanServer
      LmHosts
ClipBook Server                                 Stopped   (Manual)
   C:\WINNT\system32\clipsrv.exe
   Service Account Name: LocalSystem
   Error Severity: Normal
   Service Flags: Own Process
   Service Dependencies:
      NetDDE
FCArray Assistant - Server                      Stopped   (Manual)
   C:\WINNT\system32\DacServ\dacscm.exe
   Service Account Name: LocalSystem
   Error Severity: Normal
   Service Flags: Own Process, Interactive
DHCP Client (TDI)                               Stopped   (Disabled)
   C:\WINNT\System32\services.exe
   Service Account Name: LocalSystem
   Error Severity: Normal
   Service Flags: Shared Process
   Service Dependencies:
      Tcpip
      Afd
      NetBT
EventLog (Event log)                            Running   (Automatic)
   C:\WINNT\system32\services.exe
   Service Account Name: LocalSystem
   Error Severity: Normal
   Service Flags: Shared Process
Gopher Publishing Service                       Stopped   (Manual)
   C:\WINNT\System32\inetsrv\inetinfo.exe
   Service Account Name: LocalSystem
   Error Severity: Ignore
   Service Flags: Shared Process
   Service Dependencies:
      RPCSS
      NTLMSSP
Server                                          Running   (Automatic)
   C:\WINNT\System32\services.exe
   Service Account Name: LocalSystem
   Error Severity: Normal
   Service Flags: Shared Process
   Group Dependencies:
      TDI
Workstation (NetworkProvider)                   Running   (Automatic)
   C:\WINNT\System32\services.exe
   Service Account Name: LocalSystem
   Error Severity: Normal
   Service Flags: Shared Process
   Group Dependencies:
      TDI
License Logging Service                         Stopped   (Manual)
   C:\WINNT\System32\llssrv.exe
   Service Account Name: LocalSystem
   Error Severity: Normal
   Service Flags: Own Process
TCP/IP NetBIOS Helper                           Stopped   (Manual)
   C:\WINNT\System32\services.exe
   Service Account Name: LocalSystem
   Error Severity: Normal
   Service Flags: Shared Process
   Group Dependencies:
      NetworkProvider
Messenger                                       Stopped   (Manual)
   C:\WINNT\System32\services.exe
   Service Account Name: LocalSystem
   Error Severity: Normal
   Service Flags: Shared Process
   Service Dependencies:
      LanmanWorkstation
      NetBios
Monitor Service                                 Stopped   (Manual)
```

```
   C:\WINNT\system32\datalog.exe
   Service Account Name: LocalSystem
   Error Severity: Normal
   Service Flags: Own Process
MSDTC (MS Transactions)                    Stopped   (Manual)
   C:\WINNT\System32\msdtc.exe
   Service Account Name: LocalSystem
   Error Severity: Normal
   Service Flags: Own Process
   Service Dependencies:
      RPCSS
      NTLMSSP
FTP Publishing Service                     Stopped   (Manual)
   C:\WINNT\System32\inetsrv\inetinfo.exe
   Service Account Name: LocalSystem
   Error Severity: Ignore
   Service Flags: Shared Process
   Service Dependencies:
      RPCSS
      NTLMSSP
MSSQLServer                                Stopped   (Manual)
   C:\MSSQL7\binn\sqlservr.exe
   Service Account Name: LocalSystem
   Error Severity: Normal
   Service Flags: Own Process
Network DDE (NetDDEGroup)                  Stopped   (Manual)
   C:\WINNT\system32\netdde.exe
   Service Account Name: LocalSystem
   Error Severity: Normal
   Service Flags: Shared Process
   Service Dependencies:

      NetDDEDSDM

Network DDE DSDM                           Stopped   (Manual)
   C:\WINNT\system32\netdde.exe
   Service Account Name: LocalSystem
   Error Severity: Normal
   Service Flags: Shared Process
Net Logon (RemoteValidation)               Stopped   (Manual)
   C:\WINNT\System32\lsass.exe
   Service Account Name: LocalSystem
   Error Severity: Normal
   Service Flags: Shared Process
   Service Dependencies:
      LanmanWorkstation
      LmHosts
NT LM Security Support Provider            Running   (Manual)
   C:\WINNT\System32\SERVICES.EXE
   Service Account Name: LocalSystem
   Error Severity: Normal
   Service Flags: Shared Process
Plug and Play (PlugPlay)                   Running   (Automatic)
   C:\WINNT\system32\services.exe
   Service Account Name: LocalSystem
   Error Severity: Normal
   Service Flags: Shared Process
Protected Storage                          Running   (Automatic)
   c:\winnt\system32\pstores.exe
   Service Account Name: LocalSystem
   Error Severity: Normal
   Service Flags: Own Process, Interactive
   Service Dependencies:
      RpcSs
Directory Replicator                       Stopped   (Manual)
   C:\WINNT\System32\lmrepl.exe
   Service Account Name: LocalSystem
   Error Severity: Normal
   Service Flags: Own Process
   Service Dependencies:
      LanmanWorkstation
      LanmanServer
Remote Procedure Call (RPC) Locator        Stopped   (Manual)
   C:\WINNT\System32\LOCATOR.EXE

   Service Account Name: LocalSystem
   Error Severity: Normal
   Service Flags: Own Process
   Service Dependencies:
      LanmanWorkstation
      Rdr
Remote Procedure Call (RPC) Service        Running   (Automatic)
   C:\WINNT\system32\RpcSs.exe
   Service Account Name: LocalSystem
   Error Severity: Normal
   Service Flags: Own Process
Schedule                                   Stopped   (Manual)
```

C:\WINNT\System32\AtSvc.Exe
Service Account Name: LocalSystem
Error Severity: Normal
Service Flags: Own Process

Spooler (SpoolerGroup) Stopped (Manual)
C:\WINNT\system32\spoolss.exe
Service Account Name: LocalSystem
Error Severity: Normal
Service Flags: Own Process, Interactive

SQLServerAgent Stopped (Manual)
C:\MSSQL7\binn\sqlagent.exe
Service Account Name: LocalSystem
Error Severity: Normal
Service Flags: Own Process
Service Dependencies:
MSSQLServer

Telephony Service Stopped (Manual)
C:\WINNT\system32\tapisrv.exe
Service Account Name: LocalSystem
Error Severity: Normal
Service Flags: Own Process

UPS Stopped (Manual)
C:\WINNT\System32\ups.exe
Service Account Name: LocalSystem
Error Severity: Normal
Service Flags: Own Process

World Wide Web Publishing Service Stopped (Manual)
C:\WINNT\System32\inetsrv\inetinfo.exe

Service Account Name: LocalSystem
Error Severity: Ignore
Service Flags: Shared Process
Service Dependencies:
RPCSS
NTLMSSP

Drivers Report

Abiosdsk (Primary disk) Stopped (Disabled)
Error Severity: Ignore
Service Flags: Kernel Driver, Shared Process

AFD Networking Support Environment (TDI) Running (Automatic)
C:\WINNT\System32\drivers\afd.sys
Error Severity: Normal
Service Flags: Kernel Driver, Shared Process

Aha154x (SCSI miniport) Stopped (Disabled)
Error Severity: Normal
Service Flags: Kernel Driver, Shared Process

Aha174x (SCSI miniport) Stopped (Disabled)
Error Severity: Normal
Service Flags: Kernel Driver, Shared Process

aic78xx (SCSI miniport) Stopped (Disabled)
Error Severity: Normal
Service Flags: Kernel Driver, Shared Process

Always (SCSI miniport) Stopped (Disabled)
Error Severity: Normal
Service Flags: Kernel Driver, Shared Process

ami0nt (SCSI miniport) Stopped (Disabled)
Error Severity: Normal
Service Flags: Kernel Driver, Shared Process

amsint (SCSI miniport) Stopped (Disabled)
Error Severity: Normal
Service Flags: Kernel Driver, Shared Process

Arrow (SCSI miniport) Stopped (Disabled)
Error Severity: Normal
Service Flags: Kernel Driver, Shared Process

atapi (SCSI miniport) Running (Boot)
C:\WINNT\System32\DRIVERS\atapi.sys
Error Severity: Normal
Service Flags: Kernel Driver, Shared Process

Atdisk (Primary disk) Stopped (Disabled)
Error Severity: Ignore
Service Flags: Kernel Driver, Shared Process

ati (Video) Stopped (Disabled)
Error Severity: Ignore
Service Flags: Kernel Driver, Shared Process

Beep (Base) Running (System)
Error Severity: Normal
Service Flags: Kernel Driver, Shared Process

BusLogic (SCSI miniport) Stopped (Disabled)
Error Severity: Normal
Service Flags: Kernel Driver, Shared Process

Busmouse (Pointer Port) Stopped (Disabled)

```
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
Cdaudio (Filter)                          Stopped   (System)
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
Cdfs (File system)                        Running   (Disabled)
   Error Severity: Normal
   Service Flags: File System Driver, Shared Process
   Group Dependencies:
      SCSI CDROM Class
Cdrom (SCSI CDROM Class)                  Running   (System)
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
   Group Dependencies:
      SCSI miniport
Changer (Filter)                          Stopped   (System)
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
cirrus (Video)                            Stopped   (Disabled)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
Cpqarray (SCSI miniport)                  Stopped   (Disabled)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process

cpqfws2e (SCSI miniport)                  Stopped   (Disabled)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
dac960nt (SCSI miniport)                  Stopped   (Boot)
   C:\WINNT\System32\drivers\dac960nt.sys
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
FCArray Assistant - Driver (SCSI Class)   Stopped   (Manual)
   System32\drivers\dacdrv.sys
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
dce376nt (SCSI miniport)                  Stopped   (Disabled)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
Delldsa (SCSI miniport)                   Stopped   (Disabled)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
Dell_DGX (Video)                          Stopped   (Disabled)
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
Disk (SCSI Class)                         Running   (Boot)
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
   Group Dependencies:
      SCSI miniport
Diskperf (Filter)                         Stopped   (Disabled)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
DptScsi (SCSI miniport)                   Stopped   (Disabled)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
dtc329x (SCSI miniport)                   Stopped   (Disabled)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
em (Base)                                 Running   (System)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
et4000 (Video)                            Stopped   (Disabled)
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process

Fastfat (Boot file system)                Running   (Disabled)
   Error Severity: Normal
   Service Flags: File System Driver, Shared Process
Fd16_700 (SCSI miniport)                  Stopped   (Disabled)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
Fd7000ex (SCSI miniport)                  Stopped   (Disabled)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
Fd8xx (SCSI miniport)                     Stopped   (Disabled)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
flashpnt (SCSI miniport)                  Stopped   (Disabled)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
Floppy (Primary disk)                     Running   (System)
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
Ftdisk (Filter)                           Stopped   (Disabled)
   Error Severity: Ignore
```

```
   Service Flags: Kernel Driver, Shared Process
HHBA5100 (SCSI Miniport)                Running   (Boot)
   C:\WINNT\System32\DRIVERS\HHBA5100.SYS
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
HP 10/100TX PCI LAN NDIS Driver (NDIS)  Running   (Automatic)
   C:\WINNT\System32\drivers\HPTXNT.SYS
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
i8042 Keyboard and PS/2 Mouse Port Driver (Keyboard Port) Running   (System)
   System32\DRIVERS\i8042prt.sys
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
Inport (Pointer Port)                   Stopped   (Disabled)
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
intlfxsr (Base)                         Running   (Boot)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
Jazzg300 (Video)                        Stopped   (Disabled)
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
Jazzg364 (Video)                        Stopped   (Disabled)
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
Jzvxl484 (Video)                        Stopped   (Disabled)
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
Keyboard Class Driver (Keyboard Class)  Running   (System)
   System32\DRIVERS\kbdclass.sys
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
KSecDD (Base)                           Running   (System)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
macdisk (Filter)                        Stopped   (Boot)
   C:\WINNT\System32\drivers\macdisk.sys
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
mga (Video)                             Stopped   (Disabled)
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
mgamil (Video)                          Stopped   (Disabled)
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
mitsumi (SCSI miniport)                 Stopped   (Disabled)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
mkecr5xx (SCSI miniport)                Stopped   (Disabled)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
Modem (Extended base)                   Stopped   (Manual)
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
Mouse Class Driver (Pointer Class)      Running   (System)
   System32\DRIVERS\mouclass.sys
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
mraid (Primary disk)                    Running   (Boot)
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
mraidnt (SCSI Miniport)                 Stopped   (Boot)
   C:\WINNT\System32\DRIVERS\mraidnt.sys
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
Msfs (File system)                      Running   (System)
   Error Severity: Normal
   Service Flags: File System Driver, Shared Process
Mup (Network)                           Running   (Manual)
   C:\WINNT\System32\drivers\mup.sys
   Error Severity: Normal
   Service Flags: File System Driver, Shared Process
Ncr53c9x (SCSI miniport)                Stopped   (Disabled)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
ncr77c22 (Video)                        Stopped   (Disabled)
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
Ncrc700 (SCSI miniport)                 Stopped   (Disabled)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
Ncrc710 (SCSI miniport)                 Stopped   (Disabled)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
```

```
Microsoft NDIS System Driver (NDIS)                Running   (System)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
NetBIOS Interface (NetBIOSGroup)                   Stopped   (Manual)
   C:\WINNT\System32\drivers\netbios.sys
   Error Severity: Normal
   Service Flags: File System Driver, Shared Process
   Group Dependencies:
      TDI
WINS Client(TCP/IP) (PNP_TDI)                      Running   (Automatic)
   C:\WINNT\System32\drivers\netbt.sys
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
   Service Dependencies:
      Tcpip
NetDetect                                          Stopped   (Manual)

   C:\WINNT\system32\drivers\netdtect.sys
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
Npfs (File system)                                 Running   (System)
   Error Severity: Normal
   Service Flags: File System Driver, Shared Process
Ntfs (File system)                                 Running   (Disabled)
   Error Severity: Normal
   Service Flags: File System Driver, Shared Process
Null (Base)                                        Running   (System)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
Oliscsi (SCSI miniport)                            Stopped   (Disabled)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
Parallel (Extended base)                           Stopped   (Manual)
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
   Service Dependencies:
      Parport
   Group Dependencies:
      Parallel arbitrator
Parport (Parallel arbitrator)                      Stopped   (Manual)
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
ParVdm (Extended base)                             Stopped   (Manual)
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
   Service Dependencies:
      Parport
   Group Dependencies:
      Parallel arbitrator
PCIDump (PCI Configuration)                        Stopped   (System)
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
Pcmcia (System Bus Extender)                       Stopped   (Disabled)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
PnP ISA Enabler Driver (Base)                      Stopped   (System)
   Error Severity: Ignore

   Service Flags: Kernel Driver, Shared Process
psidisp (Video)                                    Stopped   (Disabled)
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
Ql10wnt (SCSI miniport)                            Stopped   (Disabled)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
qv (Video)                                         Stopped   (Disabled)
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
Rdr (Network)                                      Running   (Manual)
   C:\WINNT\System32\drivers\rdr.sys
   Error Severity: Normal
   Service Flags: File System Driver, Shared Process
s3 (Video)                                         Stopped   (Disabled)
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
Scsiprnt (Extended base)                           Stopped   (Automatic)
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
   Group Dependencies:
      SCSI miniport
Scsiscan (SCSI Class)                              Running   (System)
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
   Group Dependencies:
      SCSI miniport
Serial (Extended base)                             Running   (Automatic)
```

```
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
Sermouse (Pointer Port)                    Stopped   (Disabled)
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
Sfloppy (Primary disk)                     Stopped   (System)
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
   Group Dependencies:
      SCSI miniport
Simbad (Filter)                            Stopped   (Disabled)
   Error Severity: Normal

   Service Flags: Kernel Driver, Shared Process
slcd32 (SCSI miniport)                     Stopped   (Disabled)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
Sparrow (SCSI miniport)                    Stopped   (Disabled)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
Spock (SCSI miniport)                      Stopped   (Disabled)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
Srv (Network)                              Running   (Manual)
   C:\WINNT\System32\drivers\srv.sys
   Error Severity: Normal
   Service Flags: File System Driver, Shared Process
symc810 (SCSI miniport)                    Stopped   (Disabled)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
sym_hi (SCSI miniport)                     Running   (Boot)
   C:\WINNT\system32\drivers\sym_hi.sys
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
T128 (SCSI miniport)                       Stopped   (Disabled)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
T13B (SCSI miniport)                       Stopped   (Disabled)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
TCP/IP Service (PNP_TDI)                   Running   (Automatic)
   C:\WINNT\System32\drivers\tcpip.sys
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
tga (Video)                                Stopped   (Disabled)
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
tmv1 (SCSI miniport)                       Stopped   (Disabled)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
Ultra124 (SCSI miniport)                   Stopped   (Disabled)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process

Ultra14f (SCSI miniport)                   Stopped   (Disabled)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
Ultra24f (SCSI miniport)                   Stopped   (Disabled)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
update (Base)                              Stopped   (System)
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
v7vram (Video)                             Stopped   (Disabled)
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
VgaSave (Video Save)                       Running   (System)
   C:\WINNT\System32\drivers\vga.sys
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
VgaStart (Video Init)                      Stopped   (System)
   C:\WINNT\System32\drivers\vga.sys
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
Wd33c93 (SCSI miniport)                    Stopped   (Disabled)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
wd90c24a (Video)                           Stopped   (Disabled)
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
wdvga (Video)                              Stopped   (Disabled)
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
weitekp9 (Video)                           Stopped   (Disabled)
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
```

```
Xga (Video)                                    Stopped   (Disabled)
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
```

IRQ and Port Report

Devices	Vector	Level	Affinity
MPS 1.4 - APIC platform	8	8	0x0000000f
MPS 1.4 - APIC platform	0	0	0x0000000f
MPS 1.4 - APIC platform	1	1	0x0000000f
MPS 1.4 - APIC platform	2	2	0x0000000f
MPS 1.4 - APIC platform	3	3	0x0000000f
MPS 1.4 - APIC platform	4	4	0x0000000f
MPS 1.4 - APIC platform	5	5	0x0000000f
MPS 1.4 - APIC platform	6	6	0x0000000f
MPS 1.4 - APIC platform	7	7	0x0000000f
MPS 1.4 - APIC platform	8	8	0x0000000f
MPS 1.4 - APIC platform	9	9	0x0000000f
MPS 1.4 - APIC platform	10	10	0x0000000f
MPS 1.4 - APIC platform	11	11	0x0000000f
MPS 1.4 - APIC platform	12	12	0x0000000f
MPS 1.4 - APIC platform	13	13	0x0000000f
MPS 1.4 - APIC platform	14	14	0x0000000f
MPS 1.4 - APIC platform	15	15	0x0000000f
MPS 1.4 - APIC platform	16	16	0x0000000f
MPS 1.4 - APIC platform	17	17	0x0000000f
MPS 1.4 - APIC platform	18	18	0x0000000f
MPS 1.4 - APIC platform	19	19	0x0000000f
MPS 1.4 - APIC platform	20	20	0x0000000f
MPS 1.4 - APIC platform	21	21	0x0000000f
MPS 1.4 - APIC platform	22	22	0x0000000f
MPS 1.4 - APIC platform	23	23	0x0000000f
MPS 1.4 - APIC platform	24	24	0x0000000f
MPS 1.4 - APIC platform	25	25	0x0000000f
MPS 1.4 - APIC platform	26	26	0x0000000f
MPS 1.4 - APIC platform	27	27	0x0000000f
MPS 1.4 - APIC platform	28	28	0x0000000f
MPS 1.4 - APIC platform	29	29	0x0000000f
MPS 1.4 - APIC platform	30	30	0x0000000f
MPS 1.4 - APIC platform	31	31	0x0000000f
MPS 1.4 - APIC platform	32	32	0x0000000f
MPS 1.4 - APIC platform	33	33	0x0000000f
MPS 1.4 - APIC platform	34	34	0x0000000f
MPS 1.4 - APIC platform	35	35	0x0000000f
MPS 1.4 - APIC platform	36	36	0x0000000f
MPS 1.4 - APIC platform	37	37	0x0000000f
MPS 1.4 - APIC platform	38	38	0x0000000f
MPS 1.4 - APIC platform	39	39	0x0000000f
MPS 1.4 - APIC platform	40	40	0x0000000f
MPS 1.4 - APIC platform	41	41	0x0000000f
MPS 1.4 - APIC platform	42	42	0x0000000f
MPS 1.4 - APIC platform	43	43	0x0000000f
MPS 1.4 - APIC platform	44	44	0x0000000f
MPS 1.4 - APIC platform	45	45	0x0000000f
MPS 1.4 - APIC platform	46	46	0x0000000f
MPS 1.4 - APIC platform	47	47	0x0000000f
MPS 1.4 - APIC platform	61	61	0x0000000f
MPS 1.4 - APIC platform	65	65	0x0000000f
MPS 1.4 - APIC platform	80	80	0x0000000f
MPS 1.4 - APIC platform	193	193	0x0000000f
MPS 1.4 - APIC platform	225	225	0x0000000f
MPS 1.4 - APIC platform	253	253	0x0000000f
MPS 1.4 - APIC platform	254	254	0x0000000f
MPS 1.4 - APIC platform	255	255	0x0000000f
i8042prt	1	1	0xffffffff
i8042prt	12	12	0xffffffff
Serial	4	4	0x00000000
Serial	3	3	0x00000000
Floppy	6	6	0x00000000
HPTX	24	24	0x00000000
atapi	0	14	0x00000000
HHBA5100	16	16	0x00000000
sym_hi	20	20	0x00000000
sym_hi	21	21	0x00000000

Devices	Physical Address	Length
MPS 1.4 - APIC platform	0x00000000	0x0000000010
MPS 1.4 - APIC platform	0x00000020	0x0000000002
MPS 1.4 - APIC platform	0x00000040	0x0000000004
MPS 1.4 - APIC platform	0x00000048	0x0000000004

```
MPS 1.4 - APIC platform          0x00000061  0x0000000001
MPS 1.4 - APIC platform          0x00000070  0x0000000002
MPS 1.4 - APIC platform          0x00000080  0x0000000010
MPS 1.4 - APIC platform          0x00000092  0x0000000001

MPS 1.4 - APIC platform          0x000000a0  0x0000000002
MPS 1.4 - APIC platform          0x000000c0  0x0000000010
MPS 1.4 - APIC platform          0x000000f0  0x0000000010
i8042prt                         0x00000060  0x0000000001
i8042prt                         0x00000064  0x0000000001
Serial                           0x000003f8  0x0000000007
Serial                           0x000002f8  0x0000000007
Floppy                           0x000003f0  0x0000000006
Floppy                           0x000003f7  0x0000000001
HPTX                             0x00001800  0x000000001e
atapi                            0x000001f0  0x0000000008
atapi                            0x000003f6  0x0000000001
HHBA5100                         0x00003400  0x0000000100
HHBA5100                         0x00003000  0x0000000100
sym_hi                           0x00003800  0x0000000100
sym_hi                           0x00004000  0x0000000100
VgaSave                          0x000003b0  0x000000000c
VgaSave                          0x000003c0  0x0000000020
VgaSave                          0x000001ce  0x0000000002
```

DMA and Memory Report

```
-------------------------------------------------------------------------
Devices                          Channel    Port
-------------------------------------------------------------------------
Floppy                              2     0
-------------------------------------------------------------------------
Devices                          Physical Address  Length
-------------------------------------------------------------------------
MPS 1.4 - APIC platform          0xfec00000  0x00000400
MPS 1.4 - APIC platform          0xfec01000  0x00000400
MPS 1.4 - APIC platform          0xfee00000  0x00000400
HPTX                             0xf5801000  0x0000001e
HHBA5100                         0xf780d000  0x00000200
HHBA5100                         0xf7820000  0x00020000
sym_hi                           0xf780d400  0x00000400
sym_hi                           0xf7808000  0x00002000
sym_hi                           0xf780d800  0x00000400
sym_hi                           0xf780a000  0x00002000

VgaSave                          0x000a0000  0x00020000
```

Environment Report

```
-------------------------------------------------------------------------
```

System Environment Variables

```
   ComSpec=C:\WINNT\system32\cmd.exe
   HOME=C:/
   NTRESKIT=C:\NTRESKIT
   NUMBER_OF_PROCESSORS=4
   OS=Windows_NT
   Os2LibPath=C:\WINNT\system32\os2\dll;

Path=C:\mksnt;C:\WINNT\system32;C:\WINNT;;C:\NTRESKIT;C:\NTRESKIT\Perl;C:\MSSQL
7\BINN;D:\MSTOOLS\bin
   PROCESSOR_ARCHITECTURE=x86
   PROCESSOR_IDENTIFIER=x86 Family 6 Model 7 Stepping 3, GenuineIntel
   PROCESSOR_LEVEL=6
   PROCESSOR_REVISION=0703
   ROOTDIR=C:/
   SHELL=C:/mksnt/sh.exe
   TMPDIR=C:/TEMP
   windir=C:\WINNT
   Cpu=i386
   Mstools=D:\MSTOOLS
```

Environment Variables for Current User

```
   TEMP=C:\TEMP
   TMP=C:\TEMP
   MSDevDir=C:\Program Files\DevStudio\SharedIDE
   path=c:\program files\devstudio\sharedide\bin\ide;c:\program
files\devstudio\sharedide\bin;c:\program files\devstudio\vc\bin
```

```
   lib=c:\program files\devstudio\vc\lib;c:\program
files\devstudio\vc\mfc\lib;c:\program files\devstudio\vc\lib;c:\program
files\devstudio\vc\mfc\lib;%lib%
   include=c:\program files\devstudio\vc\include;c:\program
files\devstudio\vc\atl\include;c:\program
files\devstudio\vc\mfc\include;c:\program files\devstudio\vc\include;c:\program
files\devstudio\vc\atl\include;c:\program
files\devstudio\vc\mfc\include;%include%



Network Report
----------------------------------------------------------------------
Your Access Level: Admin & Local
Workgroup or Domain: WORKGROUP
Network Version: 4.0
LanRoot: WORKGROUP
Logged On Users: 1
Current User (1): Administrator
  Logon Domain: PRF_SUT6
  Logon Server: PRF_SUT6

