HEWLETT® PACKARD

TPC Benchmark® C
Full Disclosure Report

HP NetServer LXr 8500

using Microsoft SQLServer 2000 Enterprise Edition
on Microsoft Windows 2000 Advanced Server

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January 10, 2001

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Abstract

Overview

This report documents the methodology and results of the TPC Benchmark® C test conducted on the HP NetServer LXr 8500 in a client/server configuration, using Microsoft SQLServer 2000 Enterprise Edition and Microsoft COM+ Transaction Monitor. The operating system used for the benchmark was Microsoft Windows 2000 Advanced Server.

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 LXr 8500 system. The Standard System Summary is given below.

Company Name	System Name	Database Software	Operating System
Hewlett-Packard Company	HP NetServer LXr 8500	Microsoft SQLServer 2000 Enterprise Edition	Microsoft Windows 2000 Advanced Server
Total System Cost	**TPC-C Throughput**	**Price/Performance**	**Availability Date**
$556,409.00	43046.55 tpmC	$12.76 per tpmC	March 1, 2001

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
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Enterprise NetServer Division
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Cupertino, CA 95014-0770 USA
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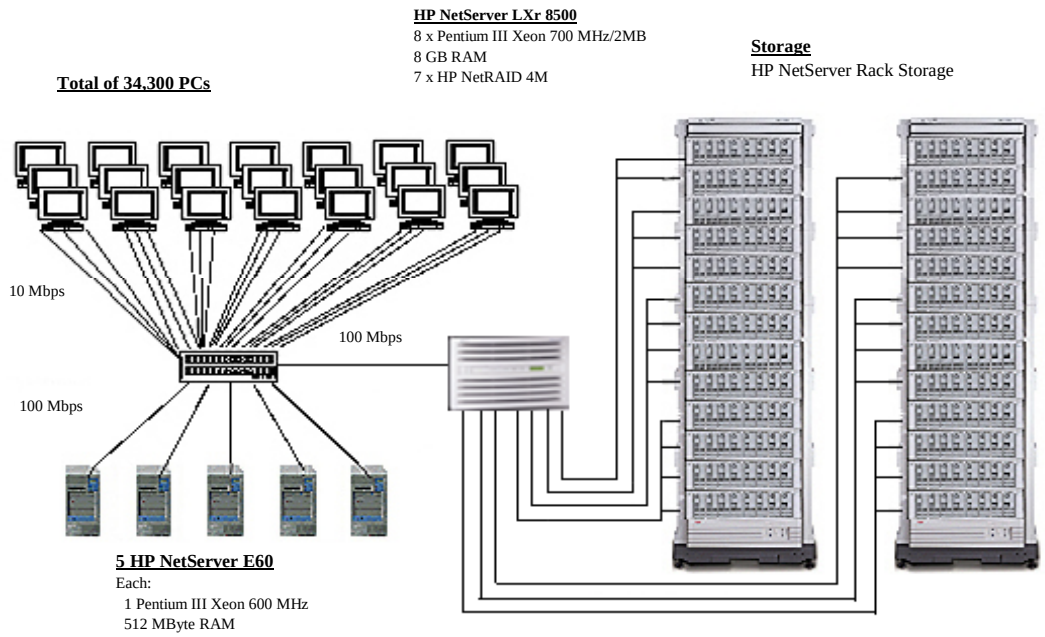
HEWLETT PACKARD	HP NetServer LXr 8500 Client/Server			TPC-C Revision 3.5
Total System Cost	**TPC Throughput**	**Price/Performance**	**Report Date**	**Availability Date**
$556,409	43046.55 tpmC	$12.76 per tpmC	January 10, 2001	March 1, 2001
Processors	**Database Manager**	**Operating System**	**Other Software**	**Number of Users**
8 Intel Pentium III Xeon 700MHz 2 Mbyte L2	Microsoft SQLServer 2000 Enterprise Edition	Microsoft Windows 2000 Advanced Server	Microsoft Visual C++ Microsoft COM+ Transaction Monitor	34300



System Components	Server		Each Client	
	Qty	**Type**	**Qty**	**Type**
Processors	8	700MHz Intel Pentium III Xeon	1	600MHz Pentium III
Cache Memory	each	2 Mbyte L2 cache		512kbyte L2 Cache
Memory	16	512 Mbyte		512 Mbyte
Disk Controllers	7	HP NetRAID 4M	1	HP SCSI-2 Controller
Disk Drives	240	HP Hot-swap 9GB SCSI (8.47GB)	1	9 Gbyte disk
	52	HP Hot-swap 18GB SCSI (16.9GB)		
	1	HP 9GB SCSI (8.46GB, boot drive)		
Total Storage		2920.06 Gbyte		8.46 Gbyte
Tape Drives	1	HP Surestore DAT24i		
Terminals	1	Console Terminal	1	Console Terminal

e	**HP NetServer LXr 8500** **8P/700-2MB/8GB**	**TPC-C Rev 3.5** **Report Date:** **10-Jan-01**

Description	Part Number	Brand	Price Key	Unit Price	Qty	Extended Price	Maint. Price
HP NetServer LXr 8500 Intel Pentium III Xeon 700MHz	P1765AV	HP	1	16,800	1	16,800	
Intel Pentium III Xeon 700MHz 2Mbyte L2	P1763AV	HP	1	4,740	7	33,180	
512MB Dimm for LXr 8500 (to 8GB)	D7138AV	HP	1	1,560	16	24,960	
HP NetRAID4M RAID controller w/64MB cache	D9161A	HP	1	1960	7	13,720	
HP 9GB, 10krpm Hot-swap disk module	P1168A	HP	1	405	1	405	
HP NetServer 10/100TX PCI LAN Adapter	D5013A	HP	1	82	1	82	
HP 15" VGA Monitor	D2828A	HP	1	185	1	185	
HP NetServer mini-DIN keyboard and mouse	D4950B/C375	HP	1	79	1	79	
HP Rack System/E41 (41 Units usable space)	J1500A	HP	1	1590	2	3,180	
HP Power Distribution Unit 120-240V	E5929A	HP	1	234	4	936	
HP SureStore DAT24i Internal Tape Drive	C1555D	HP	1	790	1	790	
APC Smart-UPS 3000 + Spares	588293	APC	1	1725	3	5,175	
				Server Hardware Subtotal		**99,492**	**0**
HP NetServer Rack Storage/12	D5989B	HP	1	1890	25	47,250	
HP 9GB, 10krpm Hot-swap disk module	P1168A	HP	1	405	240	97,200	
HP 18GB, 10krpm Hot-swap disk module	P1166A	HP	1	590	52	30,680	
HP SCSI Cable 2.5m UDHTS 68/HDTS 68	D6020A	HP	1	97	25	2,425	
					Storage Subtotal	**177,555**	**0**
Microsoft Windows 2000 Advanced Server, 25 Licences		MS	1	2399	1	2,399	
Microsoft SQL Server 2000 Enterprise Edition per processor license unlimited users (open program level C)	810-00846	MS	1	14749	8	117,992	10,475
				Server Software Subtotal		**120,391**	**10,475**
HP Netserver E60 Pentium III 600MHz	D9128A	HP	1	1270	5	6,350	
128MB DRAMs for E60	D7156A	HP	1	205	20	4,100	
HP NetServer 10/100TX PCI LAN Adapter	D5013A	HP	1	82	5	410	
HP 15" VGA Display	D2828A	HP	1	185	5	925	
				Client Hardware Subtotal		**11,785**	**0**
Microsoft Windows 2000 Server	C11-0016	MS	1	790	5	3,950	
Microsoft Visual C++ Professional 6.0 ($549)	716856	MS	1	449	1	449	
				Client Software Subtotal		**4,399**	**0**
HP Procurve Switch 2424M, Lifetime Warranty + 10% spares	J4093A	HP	1	979	8	7,832	
ArkPC 17-port 10baseT hub (16+1 ports) 5 Yr Warranty + 10% spares	CT1017D1			31	2376	73,656	
				Connectivity Subtotal		**81,488**	**0**
HP Full System Support: 5 Yrs, on-site, 4 Hr response, 5x8 (Mon-Fri) includes clients & mass storage	----		2				**$43,900**
					Total	**$495,110**	**$54,375**

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

3 = Microsoft

5-yr Cost of Ownership:	**$549,485**
tpmC:	**43,046.55**
$/tpmC:	**$12.76**

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 LXr 8500DC

MQTH, Computed Maximum Qualified Throughput **43046.55 tpmC**

Response Times (in seconds)

	90th %-ile	Maximum	Average
New-Order	0.47s	5.41s	0.32s
Payment	0.37s	5.28s	0.22s
Order-Status	0.39s	5.29s	0.25s
Delivery (interactive portion)	0.13s	0.62s	0.11s
Delivery (deferred portion)	0.61s	2.63s	0.38s
Stock-Level	1.91s	5.10s	1.01s
Menu	0.13s	0.76s	0.11s

Response time delay added for emulated components 0.1 seconds

Transaction Mix, in percent of total transactions

New-Order	44.82%
Payment	43.10%
Delivery	4.06%
Stock-Level	4.01%
Order-Status	4.01%

Keying/Think Times

	Keying Time			Think Time		
	Min	Avg	Max	Min	Avg	Max
New-Order	18s	18.01s	18.03s	0s	12.05s	120.5s
Payment	3s	3.01s	3.03s	0s	12.03s	120.5s
Order-Status	2s	2.01s	2.03s	0s	10.01s	100.6s
Delivery (interactive)	2s	2.01s	2.03s	0s	5.05s	50.4s
Stock-Level	2s	2.01s	2.03s	0s	5.06s	50.4s

Test Duration

Ramp up time	20	minutes
Measurement interval	20	minutes
Transactions during measurement interval	1998965	
Ramp down time	47	minutes

Checkpointing

Number of checkpoints in measurement interval	1	
Checkpoint Interval	20	minutes

Reproducibility Run

Throughput	42913.95	tpmC
Relative to MQTH	-0.31%	

Table of Contents

Preface

Document Structure

This is the full disclosure report for a benchmark test of the HP NetServer LXr 8500 using Microsoft SQLServer 2000 Enterprise Edition. It meets the requirements of the TPC Benchmark ® C Standard Specification, Revision 3.5 dated Octorber 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.

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

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 LXr 8500. The full configuration was built by adding additional memory, additional disk adapters and drives. The operating system used on the server was Microsoft Windows 2000 Advanced Server and the database was Microsoft SQLServer 2000 Enterprise Edition.

The processor architecture of the HP NetServer LXr 8500 was designed for the Intel Pentium III Xeon processor. The HP NetServer LXr 8500 used in this test was powered by eight 700MHz Intel Pentium III Xeon processors, each with 2MB of 2nd level cache.

This configuration used 8 GB of HP RAM. This was achieved by using sixteen 512 MB DIMMs spread across the two memory boards.

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

This measured configuration used seven HP NetRAID 4M RAID Disk Array Controllers (DACs), which were plugged into seven PCI slots on the motherboard. The database log drives consisted of eight pairs of 18GB 10krpm Ultra Wide hard disks attached to one DAC. The TPC-C database storage consisted of 240 HP 9.1GB 10krpm hard drives and 36 HP 18GB 10krpm hard drives. The 9.1GB drives on each DAC were equally distributed across the 4 SCSI channels. The 36 18GB drives were distributed across 3 SCSI channels. The channels were striped using the HP NetRAID 4M RAID configuration utility. Controller write-back caching and read ahead were specifically disabled for the PCI DACs.

Each of the five clients is a HP NetServer E60 with a single Pentium III 600MHz, 512 MB RAM, one 9.1GB 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 34,300 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. Five clients driven through seven network segments each, provided 35 network segments and 980 emulated users per network segment for the 34,300 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 Enterprise NetServer 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

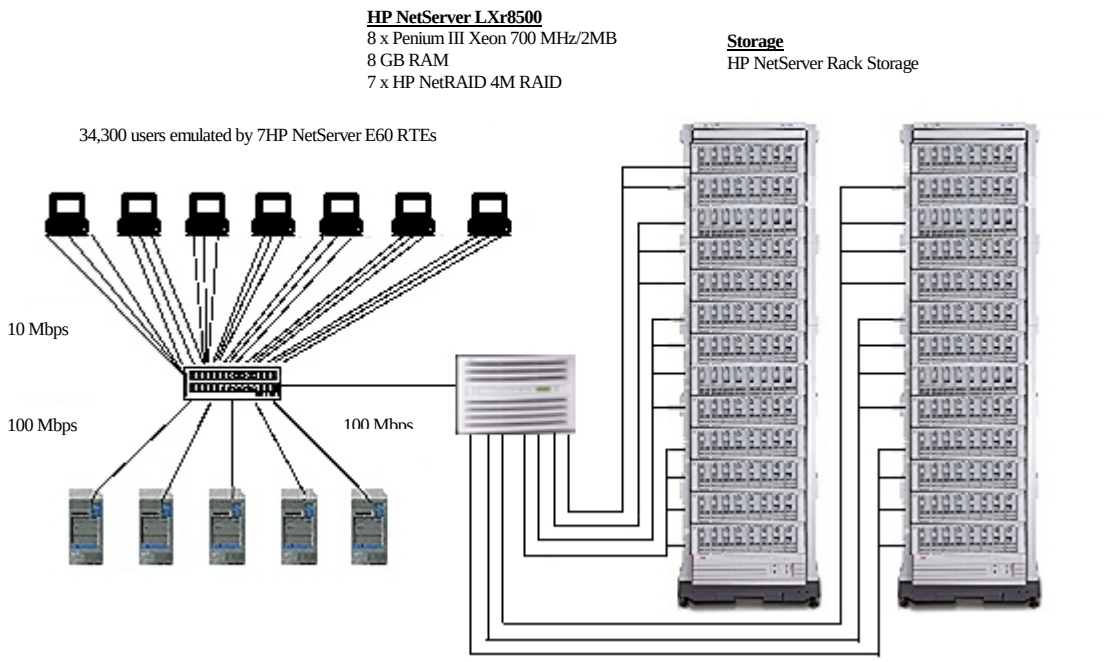
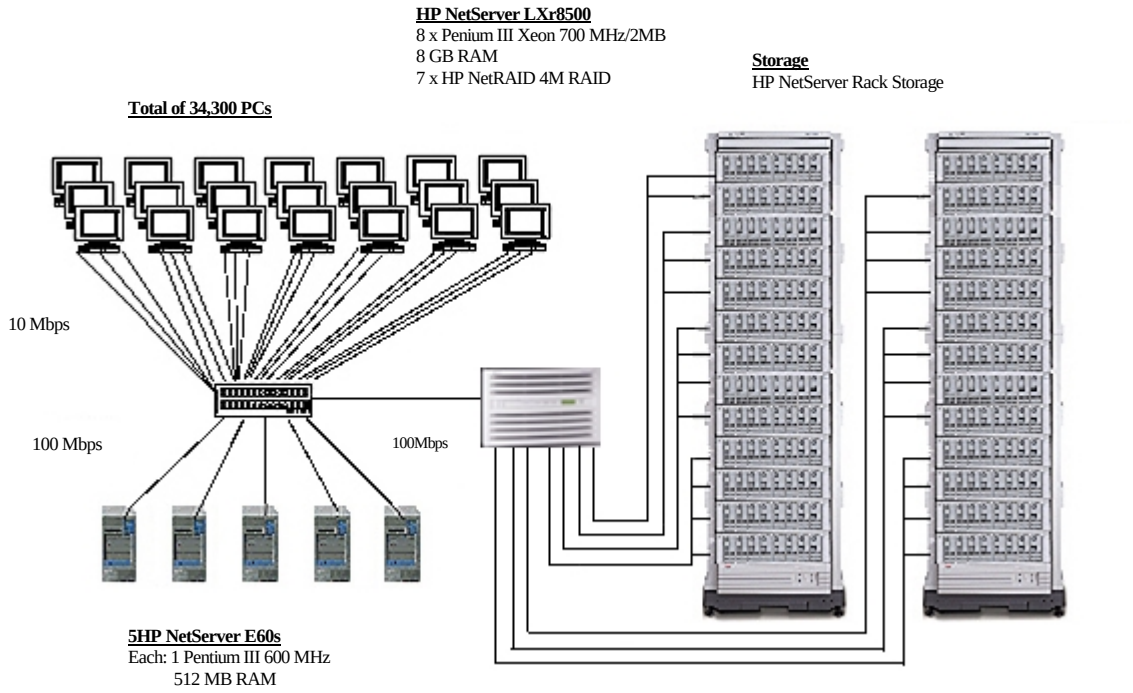


Figure 2. Priced Configuration



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 293 disks, which included 240 9GB Hot Swap disk drives and 36 18GB Hot Swap disk drives for data, 16 18GB drives for logs, and one 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 maximum 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	0.99%
	Average items per order	10.00
Payment	Home warehouse	85.02%
	Remote warehouse	14.98%
	Non primary key access	59.99%
Order Status	Non primary key access	59.94%
Delivery	Skipped transactions	0
Transaction Mix	New Order	44.82%
	Payment	43.10%
	Delivery	4.06%
	Stock Level	4.01%
	Order Status	4.01%

2.5 Presentation Manager or Intelligent Terminal

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

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

Application code 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 LXr 8500. 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.