Transport: NetBT_HPTX1, 00-10-83-65-08-F0, VC's: 0, Wan: Wan

Character Wait: 3,600
Collection Time: 250
Maximum Collection Count: 16
Keep Connection: 600
Maximum Commands: 5
Session Time Out: 45
Character Buffer Size: 512
Maximum Threads: 17
Lock Quota: 6,144
Lock Increment: 10
Maximum Locks: 500
Pipe Increment: 10
Maximum Pipes: 500
Cache Time Out: 40
Dormant File Limit: 45
Read Ahead Throughput: 4,294,967,295
Mailslot Buffers: 3
Server Announce Buffers: 20
Illegal Datagrams: 5
Datagram Reset Frequency: 60
Log Election Packets: False
Use Opportunistic Locking: True
Use Unlock Behind: True
Use Close Behind: True
Buffer Pipes: True
Use Lock, Read, Unlock: True
Use NT Caching: True
Use Raw Read: True
Use Raw Write: True
Use Write Raw Data: True
Use Encryption: True
Buffer Deny Write Files: True
Buffer Read Only Files: True
Force Core Creation: True
512 Byte Max Transfer: False
Bytes Received: 269
SMB's Received: 3
Paged Read Bytes Requested: 0
Non Paged Read Bytes Requested: 0
Cache Read Bytes Requested: 0
Network Read Bytes Requested: 0
Bytes Transmitted: 489
SMB's Transmitted: 3
Paged Read Bytes Requested: 0
Non Paged Read Bytes Requested: 0
Cache Read Bytes Requested: 0
Network Read Bytes Requested: 0
Initally Failed Operations: 0
Failed Completion Operations: 0
Read Operations: 0
Random Read Operations: 0
Read SMB's: 0
Large Read SMB's: 0
Small Read SMB's: 0
Write Operations: 0
Random Write Operations: 0
Write SMB's: 0
Large Write SMB's: 0
```

```
Small Writes SMBs: 0
Raw Reads Denied: 0
Raw Writes Denied: 0
Network Errors: 0
Sessions: 1
Failed Sessions: 0
Reconnects: 0
Core Connects: 0
LM 2.0 Connects: 0
LM 2.x Connects: 0
Windows NT Connects: 1
Server Disconnects: 0
Hung Sessions: 0
Use Count: 0
Failed Use Count: 0
Current Commands: 0
Server File Opens: 41
Server Device Opens: 0
Server Jobs Queued: 0
Server Sessions Opened: 0
Server Sessions Timed Out: 1
Server Sessions Errored Out: 1
Server Password Errors: 0
Server Permission Errors: 0
Server System Errors: 0
Server Bytes Sent: 85,593
Server Bytes Received: 14,705
Server Average Response Time: 0
Server Request Buffers Needed: 0
Server Big Buffers Needed: 0
```

C.3 Microsoft SQL Server 7.0 Startup Parameters

sqlservr -x -c -T3502 –g37

where

-x	Disable the keeping of CPU time and cache-hit ratios.
-c	Start SQLServer independently of the Microsoft Windows NT Service Control Manager.
-T3502	Prints a message to the log at the beginning and end of each checkpoint.
-g37	Reserve 37MB for non-buffer pool allocations.

C.4 Microsoft SQL Server 7.0 Stack Size

The default stack size for Microsoft SQL Server was changed using the EDITBIN utility, which ships with Microsoft Visual C++. The command used to change the stack size is:

editbin /Stack:131072 sqlservr.exe

This command is fully documented as an article in the Microsoft Knowledge Base on the Microsoft Web Site at www.microsoft.com/support

C.5 BOOT.INI

Two switches were added to the *boot.ini* file

- /3gb to cause Windows NT Enterprise Edition to allow 3GB of user and 1GB of kernel virtual address space, rather than the usual 2GB space for each
- /maxmem=3840 to limit the physical memory in the system to 3840MB.

C.6 Microsoft SQL Server 7.0 Configuration Parameters

Name	minimum	maximum	config_value	run_value
affinity mask	0	2147483647	15	15
allow updates	0	1	0	0
cost threshold for parallelism	0	32767	5	5
cursor threshold	-1	2147483647	-1	-1
default language	0	9999	0	0
default sortorder id	0	255	50	50
extended memory size (MB)	0	2147483647	0	0
fill factor (%)	0	100	0	0
index create memory (KB)	704	1600000	0	0
language in cache	3	100	3	3
language neutral full-text	0	1	0	0
lightweight pooling	0	1	1	1
locks	5000	2147483647	0	0
max async IO	1	255	255	255
max degree of parallelism	0	32	1	1
max server memory (MB)	4	2147483647	3025	3025
max text repl size (B)	0	2147483647	65536	65536
max worker threads	10	1024	266	266
media retention	0	365	0	0
min memory per query (KB)	512	2147483647	512	512
min server memory (MB)	0	2147483647	3025	3025
nested triggers	0	1	0	0
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	32767	32767
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
resource timeout (s)	5	2147483647	10	10
scan for startup procs	0	1	0	0
set working set size	0	1	1	1

show advanced options	0	1	1	1
spin counter	1	2147483647	10000	10000
time slice (ms)	50	1000	100	100
two digit year cutoff	1753	9999	2049	2049
Unicode comparison style	0	2147483647	0	0
Unicode locale id	0	2147483647	33280	33280
user connections	0	32767	0	0
user options	0	4095	0	0

C.7 Internal DAC Configuration Parameters

The disk controllers used during this benchmark were configured as follows:

```
Adapter No: 0

Number of Logical Drives : 1

Logical Drive = 0
        Span Depth = 6
        Raid Level = 0,
        Read Ahead = NORMAL
        Stripe Size = 64KB,
        Status = OPTIMAL
        Write Policy = WRITE_THRU,
        Direct IO = DIRECT_IO,
        Number of Stripes = 8
        SPAN Number = 0
                Starting Block = 0
                Number of blocks = 17770496
                Device Number = 0
                        Channel Number = 0
                        Target Number = 0
                Device Number = 1
                        Channel Number = 0
                        Target Number = 1
                Device Number = 2
                        Channel Number = 0
                        Target Number = 2
                Device Number = 3
                        Channel Number = 0
                        Target Number = 3
                Device Number = 4
                        Channel Number = 0
                        Target Number = 8
                Device Number = 5
                        Channel Number = 0
                        Target Number = 9
                Device Number = 6
                        Channel Number = 0
                        Target Number = 10
                Device Number = 7
                        Channel Number = 0
                        Target Number = 11
        SPAN Number = 1
                Starting Block = 0
                Number of blocks = 17770496
                Device Number = 0
                        Channel Number = 0
                        Target Number = 12
                Device Number = 1
                        Channel Number = 0
                        Target Number = 13
                Device Number = 2
                        Channel Number = 0
                        Target Number = 14
                Device Number = 3
                        Channel Number = 0
                        Target Number = 15
                Device Number = 4
                        Channel Number = 1
                        Target Number = 0
                Device Number = 5
                        Channel Number = 1
                        Target Number = 1
                Device Number = 6
                        Channel Number = 1
                        Target Number = 2
                Device Number = 7
                        Channel Number = 1
                        Target Number = 3
        SPAN Number = 2
                Starting Block = 0
                Number of blocks = 17770496
                Device Number = 0
                        Channel Number = 1
                        Target Number = 8
                Device Number = 1
                        Channel Number = 1
                        Target Number = 9
                Device Number = 2
```

```
                Channel Number = 1
                Target Number = 10
        Device Number = 3
                Channel Number = 1
                Target Number = 11
        Device Number = 4
                Channel Number = 1
                Target Number = 12
        Device Number = 5
                Channel Number = 1
                Target Number = 13
        Device Number = 6
                Channel Number = 1
                Target Number = 14
        Device Number = 7
                Channel Number = 1
                Target Number = 15
SPAN Number = 3
        Starting Block = 0
        Number of blocks = 17770496
        Device Number = 0
                Channel Number = 2
                Target Number = 0
        Device Number = 1
                Channel Number = 2
                Target Number = 1
        Device Number = 2
                Channel Number = 2
                Target Number = 2
        Device Number = 3
                Channel Number = 2
                Target Number = 3
        Device Number = 4
                Channel Number = 2
                Target Number = 8
        Device Number = 5
                Channel Number = 2
                Target Number = 9
        Device Number = 6
                Channel Number = 2
                Target Number = 10
        Device Number = 7
                Channel Number = 2
SPAN Number = 4 Target Number = 11
        Starting Block = 0
        Number of blocks = 17770496
        Device Number = 0
                Channel Number = 2
                Target Number = 12
        Device Number = 1
                Channel Number = 2
                Target Number = 13
        Device Number = 2
                Channel Number = 2
                Target Number = 14
        Device Number = 3
                Channel Number = 2
                Target Number = 15
        Device Number = 4
                Channel Number = 3
                Target Number = 0
        Device Number = 5
                Channel Number = 3
                Target Number = 1
        Device Number = 6
                Channel Number = 3
                Target Number = 2
        Device Number = 7
                Channel Number = 3
                Target Number = 3
SPAN Number = 5
        Starting Block = 0
        Number of blocks = 17770496
        Device Number = 0
                Channel Number = 3
                Target Number = 8
        Device Number = 1

                Channel Number = 3
                Target Number = 9
        Device Number = 2
                Channel Number = 3
                Target Number = 10
        Device Number = 3
                Channel Number = 3
```

```
                Target Number = 11
        Device Number = 4
                Channel Number = 3
                Target Number = 12
        Device Number = 5
                Channel Number = 3
                Target Number = 13
        Device Number = 6
                Channel Number = 3
                Target Number = 14
        Device Number = 7
                Channel Number = 3
                Target Number = 15
```

```
(Channel 0, ID 0)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 0, ID 1)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 0, ID 2)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 0, ID 3)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 0, ID 8)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 0, ID 9)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 0, ID 10)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 0, ID 11)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 0, ID 12)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 0, ID 13)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 0, ID 14)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 0, ID 15)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 1, ID 0)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 1, ID 1)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 1, ID 2)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 1, ID 3)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 1, ID 8)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks
```

```
(Channel 1, ID 8)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 1, ID 10)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 1, ID 11)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 1, ID 12)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 1, ID 13)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 1, ID 14)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 1, ID 15)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 2, ID 0)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 2, ID 1)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 2, ID 2)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 2, ID 3)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 2, ID 8)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 2, ID 9)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 2, ID 10)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 2, ID 11)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 2, ID 12)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 2, ID 13)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks


(Channel 2, ID 14)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 2, ID 15)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 3, ID 0)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 3, ID 1)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 3, ID 2)
```

```
        Type = HARDDISK,Current Status = ONLINE
        Size 17770496 blocks

  (Channel 3, ID 3)
        Type = HARDDISK,Current Status = ONLINE
        Size 17770496 blocks

  (Channel 3, ID 8)
        Type = HARDDISK,Current Status = ONLINE
        Size 17770496 blocks

  (Channel 3, ID 9)
        Type = HARDDISK,Current Status = ONLINE
        Size 17770496 blocks

  (Channel 3, ID 10)
        Type = HARDDISK,Current Status = ONLINE
        Size 17770496 blocks

  (Channel 3, ID 11)
        Type = HARDDISK,Current Status = ONLINE
        Size 17770496 blocks

  (Channel 3, ID 12)
        Type = HARDDISK,Current Status = ONLINE
        Size 17770496 blocks

  (Channel 3, ID 13)
        Type = HARDDISK,Current Status = ONLINE
        Size 17770496 blocks

  (Channel 3, ID 14)
        Type = HARDDISK,Current Status = ONLINE
        Size 17770496 blocks

  (Channel 3, ID 15)
        Type = HARDDISK,Current Status = ONLINE
        Size 17770496 blocks


Adapter No: 1

Number of Logical Drives : 1

Logical Drive = 0
        Span Depth = 6
        Raid Level = 0,
        Read Ahead = NORMAL
        Stripe Size = 64KB,
        Status = OPTIMAL
        Write Policy = WRITE_THRU,
        Direct IO = DIRECT_IO,
        Number of Stripes = 8
        SPAN Number = 0
                Starting Block = 0
                Number of blocks = 17770496
                Device Number = 0
                        Channel Number = 0
                        Target Number = 0
                Device Number = 1
                        Channel Number = 0
                        Target Number = 1
                Device Number = 2

                        Channel Number = 0
                        Target Number = 2
                Device Number = 3
                        Channel Number = 0
                        Target Number = 3
                Device Number = 4
                        Channel Number = 0
                        Target Number = 8
                Device Number = 5
                        Channel Number = 0
                        Target Number = 9
                Device Number = 6
                        Channel Number = 0
                        Target Number = 10
                Device Number = 7
                        Channel Number = 0
                        Target Number = 11
        SPAN Number = 1
                Starting Block = 0
                Number of blocks = 17770496
                Device Number = 0
                        Channel Number = 0
```

```
        Device Number = 1
                Target Number = 12
                Channel Number = 0
                Target Number = 13
        Device Number = 2
                Channel Number = 0
                Target Number = 14
        Device Number = 3
                Channel Number = 0
                Target Number = 15
        Device Number = 4
                Channel Number = 1
                Target Number = 0
        Device Number = 5
                Channel Number = 1
                Target Number = 1
        Device Number = 6
                Channel Number = 1
                Target Number = 2
        Device Number = 7
                Channel Number = 1
                Target Number = 3
SPAN Number = 2
        Starting Block = 0
        Number of blocks = 17770496
        Device Number = 0
                Channel Number = 1
                Target Number = 8
        Device Number = 1
                Channel Number = 1
                Target Number = 9
        Device Number = 2
                Channel Number = 1
                Target Number = 10
        Device Number = 3
                Channel Number = 1
                Target Number = 11
        Device Number = 4
                Channel Number = 1
                Target Number = 12
        Device Number = 5
                Channel Number = 1
                Target Number = 13
        Device Number = 6
                Channel Number = 1
                Target Number = 14
        Device Number = 7
                Channel Number = 1
                Target Number = 15
SPAN Number = 3
        Starting Block = 0
        Number of blocks = 17770496
        Device Number = 0
                Channel Number = 2
                Target Number = 0
        Device Number = 1
                Channel Number = 2
                Target Number = 1
        Device Number = 2
                Channel Number = 2
                Target Number = 2
        Device Number = 3
                Channel Number = 2
                Target Number = 3
        Device Number = 4
                Channel Number = 2
                Target Number = 8
        Device Number = 5
                Channel Number = 2
                Target Number = 9
        Device Number = 6
                Channel Number = 2
                Target Number = 10
        Device Number = 7
                Channel Number = 2
                Target Number = 11
SPAN Number = 4
        Starting Block = 0
        Number of blocks = 17770496
        Device Number = 0
                Channel Number = 2
                Target Number = 12
        Device Number = 1
                Channel Number = 2
                Target Number = 13
```

```
        Device Number = 2
                Channel Number = 2
                Target Number = 14
        Device Number = 3
                Channel Number = 2
                Target Number = 15
        Device Number = 4
                Channel Number = 3
                Target Number = 0
        Device Number = 5
                Channel Number = 3
                Target Number = 1
        Device Number = 6
                Channel Number = 3
                Target Number = 2
        Device Number = 7
                Channel Number = 3
                Target Number = 3
SPAN Number = 5
        Starting Block = 0
        Number of blocks = 17770496
        Device Number = 0
                Channel Number = 3
                Target Number = 8
        Device Number = 1
                Channel Number = 3
                Target Number = 9
        Device Number = 2
                Channel Number = 3
                Target Number = 10
        Device Number = 3
                Channel Number = 3
                Target Number = 11
        Device Number = 4
                Channel Number = 3
                Target Number = 12
        Device Number = 5
                Channel Number = 3
                Target Number = 13
        Device Number = 6
                Channel Number = 3
                Target Number = 14
        Device Number = 7
```

```
                Channel Number = 3
                Target Number = 15

(Channel 0, ID 0)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks


(Channel 0, ID 1)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 0, ID 2)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 0, ID 3)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 0, ID 8)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 0, ID 9)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 0, ID 10)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 0, ID 11)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 0, ID 12)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks
```

```
(Channel 0, ID 13)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 0, ID 14)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 0, ID 15)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 1, ID 0)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 1, ID 1)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 1, ID 2)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 1, ID 3)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 1, ID 8)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 1, ID 9)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 1, ID 10)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 1, ID 11)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 1, ID 12)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks


(Channel 1, ID 13)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 1, ID 14)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 1, ID 15)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 2, ID 0)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 2, ID 1)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 2, ID 2)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 2, ID 3)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 2, ID 8)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 2, ID 9)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 2, ID 10)
```

```
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 2, ID 11)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 2, ID 12)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 2, ID 13)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 2, ID 14)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 2, ID 15)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 3, ID 0)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 3, ID 1)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 3, ID 2)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 3, ID 3)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 3, ID 8)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 3, ID 9)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 3, ID 10)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 3, ID 11)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 3, ID 12)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 3, ID 13)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 3, ID 14)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 3, ID 15)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks


Adapter No: 2

Number of Logical Drives : 1

Logical Drive = 0
       Span Depth = 6
       Raid Level = 0,
       Read Ahead = NORMAL
       Stripe Size = 64KB,
       Status = OPTIMAL
       Write Policy = WRITE_THRU,
```

```
Direct IO = DIRECT_IO,
Number of Stripes = 8,
SPAN Number = 0
        Starting Block = 0
        Number of blocks = 17770496
        Device Number = 0
                Channel Number = 0
                Target Number = 0
        Device Number = 1
                Channel Number = 0
                Target Number = 1
        Device Number = 2
                Channel Number = 0
                Target Number = 2
        Device Number = 3
                Channel Number = 0
                Target Number = 3
        Device Number = 4
                Channel Number = 0
                Target Number = 8
        Device Number = 5
                Channel Number = 0
                Target Number = 9
        Device Number = 6
                Channel Number = 0
                Target Number = 10
        Device Number = 7
                Channel Number = 0
                Target Number = 11
SPAN Number = 1
        Starting Block = 0
        Number of blocks = 17770496
        Device Number = 0
                Channel Number = 0
                Target Number = 12
        Device Number = 1
                Channel Number = 0
                Target Number = 13
        Device Number = 2
                Channel Number = 0
                Target Number = 14
        Device Number = 3
                Channel Number = 0
                Target Number = 15
        Device Number = 4
                Channel Number = 1
                Target Number = 0
        Device Number = 5
                Channel Number = 1
                Target Number = 1
        Device Number = 6
                Channel Number = 1
                Target Number = 2
        Device Number = 7
                Channel Number = 1
                Target Number = 3
SPAN Number = 2
        Starting Block = 0
        Number of blocks = 17770496
        Device Number = 0
                Channel Number = 1
                Target Number = 8
        Device Number = 1
                Channel Number = 1
                Target Number = 9
        Device Number = 2
                Channel Number = 1
                Target Number = 10
        Device Number = 3
                Channel Number = 1
                Target Number = 11
        Device Number = 4
                Channel Number = 1
                Target Number = 12
        Device Number = 5
                Channel Number = 1
                Target Number = 13
        Device Number = 6
                Channel Number = 1
                Target Number = 14
        Device Number = 7
                Channel Number = 1
                Target Number = 15
SPAN Number = 3
```

```
        Starting Block = 0
        Number of blocks = 17770496
        Device Number = 0
                Channel Number = 2
                Target Number = 0
        Device Number = 1
                Channel Number = 2
                Target Number = 1
        Device Number = 2
                Channel Number = 2
                Target Number = 2
        Device Number = 3
                Channel Number = 2
                Target Number = 3
        Device Number = 4
                Channel Number = 2
                Target Number = 8
        Device Number = 5
                Channel Number = 2
                Target Number = 9
        Device Number = 6
                Channel Number = 2
                Target Number = 10
        Device Number = 7
                Channel Number = 2
                Target Number = 11
SPAN Number = 4
        Starting Block = 0
        Number of blocks = 17770496
        Device Number = 0
                Channel Number = 2
                Target Number = 12
        Device Number = 1
                Channel Number = 2
                Target Number = 13
        Device Number = 2
                Channel Number = 2
                Target Number = 14
        Device Number = 3
                Channel Number = 2
                Target Number = 15
        Device Number = 4
                Channel Number = 3
                Target Number = 0
        Device Number = 5
                Channel Number = 3
                Target Number = 1
        Device Number = 6
                Channel Number = 3
                Target Number = 2
        Device Number = 7
                Channel Number = 3
                Target Number = 3
SPAN Number = 5
        Starting Block = 0
        Number of blocks = 17770496
        Device Number = 0
                Channel Number = 3
                Target Number = 8
        Device Number = 1
                Channel Number = 3
                Target Number = 9
        Device Number = 2
                Channel Number = 3
                Target Number = 10
        Device Number = 3
                Channel Number = 3
                Target Number = 11
        Device Number = 4
                Channel Number = 3
                Target Number = 12
        Device Number = 5
                Channel Number = 3
                Target Number = 13
        Device Number = 6
                Channel Number = 3
                Target Number = 14
        Device Number = 7
                Channel Number = 3
                Target Number = 15
```

```
(Channel 0, ID 0)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 0, ID 1)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 0, ID 2)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 0, ID 3)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 0, ID 8)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 0, ID 9)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 0, ID 10)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 0, ID 11)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks



(Channel 0, ID 12)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 0, ID 13)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 0, ID 14)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 0, ID 15)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 1, ID 0)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 1, ID 1)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 1, ID 2)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 1, ID 3)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 1, ID 8)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 1, ID 9)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks



(Channel 1, ID 10)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 1, ID 11)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 1, ID 12)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks
```

```
(Channel 1, ID 13)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 1, ID 14)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 1, ID 15)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 2, ID 0)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 2, ID 1)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 2, ID 2)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 2, ID 3)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks


(Channel 2, ID 8)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 2, ID 9)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 2, ID 10)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 2, ID 11)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks
(Channel 2, ID 12)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 2, ID 13)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 2, ID 14)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 2, ID 15)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 3, ID 0)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 3, ID 1)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks


(Channel 3, ID 2)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 3, ID 3)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 3, ID 8)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 3, ID 9)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks
```

```
(Channel 3, ID 10)
        Type = HARDDISK,Current Status = ONLINE
        Size 17770496 blocks

(Channel 3, ID 11)
        Type = HARDDISK,Current Status = ONLINE
        Size 17770496 blocks

(Channel 3, ID 12)
        Type = HARDDISK,Current Status = ONLINE
        Size 17770496 blocks

(Channel 3, ID 13)
        Type = HARDDISK,Current Status = ONLINE
        Size 17770496 blocks

(Channel 3, ID 14)
        Type = HARDDISK,Current Status = ONLINE
        Size 17770496 blocks

(Channel 3, ID 15)
        Type = HARDDISK,Current Status = ONLINE
        Size 17770496 blocks



Adapter No: 3

Number of Logical Drives : 1

Logical Drive = 0
        Span Depth = 6
        Raid Level = 0,
        Read Ahead = NORMAL
        Stripe Size = 64KB,
        Status = OPTIMAL
        Write Policy = WRITE_THRU,
        Direct IO = DIRECT_IO,
        Number of Stripes = 8
        SPAN Number = 0
                Starting Block = 0
                Number of blocks = 17770496
                Device Number = 0
                        Channel Number = 1
                        Target Number = 0
                Device Number = 1
                        Channel Number = 1
                        Target Number = 1
                Device Number = 2
                        Channel Number = 1
                        Target Number = 2
                Device Number = 3
                        Channel Number = 1
                        Target Number = 3
                Device Number = 4
                        Channel Number = 1
                        Target Number = 8
                Device Number = 5
                        Channel Number = 1
                        Target Number = 9
                Device Number = 6
                        Channel Number = 1
                        Target Number = 10
                Device Number = 7
                        Channel Number = 1
                        Target Number = 11
        SPAN Number = 1
                Starting Block = 0
                Number of blocks = 17770496
                Device Number = 0
                        Channel Number = 1
                        Target Number = 12
                Device Number = 1
                        Channel Number = 1
                        Target Number = 13
                Device Number = 2
                        Channel Number = 1
                        Target Number = 14
                Device Number = 3
                        Channel Number = 1
                        Target Number = 15
                Device Number = 4
                        Channel Number = 0
                        Target Number = 0
                Device Number = 5
```

```
                Channel Number = 0
                Target Number = 10
        Device Number = 6
                Channel Number = 0
                Target Number = 2
        Device Number = 7
                Channel Number = 0
                Target Number = 3
SPAN Number = 2
        Starting Block = 0
        Number of blocks = 17770496
        Device Number = 0
                Channel Number = 0
                Target Number = 8
        Device Number = 1
                Channel Number = 0
                Target Number = 9
        Device Number = 2
                Channel Number = 0
                Target Number = 10
        Device Number = 3
                Channel Number = 0
                Target Number = 11
        Device Number = 4
                Channel Number = 0
                Target Number = 12
        Device Number = 5
                Channel Number = 0
                Target Number = 13
        Device Number = 6
                Channel Number = 0
                Target Number = 14
        Device Number = 7
                Channel Number = 0
                Target Number = 15
SPAN Number = 3
        Starting Block = 0
        Number of blocks = 17770496
        Device Number = 0
                Channel Number = 2
                Target Number = 0
        Device Number = 1
                Channel Number = 2
                Target Number = 1
        Device Number = 2
                Channel Number = 2
                Target Number = 2
        Device Number = 3
                Channel Number = 2
                Target Number = 3
        Device Number = 4
                Channel Number = 2
                Target Number = 8
        Device Number = 5
                Channel Number = 2
                Target Number = 9
        Device Number = 6
                Channel Number = 2
                Target Number = 10
        Device Number = 7
                Channel Number = 2
                Target Number = 11
SPAN Number = 4
        Starting Block = 0
        Number of blocks = 17770496
        Device Number = 0
                Channel Number = 2
                Target Number = 12
        Device Number = 1
                Channel Number = 2
                Target Number = 13
        Device Number = 2
                Channel Number = 2
                Target Number = 14
        Device Number = 3
                Channel Number = 2
                Target Number = 15
        Device Number = 4
                Channel Number = 3
                Target Number = 0
        Device Number = 5
                Channel Number = 3
                Target Number = 1
        Device Number = 6
```

```
                Channel Number = 3
                Target Number = 2
        Device Number = 7
                Channel Number = 3
                Target Number = 3
SPAN Number = 5
        Starting Block = 0
        Number of blocks = 17770496
        Device Number = 0
                Channel Number = 3
                Target Number = 8
        Device Number = 1
                Channel Number = 3
                Target Number = 9
        Device Number = 2
                Channel Number = 3
                Target Number = 10
        Device Number = 3
                Channel Number = 3
                Target Number = 11
        Device Number = 4
                Channel Number = 3
                Target Number = 12
        Device Number = 5
                Channel Number = 3
                Target Number = 13
        Device Number = 6
                Channel Number = 3
                Target Number = 14
        Device Number = 7
                Channel Number = 3
                Target Number = 15
```

```
(Channel 0, ID 0)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 0, ID 1)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 0, ID 2)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 0, ID 3)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 0, ID 8)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks


(Channel 0, ID 9)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 0, ID 10)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 0, ID 11)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 0, ID 12)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 0, ID 13)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 0, ID 14)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 0, ID 15)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks
```

```
(Channel 1, ID 0)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 1, ID 1)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 1, ID 2)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks



(Channel 1, ID 3)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 1, ID 8)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 1, ID 9)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 1, ID 10)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 1, ID 11)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 1, ID 12)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 1, ID 13)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 1, ID 14)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks
(Channel 1, ID 15)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 2, ID 0)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks



(Channel 2, ID 1)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 2, ID 2)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 2, ID 3)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 2, ID 8)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 2, ID 9)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 2, ID 10)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 2, ID 11)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 2, ID 12)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks
```

```
(Channel 2, ID 13)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 2, ID 14)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks



(Channel 2, ID 15)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 3, ID 0)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 3, ID 1)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 3, ID 2)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 3, ID 3)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 3, ID 8)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 3, ID 9)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 3, ID 10)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 3, ID 11)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 3, ID 12)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks



(Channel 3, ID 13)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 3, ID 14)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 3, ID 15)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks



Adapter No: 4

Number of Logical Drives : 1

Logical Drive = 0
       Span Depth = 6
       Raid Level = 0,
       Read Ahead = NORMAL
       Stripe Size = 64KB,
       Status = OPTIMAL
       Write Policy = WRITE_THRU,
       Direct IO = DIRECT_IO,
       Number of Stripes = 8
       SPAN Number = 0
              Starting Block = 0
              Number of blocks = 17770496
              Device Number = 0
                     Channel Number = 0
                     Target Number = 0
              Device Number = 1
                     Channel Number = 0
                     Target Number = 1
              Device Number = 2
```

```
                Channel Number = 0
                Target Number = 2
        Device Number = 3
                Channel Number = 0
                Target Number = 3
        Device Number = 4
                Channel Number = 0
                Target Number = 8
        Device Number = 5
                Channel Number = 0
                Target Number = 9
        Device Number = 6
                Channel Number = 0
                Target Number = 10
        Device Number = 7
                Channel Number = 0
                Target Number = 11
SPAN Number = 1
        Starting Block = 0
        Number of blocks = 17770496
        Device Number = 0
                Channel Number = 0
                Target Number = 12
        Device Number = 1
                Channel Number = 0
                Target Number = 13
        Device Number = 2
                Channel Number = 0
                Target Number = 14
        Device Number = 3
                Channel Number = 0
                Target Number = 15
        Device Number = 4
                Channel Number = 1
                Target Number = 0
        Device Number = 5
                Channel Number = 1
                Target Number = 1
        Device Number = 6
                Channel Number = 1
                Target Number = 2
        Device Number = 7
                Channel Number = 1
                Target Number = 3
SPAN Number = 2
        Starting Block = 0
        Number of blocks = 17770496
        Device Number = 0
                Channel Number = 1
                Target Number = 8
        Device Number = 1
                Channel Number = 1
                Target Number = 9
        Device Number = 2
                Channel Number = 1
                Target Number = 10
        Device Number = 3
                Channel Number = 1
                Target Number = 11
        Device Number = 4
                Channel Number = 1
                Target Number = 12
        Device Number = 5
                Channel Number = 1
                Target Number = 13
        Device Number = 6
                Channel Number = 1
                Target Number = 14
        Device Number = 7
                Channel Number = 1
                Target Number = 15
SPAN Number = 3
        Starting Block = 0
        Number of blocks = 17770496
        Device Number = 0
                Channel Number = 2
                Target Number = 0
        Device Number = 1
                Channel Number = 2
                Target Number = 1
        Device Number = 2
                Channel Number = 2
                Target Number = 2
```

```
        Device Number = 3
                Channel Number = 2
                Target Number = 3
        Device Number = 4
                Channel Number = 2
                Target Number = 8
        Device Number = 5
                Channel Number = 2
                Target Number = 9
        Device Number = 6
                Channel Number = 2
                Target Number = 10
        Device Number = 7
                Channel Number = 2
                Target Number = 11
SPAN Number = 4
        Starting Block = 0
        Number of blocks = 17770496
        Device Number = 0
                Channel Number = 2
                Target Number = 12
        Device Number = 1
                Channel Number = 2
                Target Number = 13
        Device Number = 2
                Channel Number = 2
                Target Number = 14
        Device Number = 3
                Channel Number = 2
                Target Number = 15
        Device Number = 4
                Channel Number = 3
                Target Number = 0
        Device Number = 5
                Channel Number = 3
                Target Number = 1
        Device Number = 6
                Channel Number = 3
                Target Number = 2
        Device Number = 7
                Channel Number = 3
```

```
SPAN Number = 5 Target Number = 3
        Starting Block = 0
        Number of blocks = 17770496
        Device Number = 0
                Channel Number = 3
                Target Number = 8
        Device Number = 1
                Channel Number = 3
                Target Number = 9
        Device Number = 2
                Channel Number = 3
                Target Number = 10
        Device Number = 3
                Channel Number = 3
                Target Number = 11
        Device Number = 4
                Channel Number = 3
                Target Number = 12
        Device Number = 5
                Channel Number = 3
                Target Number = 13
        Device Number = 6
                Channel Number = 3
                Target Number = 14
        Device Number = 7
                Channel Number = 3
                Target Number = 15
```

```
(Channel 0, ID 0)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 0, ID 1)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks


(Channel 0, ID 2)
       Type = HARDDISK,Current Status = ONLINE
```

```
       Size 17770496 blocks
(Channel 0, ID 3)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 0, ID 8)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 0, ID 9)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 0, ID 10)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 0, ID 11)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 0, ID 12)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 0, ID 13)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 0, ID 14)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 0, ID 15)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 1, ID 0)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 1, ID 1)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 1, ID 2)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 1, ID 3)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 1, ID 8)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 1, ID 9)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 1, ID 10)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 1, ID 11)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 1, ID 12)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 1, ID 13)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks


(Channel 1, ID 14)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 1, ID 15)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks
```

```
(Channel 2, ID 0)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 2, ID 1)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 2, ID 2)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 2, ID 3)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 2, ID 8)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 2, ID 9)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 2, ID 10)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 2, ID 11)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 2, ID 12)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 2, ID 13)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 2, ID 14)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks
(Channel 2, ID 15)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 3, ID 0)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 3, ID 1)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 3, ID 2)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 3, ID 3)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 3, ID 8)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 3, ID 9)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks


(Channel 3, ID 10)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 3, ID 11)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 3, ID 12)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks
```

```
 (Channel 3, ID 13)
        Type = HARDDISK,Current Status = ONLINE
        Size 17770496 blocks

 (Channel 3, ID 14)
        Type = HARDDISK,Current Status = ONLINE
        Size 17770496 blocks

 (Channel 3, ID 15)
        Type = HARDDISK,Current Status = ONLINE
        Size 17770496 blocks

Adapter No: 5 – although present in the system was never used. Please see the
auditor's attestation letter for clarification.

Adapter No: 6

Number of Logical Drives : 1

Logical Drive = 0
        Span Depth = 6
        Raid Level = 1,
        Read Ahead = ADAPTIVE
        Stripe Size = 64KB,
        Status = OPTIMAL
        Write Policy = WRITE_THRU,
        Direct IO = DIRECT_IO,
        Number of Stripes = 2
        SPAN Number = 0
                Starting Block = 0
                Number of blocks = 35563520
                Device Number = 0
                        Channel Number = 0
                        Target Number = 0
                Device Number = 1
                        Channel Number = 0
                        Target Number = 1
        SPAN Number = 1
                Starting Block = 0
                Number of blocks = 35563520
                Device Number = 0
                        Channel Number = 0
                        Target Number = 2
                Device Number = 1
                        Channel Number = 0
                        Target Number = 3
SPAN Number = 2
        Starting Block = 0
        Number of blocks = 35563520
        Device Number = 0
                Channel Number = 0
                Target Number = 8
        Device Number = 1
                Channel Number = 0
                Target Number = 9
SPAN Number = 3
        Starting Block = 0
        Number of blocks = 35563520
        Device Number = 0
                Channel Number = 0
                Target Number = 10
        Device Number = 1
                Channel Number = 0
                Target Number = 11
SPAN Number = 4
        Starting Block = 0
        Number of blocks = 35563520
        Device Number = 0
                Channel Number = 0
                Target Number = 12
        Device Number = 1
                Channel Number = 0
                Target Number = 13
SPAN Number = 5
        Starting Block = 0
        Number of blocks = 35563520
        Device Number = 0
                Channel Number = 0
                Target Number = 14
        Device Number = 1
                Channel Number = 0
                Target Number = 15
```

```
(Channel 0, ID 0)
       Type = HARDDISK,Current Status = ONLINE
       Size 35563520 blocks

(Channel 0, ID 1)
       Type = HARDDISK,Current Status = ONLINE
       Size 35563520 blocks

(Channel 0, ID 2)
       Type = HARDDISK,Current Status = ONLINE
       Size 35563520 blocks

(Channel 0, ID 3)
       Type = HARDDISK,Current Status = ONLINE
       Size 35563520 blocks

(Channel 0, ID 8)
       Type = HARDDISK,Current Status = ONLINE
       Size 35563520 blocks

(Channel 0, ID 9)
       Type = HARDDISK,Current Status = ONLINE
       Size 35563520 blocks

(Channel 0, ID 10)
       Type = HARDDISK,Current Status = ONLINE
       Size 35563520 blocks

(Channel 0, ID 11)
       Type = HARDDISK,Current Status = ONLINE
       Size 35563520 blocks

(Channel 0, ID 12)
       Type = HARDDISK,Current Status = ONLINE
       Size 35563520 blocks

(Channel 0, ID 13)
       Type = HARDDISK,Current Status = ONLINE
       Size 35563520 blocks

(Channel 0, ID 14)
       Type = HARDDISK,Current Status = ONLINE
       Size 35563520 blocks

(Channel 0, ID 15)
       Type = HARDDISK,Current Status = ONLINE
       Size 35563520 blocks

(Channel 1, ID 0)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 1, ID 1)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 1, ID 2)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 1, ID 3)
       Type = HARDDISK,Current Status = ONLINE

       Size 17770496 blocks

(Channel 1, ID 8)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 1, ID 9)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 1, ID 10)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 1, ID 11)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 1, ID 12)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks
```

```
(Channel 1, ID 13)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 1, ID 14)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 1, ID 15)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 2, ID 0)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 2, ID 1)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 2, ID 2)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 2, ID 3)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 2, ID 8)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 2, ID 9)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 2, ID 10)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 2, ID 11)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 2, ID 12)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 2, ID 13)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 2, ID 14)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 2, ID 15)
       Type = HARDDISK,Current Status = ONLINE

       Size 17770496 blocks

(Channel 3, ID 0)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 3, ID 1)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 3, ID 2)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 3, ID 3)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 3, ID 8)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 3, ID 9)
       Type = HARDDISK,Current Status = ONLINE
       Size 17770496 blocks

(Channel 3, ID 10)
```

```
        Type = HARDDISK,Current Status = ONLINE
        Size 17770496 blocks

(Channel 3, ID 11)
        Type = HARDDISK,Current Status = ONLINE
        Size 17770496 blocks

(Channel 3, ID 12)
        Type = HARDDISK,Current Status = ONLINE
        Size 17770496 blocks

(Channel 3, ID 13)
        Type = HARDDISK,Current Status = ONLINE
        Size 17770496 blocks

(Channel 3, ID 14)
        Type = HARDDISK,Current Status = ONLINE
        Size 17770496 blocks

(Channel 3, ID 15)
        Type = HARDDISK,Current Status = ONLINE
        Size 17770496 blocks
```

C.8 Client System Configuration Parameters

COM+ Settings

```
TPCC.AllTxns:
        Activation:
                Enable Object Pooling selected
                Minimum Pool Size: 58
                Maximum Pool Size: 58
                Creation Timeout: 60000
                Enable Object Construction
                Enable Just In Time Activation
        Concurrency:
                Concurrency Required
```

Microsoft IIS Registry Parameters

```
Key Name:          SYSTEM\CurrentControlSet\Services\InetInfo\Parameters
Class Name:        <NO CLASS>
Last Write Time:   2/8/2000 - 6:19 PM
Value 0
  Name:            DispatchEntries
  Type:            REG_MULTI_SZ
  Data:            LDAPSVC


Value 1
  Name:            ListenBackLog
  Type:            REG_DWORD
  Data:            0x30


Value 2
  Name:            PoolThreadLimit
  Type:            REG_DWORD
  Data:            0x100

Value 3
  Name:            ThreadTimeout
  Type:            REG_DWORD
  Data:            0x15180
```

World Wide Web Service Registry Parameters

```
Key Name:          SYSTEM\CurrentControlSet\Services\W3SVC\Parameters
Class Name:        <NO CLASS>
Last Write Time:   11/9/1999 - 4:44 PM
Value 0
  Name:            AcceptExOutstanding
  Type:            REG_DWORD
  Data:            0x28

Value 1
  Name:            AccessDeniedMessage
  Type:            REG_SZ
  Data:            Error: Access is Denied.

Value 2
  Name:            CertMapList
  Type:            REG_SZ
  Data:            C:\WINNT\System32\inetsrv\iiscrmap.dll
```

```
Value 3
  Name:           Filter DLLs
  Type:           REG_SZ
  Data:

Value 4
  Name:           InstallPath
  Type:           REG_SZ
  Data:           C:\WINNT\System32\inetsrv

Value 5
  Name:           LogFileDirectory
  Type:           REG_SZ
  Data:           C:\WINNT\System32\LogFiles

Value 6
  Name:           MajorVersion
  Type:           REG_DWORD
  Data:           0x5

Value 7
  Name:           MinorVersion
  Type:           REG_DWORD
  Data:           0


Key Name:         SYSTEM\CurrentControlSet\Services\W3SVC\Parameters\ADCLaunch
Class Name:       <NO CLASS>
Last Write Time:  11/9/1999 - 1:53 PM

Key Name:
SYSTEM\CurrentControlSet\Services\W3SVC\Parameters\ADCLaunch\AdvancedDataFactor
y
Class Name:       <NO CLASS>
Last Write Time:  11/9/1999 - 1:53 PM

Key Name:
SYSTEM\CurrentControlSet\Services\W3SVC\Parameters\ADCLaunch\RDSServer.DataFact
ory
Class Name:       <NO CLASS>
Last Write Time:  11/9/1999 - 1:53 PM


Key Name:         SYSTEM\CurrentControlSet\Services\W3SVC\Parameters\Script
Map
Class Name:       <NO CLASS>
Last Write Time:  11/9/1999 - 2:05 PM

Key Name:         SYSTEM\CurrentControlSet\Services\W3SVC\Parameters\Virtual
Roots
Class Name:       <NO CLASS>
Last Write Time:  2/25/2000 - 11:05 AM
Value 0
  Name:           /
  Type:           REG_SZ
  Data:           c:\inetpub\wwwroot,,205

Value 1
  Name:           /_vti_bin
  Type:           REG_SZ
  Data:           C:\Program Files\Common Files\Microsoft Shared\Web Server
Extensions\40\isapi,,205

Value 2
  Name:           /IISAdmin
  Type:           REG_SZ
  Data:           C:\WINNT\System32\inetsrv\iisadmin,,201

Value 3
  Name:           /IISHelp
  Type:           REG_SZ
  Data:           c:\winnt\help\iishelp,,201

Value 4
  Name:           /IISSamples
  Type:           REG_SZ
  Data:           c:\inetpub\iissamples,,201

Value 5
  Name:           /MSADC
  Type:           REG_SZ
  Data:           c:\program files\common files\system\msadc,,205

Value 6
  Name:           /Printers
```

```
  Type:           REG_SZ
  Data:           C:\WINNT\web\printers,,201

Value 7
  Name:           /Rpc
  Type:           REG_SZ
  Data:           C:\WINNT\System32\RpcProxy,,4

Value 8
  Name:           /Scripts
  Type:           REG_SZ
  Data:           c:\inetpub\scripts,,204
```

TPCC Application Registry Parameters

```
Key Name:         SOFTWARE\Microsoft\TPCC
Class Name:       <NO CLASS>
Last Write Time:  2/8/2000 - 6:17 PM
Value 0
  Name:           COM_SinglePool
  Type:           REG_SZ
  Data:           YES

Value 1
  Name:           DB_Protocol
  Type:           REG_SZ
  Data:           DBLIB

Value 2
  Name:           DbName
  Type:           REG_SZ
  Data:           tpcc

Value 3
  Name:           DbPassword
  Type:           REG_SZ
  Data:

Value 4
  Name:           DbServer
  Type:           REG_SZ
  Data:           prf_sut6

Value 5
  Name:           DbUser
  Type:           REG_SZ
  Data:           sa

Value 6
  Name:           MaxConnections

  Type:           REG_DWORD
  Data:           0x2134

Value 7
  Name:           MaxPendingDeliveries
  Type:           REG_DWORD
  Data:           0x3e8

Value 8
  Name:           NumberOfDeliveryThreads
  Type:           REG_DWORD
  Data:           0x6

Value 9
  Name:           Path
  Type:           REG_SZ
  Data:           c:\inetpub\wwwroot\

Value 10
  Name:           TxnMonitor
  Type:           REG_SZ
  Data:           COM
```

Microsoft Windows 2000 Server Configuration Parameters

```
System Information report written at: 02/15/2000 04:41:48 PM
[System Information]

[ Following are sub-categories of this main category ]

[System Summary]
```

```
Item  Value
OS Name Microsoft Windows 2000 Server
Version 5.0.2128  Build 2128
OS Manufacturer Microsoft Corporation
System Name     CLIENTA
System Manufacturer     Hewlett Packard
System Model    HP NetServer
System Type     X86-based PC
Processor       x86 Family 6 Model 7 Stepping 3 GenuineIntel ~550 Mhz
BIOS Version    09/16/99
Windows Directory       C:\WINNT
System DirectoryC:\WINNT\System32
Boot Device     \Device\Harddisk0\Partition1
Locale  United States
User Name       CLIENTA\Administrator
Time Zone       Pacific Standard Time
Total Physical Memory   523,756 KB
Available Physical Memory433,260 KB
Total Virtual Memory    1,802,780 KB
Available Virtual Memory1,649,536 KB
Page File Space 1,279,024 KB
Page File       Not Available

[Hardware Resources]

[ Following are sub-categories of this main category ]

[Conflicts/Sharing]

ResourceDevice
IRQ 19  Intel 82371AB/EB PCI to USB Universal Host Controller
IRQ 19  HP NetServer 10/100TX PCI LAN Adapter #2
IRQ 18  Adaptec AHA-2940U/UW Dual/AHA-394xAU/AUW/AUWD PCI SCSI Controller
IRQ 18  Adaptec AHA-2940U/UW Dual/AHA-394xAU/AUW/AUWD PCI SCSI Controller

[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
0x0000-0x0CF7   PCI bus OK
0x0000-0x0CF7   Direct memory access controller OK
0x0D00-0xFFFF   PCI bus OK
0x9000-0x9FFF   Intel 82443BX Pentium(r) II Processor to AGP Controller OK
0x9000-0x9FFF   ATI Technologies Inc. 3D RAGE IIC AGP   OK
0x03B0-0x03BB   Intel 82443BX Pentium(r) II Processor to AGP Controller OK
0x03B0-0x03BB   ATI Technologies Inc. 3D RAGE IIC AGP   OK
0x03C0-0x03DF   Intel 82443BX Pentium(r) II Processor to AGP Controller OK
0x03C0-0x03DF   ATI Technologies Inc. 3D RAGE IIC AGP   OK
0x0A79-0x0A79   ISAPNP Read Data Port   OK
0x0279-0x0279   ISAPNP Read Data Port   OK
0x0274-0x0277   ISAPNP Read Data Port   OK
0x0081-0x008F   Direct memory access controller OK
0x00C0-0x00DF   Direct memory access controller OK
0x0070-0x0071   System CMOS/real time clock     OK
0x0020-0x0021   Programmable interrupt controllerOK
0x00A0-0x00A1   Programmable interrupt controllerOK
0x00F0-0x00FE   Numeric data processor  OK
0x0040-0x0043   System timer    OK
0x0061-0x0061   System speaker  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
0x03F0-0x03F5   Standard floppy disk controller OK
0x03F7-0x03F7   Standard floppy disk controller OK
0x03F8-0x03FF   Communications Port (COM1)      OK
0x0378-0x037B   Printer Port (LPT1)     OK
0x02F8-0x02FF   Communications Port (COM2)      OK
0x1880-0x188F   Intel(r) 82371AB/EB PCI Bus Master IDE ControllerOK
0x01F0-0x01F7   Primary IDE Channel     OK
0x03F6-0x03F6   Primary IDE Channel     OK
0x0170-0x0177   Secondary IDE Channel   OK
0x0376-0x0376   Secondary IDE Channel   OK
0x1840-0x185F   Intel 82371AB/EB PCI to USB Universal Host Controller   OK
0x1000-0x10FF   Adaptec AHA-2940U/UW Dual/AHA-394xAU/AUW/AUWD PCI SCSI
Controller      OK
```

```
0x1400-0x14FF   Adaptec AHA-2940U/UW Dual/AHA-394xAU/AUW/AUWD PCI SCSI
Controller      OK
0x1800-0x183F   HP NetServer 10/100TX PCI LAN Adapter #2OK
0x1860-0x187F   HP NetServer 10/100TX PCI LAN Adapter   OK

[IRQs]

IRQ Number      Device
20      Microsoft ACPI-Compliant System
8       System CMOS/real time clock
13      Numeric data processor
0       System timer
1       Standard 101/102-Key or Microsoft Natural PS/2 Keyboard
12      PS/2 Compatible Mouse
6       Standard floppy disk controller
4       Communications Port (COM1)
3       Communications Port (COM2)
14      Primary IDE Channel
15      Secondary IDE Channel
19      Intel 82371AB/EB PCI to USB Universal Host Controller
19      HP NetServer 10/100TX PCI LAN Adapter #2
18      Adaptec AHA-2940U/UW Dual/AHA-394xAU/AUW/AUWD PCI SCSI Controller
18      Adaptec AHA-2940U/UW Dual/AHA-394xAU/AUW/AUWD PCI SCSI Controller
16      HP NetServer 10/100TX PCI LAN Adapter

[Memory]

Range   Device  Status
0xA0000-0xBFFFF PCI bus OK
0xA0000-0xBFFFF Intel 82443BX Pentium(r) II Processor to AGP Controller OK
0xA0000-0xBFFFF ATI Technologies Inc. 3D RAGE IIC AGP   OK
0xC0000-0xC3FFF PCI bus OK
0xC4000-0xC7FFF PCI bus OK
0xC8000-0xCBFFF PCI bus OK
0xCC000-0xCFFFF PCI bus OK
0xE8000-0xEBFFF PCI bus OK
0xEC000-0xEFFFF PCI bus OK
0x20000000-0xFFDFFFFF   PCI bus OK
0xFC300000-0xFC3FFFFF   Intel 82443BX Pentium(r) II Processor to AGP
Controller      OK
0xFC300000-0xFC3FFFFF   ATI Technologies Inc. 3D RAGE IIC AGP   OK
0xFD000000-0xFDFFFFFF   Intel 82443BX Pentium(r) II Processor to AGP
Controller      OK
0xFD000000-0xFDFFFFFF   ATI Technologies Inc. 3D RAGE IIC AGP   OK
0xE0000000-0xEFFFFFFF   Intel 82443BX Pentium(r) II Processor to AGP
Controller      OK
0xFFFD0000-0xFFFEFFFF   System board    OK
0xFC200000-0xFC200FFF   Adaptec AHA-2940U/UW Dual/AHA-394xAU/AUW/AUWD PCI SCSI
Controller      OK
0xFC201000-0xFC201FFF   Adaptec AHA-2940U/UW Dual/AHA-394xAU/AUW/AUWD PCI SCSI
Controller      OK
0xFC202000-0xFC202FFF   HP NetServer 10/100TX PCI LAN Adapter #2OK
0xFC000000-0xFC0FFFFF   HP NetServer 10/100TX PCI LAN Adapter #2OK
0xFC203000-0xFC203FFF   HP NetServer 10/100TX PCI LAN Adapter   OK
0xFC100000-0xFC1FFFFF   HP NetServer 10/100TX PCI LAN Adapter   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
softwareOK      C:\WINNT\System32\IAC25_32.AX   2.05.53 195.00 KB (199,680
bytes)  9/9/1999 5:00:00 PM
c:\winnt\system32\msg723.acm    Microsoft Corporation           OK
        C:\WINNT\System32\MSG723.ACM    4.4.3385106.77 KB (109,328 bytes)
        11/9/1999 1:53:30 PM
c:\winnt\system32\lhacm.acm     Microsoft Corporation           OK
        C:\WINNT\System32\LHACM.ACM     4.4.338533.27 KB (34,064 bytes)
        11/9/1999 1:53:30 PM
c:\winnt\system32\tssoft32.acm  DSP GROUP, INC.         OK
        C:\WINNT\System32\TSSOFT32.ACM  1.01    9.27 KB (9,488 bytes)
        9/9/1999 5:00:00 PM
```

```
c:\winnt\system32\msgsm32.acm   Microsoft Corporation          OK
        C:\WINNT\System32\MSGSM32.ACM   5.00.2113.1     22.27 KB (22,800
bytes)  9/9/1999 5:00:00 PM
c:\winnt\system32\msg711.acm    Microsoft Corporation          OK
        C:\WINNT\System32\MSG711.ACM    5.00.2113.1     10.27 KB (10,512
bytes)  9/9/1999 5:00:00 PM
c:\winnt\system32\msadp32.acm   Microsoft Corporation          OK
        C:\WINNT\System32\MSADP32.ACM   5.00.2113.1     14.77 KB (15,120
bytes)  9/9/1999 5:00:00 PM
c:\winnt\system32\imaadp32.acm  Microsoft Corporation          OK
        C:\WINNT\System32\IMAADP32.ACM  5.00.2113.1     16.27 KB (16,656
bytes)  9/9/1999 5:00:00 PM