Three 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, Windows 2000 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, Windows 2000 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 3780 warehouses in a single test. The standard driving mechanism was used to generate the transaction load of 37,800 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. 34,300 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 again and rebooted.
9. Microsoft SQL Server was restarted and performed an automatic recovery.
10. A new count of D_NEXT_O_ID was taken.
11. 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 embedded dual-channel Ultra-2 SCSI PCI Disk controllers and 7 HP NetRAID 4M 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 293 disks – 240 9GB for data, 36 18GB for data, 16 18GB for log, and 1 9GB for the OS and application software. The priced configuration is identical to the measured one. The data drives were all configured as hardware RAID 0. Logs were configured as hardware RAID 10. DACs 1, 2, 5, 6, and 7 were configured with 12 disk drives per RAID stripe and 4 spans for a total of 48 disk drives per data controller. DAC 4 contained 36 18 GB drives. DAC 3 was configured with 2 mirrored drives per RAID stripe and a 8 drive span for a total of 16 log drives. DAC 1, 2, 5 and 6 contained 3 partitions: partition 1 for customer/stock, partition 2 for miscellaneous, and partition 3 for backup. The other two data controllers didn't have the space for backup. Write caching was disabled on both the controller and on all the physical data drives. Write caching was enabled on the log drives. For the priced configuration, these log disks were backed up by a UPS.

Table 2 shows the complete data distribution.

Table 2: Data Distribution

HP NETRAID4M CONFIGURATION					WIN2K DISK ADMINISTRATION		
Controller #1					Disk 1: 60.0 GB		Disk 2: 173.37 GB
SCSI ID	Channels				Partitions (RAID 0)		Partition (RAID 10)
	0	1	2	3	1	2	1
0	A0-1	A1-1	A2-1	A3-1	F: CS1 Unknown 39.06 GB	O: MISC1 Unknown 20.94 GB	W: BACKUP NTFS 173.37 GB
1	A0-2	A1-2	A2-2	A3-2			
2	A0-3	A1-3	A2-3	A3-3			
3	A0-4	A1-4	A2-4	A3-4			
8	A0-5	A1-5	A2-5	A3-5			
9	A0-6	A1-6	A2-6	A3-6			
10	A0-7	A1-7	A2-7	A3-7			
11	A0-8	A1-8	A2-8	A3-8			
12	A0-9	A1-9	A2-9	A3-9			
13	A0-10	A1-10	A2-10	A3-10			
14	A0-11	A1-11	A2-11	A3-11			
15	A0-12	A1-12	A2-12	A3-12			

HP NETRAID4M CONFIGURATION					WIN2K DISK ADMINISTRATION		
Controller #2					Disk 3: 60.0 GB		Disk 4: 173.37 GB
SCSI ID	Channels				Partitions (RAID 0)		Partition (RAID 10)
	0	1	2	3	1	2	1
0	A0-1	A1-1	A2-1	A3-1	G: CS1 Unknown 39.06 GB	P: MISC1 Unknown 20.94 GB	V: BACKUP NTFS 173.37 GB
1	A0-2	A1-2	A2-2	A3-2			
2	A0-3	A1-3	A2-3	A3-3			
3	A0-4	A1-4	A2-4	A3-4			
8	A0-5	A1-5	A2-5	A3-5			
9	A0-6	A1-6	A2-6	A3-6			
10	A0-7	A1-7	A2-7	A3-7			
11	A0-8	A1-8	A2-8	A3-8			
12	A0-9	A1-9	A2-9	A3-9			
13	A0-10	A1-10	A2-10	A3-10			
14	A0-11	A1-11	A2-11	A3-11			
15	A0-12	A1-12	A2-12	A3-12			

HP NETRAID4M CONFIGURATION					WIN2K DISK ADMINISTRATION
Controller #3					Disk 5: 135.59 GB
SCSI ID	Channels				Partition (RAID 10)
	0	1	2	3	1
0	A0-1	A1-1			E: LOG Unknown 135.59 GB
1	A0-2	A1-2			
2	A0-3	A1-3			
3	A0-4	A1-4			
8	A0-5	A1-5			
9	A0-6	A1-6			
10	A0-7	A1-7			
11	A0-8	A1-8			
12					
13					
14					
15					

HP NETRAID4M CONFIGURATION					WIN2K DISK ADMINISTRATION		
Controller #4					Disk 6: 610.16 GB		
SCSI ID	Channels				Partitions (RAID 0)		
	0	1	2	3	1	2	3
0	A0-1	A1-1	A2-1	A3-1	H: CS3 Unknown 54.69 GB	P: MISC3 Unknown 26.37 GB	Freespace 529.11 GB
1	A0-2	A1-2	A2-2	A3-2			
2	A0-3	A1-3	A2-3	A3-3			
3	A0-4	A1-4	A2-4	A3-4			
8	A0-5	A1-5	A2-5	A3-5			
9	A0-6	A1-6	A2-6	A3-6			
10	A0-7	A1-7	A2-7	A3-7			
11	A0-8	A1-8	A2-8	A3-8			
12	A0-9	A1-9	A2-9	A3-9			
13	A0-10	A1-10	A2-10	A3-10			
14	A0-11	A1-11	A2-11	A3-11			
15	A0-12	A1-12	A2-12	A3-12			

HP NETRAID4M CONFIGURATION					WIN2K DISK ADMINISTRATION		
Controller #5					Disk 7: 60.0 GB		Disk 8: 173.37 GB
SCSI ID	Channels				Partitions (RAID 0)		Partition (RAID 10)
	0	1	2	3	1	2	1
0	A0-1	A1-1	A2-1	A3-1	I: CS1 Unknown 39.06 GB	R: MISC1 Unknown 20.94 GB	X: BACKUP NTFS 173.37 GB
1	A0-2	A1-2	A2-2	A3-2			
2	A0-3	A1-3	A2-3	A3-3			
3	A0-4	A1-4	A2-4	A3-4			
8	A0-5	A1-5	A2-5	A3-5			
9	A0-6	A1-6	A2-6	A3-6			
10	A0-7	A1-7	A2-7	A3-7			
11	A0-8	A1-8	A2-8	A3-8			
12	A0-9	A1-9	A2-9	A3-9			
13	A0-10	A1-10	A2-10	A3-10			
14	A0-11	A1-11	A2-11	A3-11			
15	A0-12	A1-12	A2-12	A3-12			

HP NETRAID4M CONFIGURATION					WIN2K DISK ADMINISTRATION		
Controller #6					Disk 9: 60.0 GB		Disk 10: 173.37 GB
SCSI ID	Channels				Partitions (RAID 0)		Partition (RAID 10)
	0	1	2	3	1	2	1
0	A0-1	A1-1	A2-1	A3-1	J: CS1 Unknown 39.06 GB	S: MISC1 Unknown 20.94 GB	Y: BACKUP NTFS 173.37 GB
1	A0-2	A1-2	A2-2	A3-2			
2	A0-3	A1-3	A2-3	A3-3			
3	A0-4	A1-4	A2-4	A3-4			
8	A0-5	A1-5	A2-5	A3-5			
9	A0-6	A1-6	A2-6	A3-6			
10	A0-7	A1-7	A2-7	A3-7			
11	A0-8	A1-8	A2-8	A3-8			
12	A0-9	A1-9	A2-9	A3-9			
13	A0-10	A1-10	A2-10	A3-10			
14	A0-11	A1-11	A2-11	A3-11			
15	A0-12	A1-12	A2-12	A3-12			

HP NETRAID4M CONFIGURATION					WIN2K DISK ADMINISTRATION		
Controller #7					Disk 11: 406.75 GB		
SCSI ID	Channels				Partitions (RAID 0)		
	0	1	2	3	1	2	3
0	A0-1	A1-1	A2-1	A3-1	K: CS3 Unknown 54.69 GB	T: MISC3 Unknown 26.37 GB	Freespace 325.69 GB
1	A0-2	A1-2	A2-2	A3-2			
2	A0-3	A1-3	A2-3	A3-3			
3	A0-4	A1-4	A2-4	A3-4			
8	A0-5	A1-5	A2-5	A3-5			
9	A0-6	A1-6	A2-6	A3-6			
10	A0-7	A1-7	A2-7	A3-7			
11	A0-8	A1-8	A2-8	A3-8			
12	A0-9	A1-9	A2-9	A3-9			
13	A0-10	A1-10	A2-10	A3-10			
14	A0-11	A1-11	A2-11	A3-11			
15	A0-12	A1-12	A2-12	A3-12			

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 2 shows the cardinality of the various tables.

Table 3: Table Cardinality

Table	Occurrences
Warehouse	3,430
District	34,300
Customer	102,900,000
History	102,900,000
Orders	102,900,000
New Orders	30,870,000
Order Line	468,001,833
Stock	100,000
Item	343,000,000

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 100.92 GB (including mirror) to sustain the log for 8 hours. Space available for the transaction log was 135.59 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 the DBMS used (e.g., relational, network, hierarchical)*
2. *The database interface (e.g., embedded, call level) and access language (e.g., SQL, DL/1, COBOL read/write) used to implement the TPC-C transactions. If more than one interface/access language is used to implement TPC-C, each interface/access language must be described and a list of which interface/access language is used with which transaction type must be disclosed.*

Microsoft SQLServer 2000 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 6 partitions at 34 GB each and MSSQL70_misc_fg consist of 6 partitions at 16 GB each as shown in the createdb.sql. The log was configured with 120 GB.

Chapter 5 Performance Metrics and Response Time

5.1 Throughput

Measured tpmC® must be reported.

Measured TpmC®: 43,046.55
Price per TpmC®: 12.76

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 3 shows the response times for all transaction types.

Table 4: Transaction Response Times

Response Times	Average	90th %-ile	Maximum
New-Order	0.32s	0.47s	5.41s
Payment	0.22s	0.37s	5.28s
Order-Status	0.25s	0.39s	5.29s
Delivery (interactive portion)	0.11s	0.13s	0.62s
Delivery (deferred portion)	0.38s	0.61s	2.63s
Stock-Level	1.01s	1.91s	5.10s
Menu	0.11s	0.13s	0.76s

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 4 and 5 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	18.03s
Payment	3s	3.01s	3.03s
Order Status	2s	2.01s	2.03s
Interactive Delivery	2s	2.01s	2.03s
Stock Level	2s	2.01s	2.03s

Table 6: Transaction Think Times

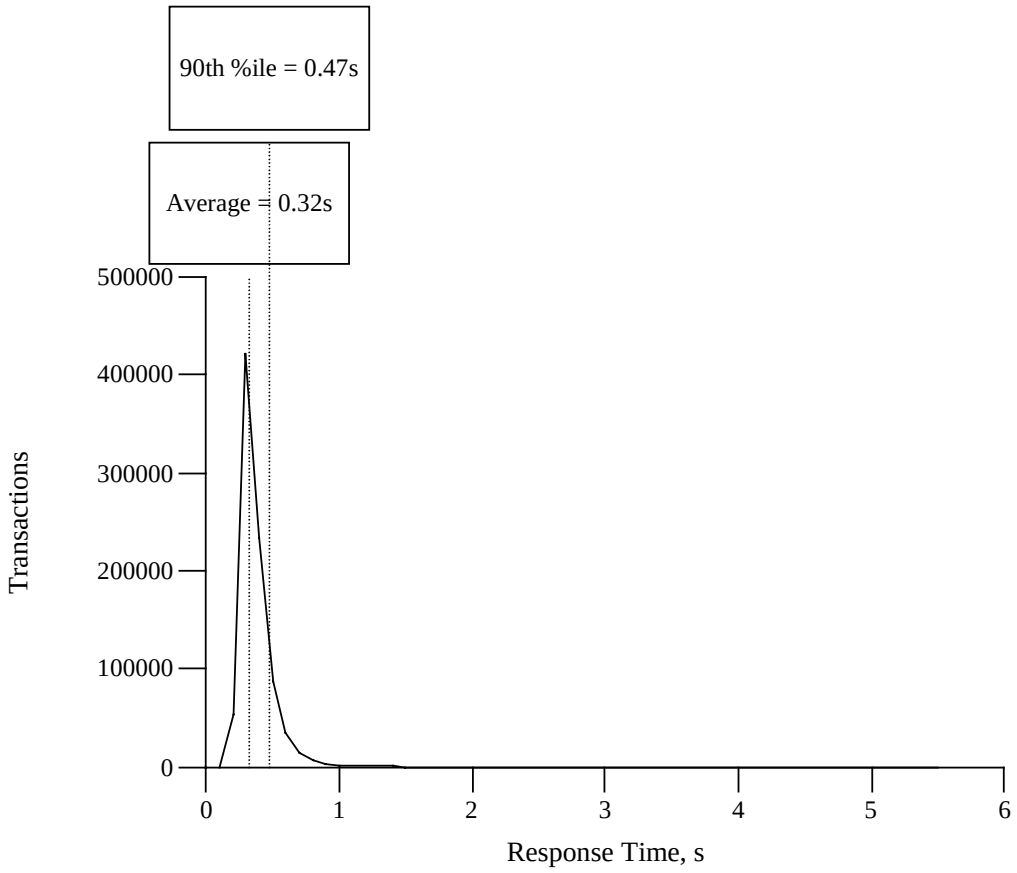
Think Times	Minimum	Average	Maximum
New Order	0s	12.05s	120.5s
Payment	0s	12.03s	120.5s
Order Status	0s	10.01s	100.6s
Interactive Delivery	0s	5.05s	50.4s
Stock Level	0s	5.06s	50.4s