[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.5.10.15.2.54  737.50 KB
(755,200 bytes) 9/9/1999 5:00:00 PM
c:\winnt\system32\msh261.drv    Microsoft Corporation          OK
        C:\WINNT\System32\MSH261.DRV    4.4.3385163.77 KB (167,696 bytes)
        11/9/1999 1:53:30 PM
c:\winnt\system32\msh263.drv    Microsoft Corporation          OK
        C:\WINNT\System32\MSH263.DRV    4.4.3385252.27 KB (258,320 bytes)
        11/9/1999 1:52:59 PM
c:\winnt\system32\msvidc32.dll  Microsoft Corporation          OK
        C:\WINNT\System32\MSVIDC32.DLL  5.00.2113.1     27.27 KB (27,920
bytes)  9/9/1999 5:00:00 PM
c:\winnt\system32\msrle32.dll   Microsoft Corporation          OK
        C:\WINNT\System32\MSRLE32.DLL   5.00.2113.1     10.77 KB (11,024
bytes)  9/9/1999 5:00:00 PM
c:\winnt\system32\ir32_32.dll   Intel(R) Corporation          OK
        C:\WINNT\System32\IR32_32.DLL   Not Available   194.50 KB (199,168
bytes)  9/9/1999 5:00:00 PM
c:\winnt\system32\iccvid.dll    Radius Inc.             OK
        C:\WINNT\System32\ICCVID.DLL    1.10.0.6108.00 KB (110,592 bytes)
        9/9/1999 5:00:00 PM

[CD-ROM]

Item    Value
Drive   D:
Description     CD-ROM Drive
Media Loaded    False
Media Type      CD-ROM
Name    HITACHI CDR-8435
Manufacturer    (Standard CD-ROM drives)
Status  Unknown
Transfer Rate   Not Available
SCSI Target ID  0
PNP Device ID   IDE\CDROMHITACHI_CDR-
8435_____0010____\5&32611E33&0&0.0.0


[Sound Device]

Item    Value
No sound devices

[Display]

Item    Value
Name    ATI Technologies Inc. 3D RAGE IIC AGP
PNP Device ID   PCI\VEN_1002&DEV_475A&SUBSYS_00000000&REV_7A\4&415A68E&0&0008
Adapter Type    ATI 3D RAGE IIC AGP (A21), ATI Technologies Inc. compatible
Adapter Description     ATI Technologies Inc. 3D RAGE IIC AGP
Adapter RAM     4.00 MB (4,194,304 bytes)
Installed Drivers       atirage.sys
Driver Version  5.00.2112.1
INF Filedisplay.inf (atirage section)
Color Planes    1
Color Table Entries     65536
Resolution      1024 x 768 x 75 hertz
Bits/Pixel      16


[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&244B3C61&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&244B3C61&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    [000] HP NetServer 10/100TX PCI LAN Adapter

Adapter Type    Ethernet 802.3
Product Name    HP NetServer 10/100TX PCI LAN Adapter
Installed       True
PNP Device ID   PCI\VEN_8086&DEV_1229&SUBSYS_10C3103C&REV_05\3&61AAA01&0&50
Index   0
Last Reset      2/15/2000 8:19:41 AM
Service Name    HPTX
IP Address      180.20.1.100
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     00:90:27:9C:C7:E8
Service Name    HPTX
IRQ Number      16
I/O Port0x1860-0x187F
Driver  78.27 KB (80,144 bytes)

Name    [001] HP NetServer 10/100TX PCI LAN Adapter
Adapter Type    Ethernet 802.3
Product Name    HP NetServer 10/100TX PCI LAN Adapter
Installed       True
PNP Device ID   PCI\VEN_8086&DEV_1229&SUBSYS_10CA103C&REV_08\3&61AAA01&0&30
Last Reset      2/15/2000 8:19:41 AM
Index   1
Service Name    HPTX
IP Address      15.27.241.1
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:E0:18:C1:CF:FF
Service Name    HPTX
IRQ Number      19
I/O Port0x1800-0x183F
Driver  78.27 KB (80,144 bytes)


Name    [002] RAS Async Adapter
Adapter Type    RAS Async Adapter
Product Name    RAS Async Adapter
Installed       True
PNP Device ID   Not Available
```

```
Last Reset      2/15/2000 8:19:41 AM
Index   2
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    [003] WAN Miniport (L2TP)
Adapter Type    WAN Miniport (L2TP)
Product Name    WAN Miniport (L2TP)
Installed       True
PNP Device ID   ROOT\MS_L2TPMINIPORT\0000
Last Reset      2/15/2000 8:19:41 AM
Index   3
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  48.11 KB (49,264 bytes)

Name    [004] 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      2/15/2000 8:19:41 AM
Index   4
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     Not Available
Service Name    PptpMiniport
Driver  44.58 KB (45,648 bytes)

Name    [005] Direct Parallel
Adapter Type    Direct Parallel
Product Name    Direct Parallel
Installed       True
PNP Device ID   ROOT\MS_PTIMINIPORT\0000
Last Reset      2/15/2000 8:19:41 AM
Index   5
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  16.48 KB (16,880 bytes)

Name    [006] WAN Miniport (IP)
Adapter Type    WAN Miniport (IP)
Product Name    WAN Miniport (IP)

Installed       True

PNP Device ID   ROOT\MS_NDISWANIP\0000
Last Reset      2/15/2000 8:19:41 AM
Index   6
Service Name    NdisWan
IP Address      0.0.0.0
IP Subnet       0.0.0.0
Default IP Gateway
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  86.92 KB (89,008 bytes)


[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
SupportsFragmentation   Not Available
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
SupportsFragmentation   Not Available
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
SupportsFragmentation   Not Available
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
SupportsFragmentation   Not Available
SupportsGracefulClosing True
SupportsGuaranteedBandwidth     False
SupportsMulticasting    False
```

```
Name    MSAFD NetBIOS [\Device\NetBT_Tcpip_{D428C674-0F6C-4AF5-A20B-
B66B08421706}] 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
SupportsFragmentation   Not Available
SupportsGracefulClosing False
SupportsGuaranteedBandwidth     False
SupportsMulticasting    False

Name    MSAFD NetBIOS [\Device\NetBT_Tcpip_{D428C674-0F6C-4AF5-A20B-
B66B08421706}] 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
SupportsFragmentation   Not Available
SupportsGracefulClosing False
SupportsGuaranteedBandwidth     False
SupportsMulticasting    False
```

```
Name    MSAFD NetBIOS [\Device\NetBT_Tcpip_{43466D29-0F72-45B2-AFA4-
2ADFA67EDCF1}] 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
SupportsFragmentation   Not Available
SupportsGracefulClosing False
SupportsGuaranteedBandwidth     False
SupportsMulticasting    False

Name    MSAFD NetBIOS [\Device\NetBT_Tcpip_{43466D29-0F72-45B2-AFA4-
2ADFA67EDCF1}] 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
SupportsFragmentation   Not Available
SupportsGracefulClosing False
SupportsGuaranteedBandwidth     False
SupportsMulticasting    False

Name    MSAFD NetBIOS [\Device\NetBT_Tcpip_{FD8C9E7C-5A63-4B52-8837-
748AD106BD8A}] 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
SupportsFragmentation   Not Available
SupportsGracefulClosing False
SupportsGuaranteedBandwidth     False
SupportsMulticasting    False

Name    MSAFD NetBIOS [\Device\NetBT_Tcpip_{FD8C9E7C-5A63-4B52-8837-
748AD106BD8A}] 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
SupportsFragmentation   Not Available
SupportsGracefulClosing False
SupportsGuaranteedBandwidth     False
SupportsMulticasting    False

Name    MSAFD NetBIOS [\Device\NetBT_Tcpip_{2FE462C9-7B2D-4C11-9639-
D5362D3BD3A4}] 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
SupportsFragmentation   Not Available
SupportsGracefulClosing False
SupportsGuaranteedBandwidth     False
SupportsMulticasting    False

Name    MSAFD NetBIOS [\Device\NetBT_Tcpip_{2FE462C9-7B2D-4C11-9639-
D5362D3BD3A4}] 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
SupportsFragmentation   Not Available
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 5.00.2120.1
Size    21.27 KB (21,776 bytes)


[Ports]

[ Following are sub-categories of this main category ]

[Serial]

Item    Value
Name    Communications Port (COM1)
Status  OK
PNP Device ID   ACPI\PNP0501\1
Maximum Input Buffer Size0
Maximum Output Buffer Size      False

Settable Baud Rate      True
Settable Data Bits      True
Settable Flow Control   True
Settable Parity True
Settable Parity Check   True
Settable Stop Bits      True
Settable RLSD   True
Supports RLSD   True
Supports 16 Bit Mode    False
Supports Special Characters     False
Baud Rate       9600
Bits/Byte       8
Stop Bits       1
Parity  NONE
Busy    0
Abort Read/Write on Error0
Binary Mode Enabled     -1
Continue XMit on XOff   0
CTS Outflow Control     0
Discard NULL Bytes      0
DSR Outflow Control     0
DSR Sensitivity 0
DTR Flow Control Type   ENABLE
EOF Character   0
Error Replace Character 0
Error Replacement Enabled0
Event Character 0
Parity Check Enabled    0
RTS Flow Control Type   ENABLE
XOff Character  19
XOffXMit Threshold      512
XOn Character   17
XOnXMit Threshold       2048
XOnXOff InFlow Control  0
XOnXOff OutFlow Control 0
IRQ Number      4
I/O Port0x03F8-0x03FF
Driver  60.95 KB (62,416 bytes)


Name    Communications Port (COM2)

Status  OK
PNP Device ID   ACPI\PNP0501\2
Maximum Input Buffer Size0
Maximum Output Buffer Size      False
Settable Baud Rate      True
Settable Data Bits      True
Settable Flow Control   True
Settable Parity True
Settable Parity Check   True
Settable Stop Bits      True
Settable RLSD   True
Supports RLSD   True
Supports 16 Bit Mode    False
Supports Special Characters     False
Baud Rate       9600
Bits/Byte       8
Stop Bits       1
Parity  NONE
Busy    0
Abort Read/Write on Error0
Binary Mode Enabled     -1
Continue XMit on XOff   0
CTS Outflow Control     0
Discard NULL Bytes      0
DSR Outflow Control     0
```

```
DSR Sensitivity 0
DTR Flow Control Type   ENABLE
EOF Character   0
Error Replace Character 0
Error Replacement Enabled0
Event Character 0
Parity Check Enabled    0
RTS Flow Control Type   ENABLE
XOff Character  19
XOffXMit Threshold      512
XOn Character   17
XOnXMit Threshold       2048
XOnXOff InFlow Control  0
XOnXOff OutFlow Control 0

IRQ Number      3

I/O Port0x02F8-0x02FF
Driver  60.95 KB (62,416 bytes)


[Parallel]

Item    Value
Name    LPT1
PNP Device ID   ACPI\PNP0400\1


[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    8.46 GB (9,088,901,120 bytes)
Free Space      6.55 GB (7,036,411,904 bytes)
Volume Name
Volume Serial Number    2C767FD4
Partition       Disk #0, Partition #0
Partition Size  8.46 GB (9,088,902,144 bytes)
Starting Offset 32256 bytes
Drive Description       Disk drive
Drive Manufacturer      (Standard disk drives)
Drive Model     HP 9.10GB A 68-SA40 SCSI Disk Device
Drive BytesPerSector    512
Drive MediaLoaded       True
Drive MediaType Fixed hard disk media
Drive Partitions1

Drive SCSIBus   0

Drive SCSILogicalUnit   0
Drive SCSIPort  2
Drive SCSITargetId      0
Drive SectorsPerTrack   63
Drive Size      9097159680 bytes
Drive TotalCylinders    1106
Drive TotalSectors      17767890
Drive TotalTracks       282030
Drive TracksPerCylinder 255

Drive   E:
Description     Network Connection
Provider Name   \\prf_sut6\c$


[SCSI]

Item    Value
Name    Adaptec AHA-2940U/UW Dual/AHA-394xAU/AUW/AUWD PCI SCSI Controller
Caption Adaptec AHA-2940U/UW Dual/AHA-394xAU/AUW/AUWD PCI SCSI Controller
Driver  aic78xx
Status  OK
PNP Device ID   PCI\VEN_9004&DEV_7895&SUBSYS_78959004&REV_04\3&61AAA01&0&28
Device ID       PCI\VEN_9004&DEV_7895&SUBSYS_78959004&REV_04\3&61AAA01&0&28
Device Map      Not Available
Index   Not Available
Max Number Controlled   Not Available
IRQ Number      18
I/O Port0x1000-0x10FF
```

```
Driver  55.58 KB (56,912 bytes)
Name    Adaptec AHA-2940U/UW Dual/AHA-394xAU/AUW/AUWD PCI SCSI Controller
Caption Adaptec AHA-2940U/UW Dual/AHA-394xAU/AUW/AUWD PCI SCSI Controller
Driver  aic78xx
Status  OK
PNP Device ID   PCI\VEN_9004&DEV_7895&SUBSYS_78959004&REV_04\3&61AAA01&0&29
Device ID       PCI\VEN_9004&DEV_7895&SUBSYS_78959004&REV_04\3&61AAA01&0&29
Device Map      Not Available
Index   Not Available
Max Number Controlled   Not Available

IRQ Number      18
I/O Port0x1400-0x14FF
Driver  55.58 KB (56,912 bytes)


[Printing]

Name    Port Name       Server Name
No printing information

[Problem Devices]

Device  PNP Device ID   Error Code
No Problem Devices

[USB]

Device  PNP Device ID
USB Root Hub    USB\ROOT_HUB\4&5741930&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
abiosdskAbiosdskNot Available   Kernel Driver   False   DisabledStopped OK
        Ignore  False   False

abp480n5abp480n5Not Available   Kernel Driver   False   DisabledStopped OK
        Normal  False   False
acpi    Microsoft ACPI Driver   c:\winnt\system32\drivers\acpi.sys
        Kernel Driver   True    Boot Start      Running OK      Normal
        False   True
acpiec  ACPIEC  c:\winnt\system32\drivers\acpiec.sys    Kernel Driver
        False   DisabledStopped OK      Normal  False   False
adpu160madpu160mNot Available   Kernel Driver   False   DisabledStopped OK
        Normal  False   False
afd     AFD Networking Support Environment
        c:\winnt\system32\drivers\afd.sysKernel Driver   True    Auto Start
        Running OK      Normal  False   True

agp440  AGP Bus Filter  c:\winnt\system32\drivers\agp440.sys    Kernel
Driver  True    Boot Start      Running OK      Normal  False   True
aha154x Aha154x Not Available   Kernel Driver   False   DisabledStopped OK
        Normal  False   False
aic116x aic116x Not Available   Kernel Driver   False   DisabledStopped OK
        Normal  False   False
aic78u2 aic78u2 Not Available   Kernel Driver   False   DisabledStopped OK
        Normal  False   False
aic78xx aic78xx c:\winnt\system32\drivers\aic78xx.sys   Kernel Driver   True
        Boot Start      Running OK      Normal  False   True
ami0nt  ami0nt  Not Available   Kernel Driver   False   DisabledStopped OK
        Normal  False   False
amsint  amsint  Not Available   Kernel Driver   False   DisabledStopped OK
        Normal  False   False
arp1394 1394 ARP Client Protocolc:\winnt\system32\drivers\arp1394.sys
        Kernel Driver   False   Demand Start    Stopped OK      Normal
        False   False
asc     asc     Not Available   Kernel Driver   False   DisabledStopped OK
        Normal  False   False
asc3350pasc3350pNot Available   Kernel Driver   False   DisabledStopped OK
        Normal  False   False
asc3550 asc3550 Not Available   Kernel Driver   False   DisabledStopped OK
        Normal  False   False
asyncmacRAS Asynchronous Media Driver
        c:\winnt\system32\drivers\asyncmac.sys  Kernel Driver   False
        Demand Start    Stopped OK      Normal  False   False
atapi   Standard IDE/ESDI Hard Disk Controller
        c:\winnt\system32\drivers\atapi.sys     Kernel Driver   True    Boot
Start   Running OK      Normal  False   True
```

```
atdisk  Atdisk  Not Available   Kernel Driver   False   DisabledStopped OK
atirage Atirage c:\winnt\system32\drivers\atirage.sys   Kernel Driver   True
        Ignore  False   False
        Demand Start    Running OK      Ignore  False   True
atmarpc ATM ARP Client Protocol c:\winnt\system32\drivers\atmarpc.sys
        Kernel Driver   False   Demand Start    Stopped OK      Normal
        False   False
audstub Audio Stub Driver       c:\winnt\system32\drivers\audstub.sys
        Kernel Driver   True    Demand Start    Running OK      Normal
        False   True

beep    Beep    c:\winnt\system32\drivers\beep.sys      Kernel Driver   True
        System Start    Running OK      Normal  False   True
buslogicBusLogicNot Available   Kernel Driver   False   DisabledStopped OK
        Normal  False   False
cd20xrntcd20xrntNot Available   Kernel Driver   False   DisabledStopped OK
        Normal  False   False
cdaudio Cdaudio c:\winnt\system32\drivers\cdaudio.sys   Kernel Driver
        False   System Start    Stopped OK      Ignore  False   False
cdfs    Cdfs    c:\winnt\system32\drivers\cdfs.sys      File System Driver
        True    DisabledRunning OK      Normal  False   True
cdrom   CD-ROM Driver   c:\winnt\system32\drivers\cdrom.sys     Kernel
Driver  True    System Start    Running OK      Normal  False   True
changer Changer Not Available   Kernel Driver   False   System Start
        Stopped OK      Ignore  False   False
cpqarrayCpqarrayNot Available   Kernel Driver   False   DisabledStopped OK
        Normal  False   False
cpqfcalmcpqfcalmNot Available   Kernel Driver   False   DisabledStopped OK
        Normal  False   False
cpqfws2ecpqfws2eNot Available   Kernel Driver   False   DisabledStopped OK
        Normal  False   False
dac960ntdac960ntNot Available   Kernel Driver   False   DisabledStopped OK
        Normal  False   False
deckzpsxdeckzpsxNot Available   Kernel Driver   False   DisabledStopped OK
        Normal  False   False
dfsdriver       DfsDriver       c:\winnt\system32\drivers\dfs.sysFile System
Driver  True    Boot Start      Running OK      Normal  False   True
disk    Disk Driver     c:\winnt\system32\drivers\disk.sys      Kernel
Driver  True    Boot Start      Running OK      Normal  False   True
diskperfDiskperfc:\winnt\system32\drivers\diskperf.sys  Kernel Driver   True
        Boot Start      Running OK      Normal  False   True
dmboot  dmboot  c:\winnt\system32\drivers\dmboot.sys    Kernel Driver
        False   DisabledStopped OK      Normal  False   False
dmio    Logical Disk Manager Driver     c:\winnt\system32\drivers\dmio.sys
        Kernel Driver   True    Boot Start      Running OK      Normal
        False   True
dmload  dmload  c:\winnt\system32\drivers\dmload.sys    Kernel Driver   True
        Boot Start      Running OK      Normal  False   True
efs     EFS     c:\winnt\system32\drivers\efs.sysFile System Driver      True
        DisabledRunning OK      Normal  False   True

fastfat Fastfat c:\winnt\system32\drivers\fastfat.sys   File System Driver
        True    DisabledRunning OK      Normal  False   True
fd16_700Fd16_700Not Available   Kernel Driver   False   DisabledStopped OK
        Normal  False   False
fdc     Floppy Disk Controller Driver   c:\winnt\system32\drivers\fdc.sys
        Kernel Driver   True    Demand Start    Running OK      Normal
        False   True
fireportfireportNot Available   Kernel Driver   False   DisabledStopped OK
        Normal  False   False
flashpntflashpntNot Available   Kernel Driver   False   DisabledStopped OK
        Normal  False   False
flpydiskFloppy Disk Driver      c:\winnt\system32\drivers\flpydisk.sys
        Kernel Driver   True    Demand Start    Running OK      Normal
        False   True
ftdisk  Volume Manager Driver   c:\winnt\system32\drivers\ftdisk.sys
        Kernel Driver   True    Boot Start      Running OK      Normal
        False   True
gpc     Generic Packet Classifierc:\winnt\system32\drivers\msgpc.sys
        Kernel Driver   True    Demand Start    Running OK      Normal
        False   True
hptx    HP 10/100TX PCI LAN Adapter NT Driver
        c:\winnt\system32\drivers\hptxnt5.sys   Kernel Driver   True
        Demand Start    Running OK      Normal  False   True
i8042prti8042 Keyboard and PS/2 Mouse Port Driver
        c:\winnt\system32\drivers\i8042prt.sys  Kernel Driver   True
        System Start    Running OK      Normal  False   True
ini910u ini910u Not Available   Kernel Driver   False   DisabledStopped OK
        Normal  False   False
intelideIntelIdec:\winnt\system32\drivers\intelide.sys  Kernel Driver   True
        Boot Start      Running OK      Normal  False   True
ipfilterdriver  IP Traffic Filter Driver
        c:\winnt\system32\drivers\ipfltdrv.sys  Kernel Driver   False
        Demand Start    Stopped OK      Normal  False   False
```

```
ipinip  IP in IP Tunnel Driver  c:\winnt\system32\drivers\ipinip.sys
        Kernel Driver   False   Demand Start    Stopped OK      Normal
        False   False
ipnat   IP Network Address Translator   c:\winnt\system32\drivers\ipnat.sys
        Kernel Driver   False   Demand Start    Stopped OK      Normal
        False   False
ipsec   IPSEC driver    c:\winnt\system32\drivers\ipsec.sys     Kernel
Driver  True    Demand Start    Running OK      Normal  False   True

ipsraidnipsraidnNot Available   Kernel Driver   False   DisabledStopped OK
        Normal  False   False
isapnp  PnP ISA/EISA Bus Driver c:\winnt\system32\drivers\isapnp.sys
        Kernel Driver   True    Boot Start      Running OK      Critical
        False   True
kbdclassKeyboard Class Driver   c:\winnt\system32\drivers\kbdclass.sys
        Kernel Driver   True    System Start    Running OK      Normal
        False   True
ksecdd  KSecDD  c:\winnt\system32\drivers\ksecdd.sys    Kernel Driver   True
        Boot Start      Running OK      Normal  False   True
lbrtfdc lbrtfdc Not Available   Kernel Driver   False   System Start
        Stopped OK      Ignore  False   False
lp6nds35lp6nds35Not Available   Kernel Driver   False   DisabledStopped OK
        Normal  False   False
mnmdd   mnmdd   c:\winnt\system32\drivers\mnmdd.sys     Kernel Driver   True
        System Start    Running OK      Ignore  False   True
modem   Modem   c:\winnt\system32\drivers\modem.sys     Kernel Driver
        False   Demand Start    Stopped OK      Ignore  False   False
mouclassMouse Class Driver      c:\winnt\system32\drivers\mouclass.sys
        Kernel Driver   True    System Start    Running OK      Normal
        False   True
mountmgrMountMgrc:\winnt\system32\drivers\mountmgr.sys  Kernel Driver   True
        Boot Start      Running OK      Normal  False   True
mraid35xmraid35xNot Available   Kernel Driver   False   DisabledStopped OK
        Normal  False   False
mrxsmb  MRXSMB  c:\winnt\system32\drivers\mrxsmb.sys    File System Driver
        True    System Start    Running OK      Normal  False   True
msfs    Msfs    c:\winnt\system32\drivers\msfs.sys      File System Driver
        True    System Start    Running OK      Normal  False   True
mskssrv Microsoft Streaming Service Proxyc:\winnt\system32\drivers\mskssrv.sys
        Kernel Driver   False   Demand Start    Stopped OK      Normal
        False   False
mspclockMicrosoft Streaming Clock Proxy
        c:\winnt\system32\drivers\mspclock.sys  Kernel Driver   False
        Demand Start    Stopped OK      Normal  False   False
mspqm   Microsoft Streaming Quality Manager Proxy
        c:\winnt\system32\drivers\mspqm.sys     Kernel Driver   False
        Demand Start    Stopped OK      Normal  False   False
mup     Mup     c:\winnt\system32\drivers\mup.sysFile System Driver      True
        Boot Start      Running OK      Normal  False   True

ncrc710 Ncrc710 Not Available   Kernel Driver   False   DisabledStopped OK
        Normal  False   False
ndis    NDIS System Driver      c:\winnt\system32\drivers\ndis.sys
        Kernel Driver   True    Boot Start      Running OK      Normal
        False   True
ndistapiRemote Access NDIS TAPI Driver
        c:\winnt\system32\drivers\ndistapi.sys  Kernel Driver   True
        Demand Start    Running OK      Normal  False   True
ndiswan Remote Access NDIS WAN Driver   c:\winnt\system32\drivers\ndiswan.sys
        Kernel Driver   True    Demand Start    Running OK      Normal
        False   True
ndproxy NDIS Proxy      c:\winnt\system32\drivers\ndproxy.sys   Kernel
Driver  True    Demand Start    Running OK      Normal  False   True
netbios NetBIOS Interface       c:\winnt\system32\drivers\netbios.sys   File
System Driver   True    System Start    Running OK      Normal  False   True
netbt   NetBios over Tcpip      c:\winnt\system32\drivers\netbt.sys
        Kernel Driver   True    System Start    Running OK      Normal
        False   True
netdetect       NetDetect       c:\winnt\system32\drivers\netdtect.sys
        Kernel Driver   False   Demand Start    Stopped OK      Normal
        False   False
npfs    Npfs    c:\winnt\system32\drivers\npfs.sys      File System Driver
        True    System Start    Running OK      Normal  False   True
ntfs    Ntfs    c:\winnt\system32\drivers\ntfs.sys      File System Driver
        True    DisabledRunning OK      Normal  False   True
null    Null    c:\winnt\system32\drivers\null.sys      Kernel Driver   True
        System Start    Running OK      Normal  False   True
nwlnkfltIPX Traffic Filter Driverc:\winnt\system32\drivers\nwlnkflt.sys
        Kernel Driver   False   Demand Start    Stopped OK      Normal
        False   False
nwlnkfwdIPX Traffic Forwarder Driver
        c:\winnt\system32\drivers\nwlnkfwd.sys  Kernel Driver   False
        Demand Start    Stopped OK      Normal  False   False
```