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

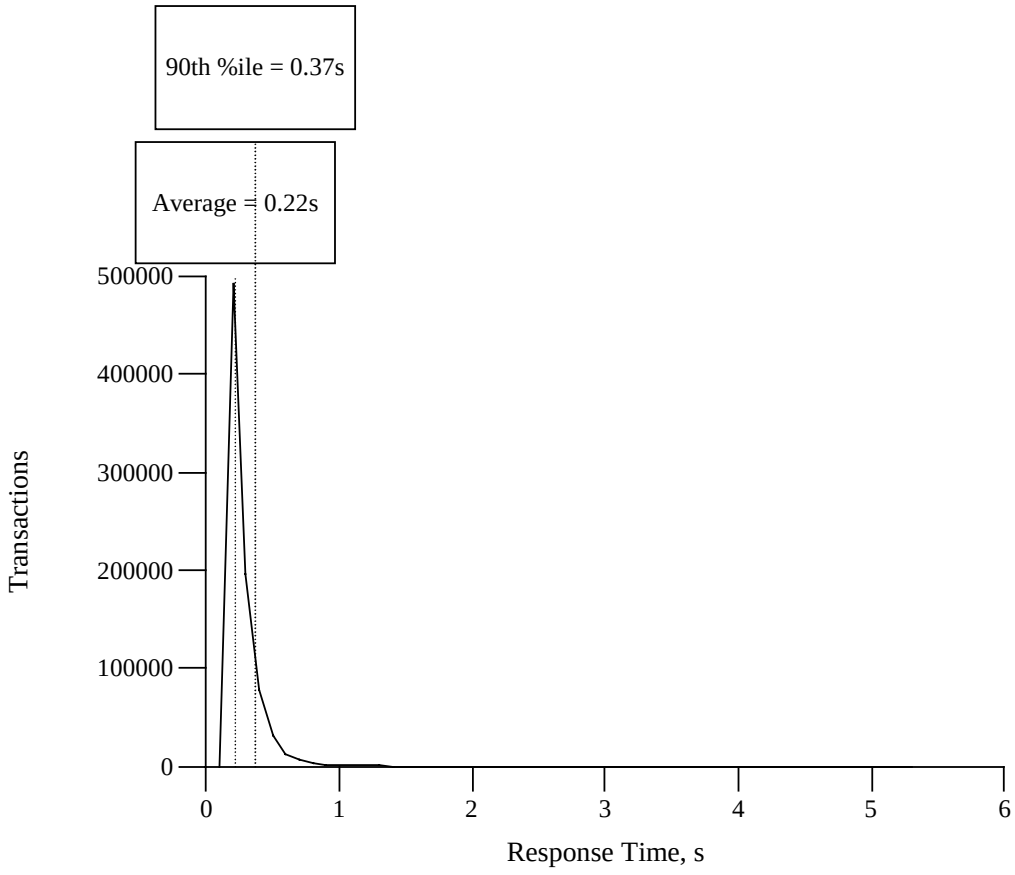
Figure 3: New Order Response Time Distribution



Response time frequency distribution for New Order transaction

5.4.2 Payment Response Time Distribution

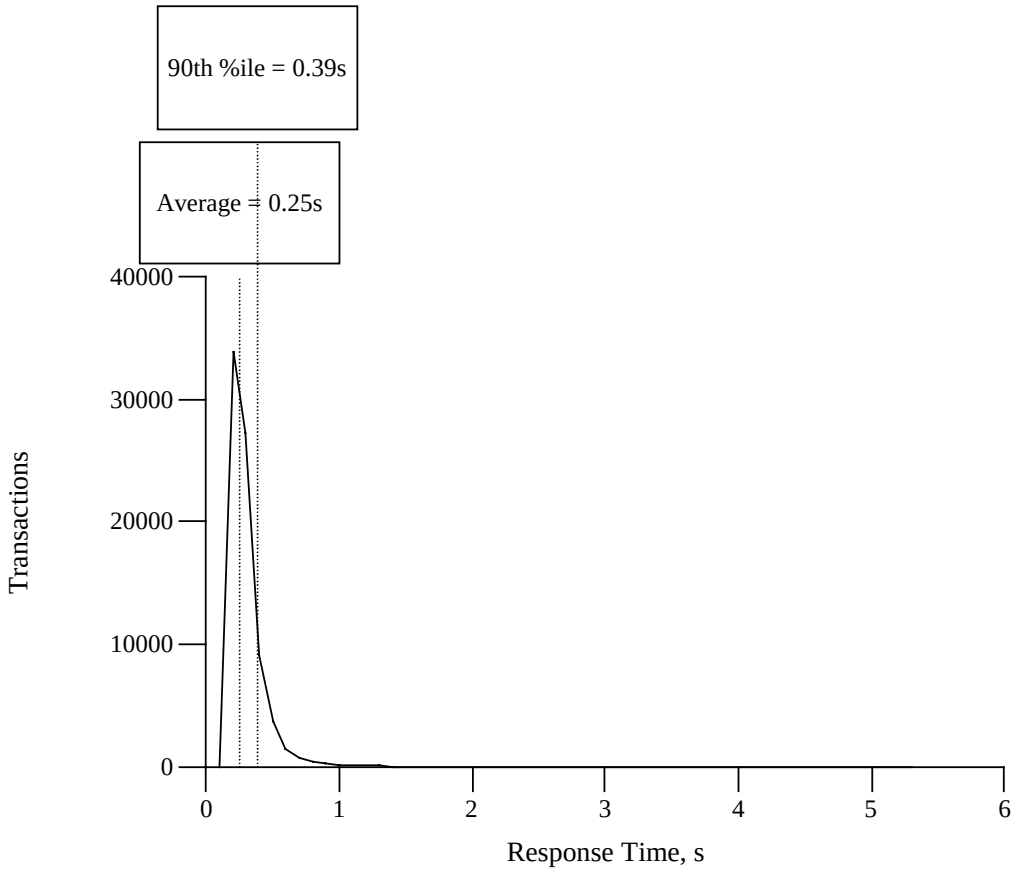
Figure 4: Payment Response Time Distribution



Response time frequency distribution for Payment transaction

5.4.3 Order Status Response Time

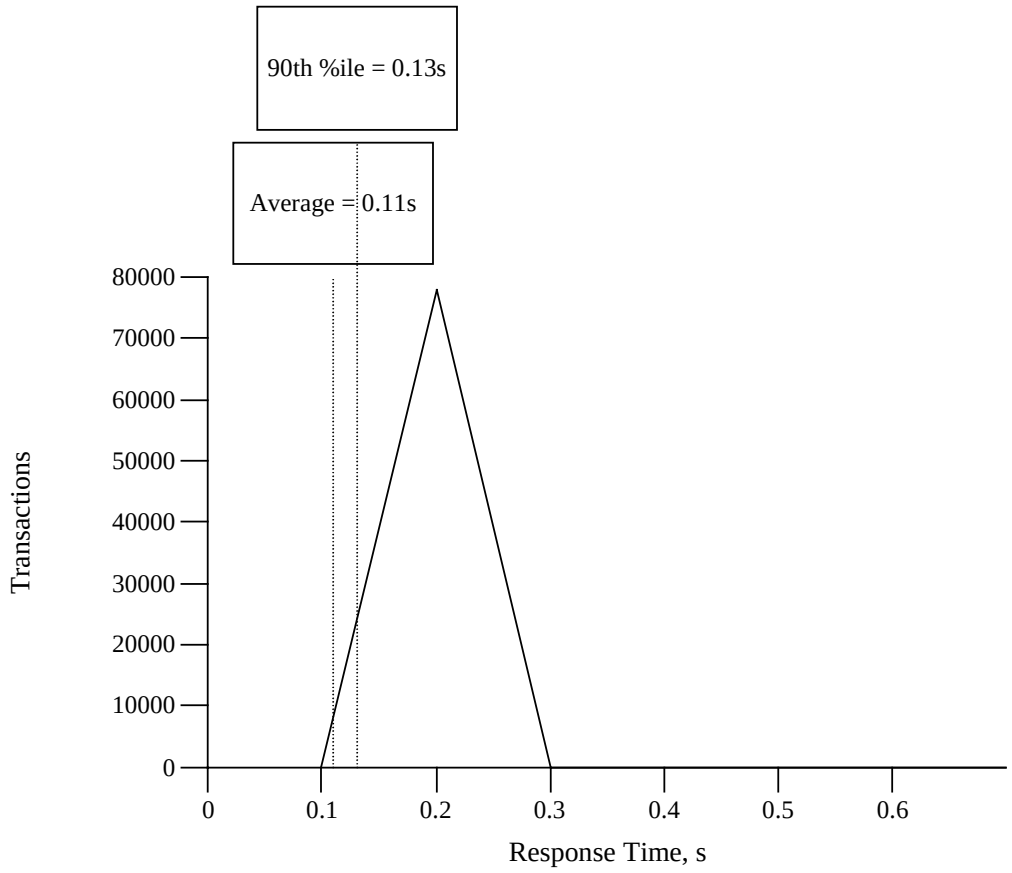
Figure 5: Order Status Response Time Distribution



Response time frequency distribution for Order Status transaction

5.4.4 Delivery Response Time Distribution

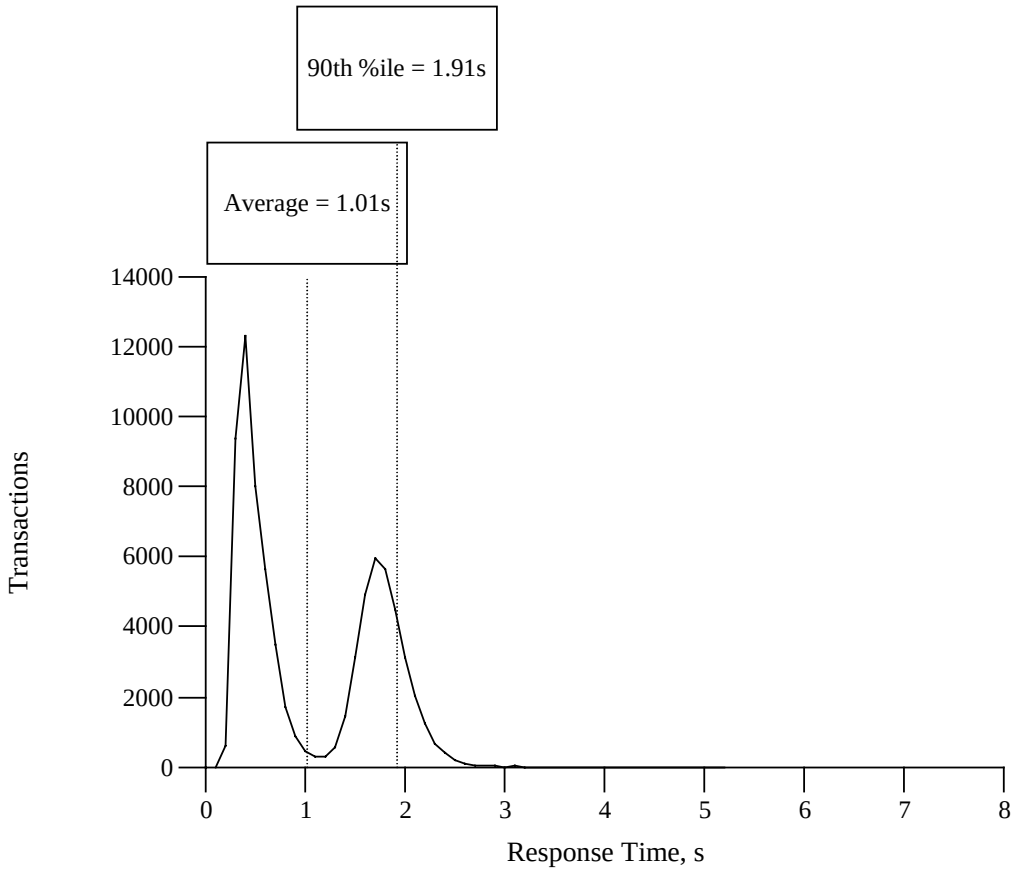
Figure 6: Delivery Response Time Distribution



Response time frequency distribution for Delivery transaction

5.4.5 Stock Level Response Time

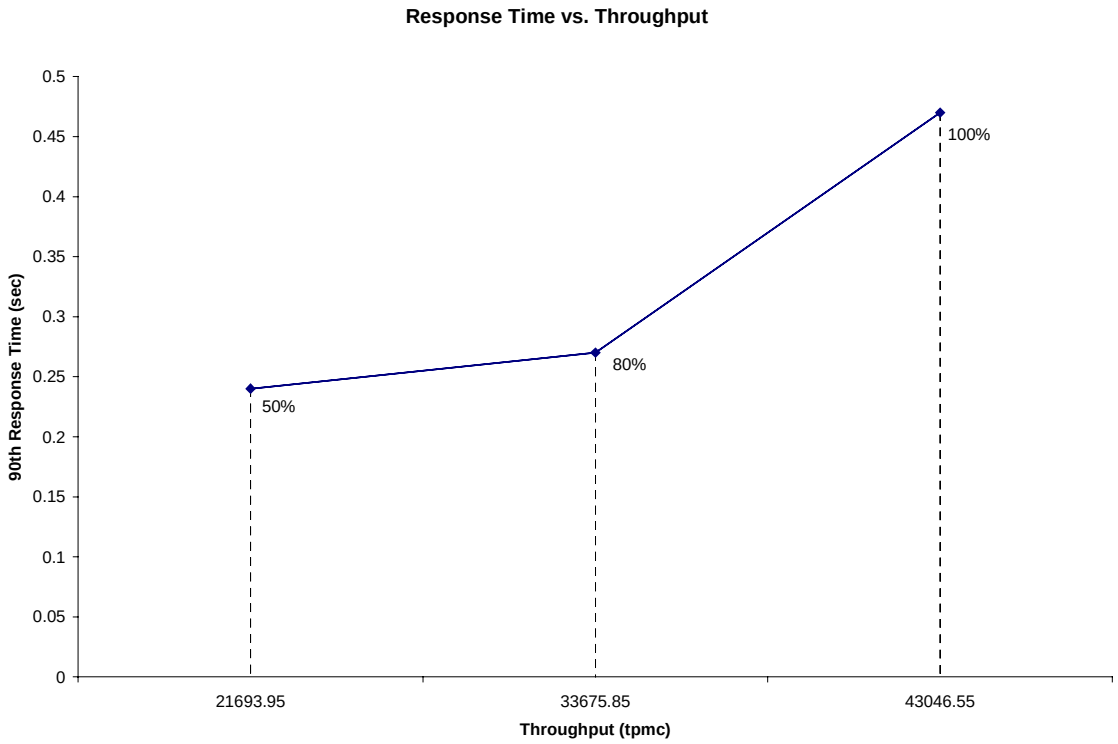
Figure 7: Stock Level Response Time Distribution



Response time frequency distribution for Stock Level transaction

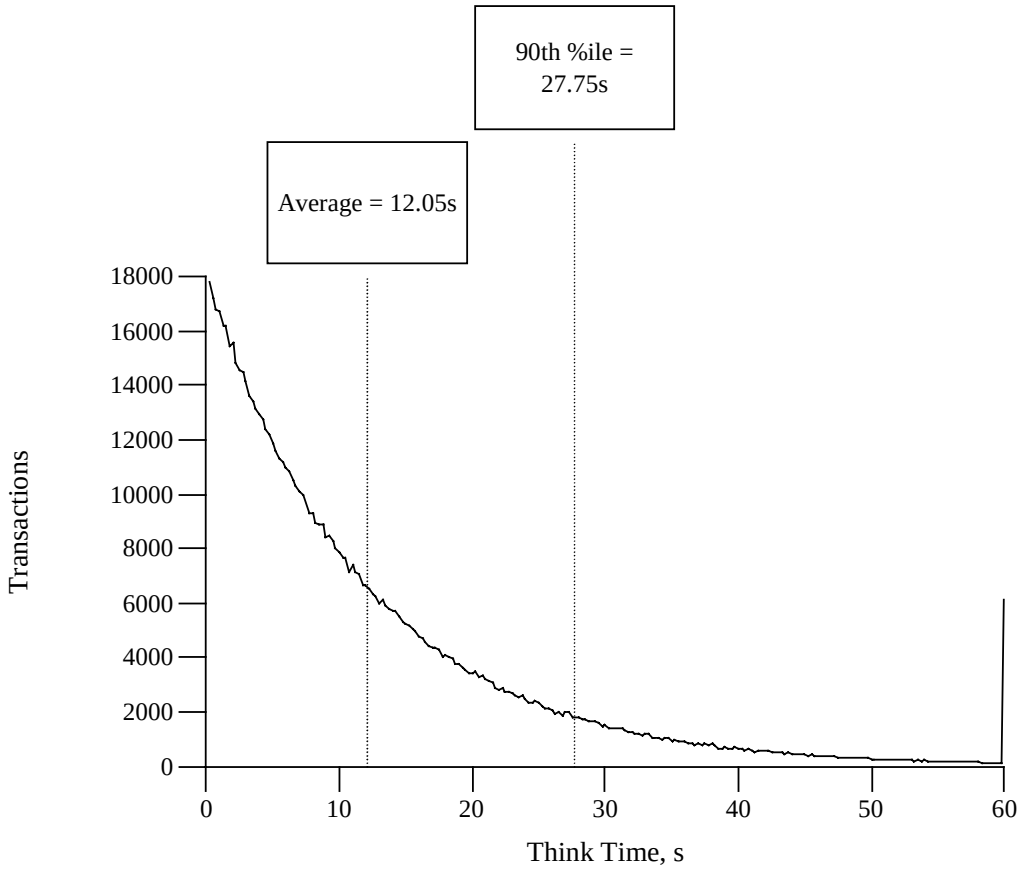
5.4.6 Response Time Versus Throughput

Figure 8: New Order Response Time Distribution



5.4.7 New Order Think Time Distribution

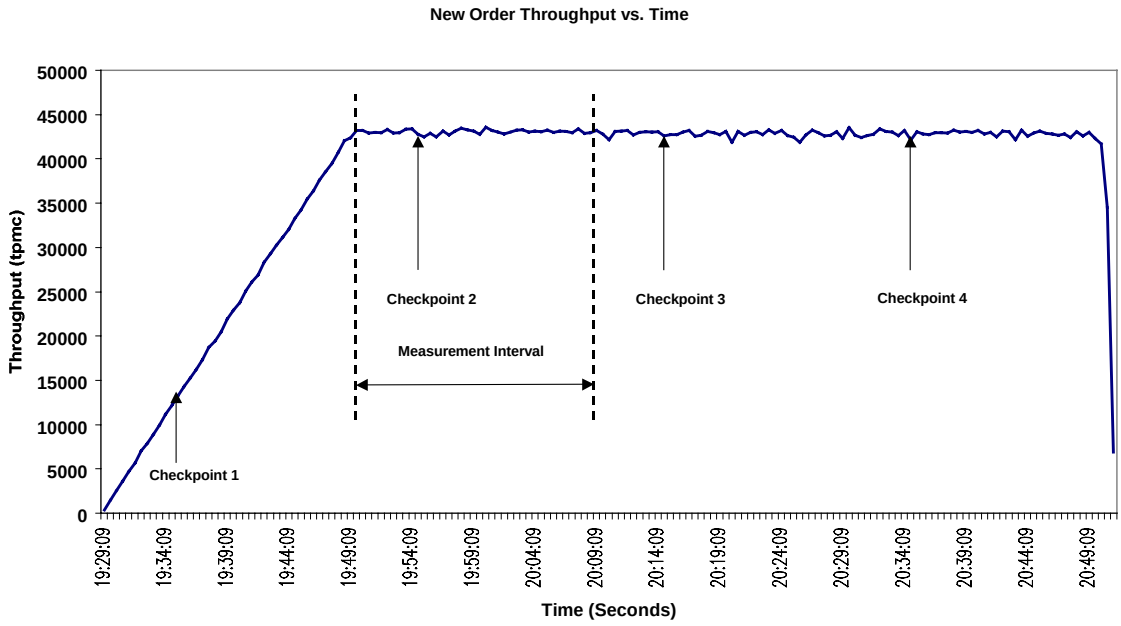
Figure 9: New Order Think Time Distribution



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 check point 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

To perform checkpoints at specific intervals, the SQL Server *recovery interval* was set to 24 and a NT command script was issued to schedule multiple checkpoints at specific intervals. The manual checkpoints were spread across 25% of the recovery interval, which was 6 minutes. 2 manual checkpoints were invoked during login phase to make sure that the automatic checkpoint would never get to execute. The interval between each pair was as short as 10 minutes. During the ramp-up and after all users were active, a background process slept and performed the checkpoint every 20 minutes. The measurement interval was equal to the waiting time between the checkpoints. By setting the TRACE FLAG #3502, SQL Server logged the checkpoint beginning and ending time in the ERRORLOG file.

At each checkpoint, Microsoft SQL Server wrote to disk all memory pages that had been updated but not yet physically written to disk. Upon completion of the checkpoint, Microsoft SQL Server wrote a special record to the recovery log to indicate that all disk operations had been satisfied to this point. The positioning of the checkpoint was verified to be clear of the guard zones and is depicted on the graph in Figure 10.

5.7 Reproducibility

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

A second measurement achieved a throughput of 42,913.95 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	44.82%
Payment	43.10%
Delivery	4.06%
Stock Level	4.01%
Order Status	4.01%

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 378 seconds into the measurement interval. The checkpoint interval (time between starts of two consecutive checkpoints) is also 20 minutes. Each checkpoint took approximately 360 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.

6.5 Operator Intervention

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

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

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:	43046.55 tpmC
Price per tpmC:	$12.76
Availability:	March 1, 2001

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 2000 Enterprise Edition license.
- 1 Microsoft Windows 2000 Advanced Server license.
- 5 Microsoft Windows 2000 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
Enterprise NetServer Division
10955 Tantau Avenue
Cupertino, CA 95014-0770 USA
Attn: Dave Tanis, MS 45NUH

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

PERFORMANCE METRICS INC.
TPC Certified Auditors

December 28, 2000

Mr. Dave Tanis
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 LXr8500
Database Manager:	Microsoft SQL Server 2000 Enterprise Edition
Operating System:	Microsoft Windows 2000 Advanced Server
Transaction Manager:	Microsoft Com+

Server: Hewlett-Packard NetServer LXr8500				
CPU's	Memory	Disks	90% Response	TpmC
8 Pentium III Xeon @ 700 MHz	Main: 8 GB Cache: 2MB each	241 @ 9GB 52 @ 18GB	**0.47 sec.**	**43,046.55**
5 Clients: Hewlett-Packard NetServer E60				
1 Pentium III @ 600 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.

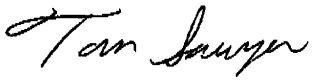
137 Yankton St. Suite 101, Folsom 95630
(916) 985-1131 fax: (916) 985-1185 email: Lorna@PerfMetrics.com

- The database was properly scaled with 3,430 warehouses.
- There were 34,300 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.
- 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 measured database had sufficient space.
- 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:

None.

Sincerely,



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Appendix A Application Source

A.1 Client Front End

Isapi_dll/src/tpcc.def

```
LIBRARY TPCC.DLL

EXPORTS

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

Isapi_dll/src/tpcc.h

```
/*      FILE:           TPCC.H
 *                      Microsoft TPC-C Kit Ver. 4.20.000
 *                      Copyright Microsoft, 1999      All Rights Reserved
 *                      Version 4.10.000 audited by Richard Gimarc, Performance Metrics,
3/17/99
 *
 *      PURPOSE:  Header file for ISAPI TPCC.DLL, defines structures and functions used in
the isapi tpcc.dll.
 *
 *
//VERSION RESOURCE DEFINES
#define _APS_NEXT_RESOURCE_VALUE                                101
#define _APS_NEXT_COMMAND_VALUE                                 40001
#define _APS_NEXT_CONTROL_VALUE                                 1000
#define _APS_NEXT_SYMED_VALUE                           101

#define TP_MAX_RETRIES                                                  50

//note that the welcome form must be processed first as terminal ids assigned here, once the
//terminal id is assigned then the forms can be processed in any order.
#define WELCOME_FORM                                                    1
        //beginning form no term id assigned, form id
#define MAIN_MENU_FORM                                                  2
        //term id assigned main menu form id
#define NEW_ORDER_FORM                                                  3
        //new order form id
#define PAYMENT_FORM                                                    4
        //payment form id
#define DELIVERY_FORM                                                   5
        //delivery form id
#define ORDER_STATUS_FORM                                               6
        //order status id
#define STOCK_LEVEL_FORM                                                7
        //stock level form id

//This macro is used to prevent the compiler error unused formal parameter
#define UNUSEDPARAM(x) (x = x)


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

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

        CTPCC_BASE          *pTxn;

} CLIENTDATA, *PCLIENTDATA;


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

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


        enum WEBERROR
        {
                NO_ERR,
                ERR_COMMAND_UNDEFINED,
                ERR_D_ID_INVALID,
                ERR_DELIVERY_CARRIER_ID_RANGE,
                ERR_DELIVERY_CARRIER_INVALID,
```

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

class CWEBCLNT_ERR : public CBaseErr
{
        public:

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

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

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

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

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

};

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

//function prototypes

BOOL APIENTRY DllMain(HANDLE hModule, DWORD ul_reason_for_call, LPVOID lpReserved);
void WriteMessageToEventLog(LPTSTR lpszMsg);
void ProcessQueryString(EXTENSION_CONTROL_BLOCK *pECB, int *pCmd, int *pFormId, int *pTermId,
int *pSyncId);
void WelcomeForm(EXTENSION_CONTROL_BLOCK *pECB, char *szBuffer);
```

```
void SubmitCmd(EXTENSION_CONTROL_BLOCK *pECB, char *szBuffer);
void BeginCmd(EXTENSION_CONTROL_BLOCK *pECB, int iFormId, int iTermId);
void ProcessCmd(EXTENSION_CONTROL_BLOCK *pECB, int iFormId, int iTermId);
void StatsCmd(EXTENSION_CONTROL_BLOCK *pECB, char *szBuffer);
void ErrorMessage(EXTENSION_CONTROL_BLOCK *pECB, int iError, int iErrorType, char *szMsg, int
iTermId);
void GetKeyValue(char **pQueryString, char *pKey, char *pValue, int iMax, WEBERROR err);
int  GetIntKeyValue(char **pQueryString, char *pKey, WEBERROR NoKeyErr, WEBERROR NotIntErr);
void TermInit(void);
void TermDeleteAll(void);
int  TermAdd(void);
void TermDelete(int id);
void ErrorForm(EXTENSION_CONTROL_BLOCK *pECB, int iType, int iErrorNum, int iTermId, int
iSyncId, char *szErrorText, char *szBuffer );
void MakeMainMenuForm(int iTermId, int iSyncId, char *szForm);
void MakeStockLevelForm(int iTermId, STOCK_LEVEL_DATA *pStockLevelData, BOOL bInput, char
*szForm);
void MakeNewOrderForm(int iTermId, NEW_ORDER_DATA *pNewOrderData, BOOL bInput, char *szForm);
void MakePaymentForm(int iTermId, PAYMENT_DATA *pPaymentData, BOOL bInput, char *szForm);
void MakeOrderStatusForm(int iTermId, ORDER_STATUS_DATA *pOrderStatusData, BOOL bInput, char
*szForm);
void MakeDeliveryForm(int iTermId, DELIVERY_DATA *pDeliveryData, BOOL bInput, char *szForm);
void ProcessNewOrderForm(EXTENSION_CONTROL_BLOCK  *pECB, int iTermId, char *szBuffer);
void ProcessPaymentForm(EXTENSION_CONTROL_BLOCK *pECB, int iTermId, char *szBuffer);
void ProcessOrderStatusForm(EXTENSION_CONTROL_BLOCK *pECB, int iTermId, char *szBuffer);
void ProcessDeliveryForm(EXTENSION_CONTROL_BLOCK *pECB, int iTermId, char *szBuffer);
void ProcessStockLevelForm(EXTENSION_CONTROL_BLOCK *pECB, int iTermId, char *szBuffer);
void GetNewOrderData(LPSTR lpszQueryString, NEW_ORDER_DATA *pNewOrderData);
void GetPaymentData(LPSTR lpszQueryString, PAYMENT_DATA *pPaymentData);
void GetOrderStatusData(LPSTR lpszQueryString, ORDER_STATUS_DATA *pOrderStatusData);
BOOL PostDeliveryInfo(short w_id, short o_carrier_id);
BOOL IsNumeric(char *ptr);
BOOL IsDecimal(char *ptr);
void DeliveryWorkerThread(void *ptr);
```

Isapi_dll/src/tpcc.rc

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

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

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

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

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

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

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

#endif    // !_MAC


#ifdef APSTUDIO_INVOKED
////////////////////////////////////////////////////////////////////////////
//
```

APPENDIX A - APPLICATION SOURCE CODE

```
// TEXTINCLUDE
//

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

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

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

#endif    // APSTUDIO_INVOKED


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

IDD_DIALOG1 DIALOG DISCARDABLE  0, 0, 186, 95
STYLE DS_MODALFRAME | WS_POPUP | WS_CAPTION | WS_SYSMENU
CAPTION "Dialog"
FONT 8, "MS Sans Serif"
BEGIN
    DEFPUSHBUTTON   "OK",IDOK,129,7,50,14
    PUSHBUTTON      "Cancel",IDCANCEL,129,24,50,14
END


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

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


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



#ifndef APSTUDIO_INVOKED
/////////////////////////////////////////////////////////////////////////////
//
// Generated from the TEXTINCLUDE 3 resource.
//
/////////////////////////////////////////////////////////////////////////////
#endif    // not APSTUDIO_INVOKED
```

Isapi_dll/src/tpcc.cpp

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

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

#include <sqltypes.h>

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

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

APPENDIX A - APPLICATION SOURCE CODE

```
#include "..\..\common\src\error.h"
#include "..\..\common\src\txn_base.h"
#include "..\..\common\src\ReadRegistry.h"

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

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

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

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


#define   LEN_ERR_STRING      256

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

char                szMyComputerName[MAX_COMPUTERNAME_LENGTH+1];

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

// The WEBCLIENT_VERSION string specifies the version level of this web client interface.
// The RTE must be synchronized with the interface level on login, otherwise the login
// will fail.  This is a sanity check to catch problems resulting from mismatched versions
// of the RTE and web client.
#define WEBCLIENT_VERSION "410"

static    CRITICAL_SECTION              TermCriticalSection;

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

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

// For deferred Delivery txns:
CTxnLog                                         *txnDelilog = NULL;
          //used to log delivery transaction information

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

// configuration settings from registry
TPCCREGISTRYDATA              Reg;


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

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

/* FUNCTION: DllMain
 *
 * PURPOSE:         This function is the entry point for the DLL.  This implementation is
based on the
 *                  fact that DLL_PROCESS_ATTACH is only called from the inet
service once.
 *
 * ARGUMENTS:       HANDLE    hModule                                 module handle
 *                                    DWORD     ul_reason_for_call  reason for call
 *                                    LPVOID    lpReserved
          reserved for future use
 *
 * RETURNS:                   BOOL      FALSE                                 errors occured
in initialization
 *                                                                  TRUE
          DLL successfully initialized
 */