```
parallelParallel class driver   c:\winnt\system32\drivers\parallel.sys
        Kernel Driver   True    Demand Start    Running OK      Normal
        False   True
parport Parallel port driver    c:\winnt\system32\drivers\parport.sys
        Kernel Driver   True    System Start    Running OK      Ignore
        False   True
partmgr PartMgr c:\winnt\system32\drivers\partmgr.sys   Kernel Driver   True
        Boot Start      Running OK      Normal  False   True

parvdm  ParVdm  c:\winnt\system32\drivers\parvdm.sys    Kernel Driver   True
        Auto Start      Running OK      Ignore  False   True
pci     PCI Bus Driver  c:\winnt\system32\drivers\pci.sysKernel Driver   True
        Boot Start      Running OK      CriticalFalse   True
pcidump PCIDump Not Available   Kernel Driver   False   System Start
        Stopped OK      Ignore  False   False
pciide  PCIIde  Not Available   Kernel Driver   False   DisabledStopped OK
        Normal  False   False
pcmcia  Pcmcia  c:\winnt\system32\drivers\pcmcia.sys    Kernel Driver
        False   DisabledStopped OK      Normal  False   False
pdcomp  PDCOMP  Not Available   Kernel Driver   False   Demand Start
        Stopped OK      Ignore  False   False
pdframe PDFRAME Not Available   Kernel Driver   False   Demand Start
        Stopped OK      Ignore  False   False
pdreli  PDRELI  Not Available   Kernel Driver   False   Demand Start
        Stopped OK      Ignore  False   False
pdrframePDRFRAMENot Available   Kernel Driver   False   Demand Start
        Stopped OK      Ignore  False   False
pptpminiport    WAN Miniport (PPTP)     c:\winnt\system32\drivers\raspptp.sys
        Kernel Driver   True    Demand Start    Running OK      Normal
        False   True
ptilink Direct Parallel Link Driver     c:\winnt\system32\drivers\ptilink.sys
        Kernel Driver   True    Demand Start    Running OK      Normal
        False   True
ql1080  ql1080  Not Available   Kernel Driver   False   DisabledStopped OK
        Normal  False   False
ql10wnt Ql10wnt Not Available   Kernel Driver   False   DisabledStopped OK
        Normal  False   False
ql1240  ql1240  Not Available   Kernel Driver   False   DisabledStopped OK
        Normal  False   False
ql2100  ql2100  Not Available   Kernel Driver   False   DisabledStopped OK
        Normal  False   False
rasacd  Remote Access Auto Connection Driver
        c:\winnt\system32\drivers\rasacd.sys    Kernel Driver   True
        System Start    Running OK      Normal  False   True
rasl2tp WAN Miniport (L2TP)     c:\winnt\system32\drivers\rasl2tp.sys
        Kernel Driver   True    Demand Start    Running OK      Normal
        False   True
raspti  Direct Parallel c:\winnt\system32\drivers\raspti.sys    Kernel
Driver  True    Demand Start    Running OK      Normal  False   True

rca     Microsoft Streaming Network Raw Channel Access
        c:\winnt\system32\drivers\rca.sysKernel Driver   False   Demand Start
        Stopped OK      Normal  False   False
rdbss   Rdbss   c:\winnt\system32\drivers\rdbss.sys     File System Driver
        True    System Start    Running OK      Normal  False   True
rdpwd   RDPWD   c:\winnt\system32\drivers\rdpwd.sys     Kernel Driver
        False   Demand Start    Stopped OK      Ignore  False   False
redbook Digital CD Audio Playback Filter Driver
        c:\winnt\system32\drivers\redbook.sys   Kernel Driver   False
        System Start    Stopped OK      Normal  False   False
serenum Serenum Filter Driver   c:\winnt\system32\drivers\serenum.sys
        Kernel Driver   True    Demand Start    Running OK      Normal
        False   True
serial  Serial port driver      c:\winnt\system32\drivers\serial.sys
        Kernel Driver   True    System Start    Running OK      Ignore
        False   True
sfloppy Sfloppy c:\winnt\system32\drivers\sfloppy.sys   Kernel Driver
        False   System Start    Stopped OK      Ignore  False   False
sglfb   sglfb   Not Available   Kernel Driver   False   System Start
        Stopped OK      Normal  False   False
simbad  Simbad  Not Available   Kernel Driver   False   DisabledStopped OK
        Normal  False   False
sparrow Sparrow Not Available   Kernel Driver   False   DisabledStopped OK
        Normal  False   False
spud    Special Purpose Utility Driver  c:\winnt\system32\drivers\spud.sys
        Kernel Driver   True    Demand Start    Running OK      Normal
        False   True
srv     Srv     c:\winnt\system32\drivers\srv.sysFile System Driver      True
        Demand Start    Running OK      Normal  False   True
swenum  Software Bus Driver     c:\winnt\system32\drivers\swenum.sys
        Kernel Driver   True    Demand Start    Running OK      Normal
        False   True
symc810 symc810 Not Available   Kernel Driver   False   DisabledStopped OK
        Normal  False   False
```

```
symc8xx symc8xx Not Available   Kernel Driver   False   DisabledStopped OK
        Normal  False   False
sym_hi  sym_hi  Not Available   Kernel Driver   False   DisabledStopped OK
        Normal  False   False
tcpip   TCP/IP Protocol Driver  c:\winnt\system32\drivers\tcpip.sys
        Kernel Driver   True    System Start    Running OK      Normal
        False   True

tdasync TDASYNC c:\winnt\system32\drivers\tdasync.sys   Kernel Driver
        False   Demand Start    Stopped OK      Ignore  False   False
tdipx   TDIPX   c:\winnt\system32\drivers\tdipx.sys     Kernel Driver
        False   Demand Start    Stopped OK      Ignore  False   False
tdnetb  TDNETB  c:\winnt\system32\drivers\tdnetb.sys    Kernel Driver
        False   Demand Start    Stopped OK      Ignore  False   False
tdpipe  TDPIPE  c:\winnt\system32\drivers\tdpipe.sys    Kernel Driver
        False   Demand Start    Stopped OK      Ignore  False   False
tdspx   TDSPX   c:\winnt\system32\drivers\tdspx.sys     Kernel Driver
        False   Demand Start    Stopped OK      Ignore  False   False
tdtcp   TDTCP   c:\winnt\system32\drivers\tdtcp.sys     Kernel Driver
        False   Demand Start    Stopped OK      Ignore  False   False
termdd  Terminal Device Driver  c:\winnt\system32\drivers\termdd.sys
        Kernel Driver   False   DisabledStopped OK      Normal  False
        False
tga     tga     Not Available   Kernel Driver   False   System Start
        Stopped OK      Ignore  False   False
udfs    Udfs    c:\winnt\system32\drivers\udfs.sys      File System Driver
        False   DisabledStopped OK      Normal  False   False
uhcd    Microsoft USB Universal Host Controller Driver
        c:\winnt\system32\drivers\uhcd.sys      Kernel Driver   True
        Demand Start    Running OK      Normal  False   True
ultra66 ultra66 Not Available   Kernel Driver   False   DisabledStopped OK
        Normal  False   False
update  Microcode Update Driver c:\winnt\system32\drivers\update.sys
        Kernel Driver   True    Demand Start    Running OK      Normal
        False   True
usbhub  Microsoft USB Standard Hub Driverc:\winnt\system32\drivers\usbhub.sys
        Kernel Driver   True    Demand Start    Running OK      Normal
        False   True
vgasave VgaSave c:\winnt\system32\drivers\vga.sysKernel Driver   True
        System Start    Running OK      Ignore  False   True
wanarp  Remote Access IP ARP Driver     c:\winnt\system32\drivers\wanarp.sys
        Kernel Driver   True    Demand Start    Running OK      Normal
        False   True
wdica   WDICA   Not Available   Kernel Driver   False   Demand Start
        Stopped OK      Ignore  False   False

[Environment Variables]


VariableValue   User Name
ComSpec %SystemRoot%\system32\cmd.exe   <SYSTEM>
Os2LibPath      %SystemRoot%\system32\os2\dll;  <SYSTEM>
Path
     %SystemRoot%\system32;%SystemRoot%;%SystemRoot%\System32\Wbem;C:\MSSQL7
\BINN   <SYSTEM>
windir  %SystemRoot%    <SYSTEM>
OS      Windows_NT      <SYSTEM>
PROCESSOR_ARCHITECTURE  x86     <SYSTEM>
PROCESSOR_LEVEL 6       <SYSTEM>
PROCESSOR_IDENTIFIER    x86 Family 6 Model 7 Stepping 3, GenuineIntel
        <SYSTEM>
PROCESSOR_REVISION      0703    <SYSTEM>
NUMBER_OF_PROCESSORS    1       <SYSTEM>
PATHEXT .COM;.EXE;.BAT;.CMD;.VBS;.VBE;.JS;.JSE;.WSF;.WSH<SYSTEM>
TEMP    %SystemRoot%\TEMP       <SYSTEM>
TMP     %SystemRoot%\TEMP       <SYSTEM>
TEMP    %USERPROFILE%\Local Settings\TempCLIENTA\Administrator
TMP     %USERPROFILE%\Local Settings\TempCLIENTA\Administrator

[Jobs]

[ Following are sub-categories of this main category ]

[Print]

DocumentSize    Owner   Notify  Status  Time Submitted  Start Time
        Until Time      Elapsed Time    Pages Printed   Job ID  Priority
        Parameters      Driver Name     Print Processor Host Print QueueData
Type    Name
No print jobs


[Network Connections]

Local Name      Remote Name     Type    Status  User Name
E:      \\prf_sut6\c$   Disk    OK      CLIENTA\Administrator
```

```
[Running Tasks]

Name    Path    Process ID      PriorityMin 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.exec:\winnt\system32\smss.exe      160     11      204800  1413120
        2/15/2000 4:20:02 PM    5.00.2090.1     42.77 KB (43,792 bytes) Not
Available
csrss.exe       Not Available   184     13      Not Available   Not
Available       2/15/2000 4:20:10 PM    Unknown Unknown Unknown
winlogon.exe    c:\winnt\system32\winlogon.exe  204     13      204800
        1413120 2/15/2000 4:20:11 PM    5.00.2116.1     171.27 KB (175,376
bytes)  Not Available
services.exe    c:\winnt\system32\services.exe  232     9       204800
        1413120 2/15/2000 4:20:13 PM    5.00.2106.1     87.27 KB (89,360
bytes)  Not Available
lsass.exe       c:\winnt\system32\lsass.exe     244     13      204800
        1413120 2/15/2000 4:20:13 PM    5.00.2121.1     32.77 KB (33,552
bytes)  Not Available
svchost.exe     c:\winnt\system32\svchost.exe   420     8       204800
        1413120 2/15/2000 4:20:19 PM    5.00.2090.1     7.77 KB (7,952
bytes)  Not Available
spoolsv.exe     c:\winnt\system32\spoolsv.exe   452     8       204800
        1413120 2/15/2000 4:20:21 PM    5.00.2107.1     43.77 KB (44,816
bytes)  Not Available
msdtc.exe       c:\winnt\system32\msdtc.exe     480     8       204800
        1413120 2/15/2000 4:20:21 PM    1999.8.3413.3   6.77 KB (6,928
bytes)  Not Available
svchost.exe     c:\winnt\system32\svchost.exe   588     8       204800
        1413120 2/15/2000 4:20:25 PM    5.00.2090.1     7.77 KB (7,952
bytes)  Not Available
llssrv.exe      c:\winnt\system32\llssrv.exe    612     9       204800
        1413120 2/15/2000 4:20:25 PM    5.00.2090.1     113.77 KB (116,496
bytes)  Not Available
regsvc.exe      c:\winnt\system32\regsvc.exe    648     8       204800
        1413120 2/15/2000 4:20:25 PM    5.00.2091.1     63.77 KB (65,296
bytes)  Not Available
mstask.exe      c:\winnt\system32\mstask.exe    724     8       204800
        1413120 2/15/2000 4:20:27 PM    4.71.2113.1     114.77 KB (117,520
bytes)  Not Available
tcpsvcs.exe     c:\winnt\system32\tcpsvcs.exe   848     8       204800
        1413120 2/15/2000 4:20:34 PM    5.00.2090.1     24.77 KB (25,360
bytes)  Not Available
dfssvc.exe      c:\winnt\system32\dfssvc.exe    896     8       204800
        1413120 2/15/2000 4:20:35 PM    5.00.2124.1     95.77 KB (98,064
bytes)  Not Available
inetinfo.exe    c:\winnt\system32\inetsrv\inetinfo.exe  912     8
        204800  1413120 2/15/2000 4:20:35 PM    5.00.0984       14.27 KB
(14,608 bytes)  Not Available
explorer.exe    c:\winnt\explorer.exe   816     8       204800  1413120
        2/15/2000 4:28:31 PM    5.00.2919.3800  232.77 KB (238,352 bytes)Not
Available
mmc.exe c:\winnt\system32\mmc.exe412     8       204800  1413120 2/15/2000
4:39:05 PM      5.00.2115.1     589.27 KB (603,408 bytes)Not Available
winmgmt.exe     c:\winnt\system32\wbem\winmgmt.exe      344     8
        204800  1413120 2/15/2000 4:40:26 PM    1.50.1025.0015  164.05 KB
(167,991 bytes) Not Available
svchost.exe     c:\winnt\system32\svchost.exe   1260    8       204800
        1413120 2/15/2000 4:40:41 PM    5.00.2090.1     7.77 KB (7,952
bytes)  Not Available
rsvp.exec:\winnt\system32\rsvp.exe      1204    8       204800  1413120
        2/15/2000 4:40:59 PM    5.00.2120.1     170.77 KB (174,864 bytes)Not
Available

[Loaded Modules]

Name    Version Size    File Date       Manufacturer    Path
traffic.dll     5.00.2090.1     30.77 KB (31,504 bytes) 9/9/1999 5:00:00 PM
        Microsoft Corporation   c:\winnt\system32\traffic.dll
rsvp.exe5.00.2120.1     170.77 KB (174,864 bytes)9/9/1999 5:00:00 PM
        Microsoft Corporation   c:\winnt\system32\rsvp.exe
tapisrv.dll     5.00.2114.1     170.77 KB (174,864 bytes)9/9/1999 5:00:00 PM
        Microsoft Corporation   c:\winnt\system32\tapisrv.dll
rapilib.dll     5.00.2120.1     24.77 KB (25,360 bytes) 9/9/1999 5:00:00 PM
        Microsoft Corporation   c:\winnt\system32\rapilib.dll
rsvpsp.dll      5.00.2120.1     74.77 KB (76,560 bytes) 9/9/1999 5:00:00 PM
        Microsoft Corporation   c:\winnt\system32\rsvpsp.dll
```

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provthrd.dll    1.50.1025.0001  68.08 KB (69,713 bytes) 11/9/1999 1:53:16 PM
        Microsoft Corporation   c:\winnt\system32\wbem\provthrd.dll
ntevt.dll       1.50.1025.0002  176.06 KB (180,290 bytes)9/9/1999 5:00:00 PM
        Microsoft Corporation   c:\winnt\system32\wbem\ntevt.dll
ntmarta.dll     5.00.2119.1     98.27 KB (100,624 bytes)9/9/1999 5:00:00 PM
        Microsoft Corporation   c:\winnt\system32\ntmarta.dll
perfos.dll      5.0     21.27 KB (21,776 bytes) 9/9/1999 5:00:00 PM
        Microsoft Corporation   c:\winnt\system32\perfos.dll
psapi.dll       5.00.2090.1     28.27 KB (28,944 bytes) 9/9/1999 5:00:00 PM
        Microsoft Corporation   c:\winnt\system32\psapi.dll
framedyn.dll    1.50.1025.0002  164.05 KB (167,988 bytes)9/9/1999 5:00:00 PM
        Microsoft Corporation   c:\winnt\system32\wbem\framedyn.dll
cimwin32.dll    1.50.1025.0016  1.02 MB (1,065,018 bytes)9/9/1999 5:00:00 PM
        Microsoft Corporation   c:\winnt\system32\wbem\cimwin32.dll
wbemess.dll     1.50.1025.0009  324.05 KB (331,827 bytes)9/9/1999 5:00:00 PM
        Microsoft Corporation   c:\winnt\system32\wbem\wbemess.dll
wbemcore.dll    1.50.1025.0012  592.05 KB (606,260 bytes)9/9/1999 5:00:00 PM
        Microsoft Corporation   c:\winnt\system32\wbem\wbemcore.dll
winmgmt.exe     1.50.1025.0015  164.05 KB (167,991 bytes)9/9/1999 5:00:00 PM
        Microsoft Corporation   c:\winnt\system32\wbem\winmgmt.exe
fastprox.dll    1.50.1025.0009  144.08 KB (147,536 bytes)9/9/1999 5:00:00 PM
        Microsoft Corporation   c:\winnt\system32\wbem\fastprox.dll
wbemsvc.dll     1.50.1025.0009  136.07 KB (139,339 bytes)9/9/1999 5:00:00 PM
        Microsoft Corporation   c:\winnt\system32\wbem\wbemsvc.dll
wbemcomn.dll    1.50.1025.0009  688.05 KB (704,564 bytes)9/9/1999 5:00:00 PM
        Microsoft Corporation   c:\winnt\system32\wbem\wbemcomn.dll
wbemprox.dll    1.50.1025.0009  40.05 KB (41,012 bytes) 9/9/1999 5:00:00 PM
        Microsoft Corporation   c:\winnt\system32\wbem\wbemprox.dll
mlang.dll       5.00.2919.3800  509.77 KB (522,000 bytes)9/9/1999 5:00:00 PM
        Microsoft Corporation   c:\winnt\system32\mlang.dll
rassapi.dll     5.00.2116.1     14.27 KB (14,608 bytes) 9/9/1999 5:00:00 PM
        Microsoft Corporation   c:\winnt\system32\rassapi.dll
adsnt.dll       5.00.2118.1     193.77 KB (198,416 bytes)9/9/1999 5:00:00 PM
        Microsoft Corporation   c:\winnt\system32\adsnt.dll
dbghelp.dll     5.00.2128.1     77.27 KB (79,120 bytes) 9/9/1999 5:00:00 PM
        Microsoft Corporation   c:\winnt\system32\dbghelp.dll
localsec.dll    5.00.2099.1     226.77 KB (232,208 bytes)9/9/1999 5:00:00 PM
        Microsoft Corporation   c:\winnt\system32\localsec.dll
devmgr.dll      5.00.2109.1     215.27 KB (220,432 bytes)9/9/1999 5:00:00 PM
        Microsoft Corporation   c:\winnt\system32\devmgr.dll
filemgmt.dll    5.00.2116.1     287.27 KB (294,160 bytes)9/9/1999 5:00:00 PM
        Microsoft Corporation   c:\winnt\system32\filemgmt.dll
pdh.dll 5.00.1838.1     135.77 KB (139,024 bytes)9/9/1999 5:00:00 PM
        Microsoft Corporation   c:\winnt\system32\pdh.dll
smlogcfg.dll    5.00.2107.1     272.77 KB (279,312 bytes)9/9/1999 5:00:00 PM
        Microsoft Corporation   c:\winnt\system32\smlogcfg.dll
cabinet.dll     5.00.2090.1     54.77 KB (56,080 bytes) 9/9/1999 5:00:00 PM
        Microsoft Corporation   c:\winnt\system32\cabinet.dll
msinfo32.dll    5.00.2121.1     306.27 KB (313,616 bytes)11/9/1999 1:53:26 PM
        Microsoft Corporation   c:\program files\common files\microsoft
shared\msinfo\msinfo32.dll
riched20.dll    5.30.20.1200    419.77 KB (429,840 bytes)9/9/1999 5:00:00 PM
        Microsoft Corporation   c:\winnt\system32\riched20.dll
riched32.dll    5.00.2090.1     3.77 KB (3,856 bytes)   9/9/1999 5:00:00 PM
        Microsoft Corporation   c:\winnt\system32\riched32.dll
els.dll 5.00.2108.1     146.77 KB (150,288 bytes)9/9/1999 5:00:00 PM
        Microsoft Corporation   c:\winnt\system32\els.dll
ntmsmgr.dll     1,0,0,1 427.27 KB (437,520 bytes)9/9/1999 5:00:00 PM
        Microsoft Corporation and HighGround Systems, Inc.
        c:\winnt\system32\ntmsmgr.dll
mmfutil.dll     1.50.1025.0005  32.06 KB (32,834 bytes) 9/9/1999 5:00:00 PM
        Microsoft Corporation   c:\winnt\system32\mmfutil.dll
logdrive.dll    1.50.1025.0004  200.07 KB (204,868 bytes)9/9/1999 5:00:00 PM
        Microsoft Corporation   c:\winnt\system32\logdrive.dll
dfrgres.dll     5.00.2109.1     27.50 KB (28,160 bytes) 9/9/1999 5:00:00 PM
        Executive Software International, Inc.  c:\winnt\system32\dfrgres.dll
dfrgsnap.dll    5.00.2109.1     41.77 KB (42,768 bytes) 9/9/1999 5:00:00 PM
        Executive Software International, Inc.
        c:\winnt\system32\dfrgsnap.dll
dmdskres.dll    2121.1.286.1    119.00 KB (121,856 bytes)9/9/1999 5:00:00 PM
        Microsoft Corp., VERITAS Softwarec:\winnt\system32\dmdskres.dll
dmutil.dll      2121.1.286.1    41.77 KB (42,768 bytes) 9/9/1999 5:00:00 PM
        VERITAS Software Corp.  c:\winnt\system32\dmutil.dll
ntmsapi.dll     5.00.1948.1     53.27 KB (54,544 bytes) 9/9/1999 5:00:00 PM
        Microsoft Corporation   c:\winnt\system32\ntmsapi.dll
dmdskmgr.dll    2121.1.286.1    158.27 KB (162,064 bytes)9/9/1999 5:00:00 PM
        Microsoft Corp., VERITAS Softwarec:\winnt\system32\dmdskmgr.dll
mycomput.dll    5.00.2090.1     107.77 KB (110,352 bytes)9/9/1999 5:00:00 PM
        Microsoft Corporation   c:\winnt\system32\mycomput.dll
mmcndmgr.dll    5.00.2108.1     815.27 KB (834,832 bytes)9/9/1999 5:00:00 PM
        Microsoft Corporation   c:\winnt\system32\mmcndmgr.dll
```

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mmc.exe 5.00.2115.1     589.27 KB (603,408 bytes)9/9/1999 5:00:00 PM
        Microsoft Corporation   c:\winnt\system32\mmc.exe
wininet.dll     5.00.2919.3800  456.77 KB (467,728 bytes)9/9/1999 5:00:00 PM
        Microsoft Corporation   c:\winnt\system32\wininet.dll
shdoclc.dll     5.00.2919.3800  324.50 KB (332,288 bytes)9/9/1999 5:00:00 PM
        Microsoft Corporation   c:\winnt\system32\shdoclc.dll
hhsetup.dll     4.74.8576       66.27 KB (67,856 bytes) 9/9/1999 5:00:00 PM
        Microsoft Corporation   c:\winnt\system32\hhsetup.dll
mmcshext.dll    5.00.2108.1     24.27 KB (24,848 bytes) 9/9/1999 5:00:00 PM
        Microsoft Corporation   c:\winnt\system32\mmcshext.dll
msi.dll 1.10.0816.3     1.64 MB (1,715,984 bytes)9/9/1999 5:00:00 PM
        Microsoft Corporation   c:\winnt\system32\msi.dll
faxshell.dll    5.00.2101.1     8.27 KB (8,464 bytes)   9/9/1999 5:00:00 PM
        Microsoft Corporation   c:\winnt\system32\faxshell.dll
msacm32.dll     5.00.2113.1     65.27 KB (66,832 bytes) 9/9/1999 5:00:00 PM
        Microsoft Corporation   c:\winnt\system32\msacm32.dll
avifil32.dll    5.00.2113.1     76.27 KB (78,096 bytes) 9/9/1999 5:00:00 PM
        Microsoft Corporation   c:\winnt\system32\avifil32.dll
msvfw32.dll     5.00.2113.1     113.77 KB (116,496 bytes)9/9/1999 5:00:00 PM
        Microsoft Corporation   c:\winnt\system32\msvfw32.dll
docprop2.dll    5.00.2115.1     297.77 KB (304,912 bytes)9/9/1999 5:00:00 PM
        Microsoft Corporation   c:\winnt\system32\docprop2.dll
urlmon.dll      5.00.2919.3800  426.77 KB (437,008 bytes)9/9/1999 5:00:00 PM
        Microsoft Corporation   c:\winnt\system32\urlmon.dll
linkinfo.dll    5.00.2091.1     15.77 KB (16,144 bytes) 9/9/1999 5:00:00 PM
        Microsoft Corporation   c:\winnt\system32\linkinfo.dll
browselc.dll    5.00.2919.3800  34.50 KB (35,328 bytes) 9/9/1999 5:00:00 PM
        Microsoft Corporation   c:\winnt\system32\browselc.dll
powrprof.dll    5.00.2919.3800  13.27 KB (13,584 bytes) 9/9/1999 5:00:00 PM
        Microsoft Corporation   c:\winnt\system32\powrprof.dll
batmeter.dll    5.00.2919.3800  20.27 KB (20,752 bytes) 9/9/1999 5:00:00 PM
        Microsoft Corporation   c:\winnt\system32\batmeter.dll
stobject.dll    5.00.2120.1     81.27 KB (83,216 bytes) 9/9/1999 5:00:00 PM
        Microsoft Corporation   c:\winnt\system32\stobject.dll
webcheck.dll    5.00.2919.3800  251.77 KB (257,808 bytes)9/9/1999 5:00:00 PM
        Microsoft Corporation   c:\winnt\system32\webcheck.dll
ntshrui.dll     5.00.2090.1     46.77 KB (47,888 bytes) 9/9/1999 5:00:00 PM
        Microsoft Corporation   c:\winnt\system32\ntshrui.dll
mydocs.dll      5.00.2919.3800  55.77 KB (57,104 bytes) 9/9/1999 5:00:00 PM
        Microsoft Corporation   c:\winnt\system32\mydocs.dll
browseui.dll    5.00.2919.3800  791.77 KB (810,768 bytes)9/9/1999 5:00:00 PM
        Microsoft Corporation   c:\winnt\system32\browseui.dll
shdocvw.dll     5.00.2919.3800  1.05 MB (1,103,632 bytes)9/9/1999 5:00:00 PM
        Microsoft Corporation   c:\winnt\system32\shdocvw.dll
explorer.exe    5.00.2919.3800  232.77 KB (238,352 bytes)9/9/1999 5:00:00 PM
        Microsoft Corporation   c:\winnt\explorer.exe
iislog.dll      5.00.0984       75.77 KB (77,584 bytes) 11/8/1999 5:40:46 PM
        Microsoft Corporation   c:\winnt\system32\inetsrv\iislog.dll
ntlsapi.dll     5.00.2090.1     6.77 KB (6,928 bytes)   9/9/1999 5:00:00 PM
        Microsoft Corporation   c:\winnt\system32\ntlsapi.dll
wshnetbs.dll    5.00.2090.1     7.77 KB (7,952 bytes)   9/9/1999 5:00:00 PM
        Microsoft Corporation   c:\winnt\system32\wshnetbs.dll
httpext.dll     0.9.3938.5      415.77 KB (425,744 bytes)11/8/1999 5:40:46 PM
        Microsoft Corporation   c:\winnt\system32\inetsrv\httpext.dll
rpcproxy.dll    5.00.2128.1     16.27 KB (16,656 bytes) 11/8/1999 5:39:47 PM
        Microsoft Corporation   c:\winnt\system32\rpcproxy\rpcproxy.dll
fpexedll.dll    4.0.2.3228      20.06 KB (20,541 bytes) 11/8/1999 5:43:20 PM
        Microsoft Corporation   c:\program files\common files\microsoft
shared\web server extensions\40\bin\fpexedll.dll
md5filt.dll     5.00.0984       32.77 KB (33,552 bytes) 11/8/1999 5:40:53 PM
        Microsoft Corporation   c:\winnt\system32\inetsrv\md5filt.dll
gzip.dll5.00.0984       30.27 KB (30,992 bytes) 11/8/1999 5:40:52 PM
        Microsoft Corporation   c:\winnt\system32\inetsrv\gzip.dll
compfilt.dll    5.00.0984       22.27 KB (22,800 bytes) 11/8/1999 5:40:52 PM
        Microsoft Corporation   c:\winnt\system32\inetsrv\compfilt.dll
sspifilt.dll    5.00.0984       42.77 KB (43,792 bytes) 11/8/1999 5:40:54 PM
        Microsoft Corporation   c:\winnt\system32\inetsrv\sspifilt.dll
iscomlog.dll    5.00.0984       24.27 KB (24,848 bytes) 11/8/1999 5:40:47 PM
        Microsoft Corporation   c:\winnt\system32\inetsrv\iscomlog.dll
lonsint.dll     5.00.0984       11.77 KB (12,048 bytes) 11/8/1999 5:40:47 PM
        Microsoft Corporation   c:\winnt\system32\inetsrv\lonsint.dll
inetsloc.dll    5.00.0984       20.27 KB (20,752 bytes) 11/8/1999 5:40:48 PM
        Microsoft Corporation   c:\winnt\system32\inetsloc.dll
iisfecnv.dll    5.00.0984       7.27 KB (7,440 bytes)   11/8/1999 5:40:46 PM
        Microsoft Corporation   c:\winnt\system32\inetsrv\iisfecnv.dll
isatq.dll       5.00.0984       60.27 KB (61,712 bytes) 11/8/1999 5:40:49 PM
        Microsoft Corporation   c:\winnt\system32\inetsrv\isatq.dll
infocomm.dll    5.00.0984       230.27 KB (235,792 bytes)11/8/1999 5:40:47 PM
        Microsoft Corporation   c:\winnt\system32\inetsrv\infocomm.dll
w3svc.dll       5.00.0984       345.27 KB (353,552 bytes)11/8/1999 5:40:54 PM
        Microsoft Corporation   c:\winnt\system32\inetsrv\w3svc.dll
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security.dll     5.00.2112.1     5.77 KB (5,904 bytes)   9/9/1999 5:00:00 PM
       Microsoft Corporation   c:\winnt\system32\security.dll
svcext.dll       5.00.0984       39.27 KB (40,208 bytes) 11/8/1999 5:40:47 PM
       Microsoft Corporation   c:\winnt\system32\inetsrv\svcext.dll
admexs.dll       5.00.0984       27.77 KB (28,432 bytes) 11/8/1999 5:40:46 PM
       Microsoft Corporation   c:\winnt\system32\inetsrv\admexs.dll
wamreg.dll       5.00.0984       44.77 KB (45,840 bytes) 11/8/1999 5:40:55 PM
       Microsoft Corporation   c:\winnt\system32\inetsrv\wamreg.dll
metadata.dll     5.00.0984       68.27 KB (69,904 bytes) 11/8/1999 5:40:47 PM
       Microsoft Corporation   c:\winnt\system32\inetsrv\metadata.dll
iismap.dll       5.00.0984       56.27 KB (57,616 bytes) 11/8/1999 5:40:48 PM
       Microsoft Corporation   c:\winnt\system32\iismap.dll
nsepm.dll        5.00.0984       43.27 KB (44,304 bytes) 11/8/1999 5:40:47 PM
       Microsoft Corporation   c:\winnt\system32\inetsrv\nsepm.dll
admwprox.dll     5.00.0984       31.27 KB (32,016 bytes) 11/8/1999 5:40:48 PM
       Microsoft Corporation   c:\winnt\system32\admwprox.dll
coadmin.dll      5.00.0984       39.27 KB (40,208 bytes) 11/8/1999 5:40:49 PM
       Microsoft Corporation   c:\winnt\system32\inetsrv\coadmin.dll
iisadmin.dll     5.00.0984       14.77 KB (15,120 bytes) 11/8/1999 5:40:46 PM
       Microsoft Corporation   c:\winnt\system32\inetsrv\iisadmin.dll
rpcref.dll       5.00.0984       4.27 KB (4,368 bytes)   11/8/1999 5:40:47 PM
       Microsoft Corporation   c:\winnt\system32\inetsrv\rpcref.dll
iisrtl.dll       5.00.0984       119.27 KB (122,128 bytes)11/8/1999 5:40:48 PM
       Microsoft Corporation   c:\winnt\system32\iisrtl.dll
inetinfo.exe     5.00.0984       14.27 KB (14,608 bytes) 11/8/1999 5:40:47 PM
       Microsoft Corporation   c:\winnt\system32\inetsrv\inetinfo.exe
dfssvc.exe       5.00.2124.1     95.77 KB (98,064 bytes) 9/9/1999 5:00:00 PM
       Microsoft Corporation   c:\winnt\system32\dfssvc.exe
simptcp.dll      5.00.2106.1     19.27 KB (19,728 bytes) 11/8/1999 5:39:47 PM
       Microsoft Corporation   c:\winnt\system32\simptcp.dll
tcpsvcs.exe      5.00.2090.1     24.77 KB (25,360 bytes) 9/9/1999 5:00:00 PM
       Microsoft Corporation   c:\winnt\system32\tcpsvcs.exe
msidle.dll       5.00.2919.3800  6.27 KB (6,416 bytes)   9/9/1999 5:00:00 PM
       Microsoft Corporation   c:\winnt\system32\msidle.dll
mstask.exe       4.71.2113.1     114.77 KB (117,520 bytes)11/9/1999 1:53:16 PM
       Microsoft Corporation   c:\winnt\system32\mstask.exe
regsvc.exe       5.00.2091.1     63.77 KB (65,296 bytes) 9/9/1999 5:00:00 PM
       Microsoft Corporation   c:\winnt\system32\regsvc.exe
llsrpc.dll       5.00.2107.1     45.77 KB (46,864 bytes) 9/9/1999 5:00:00 PM
       Microsoft Corporation   c:\winnt\system32\llsrpc.dll
llssrv.exe       5.00.2090.1     113.77 KB (116,496 bytes)9/9/1999 5:00:00 PM
       Microsoft Corporation   c:\winnt\system32\llssrv.exe
rasdlg.dll       5.00.2120.1     512.77 KB (525,072 bytes)9/9/1999 5:00:00 PM
       Microsoft Corporation   c:\winnt\system32\rasdlg.dll
netcfgx.dll      5.00.2120.1     532.27 KB (545,040 bytes)9/9/1999 5:00:00 PM
       Microsoft Corporation   c:\winnt\system32\netcfgx.dll
rasmans.dll      5.00.2119.1     150.27 KB (153,872 bytes)9/9/1999 5:00:00 PM
       Microsoft Corporation   c:\winnt\system32\rasmans.dll
wmi.dll 5.00.2112.1     6.27 KB (6,416 bytes)   9/9/1999 5:00:00 PM
       Microsoft Corporation   c:\winnt\system32\wmi.dll
netshell.dll     5.00.2120.1     453.77 KB (464,656 bytes)9/9/1999 5:00:00 PM
       Microsoft Corporation   c:\winnt\system32\netshell.dll
netman.dll       5.00.2120.1     88.77 KB (90,896 bytes) 9/9/1999 5:00:00 PM
       Microsoft Corporation   c:\winnt\system32\netman.dll
ntmsdba.dll      5.00.2108.1     167.27 KB (171,280 bytes)9/9/1999 5:00:00 PM
       Microsoft Corporation   c:\winnt\system32\ntmsdba.dll
sens.dll5.00.2090.1     35.77 KB (36,624 bytes) 9/9/1999 5:00:00 PM
       Microsoft Corporation   c:\winnt\system32\sens.dll
iashlpr.dll      5.00.2090.1     31.27 KB (32,016 bytes) 9/9/1999 5:00:00 PM
       Microsoft Corporation   c:\winnt\system32\iashlpr.dll
iasacct.dll      5.00.2095.1     28.27 KB (28,944 bytes) 9/9/1999 5:00:00 PM
       Microsoft Corporation   c:\winnt\system32\iasacct.dll
iasuserr.dll     5.00.2090.1     25.77 KB (26,384 bytes) 9/9/1999 5:00:00 PM
       Microsoft Corporation   c:\winnt\system32\iasuserr.dll
iasnap.dll       5.00.2090.1     58.77 KB (60,176 bytes) 9/9/1999 5:00:00 PM
       Microsoft Corporation   c:\winnt\system32\iasnap.dll
iaspipe.dll      5.00.2090.1     41.77 KB (42,768 bytes) 9/9/1999 5:00:00 PM
       Microsoft Corporation   c:\winnt\system32\iaspipe.dll
expsrv.dll       6.0.8540370.27 KB (379,152 bytes)9/9/1999 5:00:00 PM
       Microsoft Corporation   c:\winnt\system32\expsrv.dll
vbajet32.dll     6.1.826830.27 KB (30,992 bytes) 9/9/1999 5:00:00 PM
       Microsoft Corporation   c:\winnt\system32\vbajet32.dll
msjtes40.dll     4.00.2927.6     232.27 KB (237,840 bytes)9/9/1999 5:00:00 PM
       Microsoft Corporation   c:\winnt\system32\msjtes40.dll
oledb32r.dll     2.50.4403.2     64.27 KB (65,808 bytes) 11/9/1999 1:53:06 PM
       Microsoft Corporation   c:\program files\common files\system\ole
db\oledb32r.dll

msdart32.dll     2.50.4403.0     24.27 KB (24,848 bytes) 9/9/1999 5:00:00 PM
       Microsoft Corporation   c:\winnt\system32\msdart32.dll

oledb32.dll      2.50.4403.3     472.27 KB (483,600 bytes)11/9/1999 1:53:06 PM
       Microsoft Corporation   c:\program files\common files\system\ole
db\oledb32.dll
msjint40.dll     4.00.2927.2     148.27 KB (151,824 bytes)9/9/1999 5:00:00 PM
       Microsoft Corporation   c:\winnt\system32\msjint40.dll
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msjter40.dll    4.00.2927.2     52.27 KB (53,520 bytes) 9/9/1999 5:00:00 PM
       Microsoft Corporation   c:\winnt\system32\msjter40.dll
mswstr10.dll    4.00.2927.2     600.27 KB (614,672 bytes)9/9/1999 5:00:00 PM
       Microsoft Corporation   c:\winnt\system32\mswstr10.dll
msjet40.dll     4.00.2927.4     1.43 MB (1,495,312 bytes)9/9/1999 5:00:00 PM
       Microsoft Corporation   c:\winnt\system32\msjet40.dll
msjetoledb40.dll4.00.2927.2     340.27 KB (348,432 bytes)9/9/1999 5:00:00 PM
       Microsoft Corporation   c:\winnt\system32\msjetoledb40.dll
iasrad.dll      5.00.2090.1     94.27 KB (96,528 bytes) 9/9/1999 5:00:00 PM
       Microsoft Corporation   c:\winnt\system32\iasrad.dll
iassam.dll      5.00.2090.1     96.27 KB (98,576 bytes) 9/9/1999 5:00:00 PM
       Microsoft Corporation   c:\winnt\system32\iassam.dll
iasads.dll      5.00.2112.1     73.77 KB (75,536 bytes) 9/9/1999 5:00:00 PM
       Microsoft Corporation   c:\winnt\system32\iasads.dll
iaspolcy.dll    5.00.2090.1     25.27 KB (25,872 bytes) 9/9/1999 5:00:00 PM
       Microsoft Corporation   c:\winnt\system32\iaspolcy.dll
iassvcs.dll     5.00.2090.1     58.27 KB (59,664 bytes) 9/9/1999 5:00:00 PM
       Microsoft Corporation   c:\winnt\system32\iassvcs.dll
iassdo.dll      5.00.2090.1     262.27 KB (268,560 bytes)9/9/1999 5:00:00 PM
       Microsoft Corporation   c:\winnt\system32\iassdo.dll
ntmssvc.dll     5.00.2108.1     390.27 KB (399,632 bytes)9/9/1999 5:00:00 PM
       Microsoft Corporation   c:\winnt\system32\ntmssvc.dll
ias.dll 5.00.2090.1     7.27 KB (7,440 bytes)   9/9/1999 5:00:00 PM
       Microsoft Corporation   c:\winnt\system32\ias.dll
es.dll  1999.8.3413.3   220.77 KB (226,064 bytes)9/9/1999 5:00:00 PM
       Microsoft Corporation   c:\winnt\system32\es.dll
mtxoci.dll      1999.8.3413.3   101.77 KB (104,208 bytes)11/8/1999 5:39:56 PM
       Microsoft Corporation   c:\winnt\system32\mtxoci.dll
resutils.dll    5.00.2123.1     39.77 KB (40,720 bytes) 9/9/1999 5:00:00 PM
       Microsoft Corporation   c:\winnt\system32\resutils.dll
clusapi.dll     5.00.2123.1     49.27 KB (50,448 bytes) 9/9/1999 5:00:00 PM
       Microsoft Corporation   c:\winnt\system32\clusapi.dll
msvcp50.dll     5.00.7051       552.50 KB (565,760 bytes)9/9/1999 5:00:00 PM
       Microsoft Corporation   c:\winnt\system32\msvcp50.dll
xolehlp.dll     1999.8.3413.3   18.27 KB (18,704 bytes) 11/8/1999 5:39:55 PM
       Microsoft Corporation   c:\winnt\system32\xolehlp.dll
msdtclog.dll    1999.8.3413.3   85.27 KB (87,312 bytes) 11/8/1999 5:39:55 PM
       Microsoft Corporation   c:\winnt\system32\msdtclog.dll
mtxclu.dll      1999.8.3413.3   50.77 KB (51,984 bytes) 9/9/1999 5:00:00 PM
       Microsoft Corporation   c:\winnt\system32\mtxclu.dll
msdtcprx.dll    1999.8.3413.7   625.77 KB (640,784 bytes)11/8/1999 5:39:56 PM
       Microsoft Corporation   c:\winnt\system32\msdtcprx.dll
txfaux.dll      1999.8.3413.7   370.77 KB (379,664 bytes)11/8/1999 5:39:55 PM
       Microsoft Corporation   c:\winnt\system32\txfaux.dll
msdtctm.dll     1999.8.3413.7   1.07 MB (1,120,528 bytes)11/8/1999 5:39:56 PM
       Microsoft Corporation   c:\winnt\system32\msdtctm.dll
msdtc.exe       1999.8.3413.3   6.77 KB (6,928 bytes)   11/8/1999 5:39:55 PM
       Microsoft Corporation   c:\winnt\system32\msdtc.exe
inetpp.dll      5.00.2090.1     62.77 KB (64,272 bytes) 9/9/1999 5:00:00 PM
       Microsoft Corporation   c:\winnt\system32\inetpp.dll
win32spl.dll    5.00.2092.1     81.27 KB (83,216 bytes) 9/9/1999 5:00:00 PM
       Microsoft Corporation   c:\winnt\system32\win32spl.dll
usbmon.dll      5.00.2116.1     11.27 KB (11,536 bytes) 9/9/1999 5:00:00 PM
       Microsoft Corporation   c:\winnt\system32\usbmon.dll
tcpmon.dll      5.00.2102.1     40.77 KB (41,744 bytes) 9/9/1999 5:00:00 PM
       Microsoft Corporation   c:\winnt\system32\tcpmon.dll
pjlmon.dll      5.00.2090.1     12.77 KB (13,072 bytes) 9/9/1999 3:37:34 AM
       Microsoft Corporation   c:\winnt\system32\pjlmon.dll
cnbjmon.dll     5.00.2090.1     43.77 KB (44,816 bytes) 9/9/1999 3:37:26 AM
       Microsoft Corporation   c:\winnt\system32\cnbjmon.dll
localspl.dll    5.00.2119.1     245.77 KB (251,664 bytes)9/9/1999 5:00:00 PM
       Microsoft Corporation   c:\winnt\system32\localspl.dll
spoolss.dll     5.00.2110.1     60.77 KB (62,224 bytes) 11/8/1999 4:28:25 PM
       Microsoft Corporation   c:\winnt\system32\spoolss.dll
spoolsv.exe     5.00.2107.1     43.77 KB (44,816 bytes) 11/8/1999 4:28:25 PM
       Microsoft Corporation   c:\winnt\system32\spoolsv.exe
rasadhlp.dll    5.00.2109.1     7.27 KB (7,440 bytes)   9/9/1999 5:00:00 PM
       Microsoft Corporation   c:\winnt\system32\rasadhlp.dll
winrnr.dll      5.00.2110.1     18.77 KB (19,216 bytes) 9/9/1999 5:00:00 PM
       Microsoft Corporation   c:\winnt\system32\winrnr.dll
rpcss.dll       5.00.2119.1     225.27 KB (230,672 bytes)9/9/1999 5:00:00 PM
       Microsoft Corporation   c:\winnt\system32\rpcss.dll

svchost.exe     5.00.2090.1     7.77 KB (7,952 bytes)   9/9/1999 5:00:00 PM
       Microsoft Corporation   c:\winnt\system32\svchost.exe

dssbase.dll     5.00.2120.1     140.27 KB (143,632 bytes)9/9/1999 5:00:00 PM
       Microsoft Corporation   c:\winnt\system32\dssbase.dll
wshtcpip.dll    5.00.2090.1     17.27 KB (17,680 bytes) 9/9/1999 5:00:00 PM
       Microsoft Corporation   c:\winnt\system32\wshtcpip.dll
msafd.dll       5.00.2095.1     52.27 KB (53,520 bytes) 9/9/1999 5:00:00 PM
       Microsoft Corporation   c:\winnt\system32\msafd.dll
oakley.dll      5.00.2115.1     420.27 KB (430,352 bytes)9/9/1999 5:00:00 PM
       Microsoft Corporation   c:\winnt\system32\oakley.dll
mfc42u.dll      6.00.8576.0     972.05 KB (995,384 bytes)9/9/1999 5:00:00 PM
       Microsoft Corporation   c:\winnt\system32\mfc42u.dll
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polagent.dll    5.00.2110.1     102.27 KB (104,720 bytes)9/9/1999 5:00:00 PM
       Microsoft Corporation   c:\winnt\system32\polagent.dll
scecli.dll      5.00.2112.1     101.77 KB (104,208 bytes)9/9/1999 5:00:00 PM
       Microsoft Corporation   c:\winnt\system32\scecli.dll
esent.dll       6.0.3938.7      848.77 KB (869,136 bytes)9/9/1999 5:00:00 PM
       Microsoft Corporation   c:\winnt\system32\esent.dll
mswsock.dll     5.00.2120.1     62.77 KB (64,272 bytes) 9/9/1999 5:00:00 PM
       Microsoft Corporation   c:\winnt\system32\mswsock.dll
ntdsatq.dll     5.00.2122.1     30.77 KB (31,504 bytes) 9/9/1999 5:00:00 PM
       Microsoft Corporation   c:\winnt\system32\ntdsatq.dll
ntdsa.dll       5.00.2127.1     984.77 KB (1,008,400 bytes)     9/9/1999
5:00:00 PM      Microsoft Corporation   c:\winnt\system32\ntdsa.dll
kdcsvc.dll      5.00.2121.1     138.77 KB (142,096 bytes)9/9/1999 5:00:00 PM
       Microsoft Corporation   c:\winnt\system32\kdcsvc.dll
sfmapi.dll      5.00.2090.1     38.77 KB (39,696 bytes) 9/9/1999 5:00:00 PM
       Microsoft Corporation   c:\winnt\system32\sfmapi.dll
rassfm.dll      5.00.2109.1     21.27 KB (21,776 bytes) 9/9/1999 5:00:00 PM
       Microsoft Corporation   c:\winnt\system32\rassfm.dll
schannel.dll    5.00.2118.1     136.77 KB (140,048 bytes)9/9/1999 5:00:00 PM
       Microsoft Corporation   c:\winnt\system32\schannel.dll
netlogon.dll    5.00.2119.1     344.77 KB (353,040 bytes)9/9/1999 5:00:00 PM
       Microsoft Corporation   c:\winnt\system32\netlogon.dll
kerberos.dll    5.00.2121.1     190.27 KB (194,832 bytes)9/9/1999 5:00:00 PM
       Microsoft Corporation   c:\winnt\system32\kerberos.dll
msprivs.dll     5.00.2112.1     41.50 KB (42,496 bytes) 9/9/1999 5:00:00 PM
       Microsoft Corporation   c:\winnt\system32\msprivs.dll
samsrv.dll      5.00.2124.1     352.27 KB (360,720 bytes)9/9/1999 5:00:00 PM
       Microsoft Corporation   c:\winnt\system32\samsrv.dll
cryptdll.dll    5.00.2112.1     40.27 KB (41,232 bytes) 9/9/1999 5:00:00 PM
       Microsoft Corporation   c:\winnt\system32\cryptdll.dll
lsasrv.dll      5.00.2121.1     483.77 KB (495,376 bytes)9/9/1999 5:00:00 PM
       Microsoft Corporation   c:\winnt\system32\lsasrv.dll
lsass.exe       5.00.2121.1     32.77 KB (33,552 bytes) 9/9/1999 5:00:00 PM
       Microsoft Corporation   c:\winnt\system32\lsass.exe
rnr20.dll       5.00.2120.1     35.27 KB (36,112 bytes) 9/9/1999 5:00:00 PM
       Microsoft Corporation   c:\winnt\system32\rnr20.dll
xactsrv.dll     5.00.2117.1     90.27 KB (92,432 bytes) 9/9/1999 5:00:00 PM
       Microsoft Corporation   c:\winnt\system32\xactsrv.dll
wmicore.dll     5.00.2119.1     70.27 KB (71,952 bytes) 9/9/1999 5:00:00 PM
       Microsoft Corporation   c:\winnt\system32\wmicore.dll
msgsvc.dll      5.00.2110.1     33.77 KB (34,576 bytes) 9/9/1999 5:00:00 PM
       Microsoft Corporation   c:\winnt\system32\msgsvc.dll
browser.dll     5.00.2098.1     48.27 KB (49,424 bytes) 9/9/1999 5:00:00 PM
       Microsoft Corporation   c:\winnt\system32\browser.dll
alrsvc.dll      5.00.2098.1     17.77 KB (18,192 bytes) 9/9/1999 5:00:00 PM
       Microsoft Corporation   c:\winnt\system32\alrsvc.dll
trkwks.dll      5.00.2110.1     87.77 KB (89,872 bytes) 9/9/1999 5:00:00 PM
       Microsoft Corporation   c:\winnt\system32\trkwks.dll
seclogon.dll    5.00.2122.1     15.27 KB (15,632 bytes) 9/9/1999 5:00:00 PM
       Microsoft Corporation   c:\winnt\system32\seclogon.dll
psbase.dll      5.00.2090.1     110.77 KB (113,424 bytes)9/9/1999 5:00:00 PM
       Microsoft Corporation   c:\winnt\system32\psbase.dll
cryptsvc.dll    5.00.2090.1     66.77 KB (68,368 bytes) 9/9/1999 5:00:00 PM
       Microsoft Corporation   c:\winnt\system32\cryptsvc.dll
wkssvc.dll      5.00.2120.1     91.27 KB (93,456 bytes) 9/9/1999 5:00:00 PM
       Microsoft Corporation   c:\winnt\system32\wkssvc.dll
srvsvc.dll      5.00.2117.1     79.27 KB (81,168 bytes) 9/9/1999 5:00:00 PM
       Microsoft Corporation   c:\winnt\system32\srvsvc.dll
cfgmgr32.dll    5.00.2098.1     16.77 KB (17,168 bytes) 9/9/1999 5:00:00 PM
       Microsoft Corporation   c:\winnt\system32\cfgmgr32.dll
dmserver.dll    2121.1.286.1    11.77 KB (12,048 bytes) 9/9/1999 5:00:00 PM
       VERITAS Software Corp.  c:\winnt\system32\dmserver.dll
winsta.dll      5.00.2100.1     36.27 KB (37,136 bytes) 9/9/1999 5:00:00 PM
       Microsoft Corporation   c:\winnt\system32\winsta.dll
lmhsvc.dll      5.00.2102.1     9.27 KB (9,488 bytes)   9/9/1999 5:00:00 PM
       Microsoft Corporation   c:\winnt\system32\lmhsvc.dll
dnsrslvr.dll    5.00.2118.1     91.27 KB (93,456 bytes) 9/9/1999 5:00:00 PM
       Microsoft Corporation   c:\winnt\system32\dnsrslvr.dll

tapi32.dll      5.00.2090.1     122.27 KB (125,200 bytes)9/9/1999 5:00:00 PM
       Microsoft Corporation   c:\winnt\system32\tapi32.dll