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

          try
          {
```

APPENDIX A - APPLICATION SOURCE CODE

```
                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() );
```

APPENDIX A - APPLICATION SOURCE CODE

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

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

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

                                                InitJulianTime(NULL);

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

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

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

                                                break;

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

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

                                                        delete [] pDeliHandles;
                                                        delete [] pDelBuff;

                                                        CloseHandle( hWorkerSemaphore );
                                                        CloseHandle( hDoneEvent );

                DeleteCriticalSection(&DelBuffCriticalSection);
                                                }

                                                DeleteCriticalSection(&TermCriticalSection);

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

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

                                                Sleep(500);
                                                break;

                                        default:
                                                /* nothing */;
                                }
                        }
                        catch (CBaseErr *e)
                        {
                                WriteMessageToEventLog( e->ErrorText() );
                                delete e;
                                TerminateExtension(0);
                                return FALSE;
```

```
        }
        catch (...)
        {
                WriteMessageToEventLog(TEXT("Unhandled exception.  DLL could not load."));
                TerminateExtension(0);
                return FALSE;
        }

        return TRUE;
}


/* FUNCTION: GetExtensionVersion
 *
 * PURPOSE:         This function is called by the inet service when the DLL is first loaded.
 *
 * ARGUMENTS:       HSE_VERSION_INFO    *pVer     passed in structure in which to place
expected version number.
 *
 * RETURNS:                 TRUE      inet service expected return value.
 */

BOOL WINAPI GetExtensionVersion(HSE_VERSION_INFO *pVer)
{
        pVer->dwExtensionVersion = MAKELONG(HSE_VERSION_MINOR, HSE_VERSION_MAJOR);
        lstrcpyn(pVer->lpszExtensionDesc, "TPC-C Server.", HSE_MAX_EXT_DLL_NAME_LEN);

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

        return TRUE;
}

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

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

        TermDeleteAll();
        return TRUE;
}
```

```
/* FUNCTION: HttpExtensionProc
 *
 * PURPOSE:         This function is the main entry point for the TPCC DLL. The internet
service
 *                          calls this function passing in the http string.
 *
 * ARGUMENTS:       EXTENSION_CONTROL_BLOCK       *pECB     structure pointer to passed in
internet
 *
                            service information.
 *
 * RETURNS:                 DWORD     HSE_STATUS_SUCCESS
        connection can be dropped if error
 *                                                              HSE_STATUS_SUCCESS_AND_KEEP_CONN
        keep connect valid comment sent
 *
 * COMMENTS:        None
 *
 */

DWORD WINAPI HttpExtensionProc(EXTENSION_CONTROL_BLOCK *pECB)
{
        int                         iCmd, FormId, TermId, iSyncId;
        char            szBuffer[4096];

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


#ifdef ICECAP
        StartCAP();
#endif

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

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

                                throw new CWEBCLNT_ERR( ERR_INVALID_TERMID );
```

```
                }

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

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


        switch(iCmd)
        {
        case 0:
                WelcomeForm(pECB, szBuffer);
                break;
        case 1:
                switch( FormId )
                {
                        case WELCOME_FORM:
                        case MAIN_MENU_FORM:
                                break;
                        case NEW_ORDER_FORM:
                                ProcessNewOrderForm(pECB, TermId, szBuffer);
                                break;
                        case PAYMENT_FORM:
                                ProcessPaymentForm(pECB, TermId, szBuffer);
                                break;
                        case DELIVERY_FORM:
                                ProcessDeliveryForm(pECB, TermId, szBuffer);
                                break;
                        case ORDER_STATUS_FORM:
                                ProcessOrderStatusForm(pECB, TermId,
szBuffer);
                                break;
                        case STOCK_LEVEL_FORM:
                                ProcessStockLevelForm(pECB, TermId,
szBuffer);
                                break;
                }
                break;
        case 2:
                // new-order selected from menu; display new-order input form
                MakeNewOrderForm(TermId, NULL, INPUT_FORM, szBuffer);
                break;
        case 3:
                // payment selected from menu; display payment input form
                MakePaymentForm(TermId, NULL, INPUT_FORM, szBuffer);
                break;
        case 4:
                // delivery selected from menu; display delivery input form
                MakeDeliveryForm(TermId, NULL, INPUT_FORM, szBuffer);
                break;
        case 5:
                // order-status selected from menu; display order-status input
form
                MakeOrderStatusForm(TermId, NULL, INPUT_FORM, szBuffer);
                break;
        case 6:
                // stock-level selected from menu; display stock-level input
form
                MakeStockLevelForm(TermId, NULL, INPUT_FORM, szBuffer);
                break;
        case 7:
                // ExitCmd
                TermDelete(TermId);
                WelcomeForm(pECB, szBuffer);
                break;
        case 8:
                SubmitCmd(pECB, szBuffer);
                break;
        case 9:
                // menu
                MakeMainMenuForm(TermId, Term.pClientData[TermId].iSyncId,
szBuffer);
                break;
        case 10:
                // CMD=Clear
                // resets all connections; should only be used when no other
connections are active
                TermDeleteAll();
                TermInit();
                WelcomeForm(pECB, szBuffer);
                break;
        case 11:  // CMD=Stats
                StatsCmd(pECB, szBuffer);
                break;
        }
    }
    catch (CBaseErr *e)
    {
        ErrorForm( pECB, e->ErrorType(), e->ErrorNum(), TermId, iSyncId, e-
>ErrorText(), szBuffer );
        delete e;
    }
    catch (...)
    {
        ErrorForm( pECB, ERR_TYPE_WEBDLL, 0, TermId, iSyncId, "Error: Unhandled
exception in Web Client.", szBuffer );
    }

#ifdef ICECAP
    StopCAP();
#endif


    lpbSize = strlen(szBuffer);
    wsprintf(szHeader1,
                "Content-Type: text/html\r\n"
```

```
                        "Content-Length: %d\r\n"
                        "Connection: Keep-Alive\r\n\r\n" , lpbSize);
        strcat( szHeader1, szBuffer );

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

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


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

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

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

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

        (VOID) DeregisterEventSource(hEventSource);
    }
}


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

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

        DELIVERY_TRANSACTION                    delivery;
        PDELIVERY_DATA                          pDeliveryData;
        TXN_RECORD_TPCC_DELIV_DEF   txnDeliRec;

        DWORD                                   index;
        HANDLE                                  handles[2];

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

        assert(txnDelilog != NULL);

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

        while (TRUE)
        {
                try
                {
```

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```
                        //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.TxnStartTO = 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.TxnStartTO);
                                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
```

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```
                // 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],
```

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```
                        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 );
```

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```
        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."
        },
```

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```
                {       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.
```

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```
 */

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

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

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

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

        *pQueryString = ptr;
        return atoi(ptr0);

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

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

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

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

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

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

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

        LeaveCriticalSection(&TermCriticalSection);
}

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

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

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

        Term.iFreeList              = 0;
        Term.iNumEntries    = 0;
        if ( Term.pClientData )
                free(Term.pClientData);
        Term.pClientData    = NULL;

        LeaveCriticalSection(&TermCriticalSection);
}

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

```
 *
 */

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

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

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

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

        LeaveCriticalSection(&TermCriticalSection);
        return iNewTerm;
}

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

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

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

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

                LeaveCriticalSection(&TermCriticalSection);
        }
}


/* FUNCTION: MakeErrorForm
 */

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

/* FUNCTION: MakeMainMenuForm
 */

void MakeMainMenuForm(int iTermId, int iSyncId, char *szForm)
{
        wsprintf(szForm,
```

```
                "<HTML><HEAD><TITLE>TPC-C Main Menu</TITLE></HEAD><BODY>"
                "Select Desired Transaction.<BR><HR>"
                "<FORM ACTION=\"tpcc.dll\" METHOD=\"GET\">"
                "<INPUT TYPE=\"hidden\" NAME=\"STATUSID\" VALUE=\"0\">"
                "<INPUT TYPE=\"hidden\" NAME=\"ERROR\" VALUE=\"0\">"
                "<INPUT TYPE=\"hidden\" NAME=\"FORMID\" VALUE=\"%d\">"
                "<INPUT TYPE=\"hidden\" NAME=\"TERMID\" VALUE=\"%d\">"
                "<INPUT TYPE=\"hidden\" NAME=\"SYNCID\" VALUE=\"%d\">"
                "<INPUT TYPE=\"submit\" NAME=\"CMD\" VALUE=\"..NewOrder..\">"
                "<INPUT TYPE=\"submit\" NAME=\"CMD\" VALUE=\"..Payment..\">"
                "<INPUT TYPE=\"submit\" NAME=\"CMD\" VALUE=\"..Delivery..\">"
                "<INPUT TYPE=\"submit\" NAME=\"CMD\" VALUE=\"..Order-Status..\">"
                "<INPUT TYPE=\"submit\" NAME=\"CMD\" VALUE=\"..Stock-Level..\">"
                "<INPUT TYPE=\"submit\" NAME=\"CMD\" VALUE=\"..Exit..\">"
                "</FORM></BODY></HTML>"
                , MAIN_MENU_FORM, iTermId, iSyncId);
}

/* FUNCTION: MakeStockLevelForm
 *
 * PURPOSE:         This function constructs the Stock Level HTML page.
 *
 * COMMENTS:        The internal client buffer is created when the terminal id is assigned and
should not
 *                                  be freed except when the client terminal id is no
longer needed.
 */

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

        c = wsprintf(szForm,
                "<HTML><HEAD><TITLE>TPC-C Stock Level</TITLE></HEAD><FORM
ACTION=\"tpcc.dll\" METHOD=\"GET\">"
                "<INPUT TYPE=\"hidden\" NAME=\"STATUSID\" VALUE=\"0\">"
                "<INPUT TYPE=\"hidden\" NAME=\"ERROR\" VALUE=\"0\">"
                "<INPUT TYPE=\"hidden\" NAME=\"FORMID\" VALUE=\"%d\">"
                "<INPUT TYPE=\"hidden\" NAME=\"TERMID\" VALUE=\"%d\">"
                "<INPUT TYPE=\"hidden\" NAME=\"SYNCID\" VALUE=\"%d\">"
                "<PRE><font face=\"Courier\">                                   Stock-
Level<BR>"
                "Warehouse: %4.4d   District: %2.2d<BR> <BR>",
                STOCK_LEVEL_FORM, iTermId, Term.pClientData[iTermId].iSyncId,
                Term.pClientData[iTermId].w_id, Term.pClientData[iTermId].d_id);

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

/* FUNCTION: MakeNewOrderForm
 *
 * COMMENTS:        The internal client buffer is created when the terminal id is assigned and
should not
 *                                  be freed except when the client terminal id is no
longer needed.
 */

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

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

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

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

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```
        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>"
```

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```
                                        " 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
```

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```
                        , pPaymentData->d_city, pPaymentData->d_state, pPaymentData-
>d_zip, pPaymentData->d_zip+5
                        , pPaymentData->c_id, pPaymentData->c_w_id,       pPaymentData-
>c_d_id
                        , pPaymentData->c_first, pPaymentData->c_middle, pPaymentData-
>c_last
                        , pPaymentData->c_since.day, pPaymentData->c_since.month,
          pPaymentData->c_since.year
                        , pPaymentData->c_street_1, pPaymentData->c_credit
                        );

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

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

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

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

                strcat(szForm,      " <BR></font></PRE><HR>"
                                                "<INPUT TYPE=\"submit\"
NAME=\"CMD\" VALUE=\"..NewOrder..\">"
                                                "<INPUT TYPE=\"submit\"
NAME=\"CMD\" VALUE=\"..Payment..\">"
                                                "<INPUT TYPE=\"submit\"
NAME=\"CMD\" VALUE=\"..Delivery..\">"
                                                "<INPUT TYPE=\"submit\"
NAME=\"CMD\" VALUE=\"..Order-Status..\">"
                                                "<INPUT TYPE=\"submit\"
NAME=\"CMD\" VALUE=\"..Stock-Level..\">"
                                                "<INPUT TYPE=\"submit\"
NAME=\"CMD\" VALUE=\"..Exit..\">"
                                                "</BODY></FORM></HTML>");
        }

}

/* FUNCTION: MakeOrderStatusForm
 *
 * COMMENTS:        The internal client buffer is created when the terminal id is assigned and
should not
 *                                      be freed except when the client terminal id is no
longer needed.
 */

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

        c = wsprintf(szForm,
                "<HTML><HEAD><TITLE>TPC-C Order-Status</TITLE></HEAD><BODY>"
                "<FORM ACTION=\"tpcc.dll\" METHOD=\"GET\">"
                "<INPUT TYPE=\"hidden\" NAME=\"STATUSID\" VALUE=\"0\">"
                "<INPUT TYPE=\"hidden\" NAME=\"ERROR\" VALUE=\"0\">"
                "<INPUT TYPE=\"hidden\" NAME=\"FORMID\" VALUE=\"%d\">"
                "<INPUT TYPE=\"hidden\" NAME=\"TERMID\" VALUE=\"%d\">"
                "<INPUT TYPE=\"hidden\" NAME=\"SYNCID\" VALUE=\"%d\">"
                "<PRE><font face=\"Courier\">                                        Order-
Status<BR>"
                "Warehouse: %4.4d   ",
                ORDER_STATUS_FORM, iTermId, Term.pClientData[iTermId].iSyncId,
Term.pClientData[iTermId].w_id);

        if ( bInput )
        {
                strcpy(szForm+c,
                        "District: <INPUT NAME=\"DID*\" SIZE=1><BR>"
                        "Customer: <INPUT NAME=\"CID*\" SIZE=4>   Name:
<INPUT NAME=\"CLT*\" SIZE=23><BR>"
                        "Cust-Balance:<BR> <BR>"
                        "Order-Number:            Entry-Date:
Carrier-Number:<BR>"
                        "Supply-W     Item-Id    Qty     Amount      Delivery-Date<BR>
<BR> <BR> <BR> <BR>"
                        " <BR> <BR> <BR> <BR> <BR> <BR> <BR> <BR> <BR> <BR>
<BR></font></PRE>"
                        "<HR><INPUT TYPE=\"submit\" NAME=\"CMD\"
VALUE=\"Process\"><INPUT TYPE=\"submit\" NAME=\"CMD\" VALUE=\"Menu\">"
                        "</BODY></FORM></HTML>" );
        }
        else
        {
                c += wsprintf(szForm+c,
                        "District: %2.2d<BR>"
                        "Customer: %4.4d   Name: %-16s %-2s %-16s<BR>",
```

```
                        pOrderStatusData->d_id, pOrderStatusData->c_id,
                        pOrderStatusData->c_first, pOrderStatusData->c_middle,
pOrderStatusData->c_last);

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

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

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

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

                strcpy(szForm+c,
                        "</font></PRE><HR><INPUT TYPE=\"submit\" NAME=\"CMD\"
VALUE=\"..NewOrder..\">"
                        "<INPUT TYPE=\"submit\" NAME=\"CMD\" VALUE=\"..Payment..\">"
                        "<INPUT TYPE=\"submit\" NAME=\"CMD\" VALUE=\"..Delivery..\">"
                        "<INPUT TYPE=\"submit\" NAME=\"CMD\" VALUE=\"..Order-
Status..\">"
                        "<INPUT TYPE=\"submit\" NAME=\"CMD\" VALUE=\"..Stock-Level..\">"
                        "<INPUT TYPE=\"submit\" NAME=\"CMD\" VALUE=\"..Exit..\">"
                        "</BODY></FORM></HTML>" );
        }
}

/* FUNCTION: MakeDeliveryForm
 *
 * COMMENTS:        The internal client buffer is created when the terminal id is assigned and
should not
 *                              be freed except when the client terminal id is no
longer needed.
 */