rasman.dll      5.00.2114.1     59.77 KB (61,200 bytes) 9/9/1999 5:00:00 PM
       Microsoft Corporation   c:\winnt\system32\rasman.dll
rasapi32.dll    5.00.2116.1     187.27 KB (191,760 bytes)9/9/1999 5:00:00 PM
       Microsoft Corporation   c:\winnt\system32\rasapi32.dll
rtutils.dll     5.00.2109.1     43.27 KB (44,304 bytes) 9/9/1999 5:00:00 PM
       Microsoft Corporation   c:\winnt\system32\rtutils.dll
adsldpc.dll     5.00.2120.1     125.77 KB (128,784 bytes)9/9/1999 5:00:00 PM
       Microsoft Corporation   c:\winnt\system32\adsldpc.dll
activeds.dll    5.00.2118.1     171.77 KB (175,888 bytes)9/9/1999 5:00:00 PM
       Microsoft Corporation   c:\winnt\system32\activeds.dll
mprapi.dll      5.00.2112.1     90.77 KB (92,944 bytes) 9/9/1999 5:00:00 PM
       Microsoft Corporation   c:\winnt\system32\mprapi.dll
iphlpapi.dll    5.00.2095.2     67.27 KB (68,880 bytes) 9/9/1999 5:00:00 PM
       Microsoft Corporation   c:\winnt\system32\iphlpapi.dll
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icmp.dll5.00.2090.1     7.27 KB (7,440 bytes)   9/9/1999 5:00:00 PM
       Microsoft Corporation   c:\winnt\system32\icmp.dll
dhcpcsvc.dll    5.00.2107.1     88.77 KB (90,896 bytes) 9/9/1999 5:00:00 PM
       Microsoft Corporation   c:\winnt\system32\dhcpcsvc.dll
eventlog.dll    5.00.2090.1     43.77 KB (44,816 bytes) 9/9/1999 5:00:00 PM
       Microsoft Corporation   c:\winnt\system32\eventlog.dll
ntdsapi.dll     5.00.2120.1     55.27 KB (56,592 bytes) 9/9/1999 5:00:00 PM
       Microsoft Corporation   c:\winnt\system32\ntdsapi.dll
scesrv.dll      5.00.2112.1     220.27 KB (225,552 bytes)9/9/1999 5:00:00 PM
       Microsoft Corporation   c:\winnt\system32\scesrv.dll
umpnpmgr.dll    5.00.2109.1     116.77 KB (119,568 bytes)9/9/1999 5:00:00 PM
       Microsoft Corporation   c:\winnt\system32\umpnpmgr.dll
services.exe    5.00.2106.1     87.27 KB (89,360 bytes) 9/9/1999 5:00:00 PM
       Microsoft Corporation   c:\winnt\system32\services.exe
msv1_0.dll      5.00.2113.1     93.77 KB (96,016 bytes) 9/9/1999 5:00:00 PM
       Microsoft Corporation   c:\winnt\system32\msv1_0.dll
clbcatq.dll     1999.8.3413.3   494.27 KB (506,128 bytes)11/8/1999 5:39:47 PM
       Microsoft Corporation   c:\winnt\system32\clbcatq.dll
oleaut32.dll    2.40.4505       596.27 KB (610,576 bytes)9/9/1999 5:00:00 PM
       Microsoft Corporation   c:\winnt\system32\oleaut32.dll
netmsg.dll      5.00.2090.1     152.50 KB (156,160 bytes)9/9/1999 5:00:00 PM
       Microsoft Corporation   c:\winnt\system32\netmsg.dll
comdlg32.dll    5.00.2919.3800  235.27 KB (240,912 bytes)9/9/1999 5:00:00 PM
       Microsoft Corporation   c:\winnt\system32\comdlg32.dll
netui2.dll      5.00.2107.1     280.27 KB (286,992 bytes)9/9/1999 5:00:00 PM
       Microsoft Corporation   c:\winnt\system32\netui2.dll
mprui.dll       5.00.2090.1     54.77 KB (56,080 bytes) 9/9/1999 5:00:00 PM
       Microsoft Corporation   c:\winnt\system32\mprui.dll
netui1.dll      5.00.2107.1     209.77 KB (214,800 bytes)9/9/1999 5:00:00 PM
       Microsoft Corporation   c:\winnt\system32\netui1.dll
netui0.dll      5.00.2107.1     70.27 KB (71,952 bytes) 9/9/1999 5:00:00 PM
       Microsoft Corporation   c:\winnt\system32\netui0.dll
ntlanman.dll    5.00.2109.1     35.27 KB (36,112 bytes) 9/9/1999 5:00:00 PM
       Microsoft Corporation   c:\winnt\system32\ntlanman.dll
mpr.dll 5.00.2111.1     53.27 KB (54,544 bytes) 9/9/1999 5:00:00 PM
       Microsoft Corporation   c:\winnt\system32\mpr.dll
cscui.dll       5.00.2116.1     225.77 KB (231,184 bytes)9/9/1999 5:00:00 PM
       Microsoft Corporation   c:\winnt\system32\cscui.dll
atl.dll 3.00.8449       57.56 KB (58,938 bytes) 9/9/1999 5:00:00 PM
       Microsoft Corporation   c:\winnt\system32\atl.dll
certcli.dll     5.00.2120.1     131.27 KB (134,416 bytes)9/9/1999 5:00:00 PM
       Microsoft Corporation   c:\winnt\system32\certcli.dll
winspool.drv    5.00.2110.1     109.77 KB (112,400 bytes)9/9/1999 5:00:00 PM
       Microsoft Corporation   c:\winnt\system32\winspool.drv
winscard.dll    5.00.2108.1     77.27 KB (79,120 bytes) 9/9/1999 5:00:00 PM
       Microsoft Corporation   c:\winnt\system32\winscard.dll
winmm.dll       5.00.2114.1     184.27 KB (188,688 bytes)9/9/1999 5:00:00 PM
       Microsoft Corporation   c:\winnt\system32\winmm.dll
wlnotify.dll    5.00.2090.1     52.77 KB (54,032 bytes) 9/9/1999 5:00:00 PM
       Microsoft Corporation   c:\winnt\system32\wlnotify.dll
cscdll.dll      5.00.2122.1     97.77 KB (100,112 bytes)9/9/1999 5:00:00 PM
       Microsoft Corporation   c:\winnt\system32\cscdll.dll
lz32.dll5.00.2090.1     9.77 KB (10,000 bytes)  9/9/1999 5:00:00 PM
       Microsoft Corporation   c:\winnt\system32\lz32.dll
version.dll     5.00.2090.1     15.77 KB (16,144 bytes) 9/9/1999 5:00:00 PM
       Microsoft Corporation   c:\winnt\system32\version.dll
rsabase.dll     5.00.2120.1     127.77 KB (130,832 bytes)9/9/1999 5:00:00 PM
       Microsoft Corporation   c:\winnt\system32\rsabase.dll
setupapi.dll    5.00.2126.1     551.27 KB (564,496 bytes)9/9/1999 5:00:00 PM
       Microsoft Corporation   c:\winnt\system32\setupapi.dll
mscat32.dll     5.131.2090.1    7.77 KB (7,952 bytes)   9/9/1999 5:00:00 PM
       Microsoft Corporation   c:\winnt\system32\mscat32.dll
ole32.dll       5.00.2120.1     961.27 KB (984,336 bytes)9/9/1999 5:00:00 PM
       Microsoft Corporation   c:\winnt\system32\ole32.dll

imagehlp.dll    5.00.2128.1     40.77 KB (41,744 bytes) 9/9/1999 5:00:00 PM
       Microsoft Corporation   c:\winnt\system32\imagehlp.dll

msasn1.dll      5.00.2090.1     50.27 KB (51,472 bytes) 9/9/1999 5:00:00 PM
       Microsoft Corporation   c:\winnt\system32\msasn1.dll
crypt32.dll     5.131.2118.1    454.77 KB (465,680 bytes)9/9/1999 5:00:00 PM
       Microsoft Corporation   c:\winnt\system32\crypt32.dll
wintrust.dll    5.131.2090.1    161.27 KB (165,136 bytes)9/9/1999 5:00:00 PM
       Microsoft Corporation   c:\winnt\system32\wintrust.dll
comctl32.dll    5.81    539.77 KB (552,720 bytes)9/9/1999 5:00:00 PM
       Microsoft Corporation   c:\winnt\system32\comctl32.dll
shlwapi.dll     5.00.2919.3800  281.77 KB (288,528 bytes)9/9/1999 5:00:00 PM
       Microsoft Corporation   c:\winnt\system32\shlwapi.dll
shell32.dll     5.00.2919.3800  2.24 MB (2,344,208 bytes)9/9/1999 5:00:00 PM
       Microsoft Corporation   c:\winnt\system32\shell32.dll
msgina.dll      5.00.2115.1     308.27 KB (315,664 bytes)9/9/1999 5:00:00 PM
       Microsoft Corporation   c:\winnt\system32\msgina.dll
wsock32.dll     5.00.2120.1     21.27 KB (21,776 bytes) 9/9/1999 5:00:00 PM
       Microsoft Corporation   c:\winnt\system32\wsock32.dll
dnsapi.dll      5.00.2120.1     133.77 KB (136,976 bytes)9/9/1999 5:00:00 PM
       Microsoft Corporation   c:\winnt\system32\dnsapi.dll
```

```
wldap32.dll     5.00.2117.1     153.77 KB (157,456 bytes)9/9/1999 5:00:00 PM
ws2help.dll     5.00.2099.1     17.77 KB (18,192 bytes) 9/9/1999 5:00:00 PM
        Microsoft Corporation   c:\winnt\system32\ws2help.dll
ws2_32.dll      5.00.2104.1     67.77 KB (69,392 bytes) 9/9/1999 5:00:00 PM
        Microsoft Corporation   c:\winnt\system32\ws2_32.dll
samlib.dll      5.00.2124.1     46.27 KB (47,376 bytes) 9/9/1999 5:00:00 PM
        Microsoft Corporation   c:\winnt\system32\samlib.dll
netrap.dll      5.00.2090.1     11.27 KB (11,536 bytes) 9/9/1999 5:00:00 PM
        Microsoft Corporation   c:\winnt\system32\netrap.dll
netapi32.dll    5.00.2120.1     295.77 KB (302,864 bytes)9/9/1999 5:00:00 PM
        Microsoft Corporation   c:\winnt\system32\netapi32.dll
profmap.dll     5.00.2112.1     27.27 KB (27,920 bytes) 9/9/1999 5:00:00 PM
        Microsoft Corporation   c:\winnt\system32\profmap.dll
secur32.dll     5.00.2119.1     44.77 KB (45,840 bytes) 9/9/1999 5:00:00 PM
        Microsoft Corporation   c:\winnt\system32\secur32.dll
sfc.dll 5.00.2124.1     83.27 KB (85,264 bytes) 9/9/1999 5:00:00 PM
        Microsoft Corporation   c:\winnt\system32\sfc.dll
nddeapi.dll     5.00.2090.1     15.27 KB (15,632 bytes) 9/9/1999 5:00:00 PM
        Microsoft Corporation   c:\winnt\system32\nddeapi.dll
userenv.dll     5.00.2127.1     343.27 KB (351,504 bytes)9/9/1999 5:00:00 PM
        Microsoft Corporation   c:\winnt\system32\userenv.dll
user32.dll      5.00.2120.1     392.27 KB (401,680 bytes)9/9/1999 5:00:00 PM
        Microsoft Corporation   c:\winnt\system32\user32.dll
gdi32.dll       5.00.2115.1     228.27 KB (233,744 bytes)9/9/1999 5:00:00 PM
        Microsoft Corporation   c:\winnt\system32\gdi32.dll
rpcrt4.dll      5.00.2128.1     440.27 KB (450,832 bytes)9/9/1999 5:00:00 PM
        Microsoft Corporation   c:\winnt\system32\rpcrt4.dll
advapi32.dll    5.00.2120.1     337.77 KB (345,872 bytes)9/9/1999 5:00:00 PM
        Microsoft Corporation   c:\winnt\system32\advapi32.dll
kernel32.dll    5.00.2122.1     711.77 KB (728,848 bytes)9/9/1999 5:00:00 PM
        Microsoft Corporation   c:\winnt\system32\kernel32.dll
msvcrt.dll      6.10.8581.0     284.05 KB (290,869 bytes)9/9/1999 5:00:00 PM
        Microsoft Corporation   c:\winnt\system32\msvcrt.dll
winlogon.exe    5.00.2116.1     171.27 KB (175,376 bytes)9/9/1999 5:00:00 PM
        Microsoft Corporation   c:\winnt\system32\winlogon.exe
sfcfiles.dll    5.00.2128.1     366.77 KB (375,568 bytes)9/9/1999 5:00:00 PM
        Microsoft Corporation   c:\winnt\system32\sfcfiles.dll
ntdll.dll       5.00.2121.1     469.27 KB (480,528 bytes)9/9/1999 5:00:00 PM
        Microsoft Corporation   c:\winnt\system32\ntdll.dll
smss.exe5.00.2090.1     42.77 KB (43,792 bytes) 9/9/1999 5:00:00 PM
        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 Running Auto Start      Share Process
        c:\winnt\system32\services.exe  Normal  LocalSystem     0
Application Management  AppMgmt Stopped Demand Start    Share Process
        c:\winnt\system32\services.exe  Normal  LocalSystem     0
Computer BrowserBrowser Running Auto Start      Share Process
        c:\winnt\system32\services.exe  Normal  LocalSystem     0
Indexing Servicecisvc   Stopped Demand Start    Share Process
        c:\winnt\system32\cisvc.exe     Normal  LocalSystem     0
ClipBookClipSrv Stopped Demand Start    Own Process
        c:\winnt\system32\clipsrv.exe   Normal  LocalSystem     0
Distributed File System Dfs     Running Auto Start      Own Process
        c:\winnt\system32\dfssvc.exe    Normal  LocalSystem     0
DHCP Client     Dhcp    Running Auto Start      Share Process
        c:\winnt\system32\services.exe  Normal  LocalSystem     0

Logical Disk Manager Administrative Service     dmadmin Stopped Demand Start
        Share Process   c:\winnt\system32\dmadmin.exe /com      Normal
        LocalSystem     0
Logical Disk Manager    dmserverRunning Auto Start      Share Process
        c:\winnt\system32\services.exe  Normal  LocalSystem     0
DNS Client      DnscacheRunning Auto Start      Share Process
        c:\winnt\system32\services.exe  Normal  LocalSystem     0
Event Log       EventlogRunning Auto Start      Share Process
        c:\winnt\system32\services.exe  Normal  LocalSystem     0
COM+ Event System       EventSystem     Running Demand Start    Share
Process c:\winnt\system32\svchost.exe -k netsvcsNormal  LocalSystem     0
Fax Service     Fax     Stopped Demand Start    Own Process
        c:\winnt\system32\faxsvc.exe    Normal  LocalSystem     0
Internet Authentication Service IAS     Running Auto Start      Share
Process c:\winnt\system32\svchost.exe -k netsvcsNormal  LocalSystem     0
IIS Admin Service       IISADMINRunning Auto Start      Share Process
        c:\winnt\system32\inetsrv\inetinfo.exe  Normal  LocalSystem     0
IMDB Server     ImdbServer      Stopped DisabledOwn Process
        c:\winnt\system32\imdbsrv.exe   Normal  LocalSystem     0
Intersite Messaging     IsmServ Stopped DisabledOwn Process
        c:\winnt\system32\ismserv.exe   Normal  LocalSystem     0
Kerberos Key Distribution Centerkdc     Stopped DisabledShare Process
        c:\winnt\system32\lsass.exe     Normal  LocalSystem     0
```

```
Server  lanmanserver    Running Auto Start      Share Process
        c:\winnt\system32\services.exe  Normal  LocalSystem     0
Workstation     lanmanworkstation       Running Auto Start      Share
Process c:\winnt\system32\services.exe  Normal  LocalSystem     0
License Logging Service LicenseService  Running Auto Start      Own Process
        c:\winnt\system32\llssrv.exe    Normal  LocalSystem     0
TCP/IP NetBIOS Helper Service   LmHosts Running Auto Start      Share
Process c:\winnt\system32\services.exe  Normal  LocalSystem     0
Messenger       Messenger       Running Auto Start      Share Process
        c:\winnt\system32\services.exe  Normal  LocalSystem     0
NetMeeting Remote Desktop Sharingmnmsrvc Stopped Demand Start    Own Process
        c:\winnt\system32\mnmsrvc.exe   Normal  LocalSystem     0
Distributed Transaction Coordinator     MSDTC   Running Auto Start      Own
Process c:\winnt\system32\msdtc.exe     Normal  LocalSystem     0
Windows Installer       MSIServer       Stopped Demand Start    Share
Process c:\winnt\system32\msiexec.exe /vNormal  LocalSystem     0
Network DDE     NetDDE  Stopped Demand Start    Share Process
        c:\winnt\system32\netdde.exe    Normal  LocalSystem     0
Network DDE DSDMNetDDEdsdm      Stopped Demand Start    Share Process
        c:\winnt\system32\netdde.exe    Normal  LocalSystem     0
Net Logon       NetlogonStopped Demand Start    Share Process
        c:\winnt\system32\lsass.exe     Normal  LocalSystem     0
Network Connections     Netman  Running Demand Start    Share Process
        c:\winnt\system32\svchost.exe -k netsvcsNormal  LocalSystem     0
File ReplicationNtFrs   Stopped Demand Start    Own Process
        c:\winnt\system32\ntfrs.exe     Ignore  LocalSystem     0
NT LM Security Support Provider NtLmSsp Stopped Demand Start    Share
Process c:\winnt\system32\lsass.exe     Normal  LocalSystem     0
Removable Storage       NtmsSvc Running Auto Start      Share Process
        c:\winnt\system32\svchost.exe -k netsvcsNormal  LocalSystem     0
Plug and Play   PlugPlayRunning Auto Start      Share Process
        c:\winnt\system32\services.exe  Normal  LocalSystem     0
IPSEC Policy Agent      PolicyAgent     Running Auto Start      Share
Process c:\winnt\system32\lsass.exe     Normal  LocalSystem     0
Protected Storage       ProtectedStorageRunning Auto Start      Share
Process c:\winnt\system32\services.exe  Normal  LocalSystem     0
Remote Access Auto Connection Manager   RasAuto Stopped Demand Start
        Share Process   c:\winnt\system32\svchost.exe -k netsvcsNormal
        LocalSystem     0
Remote Access Connection ManagerRasMan  Stopped Demand Start    Share
Process c:\winnt\system32\svchost.exe -k netsvcsNormal  LocalSystem     0
Routing and Remote AccessRemoteAccess    Stopped DisabledShare Process
        c:\winnt\system32\svchost.exe -k netsvcsNormal  LocalSystem     0
Remote Registry Service RemoteRegistry  Running Auto Start      Own Process
        c:\winnt\system32\regsvc.exe    Normal  LocalSystem     0
Remote Procedure Call (RPC) Locator     RpcLocator      Stopped Demand Start
        Own Process     c:\winnt\system32\locator.exe   Normal  LocalSystem
        0
Remote Procedure Call (RPC)     RpcSs   Running Auto Start      Share
Process c:\winnt\system32\svchost -k rpcss      Normal  LocalSystem     0
QoS Admission Control (RSVP)    RSVP    Running Auto Start      Own Process
        c:\winnt\system32\rsvp.exe -s   Normal  LocalSystem     0
Security Accounts ManagerSamSs   Running Auto Start      Share Process
        c:\winnt\system32\lsass.exe     Normal  LocalSystem     0
Smart Card Helper       SCardDrvStopped Demand Start    Share Process
        c:\winnt\system32\scardsvr.exe  Ignore  LocalSystem     0

Smart Card      SCardSvrStopped Demand Start    Share Process
        c:\winnt\system32\scardsvr.exe  Ignore  LocalSystem     0
Task Scheduler  ScheduleRunning Auto Start      Share Process
        c:\winnt\system32\mstask.exe    Normal  LocalSystem     0
RunAs Service   seclogonRunning Auto Start      Share Process
        c:\winnt\system32\services.exe  Ignore  LocalSystem     0
System Event NotificationSENS    Running Auto Start      Share Process
        c:\winnt\system32\svchost.exe -k netsvcsNormal  LocalSystem     0
Internet Connection Sharing     SharedAccess    Stopped Demand Start
        Share Process   c:\winnt\system32\svchost.exe -k netsvcsNormal
        LocalSystem     0
Simple TCP/IP Services  SimpTcp Running Auto Start      Share Process
        c:\winnt\system32\tcpsvcs.exe   Normal  LocalSystem     0
Print Spooler   Spooler Running Auto Start      Own Process
        c:\winnt\system32\spoolsv.exe   Normal  LocalSystem     0
Performance Logs and Alerts     SysmonLog       Stopped Auto Start      Own
Process c:\winnt\system32\smlogsvc.exe  Normal  LocalSystem     0
Telephony       TapiSrv Running Demand Start    Share Process
        c:\winnt\system32\svchost.exe -k tapisrvNormal  LocalSystem     0
Terminal Services       TermService     Stopped DisabledOwn Process
        c:\winnt\system32\termsrv.exe   Normal  LocalSystem     0
Telnet  TlntSvr Stopped Demand Start    Own Process
        c:\winnt\system32\tlntsvr.exe   Normal  LocalSystem     0
Distributed Link Tracking ServerTrkSvr  Stopped Demand Start    Share
Process c:\winnt\system32\services.exe  Normal  LocalSystem     0
Distributed Link Tracking ClientTrkWks  Running Auto Start      Share
Process c:\winnt\system32\services.exe  Normal  LocalSystem     0
Uninterruptible Power Supply    UPS     Stopped Demand Start    Own Process
        c:\winnt\system32\ups.exeNormal  LocalSystem     0
```

```
Utility Manager UtilMan Stopped Demand Start    Own Process
Windows Time    W32Time Stopped Demand Start    Share Process   0
        c:\winnt\system32\utilman.exe  Normal  LocalSystem
        c:\winnt\system32\services.exe  Normal  LocalSystem     0
World Wide Web Publishing ServiceW3SVC   Running Auto Start      Share
Process c:\winnt\system32\inetsrv\inetinfo.exe  Normal  LocalSystem     0
Windows Management Instrumentation      WinMgmt Running Demand Start    Own
Process c:\winnt\system32\wbem\winmgmt.exe      Ignore  LocalSystem     0
Windows Management Instrumentation Driver Extensions    Wmi     Running
        Demand Start    Share Process   c:\winnt\system32\services.exe
        Normal  LocalSystem     0

[Program Groups]

Group Name      Name    User Name
Accessories     Default User:AccessoriesDefault User
Accessories\AccessibilityDefault User:Accessories\Accessibility  Default User
Accessories\EntertainmentDefault User:Accessories\Entertainment  Default User
Accessories\System ToolsDefault User:Accessories\System Tools   Default User
Startup Default User:Startup    Default User
Accessories     All Users:Accessories   All Users
Accessories\AccessibilityAll Users:Accessories\Accessibility     All Users
Accessories\Communications      All Users:Accessories\Communications    All
Users
Accessories\EntertainmentAll Users:Accessories\Entertainment     All Users
Accessories\Games       All Users:Accessories\Games     All Users
Accessories\Microsoft Script Debugger   All Users:Accessories\Microsoft
Script Debugger All Users
Accessories\System ToolsAll Users:Accessories\System Tools      All Users
Administrative Tools    All Users:Administrative Tools  All Users
Microsoft SQL Server 7.0All Users:Microsoft SQL Server 7.0      All Users
Startup All Users:Startup       All Users
Accessories     CLIENTA\Administrator:AccessoriesCLIENTA\Administrator
Accessories\AccessibilityCLIENTA\Administrator:Accessories\Accessibility
        CLIENTA\Administrator
Accessories\Communications
        CLIENTA\Administrator:Accessories\Communications
        CLIENTA\Administrator
Accessories\Communications\HyperTerminal
        CLIENTA\Administrator:Accessories\Communications\HyperTerminal
        CLIENTA\Administrator
Accessories\EntertainmentCLIENTA\Administrator:Accessories\Entertainment
        CLIENTA\Administrator
Accessories\System ToolsCLIENTA\Administrator:Accessories\System Tools
Administrative Tools    CLIENTA\Administrator:Administrative Tools
        CLIENTA\Administrator
Startup CLIENTA\Administrator:Startup   CLIENTA\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 objectNot Available
Bitmap Image    C:\WINNT\System32\mspaint.exe

[Internet Explorer 5]

[ Following are sub-categories of this main category ]

[Summary]

Item    Value
Version 5.00.2919.3800
Build   52919.3800
Product ID      50293-270-1073316-10081
Application PathC:\Program Files\Internet Explorer
LanguageEnglish (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    5.0.2120.1      338 KB  9/9/1999 4:00:00 PM
       C:\WINNT\system32       Microsoft Corporation
advpack.dll     5.0.2919.3800   87 KB   9/9/1999 4:00:00 PM
       C:\WINNT\system32       Microsoft Corporation
browselc.dll    5.0.2919.3800   35 KB   9/9/1999 4:00:00 PM
       C:\WINNT\system32       Microsoft Corporation
browseui.dll    5.0.2919.3800   792 KB  9/9/1999 4:00:00 PM
       C:\WINNT\system32       Microsoft Corporation
ckcnv.exe       5.0.2120.1      9 KB    9/9/1999 4:00:00 PM
       C:\WINNT\system32       Microsoft Corporation
comctl32.dll    5.81.2919.3800  540 KB  9/9/1999 4:00:00 PM
       C:\WINNT\system32       Microsoft Corporation
crypt32.dll     5.131.2118.1    455 KB  9/9/1999 4:00:00 PM
       C:\WINNT\system32       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     5.0.2919.3800   57 KB   9/9/1999 4:00:00 PM
       C:\WINNT\system32       Microsoft Corporation
iexplore.exe    5.0.2919.3800   59 KB   9/9/1999 4:00:00 PM     C:\Program
Files\Internet Explorer Microsoft Corporation
imagehlp.dll    5.0.2128.1      41 KB   9/9/1999 4:00:00 PM
       C:\WINNT\system32       Microsoft Corporation
imghelp.dll     <File Missing>  Not Available   Not Available   Not
Available       Not Available
inseng.dll      5.0.2919.3800   71 KB   9/9/1999 4:00:00 PM
       C:\WINNT\system32       Microsoft Corporation
jobexec.dll     5.0.0.1 47 KB   9/9/1999 4:00:00 PM     C:\WINNT\system32
       Microsoft Corporation
jscript.dll     5.1.0.4411      476 KB  9/9/1999 4:00:00 PM
       C:\WINNT\system32       Microsoft Corporation
jsproxy.dll     5.0.2919.3800   13 KB   9/9/1999 4:00:00 PM
       C:\WINNT\system32       Microsoft Corporation
msaahtml.dll    <File Missing>  Not Available   Not Available   Not
Available       Not Available
mshtml.dll      5.0.2919.3800   2301 KB 9/9/1999 4:00:00 PM
       C:\WINNT\system32       Microsoft Corporation
msjava.dll      5.0.3229.0      918 KB  9/9/1999 4:00:00 PM
       C:\WINNT\system32       Microsoft Corporation
msoss.dll       <File Missing>  Not Available   Not Available   Not
Available       Not Available

msxml.dll       5.0.2919.3800   509 KB  9/9/1999 4:00:00 PM
       C:\WINNT\system32       Microsoft Corporation
occache.dll     5.0.2919.3800   86 KB   9/9/1999 4:00:00 PM
       C:\WINNT\system32       Microsoft Corporation
ole32.dll       5.0.2120.1      961 KB  9/9/1999 4:00:00 PM
       C:\WINNT\system32       Microsoft Corporation
oleaut32.dll    2.40.4505.1     596 KB  9/9/1999 4:00:00 PM
       C:\WINNT\system32       Microsoft Corporation
olepro32.dll    5.0.4505.1      156 KB  9/9/1999 4:00:00 PM
       C:\WINNT\system32       Microsoft Corporation
rsabase.dll     5.0.2120.1      128 KB  9/9/1999 4:00:00 PM
       C:\WINNT\system32       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    5.0.2118.0      137 KB  9/9/1999 4:00:00 PM
       C:\WINNT\system32       Microsoft Corporation
shdoc401.dll    <File Missing>  Not Available   Not Available   Not
Available       Not Available
shdocvw.dll     5.0.2919.3800   1078 KB 9/9/1999 4:00:00 PM
       C:\WINNT\system32       Microsoft Corporation
shell32.dll     5.0.2919.3800   2289 KB 9/9/1999 4:00:00 PM
       C:\WINNT\system32       Microsoft Corporation
shlwapi.dll     5.0.2919.3800   282 KB  9/9/1999 4:00:00 PM
       C:\WINNT\system32       Microsoft Corporation
url.dll 5.0.2919.3800   82 KB   9/9/1999 4:00:00 PM     C:\WINNT\system32
       Microsoft Corporation
urlmon.dll      5.0.2919.3800   427 KB  9/9/1999 4:00:00 PM
       C:\WINNT\system32       Microsoft Corporation
vbscript.dll    5.1.0.4411      428 KB  9/9/1999 4:00:00 PM
       C:\WINNT\system32       Microsoft Corporation
webcheck.dll    5.0.2919.3800   252 KB  9/9/1999 4:00:00 PM
       C:\WINNT\system32       Microsoft Corporation
win.com 5.0.2090.1      24 KB   9/9/1999 4:00:00 PM     C:\WINNT\system32
       Microsoft Corporation
```

```
wininet.dll     5.0.2919.3800   457 KB  9/9/1999 4:00:00 PM
        C:\WINNT\system32       Microsoft Corporation
winsock.dll     3.10.0.103      3 KB    9/9/1999 4:00:00 PM
        C:\WINNT\system32       Microsoft Corporation
wintrust.dll    5.131.2090.1    161 KB  9/9/1999 4:00:00 PM
        C:\WINNT\system32       Microsoft Corporation
wsock.vxd       <File Missing>  Not Available   Not Available   Not
Available       Not Available
wsock32.dll     5.0.2120.1      21 KB   9/9/1999 4:00:00 PM
        C:\WINNT\system32       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 Space8667 MB
Available Disk Space    6710 MB
Maximum Cache Size      270 MB
Available Cache Size    269 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       ValiditySignature Algorithm
Administrator   Administrator   11/9/1999 to 10/15/2099 sha1RSA

[Other People Certificates]

Issued To       Issued By       ValiditySignature Algorithm
No other people certificate information available

[Publishers]

Name
No publisher information available

[Security]

Zone    Security Level
Local intranet  Medium-low
Trusted sites   Low
InternetMedium
Restricted sitesHigh
```

C.9 RTE Input Parameters

```
Profile: 2100_4cl_7dr
File Path: c:\benchcrf\2100_4cl_7dr.pro
Version:1.0.1

        Number of Engines: 28

                Name: DRIVER1a
                Description: rte1a
                Directory: c:\log\rte1a.log
                Machine: rte1
                Parameter Set: mix 3 ?
                Index: 0
                Seed: 28814
                Configured Users: 750
                Pipe Name: DRIVER16598437
                Connect Rate: 250
                Start Rate: 120
                CLIENT_NURAND: 208
                CPU: 0

                Name: DRIVER1b
                Description: rte1b
                Directory: c:\log\rte1b.log
                Machine: rte1
                Parameter Set: mix 3 ?
                Index: 350000000
                Seed: 28814
                Configured Users: 750
                Pipe Name: DRIVER812135046
                Connect Rate: 250
                Start Rate: 120
                CLIENT_NURAND: 208
                CPU: 0

                Name: DRIVER1c
                Description: rte1c
                Directory: c:\log\rte1c.log
                Machine: rte1
                Parameter Set: mix 3 ?
                Index: 700000000
                Seed: 28814
                Configured Users: 750
                Pipe Name: DRIVER1512823203
                Connect Rate: 250
                Start Rate: 120
                CLIENT_NURAND: 208
                CPU: 0

                Name: DRIVER1d
                Description: rte1d
                Directory: c:\log\rte1d.log
                Machine: rte1
                Parameter Set: mix 3 ?
                Index: 1050000000
                Seed: 28814
                Configured Users: 750
                Pipe Name: DRIVER2213354906
                Connect Rate: 250
                Start Rate: 120
                CLIENT_NURAND: 208
                CPU: 0

                Name: DRIVER2a
                Description: rte2a
                Directory: c:\log\rte2a.log
                Machine: rte2
                Parameter Set: mix 3 ?
                Index: 50000000
                Seed: 28814
                Configured Users: 750
                Pipe Name: DRIVER26629593
                Connect Rate: 250
                Start Rate: 120
                CLIENT_NURAND: 208
                CPU: 0

                Name: DRIVER2b
                Description: rte2b
                Directory: c:\log\rte2b.log
                Machine: rte2
                Parameter Set: mix 3 ?
                Index: 400000000
                Seed: 28814
                Configured Users: 750
                Pipe Name: DRIVER912195890
```

```
Connect Rate: 250
Start Rate: 120
CLIENT_NURAND: 208
CPU: 0

Name: DRIVER2c
Description: rte2c
Directory: c:\log\rte2c.log
Machine: rte2
Parameter Set: mix 3 ?
Index: 750000000
Seed: 28814
Configured Users: 750
Pipe Name: DRIVER1612863406
Connect Rate: 250
Start Rate: 120
CLIENT_NURAND: 208
CPU: 0

Name: DRIVER2d
Description: rte2d
Directory: c:\log\rte2d.log
Machine: rte2
Parameter Set: mix 3 ?
Index: 1100000000
Seed: 28814
Configured Users: 750
Pipe Name: DRIVER2313381421
Connect Rate: 250
Start Rate: 120
CLIENT_NURAND: 208
CPU: 0

Name: DRIVER3a
Description: rte3a
Directory: c:\log\rte3a.log
Machine: rte3
Parameter Set: mix 3 ?
Index: 100000000
Seed: 28814
Configured Users: 750
Pipe Name: DRIVER36659234
Connect Rate: 250
Start Rate: 120
CLIENT_NURAND: 208
CPU: 0

Name: DRIVER3b
Description: rte3b

Directory: c:\log\rte3b.log
Machine: rte3
Parameter Set: mix 3 ?
Index: 450000000
Seed: 28814
Configured Users: 750
Pipe Name: DRIVER1012233156
Connect Rate: 250
Start Rate: 120
CLIENT_NURAND: 208
CPU: 0

Name: DRIVER3c
Description: rte3c
Directory: c:\log\rte3c.log
Machine: rte3
Parameter Set: mix 3 ?
Index: 800000000
Seed: 28814
Configured Users: 750
Pipe Name: DRIVER1712885687
Connect Rate: 250
Start Rate: 120
CLIENT_NURAND: 208
CPU: 0

Name: DRIVER3d
Description: rte3d
Directory: c:\log\rte3d.log
Machine: rte3
Parameter Set: mix 3 ?
Index: 1150000000
Seed: 28814
Configured Users: 750
Pipe Name: DRIVER2413414312
Connect Rate: 250
```

Start Rate: 120
CLIENT_NURAND: 208
CPU: 0

Name: DRIVER4a
Description: rte4a
Directory: c:\log\rte4a.log
Machine: rte4
Parameter Set: mix 3 ?
Index: 150000000
Seed: 28814
Configured Users: 750
Pipe Name: DRIVER46679921
Connect Rate: 250
Start Rate: 120
CLIENT_NURAND: 208
CPU: 0

Name: DRIVER4b
Description: rte4b
Directory: c:\log\rte4b.log
Machine: rte4
Parameter Set: mix 3 ?
Index: 500000000
Seed: 28814
Configured Users: 750
Pipe Name: DRIVER1112287421
Connect Rate: 250
Start Rate: 120
CLIENT_NURAND: 208
CPU: 0

Name: DRIVER4c
Description: rte4c
Directory: c:\log\rte4c.log
Machine: rte4
Parameter Set: mix 3 ?
Index: 850000000
Seed: 28814
Configured Users: 750
Pipe Name: DRIVER1812903281
Connect Rate: 250
Start Rate: 120
CLIENT_NURAND: 208
CPU: 0

Name: DRIVER4d
Description: rte4d
Directory: c:\log\rte4d.log
Machine: rte4
Parameter Set: mix 3 ?
Index: 1200000000
Seed: 28814
Configured Users: 750

Pipe Name: DRIVER2513497578
Connect Rate: 250
Start Rate: 120
CLIENT_NURAND: 208
CPU: 0

Name: DRIVER5a
Description: rte5a
Directory: c:\log\rte5a.log
Machine: rte5
Parameter Set: mix 3 ?
Index: 200000000
Seed: 28814
Configured Users: 750
Pipe Name: DRIVER56699171
Connect Rate: 250
Start Rate: 120
CLIENT_NURAND: 208
CPU: 0

Name: DRIVER5b
Description: rte5b
Directory: c:\log\rte5b.log
Machine: rte5
Parameter Set: mix 3 ?
Index: 550000000
Seed: 28814
Configured Users: 750
Pipe Name: DRIVER1212308437
Connect Rate: 250
Start Rate: 120

CLIENT_NURAND: 208
CPU: 0

Name: DRIVER5c
Description: rte5c
Directory: c:\log\rte5c.log
Machine: rte5
Parameter Set: mix 3 ?
Index: 900000000
Seed: 28814
Configured Users: 750
Pipe Name: DRIVER1912919093
Connect Rate: 250
Start Rate: 120
CLIENT_NURAND: 208
CPU: 0

Name: DRIVER5d
Description: rte5d
Directory: c:\log\rte5d.log
Machine: rte5
Parameter Set: mix 3 ?
Index: 1250000000
Seed: 28814
Configured Users: 750
Pipe Name: DRIVER2613541593
Connect Rate: 250
Start Rate: 120
CLIENT_NURAND: 208
CPU: 0

Name: DRIVER6a
Description: rte6a
Directory: c:\log\rte6a.log
Machine: rte6
Parameter Set: mix 3 ?
Index: 250000000
Seed: 28814
Configured Users: 750
Pipe Name: DRIVER66714859
Connect Rate: 250
Start Rate: 120
CLIENT_NURAND: 208
CPU: 0

Name: DRIVER6b
Description: rte6b
Directory: c:\log\rte6b.log
Machine: rte6
Parameter Set: mix 3 ?
Index: 600000000
Seed: 28814
Configured Users: 750
Pipe Name: DRIVER1312330218
Connect Rate: 250
Start Rate: 120
CLIENT_NURAND: 208
CPU: 0

Name: DRIVER6c
Description: rte6c
Directory: c:\log\rte6c.log
Machine: rte6
Parameter Set: mix 3 ?
Index: 850000000
Seed: 28814
Configured Users: 750
Pipe Name: DRIVER2012937390
Connect Rate: 250
Start Rate: 120
CLIENT_NURAND: 208
CPU: 0

Name: DRIVER6d
Description: rte6d
Directory: c:\log\rte6d.log
Machine: rte6
Parameter Set: mix 3 ?
Index: 1300000000
Seed: 28814
Configured Users: 750
Pipe Name: DRIVER2713627328
Connect Rate: 250
Start Rate: 120
CLIENT_NURAND: 208

```
CPU: 0
Name: DRIVER7a
Description: rte7a
Directory: c:\log\rte7a.log
Machine: rte7
Parameter Set: mix 3 ?
Index: 300000000
Seed: 28814
Configured Users: 750
Pipe Name: DRIVER76730593
Connect Rate: 250
Start Rate: 120
CLIENT_NURAND: 208
CPU: 0

Name: DRIVER7b
Description: rte7b
Directory: c:\log\rte7b.log
Machine: rte7
Parameter Set: mix 3 ?
Index: 650000000
Seed: 28814
Configured Users: 750
Pipe Name: DRIVER1412361000
Connect Rate: 250
Start Rate: 120
CLIENT_NURAND: 208
CPU: 0

Name: DRIVER7c
Description: rte7c
Directory: c:\log\rte7c.log
Machine: rte7
Parameter Set: mix 3 ?
Index: 1000000000
Seed: 28814
Configured Users: 750
Pipe Name: DRIVER2112961875
Connect Rate: 250
Start Rate: 120
CLIENT_NURAND: 208
CPU: 0

Name: DRIVER7d
Description: rte7d
Directory: c:\log\rte7d.log
Machine: rte7
Parameter Set: mix 3 ?
Index: 1350000000
Seed: 28814
Configured Users: 750
Pipe Name: DRIVER2813659578
Connect Rate: 250
Start Rate: 120
CLIENT_NURAND: 208
CPU: 0

Number of User groups: 28

Driver Engine: DRIVER1a
IIS Server: clienta
SQL Server: prf_sut6
User: sa

Protocol: Html
w_id Range: 1 - 75
w_id Max Warehouse: 2100
Scale: Normal
User Count: 750
District id: 1
Scale Down: No

Driver Engine: DRIVER4d
IIS Server: clientd
SQL Server: prf_sut6
User: sa
Protocol: Html
w_id Range: 1801 - 1875
w_id Max Warehouse: 2100
Scale: Normal
User Count: 750
District id: 1
Scale Down: No

Driver Engine: DRIVER3c
```

```
IIS Server: clientc
SQL Server: prf_sut6
User: sa
Protocol: Html
w_id Range: 1201 - 1275
w_id Max Warehouse: 2100
Scale: Normal
User Count: 750
District id: 1
Scale Down: No

Driver Engine: DRIVER6b
IIS Server: clientb
SQL Server: prf_sut6
User: sa
Protocol: Html
w_id Range: 901 - 975
w_id Max Warehouse: 2100
Scale: Normal
User Count: 750
District id: 1
Scale Down: No

Driver Engine: DRIVER3d
IIS Server: clientd
SQL Server: prf_sut6
User: sa
Protocol: Html
w_id Range: 1726 - 1800
w_id Max Warehouse: 2100
Scale: Normal
User Count: 750
District id: 1
Scale Down: No

Driver Engine: DRIVER4a
IIS Server: clienta
SQL Server: prf_sut6
User: sa
Protocol: Html
w_id Range: 226 - 300
w_id Max Warehouse: 2100
Scale: Normal
User Count: 750
District id: 1
Scale Down: No

Driver Engine: DRIVER1b
IIS Server: clientb
SQL Server: prf_sut6
User: sa
Protocol: Html
w_id Range: 526 - 600
w_id Max Warehouse: 2100
Scale: Normal
User Count: 750
District id: 1
Scale Down: No

Driver Engine: DRIVER7a
IIS Server: clienta
SQL Server: prf_sut6
User: sa
Protocol: Html
w_id Range: 451 - 525
w_id Max Warehouse: 2100
Scale: Normal
User Count: 750
District id: 1

Scale Down: No

Driver Engine: DRIVER6a
IIS Server: clienta
SQL Server: prf_sut6
User: sa
Protocol: Html
w_id Range: 376 - 450
w_id Max Warehouse: 2100
Scale: Normal
User Count: 750
District id: 1
Scale Down: No

Driver Engine: DRIVER5a
IIS Server: clienta
```

```
SQL Server: prf_sut6
User: sa
Protocol: Html
w_id Range: 301 - 375
w_id Max Warehouse: 2100
Scale: Normal
User Count: 750
District id: 1
Scale Down: No

Driver Engine: DRIVER5b
IIS Server: clientb
SQL Server: prf_sut6
User: sa
Protocol: Html
w_id Range: 826 - 900
w_id Max Warehouse: 2100
Scale: Normal
User Count: 750
District id: 1
Scale Down: No

Driver Engine: DRIVER7d
IIS Server: clientd
SQL Server: prf_sut6
User: sa
Protocol: Html
w_id Range: 2026 - 2100
w_id Max Warehouse: 2100
Scale: Normal
User Count: 750
District id: 1
Scale Down: No

Driver Engine: DRIVER5c
IIS Server: clientc
SQL Server: prf_sut6
User: sa
Protocol: Html
w_id Range: 1351 - 1425
w_id Max Warehouse: 2100
Scale: Normal
User Count: 750
District id: 1
Scale Down: No

Driver Engine: DRIVER5d
IIS Server: clientd
SQL Server: prf_sut6
User: sa
Protocol: Html
w_id Range: 1876 - 1950
w_id Max Warehouse: 2100
Scale: Normal
User Count: 750
District id: 1
Scale Down: No

Driver Engine: DRIVER6c
IIS Server: clientc
SQL Server: prf_sut6
User: sa
Protocol: Html
w_id Range: 1426 - 1500
w_id Max Warehouse: 2100
Scale: Normal
User Count: 750
District id: 1
Scale Down: No

Driver Engine: DRIVER2b
IIS Server: clientb
SQL Server: prf_sut6
User: sa

Protocol: Html
w_id Range: 601 - 675
w_id Max Warehouse: 2100
Scale: Normal
User Count: 750
District id: 1
Scale Down: No

Driver Engine: DRIVER6d
IIS Server: clientd
SQL Server: prf_sut6
```

```
User: sa
Protocol: Html
w_id Range: 1951 - 2025
w_id Max Warehouse: 2100
Scale: Normal
User Count: 750
District id: 1
Scale Down: No

Driver Engine: DRIVER1c
IIS Server: clientc
SQL Server: prf_sut6
User: sa
Protocol: Html
w_id Range: 1051 - 1125
w_id Max Warehouse: 2100
Scale: Normal
User Count: 750
District id: 1
Scale Down: No

Driver Engine: DRIVER7b
IIS Server: clientb
SQL Server: prf_sut6
User: sa
Protocol: Html
w_id Range: 976 - 1050
w_id Max Warehouse: 2100
Scale: Normal
User Count: 750
District id: 1
Scale Down: No

Driver Engine: DRIVER4c
IIS Server: clientc
SQL Server: prf_sut6
User: sa
Protocol: Html
w_id Range: 1276 - 1350
w_id Max Warehouse: 2100
Scale: Normal
User Count: 750
District id: 1
Scale Down: No

Driver Engine: DRIVER7c
IIS Server: clientc
SQL Server: prf_sut6
User: sa
Protocol: Html
w_id Range: 1501 - 1575
w_id Max Warehouse: 2100
Scale: Normal
User Count: 750
District id: 1
Scale Down: No

Driver Engine: DRIVER1d
IIS Server: clientd
SQL Server: prf_sut6
User: sa
Protocol: Html
w_id Range: 1576 - 1650
w_id Max Warehouse: 2100
Scale: Normal
User Count: 750
District id: 1
Scale Down: No

Driver Engine: DRIVER4b
IIS Server: clientb
SQL Server: prf_sut6
User: sa
Protocol: Html
w_id Range: 751 - 825
w_id Max Warehouse: 2100
Scale: Normal
User Count: 750
District id: 1

Scale Down: No

Driver Engine: DRIVER3a
IIS Server: clienta
SQL Server: prf_sut6
User: sa
```

```
Protocol: Html
w_id Range: 151 - 225
w_id Max Warehouse: 2100
Scale: Normal
User Count: 750
District id: 1
Scale Down: No

Driver Engine: DRIVER2a
IIS Server: clienta
SQL Server: prf_sut6
User: sa
Protocol: Html
w_id Range: 76 - 150
w_id Max Warehouse: 2100
Scale: Normal
User Count: 750
District id: 1
Scale Down: No

Driver Engine: DRIVER2c
IIS Server: clientc
SQL Server: prf_sut6
User: sa
Protocol: Html
w_id Range: 1126 - 1200
w_id Max Warehouse: 2100
Scale: Normal
User Count: 750
District id: 1
Scale Down: No

Driver Engine: DRIVER2d
IIS Server: clientd
SQL Server: prf_sut6
User: sa
Protocol: Html
w_id Range: 1651 - 1725
w_id Max Warehouse: 2100
Scale: Normal
User Count: 750
District id: 1
Scale Down: No

Driver Engine: DRIVER3b
IIS Server: clientb
SQL Server: prf_sut6
User: sa
Protocol: Html
w_id Range: 676 - 750
w_id Max Warehouse: 2100
Scale: Normal
User Count: 750
District id: 1
Scale Down: No

Number of Parameter Sets: 2

mix 3 ?
New Parameter Set
                Txn     Think   Key     RT      RT      Menu
                Weight  Time    Time    Delay   Fence   Delay
New Order         44.87   12.05   18.01    0.10    5.00    0.10
Payment           43.01   12.05    3.01    0.10    5.00    0.10
Delivery           4.03    5.05    2.01    0.10    5.00    0.10
Stock Level        4.04    5.05    2.01    0.10   20.00    0.10
Order Status       4.05   10.05    2.01    0.10    5.00    0.10

~Default
mix 3?
                Txn     Think   Key     RT      RT      Menu
                Weight  Time    Time    Delay   Fence   Delay
New Order         44.87   12.05   18.01    0.10    5.00    0.10
Payment           43.01   12.05    3.01    0.10    5.00    0.10
Delivery           4.03    5.05    2.01    0.10    5.00    0.10
Stock Level        4.04    5.05    2.01    0.10   20.00    0.10
Order Status       4.05   10.05    2.01    0.10    5.00    0.10
```

Please note that mix3 ? is the one that was used for the performance run.

Appendix D Disk Storage

TPC-C 180 Day Space Requirements						
Warehouses	**2170**				**TpmC**	**26,359.15**
Table	**Rows**	**Data KB**	**Index KB**	**Extra 5% KB**	**8hr Space-run**	**Total Space KB**
Warehouse	2170	232	40	14		286
District	21700	2,416	40	123		2579
Customer	65100000	47,345,456	3,039,904	2,519,268		52904628
History	65100000	3,616,680	16		702,916	3616696
NewOrder	19530000	308,776	768			309544
Orders	65100000	1,995,408	1,102,032		601,997	3097440
OrderLine	650993907	40,687,120	101,264		7,927,352	40788384
Item	100000	9,528	64	480		10072
Stock	217000000	69,440,008	155,392	3,479,770		73075170
Total		163,405,624	4,399,520	5,999,654	9,232,266	173,804,798
	MB					
8-hour growth	9,016	free space must be configured in the database for dynamic tables				
Following	59,860	Allocated to all tables except Customer and Stock				
Following	46,704	Used by above included tables				
	13,157	Available for dynamic table growth				
Excess of	4,141	After computed 8-hour growth				
Dynamic Space	45,214	Sum of Data for Order, Orderline and History				
Static Space	124,517	Sum of Data+Index+5%-Dynamic Space				
Daily Growth	8,787	(Dynamic Space/(W*62.5))*tpmc				
Daily Spread	0	(Free Space -1.5*Daily Growth) Zero Assumed				
180 Day Space MB	1,706,267		18 GB Drive	16.958	GB	
180 Day Space GB	**1,666.28**	**GB**	9 GB Drive	8.47	GB	
			4 GB Drive	3.999	GB	
Log Size	62,000	MB	DAC type	capacity in MB	count	total configured
KB Per New Order	5.6748	KB	unmirrored	416,496	5	2,082,480
8 hr log MB	70,117	MB	mirrored	104,190	1	104,190
8 hr log GB	**68.4741**	**GB**				16.95800781
Space Usage	**GB Needed**	**Disks Measured**	**GB Priced**			
180 Day Space DB	1,666.28	0	0.00	18GB		
		240	2,033.67	9GB		
		0	0.00	4GB		
Total DB		**240.00**	**2,033.67**	**GB**		
8-hr log + mirror	68.4741	12	101.75	GB	n.b. Space priced is net with mirroring	
OS, Swap	3	1	8.474	GB		
Total Storage	**1,737.75**	**GB**	**2,143.89**	**GB**		

Software House International

Pricing Proposal

SHI Account Exec: Matthew Martin Telephone: (800) 766-6357 ext. 106 Fax: (408) 232-2585

ID: NetServer LH 6000 4-way

Description	Part #	Qty	Price	Extended
512 MB DIMM kit	D8267A	8	$ 2,090	$ 16,720
Rkmt HP Ultra VGA 1280 17" Display	D2818A	1	$ 254	$ 254
HP NetServer mini-DIN keyboard and mouse	D4950B/C3751B	1	$ 79	$ 79
HP 9.1 GB 10K HotSwap Wide Ultra2 SCSI Disk	D6107A	1	$ 508	$ 508
HP Rack System/E41 (41 Units usable space)	J1500A	2	$ 1,590	$ 3,180
HP Power Distribution Unit 120-240V	E5929A	4	$ 234	$ 936
HP SureStore DAT24i Internal Tape Drive	C1555D	1	$ 805	$ 805
HP NetServer LH 6000 Support: 5 Yrs, M-F 4 Hr Response	H3159E	1	$ 3,395	$ 3,395
	Server Hardware Subtotal		$ -	$ -
HP NetServer Rack Storage/12	D5989B	23	$ 1,890	$ 43,470
HP 9GB, 10krpm Hot-swap disk module	**D6107A**	264	$ 508	$ 134,112
HP 18GB, 10krpm Hot-swap disk module	D7174A	14	$ 799	$ 11,186
AMI 1500H Disk Arry Controller	1500-H	8	$ 1,290	$ 10,320
HP SCSI Cable 2.5m UDHTS 68/HDTS 68	D6020A	23	$ 97	$ 2,231
	Storage Subtotal		$ -	$ -
Microsoft SQL Server 7.0 Enterprise Edition Unlimited Client	810-00217	1	$ 24,960	$ 24,960
Microsoft Windows NT Server 4.0 Enterprise Edition	Z75092	1	$ 3,330	$ 3,330
	Server Software Subtotal		$ -	$ -
HP Netserver E60 Pentium III 550MHz	D9124A	4	$ 1,790	$ 7,160
128MB DRAMs for E60	D7156A	16	$ 229	$ 3,664
HP NetServer 10/100TX PCI LAN Adapter	D5013A	4	$ 82	$ 328
HP Ultra VGA 1280 17" Display	D2818A	4	$ 213	$ 852
HP Netserver E60 Support: 5 Yrs, M-F 4 Hr Response	H2819VV	4	$ 1,060	$ 4,240
	Client Hardware Subtotal		$ -	$ -
Microsoft Windows 2000 Server	C11-0016	4	$ 809	$ 3,236
Microsoft Visual C++	716856	1	$ 449	$ 449
	Client Software Subtotal		$ -	$ -
HP Procurve Switch 2424M (lifetime warranty) + 10% spares	J4093A	6	$ 1,089	$ 6,534
8 Port + 1 BNC 10BT Hub - 5yr return to man warranty	Z75092	2896	$ 25	$ 72,400
TOTAL				**$ 354,349.00**

Please Note:

Prices Good for Ninety Days