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

        c = wsprintf(szForm,
                "<HTML><HEAD><TITLE>TPC-C Delivery</TITLE></HEAD><BODY>"
                "<FORM ACTION=\"tpcc.dll\" METHOD=\"GET\">"
                "<INPUT TYPE=\"hidden\" NAME=\"STATUSID\" VALUE=\"%d\">"
                "<INPUT TYPE=\"hidden\" NAME=\"ERROR\" VALUE=\"0\">"
                "<INPUT TYPE=\"hidden\" NAME=\"FORMID\" VALUE=\"%d\">"
                "<INPUT TYPE=\"hidden\" NAME=\"TERMID\" VALUE=\"%d\">"
                "<INPUT TYPE=\"hidden\" NAME=\"SYNCID\" VALUE=\"%d\">"
                "<PRE><font face=\"Courier\">
Delivery<BR>"
                "Warehouse: %4.4d<BR> <BR>",
                (!bInput && (pDeliveryData->exec_status_code != eOK)) ?
ERR_TYPE_DELIVERY_POST : 0,
                DELIVERY_FORM, iTermId, Term.pClientData[iTermId].iSyncId,
Term.pClientData[iTermId].w_id);

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

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

APPENDIX A - APPLICATION SOURCE CODE

```
/* FUNCTION: ProcessNewOrderForm
 *
 * PURPOSE:         This function gets and validates the input data from the new order form
 *                          filling in the required input variables. it then calls the
SQLNewOrder
 *                          transaction, constructs the output form and writes it back to
client
 *                          browser.
 */

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

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

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

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

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

/* FUNCTION: void ProcessPaymentForm
 *
 * PURPOSE:         This function gets and validates the input data from the payment form
 *                          filling in the required input variables. It then calls the
SQLPayment
 *                          transaction, constructs the output form and writes it back to
client
 *                          browser.
 *
 * ARGUMENTS:       EXTENSION_CONTROL_BLOCK       *pECB     passed in structure pointer from
inetsrv.
 *                                  int
          iTermId   client browser terminal id
 *
 */

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

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

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

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

/* FUNCTION: ProcessOrderStatusForm
 *
 * PURPOSE:         This function gets and validates the input data from the Order Status
 *                          form filling in the required input variables. It then calls the
 *                          SQLOrderStatus transaction, constructs the output form and
writes it
 *                          back to client browser.
 *
 * ARGUMENTS:       EXTENSION_CONTROL_BLOCK       *pECB     passed in structure pointer from
inetsrv.
 *                                  int
          iTermId   client browser terminal id
 *
 */

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

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

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

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

/* FUNCTION: ProcessDeliveryForm
 *
 * PURPOSE:         This function gets and validates the input data from the delivery form
 *                          filling in the required input variables. It then calls the
PostDeliveryInfo
 *                          Api, The client is then informed that the transaction has been
posted.
 *
 * ARGUMENTS:       EXTENSION_CONTROL_BLOCK       *pECB     passed in structure pointer from
inetsrv.
 *                                  int
          iTermId   client browser terminal id
 *
 */

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

          PDELIVERY_DATA      pDelivery;

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

```
        pDelivery->w_id = Term.pClientData[iTermId].w_id;

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

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

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

/* FUNCTION: ProcessStockLevelForm
 *
 * PURPOSE:         This function gets and validates the input data from the Stock Level
 *                          form filling in the required input variables. It then calls the
 *                          SQLStockLevel transaction, constructs the output form and writes
it
 *                          back to client browser.
 *
 * ARGUMENTS:       EXTENSION_CONTROL_BLOCK       *pECB     passed in structure pointer from
inetsrv.
 *                                  int
 *          iTermId   client browser terminal id
 *
 */

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

        PSTOCK_LEVEL_DATA   pStockLevel;

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

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

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

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

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

/* FUNCTION: GetNewOrderData
 *
 * PURPOSE:         This function extracts and validates the new order form data from an http
command string.
 *
 * ARGUMENTS:       LPSTR                           lpszQueryString              client browser
http command string
 *                                      NEW_ORDER_DATA      *pNewOrderData
        pointer to new order data structure
 *
 */

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

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

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

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

                        ol_i_id = pNewOrderData->OL[items].ol_i_id =
```

```
                                        GetIntKeyValue(&ptr, szIID[i],
ERR_NEWORDER_MISSING_IID_KEY, ERR_NEWORDER_ITEMID_INVALID);
                                if ( ol_i_id > 999999 || ol_i_id < 1 )
                                        throw new CWEBCLNT_ERR( ERR_NEWORDER_ITEMID_RANGE );

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

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

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

                pNewOrderData->o_ol_cnt = items;
}

/* FUNCTION: GetPaymentData
 *
 * PURPOSE:         This function extracts and validates the payment form data from an http
command string.
 *
 * ARGUMENTS:       LPSTR                   lpszQueryString             client browser
http command string
 *                                      PAYMENT_DATA        *pPaymentData
                pointer to payment data structure
 */

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

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

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

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

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

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

/* FUNCTION: GetOrderStatusData
 *
 * PURPOSE:         This function extracts and validates the payment form data from an http
command string.
 *
 */
void GetOrderStatusData(LPSTR lpszQueryString, ORDER_STATUS_DATA *pOrderStatusData)
{
```

```
        char    szTmp[26];
        char    *ptr = lpszQueryString;

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

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

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

}

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

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

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

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

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

        if ( *ptr == 0 )
                return FALSE;

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

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

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

        *dotptr = '.';  // replace decimal point
        return bValid;
}
```

isapi_dll/src/resource.h

```
//{{NO_DEPENDENCIES}}
// Microsoft Developer Studio generated include file.
```

APPENDIX A - APPLICATION SOURCE CODE

```
// 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
```

common/src/ReadRegistry.h

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

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

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

//This structure defines the data necessary to keep distinct for each terminal or client
connection.
typedef struct _TPCCREGISTRYDATA
{
          enum DBPROTOCOL eDB_Protocol;
          enum TXNMON eTxnMon;
          BOOL bCOM_SinglePool;
          DWORD dwMaxConnections;
          DWORD dwMaxPendingDeliveries;
          DWORD dwNumberOfDeliveryThreads;
          char szPath[128];
          char szDbServer[32];
          char szDbName[32];
          char szDbUser[32];
          char szDbPassword[32];
} TPCCREGISTRYDATA, *PTPCCREGISTRYDATA;

BOOL ReadTPCCRegistrySettings( TPCCREGISTRYDATA *pReg );
```

ReadRegistry.cpp

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


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

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

          // determine database protocol to use; may be either ODBC or DBLIB
          pReg->eDB_Protocol = Unspecified;
          size = sizeof(szTmp);
```

```
        if ( RegQueryValueEx(hKey, "DB_Protocol", 0, &type, (BYTE *)&szTmp, &size) ==
ERROR_SUCCESS )
        {
                if ( !stricmp(szTmp, szDBNames[ODBC]) )
                        pReg->eDB_Protocol = ODBC;
                else if ( !stricmp(szTmp, szDBNames[DBLIB]) )
                        pReg->eDB_Protocol = DBLIB;
        }

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

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

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

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

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

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

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

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

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

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

        RegCloseKey(hKey);

        return FALSE;
}
```

common\src\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
```

APPENDIX A - APPLICATION SOURCE CODE

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

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

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


#define ERR_TYPE_LOGIC                                                  -1
                //logic error in program; internal error
#define ERR_SUCCESS                                                     0
                //success (a non-error error)
#define ERR_BAD_ITEM_ID                                                 1
                //expected abort record in txnRecord
#define ERR_TYPE_DELIVERY_POST                                  2
        //expected delivery post failed
#define   ERR_TYPE_WEBDLL                                               3
                //tpcc web generated error
#define   ERR_TYPE_SQL                                                  4
                //sql server generated error
#define   ERR_TYPE_DBLIB                                                5
                //dblib generated error
#define   ERR_TYPE_ODBC                                                 6
                //odbc generated error
#define ERR_TYPE_SOCKET                                                 7
                //error on communication socket client rte only
#define ERR_TYPE_DEADLOCK                                       8
        //dblib and odbc only deadlock condition
#define ERR_TYPE_COM                                                    9
                //error from COM call
#define ERR_TYPE_TUXEDO                                                 10
                //tuxedo error
#define ERR_TYPE_OS                                                     11
                //operating system error
#define ERR_TYPE_MEMORY                                                 12
                //memory allocation error
#define ERR_TYPE_TPCC_ODBC                                      13
        //error from tpcc odbc txn module
#define ERR_TYPE_TPCC_DBLIB                                     14
        //error from tpcc dblib txn module
#define ERR_TYPE_DELISRV                                        15
        //delivery server error
#define ERR_TYPE_TXNLOG                                                 16
                //txn log error
#define ERR_TYPE_BCCONN                                                 17
                //Benchcraft connection class
#define ERR_TYPE_TPCC_CONN                                              18
        //Benchcraft connection class
#define ERR_TYPE_ENCINA                                                 19
                //Encina error
#define ERR_TYPE_COMPONENT                                              20
        //error from COM component

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;
```

APPENDIX A - APPLICATION SOURCE CODE

```
                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
};
```

common\src\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
```

APPENDIX A - APPLICATION SOURCE CODE

```
        EXEC_STATUS                         exec_status_code;
        char            c_last[LAST_NAME_LEN+1];
        char            c_credit[CREDIT_LEN+1];
        double          c_discount;
        double          w_tax;
        double          d_tax;
        long                        o_id;
        short                       o_commit_flag;
        TIMESTAMP_STRUCT    o_entry_d;
        short           o_all_local;
        double          total_amount;
        OL_NEW_ORDER_DATA   OL[MAX_OL_NEW_ORDER_ITEMS];
} NEW_ORDER_DATA, *PNEW_ORDER_DATA;

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

        // output params
        EXEC_STATUS                     exec_status_code;
        TIMESTAMP_STRUCT    h_date;
        char                            w_street_1[ADDRESS_LEN+1];
        char                            w_street_2[ADDRESS_LEN+1];
        char                            w_city[ADDRESS_LEN+1];
        char                            w_state[STATE_LEN+1];
        char                            w_zip[ZIP_LEN+1];
        char                            d_street_1[ADDRESS_LEN+1];
        char                            d_street_2[ADDRESS_LEN+1];
        char                            d_city[ADDRESS_LEN+1];
        char                            d_state[STATE_LEN+1];
        char                        d_zip[ZIP_LEN+1];
        char                            c_first[FIRST_NAME_LEN+1];
        char                            c_middle[MIDDLE_NAME_LEN + 1];
        char                            c_street_1[ADDRESS_LEN+1];
        char                            c_street_2[ADDRESS_LEN+1];
        char                            c_city[ADDRESS_LEN+1];
        char                            c_state[STATE_LEN+1];
        char                            c_zip[ZIP_LEN+1];
        char                            c_phone[PHONE_LEN+1];
        TIMESTAMP_STRUCT    c_since;
        char                            c_credit[CREDIT_LEN+1];
        double                          c_credit_lim;
        double                          c_discount;
        double                          c_balance;
        char                            c_data[200+1];
} PAYMENT_DATA, *PPAYMENT_DATA;

typedef struct
{
        long                            ol_i_id;
        short                           ol_supply_w_id;
        short                           ol_quantity;
        double                          ol_amount;
        TIMESTAMP_STRUCT    ol_delivery_d;
} OL_ORDER_STATUS_DATA;

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

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


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

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

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

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

        // output params
```

```
        EXEC_STATUS                     exec_status_code;
        long                            low_stock;
} STOCK_LEVEL_DATA, *PSTOCK_LEVEL_DATA;
```

common\src\txn_base.h

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

#pragma once

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

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

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

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

db_dblib_dll\src\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[] =
    {
```

APPENDIX A - APPLICATION SOURCE CODE

```
                { 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)
```

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```
                                        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);
```

APPENDIX A - APPLICATION SOURCE CODE

```
                        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;
}
```

tm_com_dll\src\tpcc_com.h

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

#pragma once

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

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

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

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

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

                int             m_hr;
                int             m_iErrorType;
                int             m_iError;

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

                int ErrorNum() {return m_hr;}

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

```
                }
};

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

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

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

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

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

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


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


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

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

tm_com_dll\src\tpcc_com.cpp

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

// needed for CoinitializeEx
#define _WIN32_WINNT 0x0400

#include <windows.h>

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

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

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

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

APPENDIX A - APPLICATION SOURCE CODE

```
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 );
}
```

tpcc_com_all\src\methods.h

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

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

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

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

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

                COMPONENT_ERROR     m_Error;
                char                        *m_szTextDetail;
                char                        *m_szErrorText;
                DWORD                       m_SystemErr;

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


static void WriteMessageToEventLog(LPTSTR lpszMsg);


////////////////////////////////////////////////////////////////////////////
// CTPCC_Common
class CTPCC_Common :
        public ITPCC,
        public IObjectControl,
```

```
        public IObjectConstruct,
        public CComObjectRootEx<CComSingleThreadModel>
{
public:
BEGIN_COM_MAP(CTPCC_Common)
        COM_INTERFACE_ENTRY(ITPCC)
        COM_INTERFACE_ENTRY(IObjectControl)
        COM_INTERFACE_ENTRY(IObjectConstruct)
END_COM_MAP()

        CTPCC_Common();
        ~CTPCC_Common();

// ITPCC
public:
        HRESULT __stdcall NewOrder(             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_DATA    StockLevel;
                        ORDER_STATUS_DATA   OrderStatus;
                } u;
        };

};

//////////////////////////////////////////////////////////////////////////
// CTPCC
class CTPCC :
        public CTPCC_Common,
        public CComCoClass<CTPCC, &CLSID_TPCC>
{
public:
DECLARE_REGISTRY_RESOURCEID(IDR_TPCC)

BEGIN_COM_MAP(CTPCC)
        COM_INTERFACE_ENTRY2(IUnknown, CComObjectRootEx)
        COM_INTERFACE_ENTRY_CHAIN(CTPCC_Common)
END_COM_MAP()

};


//////////////////////////////////////////////////////////////////////////
// CNewOrder
class CNewOrder :
        public CTPCC_Common,
        public CComCoClass<CNewOrder, &CLSID_NewOrder>
{
public:
DECLARE_REGISTRY_RESOURCEID(IDR_NEWORDER)

BEGIN_COM_MAP(CNewOrder)
        COM_INTERFACE_ENTRY2(IUnknown, CComObjectRootEx)
        COM_INTERFACE_ENTRY_CHAIN(CTPCC_Common)
END_COM_MAP()

// ITPCC
public:
//      HRESULT __stdcall NewOrder(             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\src\resource.h

```
 //{{NO_DEPENDENCIES}}
// Microsoft Developer Studio generated include file.
// Used by tpcc_com_all.rc
//
#define IDS_PROJNAME                    100
#define IDR_TPCC                        101
#define IDR_NEWORDER                    102
#define IDR_ORDERSTATUS                 103
#define IDR_PAYMENT                     104
#define IDR_STOCKLEVEL                  105

// Next default values for new objects
//
#ifdef APSTUDIO_INVOKED
#ifndef APSTUDIO_READONLY_SYMBOLS
#define _APS_NEXT_RESOURCE_VALUE        202
#define _APS_NEXT_COMMAND_VALUE         32768
#define _APS_NEXT_CONTROL_VALUE         201
#define _APS_NEXT_SYMED_VALUE           106
#endif
#endif
```

tpcc_com_all\src\tpcc_com_all.cpp

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

#define STRICT
#define _WIN32_WINNT 0x0400
#define _ATL_APARTMENT_THREADED

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

#include <atlcom.h>
```

APPENDIX A - APPLICATION SOURCE CODE

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

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

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


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


CComModule _Module;

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


// configuration settings from registry
TPCCREGISTRYDATA    Reg;
char                                szMyComputerName[MAX_COMPUTERNAME_LENGTH+1];

static  HINSTANCE hLibInstanceDb = NULL;

TYPE_CTPCC_DBLIB    *pCTPCC_DBLIB_new;
TYPE_CTPCC_ODBC             *pCTPCC_ODBC_new;


////////////////////////////////////////////////////////////////////////////
// DLL Entry Point

extern "C"
BOOL WINAPI DllMain(HINSTANCE hInstance, DWORD dwReason, LPVOID /*lpReserved*/)
{
          char szDllName[128];

          try
          {
                    if (dwReason == DLL_PROCESS_ATTACH)
                    {
                              _Module.Init(ObjectMap, hInstance);
                              DisableThreadLibraryCalls(hInstance);

                              DWORD dwSize = MAX_COMPUTERNAME_LENGTH+1;
                              GetComputerName(szMyComputerName, &dwSize);
                              szMyComputerName[dwSize] = 0;

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

                              if (Reg.eDB_Protocol == DBLIB)
                              {
                                        strcpy( szDllName, Reg.szPath );
                                        strcat( szDllName, "tpcc_dblib.dll");
                                        hLibInstanceDb = LoadLibrary( szDllName );
                                        if (hLibInstanceDb == NULL)
                                                  throw new CCOMPONENT_ERR(
ERR_LOADDLL_FAILED, szDllName, GetLastError() );

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

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

```
                else if (dwReason == DLL_PROCESS_DETACH)
                        _Module.Term();

        }
        catch (CBaseErr *e)
        {
                WriteMessageToEventLog(e->ErrorText());
                delete e;
                return FALSE;
        }
        catch (...)
        {
                WriteMessageToEventLog(TEXT("Unhandled exception in object DllMain"));
                return FALSE;
        }

        return TRUE;        // OK
}

/////////////////////////////////////////////////////////////////////////////
// Used to determine whether the DLL can be unloaded by OLE

STDAPI DllCanUnloadNow(void)
{
        return (_Module.GetLockCount()==0) ? S_OK : S_FALSE;
}

/////////////////////////////////////////////////////////////////////////////
// Returns a class factory to create an object of the requested type

STDAPI DllGetClassObject(REFCLSID rclsid, REFIID riid, LPVOID* ppv)
{
        return _Module.GetClassObject(rclsid, riid, ppv);
}

/////////////////////////////////////////////////////////////////////////////
// DllRegisterServer - Adds entries to the system registry

STDAPI DllRegisterServer(void)
{
        // registers object, typelib and all interfaces in typelib
        return _Module.RegisterServer(TRUE);
}

/////////////////////////////////////////////////////////////////////////////
// DllUnregisterServer - Removes entries from the system registry

STDAPI DllUnregisterServer(void)
{
        _Module.UnregisterServer();
        return S_OK;
}


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

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

    _stprintf(szMsg, TEXT("Error in COM+ TPC-C Component: "));
    lpszStrings[0] = szMsg;
    lpszStrings[1] = lpszMsg;

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

        (VOID) DeregisterEventSource(hEventSource);
    }
}

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

/* FUNCTION: CCOMPONENT_ERR::ErrorText
 *
 */

char* CCOMPONENT_ERR::ErrorText(void)
{
          static SERRORMSG errorMsgs[] =
          {
                  { ERR_MISSING_REGISTRY_ENTRIES,         "Required entries missing from
registry."                                              },
                  { ERR_LOADDLL_FAILED,                           "Load of DLL failed.
DLL="                                                                   },
                  { ERR_GETPROCADDR_FAILED,               "Could not map proc in DLL.
GetProcAddr error.  DLL="     },
                  { ERR_UNKNOWN_DB_PROTOCOL,              "Unknown database protocol
specified in registry."                 },
```

APPENDIX A - APPLICATION SOURCE CODE

```
                { 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\src\tpcc_com_all.def

```
; tpcc_com_all.def : Declares the module parameters.

LIBRARY      "tpcc_com_all.dll"

EXPORTS
        DllCanUnloadNow     @1 PRIVATE
        DllGetClassObject   @2 PRIVATE
        DllRegisterServer   @3 PRIVATE
        DllUnregisterServer @4 PRIVATE
```

tpcc_com_all\src\tpcc_com_all.h

```
#pragma warning( disable: 4049 )  /* more than 64k source lines */

/* this ALWAYS GENERATED file contains the definitions for the interfaces */


 /* File created by MIDL compiler version 5.03.0280 */
/* at Mon Jan 24 20:00:20 2000
 */
/* Compiler settings for .\src\tpcc_com_all.idl:
    Oicf (OptLev=i2), W1, Zp8, env=Win32 (32b run), ms_ext, c_ext
    error checks: allocation ref bounds_check enum stub_data
    VC __declspec() decoration level:
         __declspec(uuid()), __declspec(selectany), __declspec(novtable)
         DECLSPEC_UUID(), MIDL_INTERFACE()
*/
//@@MIDL_FILE_HEADING(  )


/* verify that the <rpcndr.h> version is high enough to compile this file*/
#ifndef __REQUIRED_RPCNDR_H_VERSION__
#define __REQUIRED_RPCNDR_H_VERSION__ 440
#endif

#include "rpc.h"
#include "rpcndr.h"

#ifndef __tpcc_com_all_h__
#define __tpcc_com_all_h__

/* Forward Declarations */

#ifndef __TPCC_FWD_DEFINED__
#define __TPCC_FWD_DEFINED__

#ifdef __cplusplus
typedef class TPCC TPCC;
#else
typedef struct TPCC TPCC;
#endif /* __cplusplus */

#endif    /* __TPCC_FWD_DEFINED__ */


#ifndef __NewOrder_FWD_DEFINED__
#define __NewOrder_FWD_DEFINED__

#ifdef __cplusplus
typedef class NewOrder NewOrder;
#else
typedef struct NewOrder NewOrder;
#endif /* __cplusplus */
```

APPENDIX A - APPLICATION SOURCE CODE

```
#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
```

pcc_com_all\src\tpcc_com_all.idl

```
/*        FILE:              TPCC.IDL
 *                                   Microsoft TPC-C Kit Ver. 4.20.000
 *                                   Copyright Microsoft, 1999
 *              All Rights Reserved
 *
 *                                   not yet audited
 *
 *        PURPOSE:  IDL source for TPCC.dll.  This file is processed by the MIDL tool to
 *                                   produce the type library (TPCC.tlb) and marshalling
code.
 *
 *  Change history:
 *                  4.20.000 - first version
 */

interface TPCC;
interface NewOrder;
interface OrderStatus;
interface Payment;
interface StockLevel;


import "oaidl.idl";
import "ocidl.idl";
import "..\tpcc_com_ps\src\tpcc_com_ps.idl";

[
         uuid(122A3117-2520-11D3-BA71-00C04FBFE08B),
         version(1.0),
         helpstring("TPC-C 1.0 Type Library")
]
library TPCCLib
{
         importlib("stdole32.tlb");
         importlib("stdole2.tlb");

         [
                  uuid(122A3128-2520-11D3-BA71-00C04FBFE08B),
                  helpstring("All Txns Class")
         ]
         coclass TPCC
         {
                  [default] interface ITPCC;
         };


         [
                  uuid(975BAABF-84A7-11D2-BA47-00C04FBFE08B),
                  helpstring("NewOrder Class")
         ]
         coclass NewOrder
         {
                  [default] interface ITPCC;
         };


         [
                  uuid(266836AD-A50D-11D2-BA4E-00C04FBFE08B),
                  helpstring("OrderStatus Class")
         ]
         coclass OrderStatus
         {
                  [default] interface ITPCC;
         };


         [
                  uuid(CD02F7EF-A4FA-11D2-BA4E-00C04FBFE08B),
                  helpstring("Payment Class")
         ]
         coclass Payment
         {
                  [default] interface ITPCC;
         };
         [
                  uuid(2668369E-A50D-11D2-BA4E-00C04FBFE08B),
                  helpstring("StockLevel Class")
         ]
         coclass StockLevel
         {
                  [default] interface ITPCC;
         };
};
```

tpcc_com_all\src\tpcc_com_all.rc

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

#define APSTUDIO_READONLY_SYMBOLS
////////////////////////////////////////////////////////////////////////////
//
// Generated from the TEXTINCLUDE 2 resource.
```

APPENDIX A - APPLICATION SOURCE CODE

```
//
#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

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
/////////////////////////////////////////////////////////////////////////////
```

APPENDIX A - APPLICATION SOURCE CODE

```
//
// Generated from the TEXTINCLUDE 3 resource.
//
1 TYPELIB "tpcc_com_all.tlb"

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

tpcc_common_all\src\tpcc_com_all.rgs

```
HKCR
{
          TPCC.AllTxns.1 = s 'All Txns Class'
          {
                    CLSID = s '{122A3128-2520-11D3-BA71-00C04FBFE08B}'
          }
          TPCC.AllTxns = s 'TPCC Class'
          {
                    CurVer = s 'TPCC.AllTxns.1'
          }
          NoRemove CLSID
          {
                    ForceRemove {122A3128-2520-11D3-BA71-00C04FBFE08B} = s 'TPCC Class'
                    {
                              ProgID = s 'TPCC.AllTxns.1'
                              VersionIndependentProgID = s 'TPCC.AllTxns'
                              InprocServer32 = s '%MODULE%'
                              {
                                        val ThreadingModel = s 'Both'
                              }
                    }
          }
}
```

tpcc_common_all\src\tpcc_com_all_i.c

```
#pragma warning( disable: 4049 )  /* more than 64k source lines */

/* this ALWAYS GENERATED file contains the IIDs and CLSIDs */

/* link this file in with the server and any clients */


 /* File created by MIDL compiler version 5.02.0235 */
/* 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_
```

APPENDIX A - APPLICATION SOURCE CODE

```
MIDL_DEFINE_GUID(IID,
LIBID_TPCCLib,0x122A3117,0x2520,0x11D3,0xBA,0x71,0x00,0xC0,0x4F,0xBF,0xE0,0x8B);


MIDL_DEFINE_GUID(CLSID,
CLSID_TPCC,0x122A3128,0x2520,0x11D3,0xBA,0x71,0x00,0xC0,0x4F,0xBF,0xE0,0x8B);


MIDL_DEFINE_GUID(CLSID,
CLSID_NewOrder,0x975BAABF,0x84A7,0x11D2,0xBA,0x47,0x00,0xC0,0x4F,0xBF,0xE0,0x8B);


MIDL_DEFINE_GUID(CLSID,
CLSID_OrderStatus,0x266836AD,0xA50D,0x11D2,0xBA,0x4E,0x00,0xC0,0x4F,0xBF,0xE0,0x8B);


MIDL_DEFINE_GUID(CLSID,
CLSID_Payment,0xCD02F7EF,0xA4FA,0x11D2,0xBA,0x4E,0x00,0xC0,0x4F,0xBF,0xE0,0x8B);


MIDL_DEFINE_GUID(CLSID,
CLSID_StockLevel,0x2668369E,0xA50D,0x11D2,0xBA,0x4E,0x00,0xC0,0x4F,0xBF,0xE0,0x8B);

#undef MIDL_DEFINE_GUID

#ifdef __cplusplus
}
#endif

#endif /* !defined(_M_IA64) && !defined(_M_AXP64)*/


#pragma warning( disable: 4049 )  /* more than 64k source lines */

/* this ALWAYS GENERATED file contains the IIDs and CLSIDs */

/* link this file in with the server and any clients */


 /* File created by MIDL compiler version 5.02.0235 */
/* 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,0xE0,0x8B);


MIDL_DEFINE_GUID(CLSID,
CLSID_Payment,0xCD02F7EF,0xA4FA,0x11D2,0xBA,0x4E,0x00,0xC0,0x4F,0xBF,0xE0,0x8B);


MIDL_DEFINE_GUID(CLSID,
CLSID_StockLevel,0x2668369E,0xA50D,0x11D2,0xBA,0x4E,0x00,0xC0,0x4F,0xBF,0xE0,0x8B);

#undef MIDL_DEFINE_GUID

#ifdef __cplusplus
}
#endif

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

tpcc_common_all\src\tpcc_com_no.rgs

```
HKCR
{
          TPCC.NewOrder.1 = s 'NewOrder Class'
          {
                    CLSID = s '{975BAABF-84A7-11D2-BA47-00C04FBFE08B}'
          }
          TPCC.NewOrder = s 'NewOrder Class'
          {
                    CurVer = s 'TPCC.NewOrder.1'
          }
          NoRemove CLSID
          {
                    ForceRemove {975BAABF-84A7-11D2-BA47-00C04FBFE08B} = s 'NewOrder Class'
                    {
                              ProgID = s 'TPCC.NewOrder.1'
                              VersionIndependentProgID = s 'TPCC.NewOrder'
                              InprocServer32 = s '%MODULE%'
                              {
                                        val ThreadingModel = s 'Both'
                              }
                    }
          }
}
```

tpcc_common_all\src\tpcc_com_os.rgs

```
HKCR
{
          TPCC.OrderStatus.1 = s 'OrderStatus Class'
          {
                    CLSID = s '{266836AD-A50D-11D2-BA4E-00C04FBFE08B}'
          }
          TPCC.OrderStatus = s 'OrderStatus Class'
          {
                    CurVer = s 'TPCC.OrderStatus.1'
          }
          NoRemove CLSID
          {
                    ForceRemove {266836AD-A50D-11D2-BA4E-00C04FBFE08B} = s 'OrderStatus Class'
                    {
                              ProgID = s 'TPCC.OrderStatus.1'
                              VersionIndependentProgID = s 'TPCC.OrderStatus'
                              InprocServer32 = s '%MODULE%'
                              {
                                        val ThreadingModel = s 'Both'
                              }
                    }
          }
}
```

tpcc_common_all\src\tpcc_com_ps.h

```
#pragma warning( disable: 4049 )  /* more than 64k source lines */

/* this ALWAYS GENERATED file contains the definitions for the interfaces */


 /* File created by MIDL compiler version 5.02.0235 */
/* 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"
```

APPENDIX A - APPLICATION SOURCE CODE

```
#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_common_all\src\tpcc_com_pay.rgs

```
HKCR
{
        TPCC.Payment.1 = s 'Payment Class'
        {
                CLSID = s '{CD02F7EF-A4FA-11D2-BA4E-00C04FBFE08B}'
        }
        TPCC.Payment = s 'Payment Class'
        {
                CurVer = s 'TPCC.Payment.1'
        }
        NoRemove CLSID
        {
                ForceRemove {CD02F7EF-A4FA-11D2-BA4E-00C04FBFE08B} = s 'Payment Class'
                {
                        ProgID = s 'TPCC.Payment.1'
                        VersionIndependentProgID = s 'TPCC.Payment'
                        InprocServer32 = s '%MODULE%'
                        {
                                val ThreadingModel = s 'Both'
                        }
                }
        }
}
```

tpcc_common_all\src\tpcc_com_sl.rgs

```
HKCR
{
        TPCC.StockLevel.1 = s 'StockLevel Class'
        {
                CLSID = s '{2668369E-A50D-11D2-BA4E-00C04FBFE08B}'
        }
        TPCC.StockLevel = s 'StockLevel Class'
        {
                CurVer = s 'TPCC.StockLevel.1'
        }
        NoRemove CLSID
        {
                ForceRemove {2668369E-A50D-11D2-BA4E-00C04FBFE08B} = s 'StockLevel Class'
                {
                        ProgID = s 'TPCC.StockLevel.1'
                        VersionIndependentProgID = s 'TPCC.StockLevel'
                        InprocServer32 = s '%MODULE%'
                        {
                                val ThreadingModel = s 'Both'
                        }
                }
        }
}
```

tpcc_common_ps\src\tpcc_com_ps.def

```
LIBRARY      "tpcc_com_ps"

DESCRIPTION  'Proxy/Stub DLL'

EXPORTS
        DllGetClassObject       @1    PRIVATE
        DllCanUnloadNow         @2    PRIVATE
        GetProxyDllInfo         @3    PRIVATE
        DllRegisterServer             @4        PRIVATE
        DllUnregisterServer           @5        PRIVATE
```

tpcc_common_ps\src\tpcc_com_ps.h

```
#pragma warning( disable: 4049 )  /* more than 64k source lines */

/* this ALWAYS GENERATED file contains the definitions for the interfaces */


 /* File created by MIDL compiler version 5.02.0235 */
/* 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_common_ps\src\tpcc_com_ps.idl

```
/*       FILE:              ITPCC.IDL
 *                                  Microsoft TPC-C Kit Ver. 4.20.000
 *                                  Copyright Microsoft, 1999
 *             All Rights Reserved
 *
 *                                  not yet audited
 *
 *       PURPOSE:  Defines the interface used by TPCC. This interface can be implemented by
C++ components.
 *
 *  Change history:
 *                 4.20.000 - first version
 */

// Forward declare all types defined
//interface ITPCC;
import "oaidl.idl";
import "ocidl.idl";

         [
                  object,
                  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_common_ps\src\tpcc_com_ps_i.c

```
#pragma warning( disable: 4049 )  /* more than 64k source lines */

/* this ALWAYS GENERATED file contains the IIDs and CLSIDs */

/* link this file in with the server and any clients */


 /* File created by MIDL compiler version 5.02.0235 */
/* 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_common_ps\src\tpcc_com_ps_p.c

```
#pragma warning( disable: 4049 )  /* more than 64k source lines */

/* this ALWAYS GENERATED file contains the proxy stub code */


 /* File created by MIDL compiler version 5.02.0235 */
/* 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)
```

APPENDIX A - APPLICATION SOURCE CODE

```
#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
};
```

APPENDIX A - APPLICATION SOURCE CODE

```
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 */
```

APPENDIX A - APPLICATION SOURCE CODE

```
/* 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( 0xffffffe0 ),     /* 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
```

APPENDIX A - APPLICATION SOURCE CODE

```
#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( 0xffffffe0 ),     /* 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)*/
```

tpcc_common_ps\src\dlldata.c

```
/*********************************************************
   DllData file -- generated by MIDL compiler

        DO NOT ALTER THIS FILE

   This file is regenerated by MIDL on every IDL file compile.

   To completely reconstruct this file, delete it and rerun MIDL
   on all the IDL files in this DLL, specifying this file for the
   /dlldata command line option

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


#include <rpcproxy.h>

#ifdef __cplusplus
extern "C"   {
#endif

EXTERN_PROXY_FILE( tpcc_com_ps )
```

APPENDIX A - APPLICATION SOURCE CODE

```
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
```

APPENDIX B – DATABASE DESIGN

```
@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
```

APPENDIX B – DATABASE DESIGN

```
: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.
@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. 4.21
--            Copyright Microsoft, 1999, 2000
--  Purpose:  Creates tpcc database and backup files for 10 warehouses


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                = MSSQL8O_tpcc_root,
          FILENAME  = "C:\MSSQL8O_tpcc_root.mdf",
          SIZE                = 1OMB,
          FILEGROWTH          = 0),
FILEGROUP MSSQL8O_misc_fg
(         NAME                = MSSQL8O_misc1,
          FILENAME  = "O:",
          SIZE                = 16000MB,
          FILEGROWTH          = 0),
(         NAME                = MSSQL8O_misc2,
          FILENAME  = "P:",
          SIZE                = 16000MB,
          FILEGROWTH          = 0),
(         NAME                = MSSQL8O_misc3,
          FILENAME  = "Q:",
          SIZE                = 16000MB,
          FILEGROWTH          = 0),
(         NAME                = MSSQL8O_misc4,
          FILENAME  = "R:",
          SIZE                = 16000MB,
          FILEGROWTH          = 0),
(         NAME                = MSSQL8O_misc5,
          FILENAME  = "S:",
          SIZE                = 16000MB,
          FILEGROWTH          = 0),
(         NAME                = MSSQL8O_misc6,
          FILENAME  = "T:",
          SIZE                = 16000MB,
          FILEGROWTH          = 0),
FILEGROUP MSSQL8O_cs_fg
(         NAME                = MSSQL8O_cs1,
          FILENAME  = "F:",
          SIZE                = 34000MB,
          FILEGROWTH          = 0),
(         NAME                = MSSQL8O_cs2,
          FILENAME  = "G:",
          SIZE                = 34000MB,
          FILEGROWTH          = 0),
(         NAME                = MSSQL8O_cs3,
          FILENAME  = "H:",
          SIZE                = 34000MB,
          FILEGROWTH          = 0),
(         NAME                = MSSQL8O_cs4,
          FILENAME  = "I:",
          SIZE                = 34000MB,
          FILEGROWTH          = 0),
(         NAME                = MSSQL8O_cs5,
          FILENAME  = "J:",
          SIZE                = 34000MB,
          FILEGROWTH          = 0),
(         NAME                = MSSQL8O_cs6,
          FILENAME  = "K:",
          SIZE                = 34000MB,
          FILEGROWTH          = 0)
LOG ON
(         NAME                =MSSQL8O_tpcc_log,
          FILENAME  ="E:",
          SIZE                =120000MB,
```

```
        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_1, tpccback_2, tpccback_3, tpccback_4, tpccback_5 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
```

BACKUPDEV.SQL

```
--  File:     BACKUPDEVB.SQL
--            Microsoft TPC-C Benchmark Kit Ver. 4.10
--            Copyright Microsoft, 1999
--  Purpose:  Creates tpcc database Backup Devices

use master
go

--  create backup devices
--  these are nt5 filesystem junction points

exec sp_addumpdevice 'disk','tpccback_1','V:\tpccback_1.dmp'
exec sp_addumpdevice 'disk','tpccback_2','V:\tpccback_2.dmp'
exec sp_addumpdevice 'disk','tpccback_3','W:\tpccback_3.dmp'
exec sp_addumpdevice 'disk','tpccback_4','W:\tpccback_4.dmp'
exec sp_addumpdevice 'disk','tpccback_5','W:\tpccback_5.dmp'

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_1, tpccback_2, tpccback_3, tpccback_4, tpccback_5 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. 4.21
--            Copyright Microsoft, 1999, 2000
--  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 MSSQL8O_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. 4.21
--            Copyright Microsoft, 1999,2000
--  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 MSSQL8O_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. 4.21
--            Copyright Microsoft, 1999, 2000
--  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 MSSQL8O_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. 4.21
--            Copyright Microsoft, 1999, 2000
--  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 MSSQL8O_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. 4.21
--            Copyright Microsoft, 1999, 2000
--  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 MSSQL8O_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. 4.21
--            Copyright Microsoft, 1999, 2000
--  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 MSSQL8O_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. 4.21
--            Copyright Microsoft, 1999, 2000
--  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 MSSQL8O_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. 4.21
--            Copyright Microsoft, 1999, 2000
--  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 MSSQL80_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. 4.21
--            Copyright Microsoft, 1999, 2000
--  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 MSSQL80_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. 4.21
--            Copyright Microsoft, 1999, 2000
--  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 MSSQL80_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. 4.21
--            Copyright Microsoft, 1999, 2000
--  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. 4.21
--            Copyright Microsoft, 1999, 2000
--  Purpose:  Resets database options after data load

sp_dboption tpcc,'select into/bulkcopy',FALSE
GO

sp_dboption tpcc,'trunc. log on chkpt.',FALSE
GO

USE tpcc
GO

CHECKPOINT
GO

sp_configure 'allow updates',1
GO

RECONFIGURE WITH OVERRIDE
GO

DECLARE   @msg                varchar(50)

IF (SELECT (SUBSTRING((SELECT @@version),1,25))) = 'Microsoft SQL Server 2000'
         BEGIN
                  --                                                --
                  --        OPTIONS FOR SQL SERVER 8.0              --
                  -- Set option values for user-defined indexes --
                  --                                                --

                  SET       @msg      = ' '
                  PRINT     @msg                                    --
                  SET       @msg      = 'Setting SQL Server 8.0 indexoptions'
                  PRINT     @msg

                  SET       @msg      = ' '
                  PRINT     @msg                                    --

                  EXEC sp_indexoption 'customer',         'DisAllowPageLocks',          TRUE
                  EXEC sp_indexoption 'district',         'DisAllowPageLocks',          TRUE
                  EXEC sp_indexoption 'warehouse',        'DisAllowPageLocks',          TRUE
                  EXEC sp_indexoption 'stock',  'DisAllowPageLocks',          TRUE
                  EXEC sp_indexoption 'order_line',       'DisAllowRowLocks', TRUE
                  EXEC sp_indexoption 'orders', 'DisAllowRowLocks', TRUE
                  EXEC sp_indexoption 'new_order',        'DisAllowRowLocks', TRUE
                  EXEC sp_indexoption 'item',             'DisAllowRowLocks', TRUE
                  EXEC sp_indexoption 'item',             'DisAllowPageLocks',          TRUE
         END
ELSE
         BEGIN
                  --                                                --
                  --        OPTIONS FOR SQL SERVER 7.0              --
                  -- Set option values for user-defined indexes --
                  --

                  SET       @msg      = ' '
                  PRINT     @msg                                    --
                  SET       @msg      = 'Setting SQL Server 7.0 indexoptions'
                  PRINT     @msg
                  SET       @msg      = ' '
                  PRINT     @msg                                    --

                  EXEC sp_indexoption 'customer',         'AllowPageLocks',   FALSE
                  EXEC sp_indexoption 'district',         'AllowPageLocks',   FALSE
                  EXEC sp_indexoption 'warehouse',        'AllowPageLocks',   FALSE
                  EXEC sp_indexoption 'stock',  'AllowPageLocks',   FALSE
                  EXEC sp_indexoption 'order_line',       'AllowRowLocks',    FALSE
                  EXEC sp_indexoption 'orders', 'AllowRowLocks',    FALSE
                  EXEC sp_indexoption 'new_order',        'AllowRowLocks',    FALSE
                  EXEC sp_indexoption 'item',             'AllowRowLocks',    FALSE
                  EXEC sp_indexoption 'item',             'AllowPageLocks',   FALSE

         END
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 updates',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

table.SQL

```
--  File:     TABLES.SQL
--            Microsoft TPC-C Benchmark Kit Ver. 4.21
--            Copyright Microsoft, 1999, 2000
--  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 MSSQL80_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 MSSQL80_misc_fg
go
```

APPENDIX B – DATABASE DESIGN

```
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 MSSQL80_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 MSSQL80_misc_fg
go

create table new_order
(
        no_o_id                 int,
        no_d_id                 tinyint,
        no_w_id                 smallint
) on MSSQL80_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 MSSQL80_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 MSSQL80_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 MSSQL80_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 MSSQL80_cs_fg
go
```

B.5 Stored Procedures

NEWORD.SQL

```
--  File:     NEWORD.SQL
--            Microsoft TPC-C Benchmark Kit Ver. 4.21.000
--            Copyright Microsoft, 1999, 2000
--  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,
                                          @o_ol_cnt       tinyint,
                                          @o_all_local    tinyint,
                                          @i_id1  int = 0, @s_w_id1  smallint = 0,
@ol_qty1  smallint = 0,
                                          @i_id2  int = 0, @s_w_id2  smallint = 0,
@ol_qty2  smallint = 0,
                                          @i_id3  int = 0, @s_w_id3  smallint = 0,
@ol_qty3  smallint = 0,
                                          @i_id4  int = 0, @s_w_id4  smallint = 0,
@ol_qty4  smallint = 0,
                                          @i_id5  int = 0, @s_w_id5  smallint = 0,
@ol_qty5  smallint = 0,
                                          @i_id6  int = 0, @s_w_id6  smallint = 0,
@ol_qty6  smallint = 0,
                                          @i_id7  int = 0, @s_w_id7  smallint = 0,
@ol_qty7  smallint = 0,
                                          @i_id8  int = 0, @s_w_id8  smallint = 0,
@ol_qty8  smallint = 0,
                                          @i_id9  int = 0, @s_w_id9  smallint = 0,
@ol_qty9  smallint = 0,
                                          @i_id10 int = 0, @s_w_id10 smallint = 0,
@ol_qty10 smallint = 0,
                                          @i_id11 int = 0, @s_w_id11 smallint = 0,
@ol_qty11 smallint = 0,
                                          @i_id12 int = 0, @s_w_id12 smallint = 0,
@ol_qty12 smallint = 0,
                                          @i_id13 int = 0, @s_w_id13 smallint = 0,
@ol_qty13 smallint = 0,
                                          @i_id14 int = 0, @s_w_id14 smallint = 0,
@ol_qty14 smallint = 0,
                                          @i_id15 int = 0, @s_w_id15 smallint = 0,
@ol_qty15 smallint = 0


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

begin

begin transaction n

--  get district tax and next availible order id and update
--  plus initialize local variables

          update    district
          set       @d_tax       = d_tax,
                    @o_id        = d_next_o_id,
                    d_next_o_id  = d_next_o_id + 1,
                    @o_entry_d   = getdate(),
                    @li_no       = 0,
                    @commit_flag = 1
          where     d_w_id       = @w_id and
                    d_id         = @d_id

--  process orderlines

          while (@li_no < @o_ol_cnt)
          begin

                    select @li_no = @li_no + 1
```

```
--  set i_id, s_w_id, and qty for this lineitem

                    select    @li_id = case @li_no
                                       when 1 then @i_id1
                                       when 2 then @i_id2
                                       when 3 then @i_id3
                                       when 4 then @i_id4
                                       when 5 then @i_id5
                                       when 6 then @i_id6
                                       when 7 then @i_id7
                                       when 8 then @i_id8
                                       when 9 then @i_id9
                                       when 10 then @i_id10
                                       when 11 then @i_id11
                                       when 12 then @i_id12
                                       when 13 then @i_id13
                                       when 14 then @i_id14
                                       when 15 then @i_id15
                                       end,

                              @li_s_w_id = case @li_no
                                           when 1 then @s_w_id1
                                           when 2 then @s_w_id2
                                           when 3 then @s_w_id3
                                           when 4 then @s_w_id4
                                           when 5 then @s_w_id5
                                           when 6 then @s_w_id6
                                           when 7 then @s_w_id7
                                           when 8 then @s_w_id8
                                           when 9 then @s_w_id9
                                           when 10 then @s_w_id10
                                           when 11 then @s_w_id11
                                           when 12 then @s_w_id12
                                           when 13 then @s_w_id13
                                           when 14 then @s_w_id14
                                           when 15 then @s_w_id15
                                           end,

                              @li_qty = case  @li_no
                                        when 1 then @ol_qty1
                                        when 2 then @ol_qty2
                                        when 3 then @ol_qty3
                                        when 4 then @ol_qty4
                                        when 5 then @ol_qty5
                                        when 6 then @ol_qty6
                                        when 7 then @ol_qty7
                                        when 8 then @ol_qty8
                                        when 9 then @ol_qty9
                                        when 10 then @ol_qty10
                                        when 11 then @ol_qty11
                                        when 12 then @ol_qty12
                                        when 13 then @ol_qty13
                                        when 14 then @ol_qty14
                                        when 15 then @ol_qty15
                                        end

--  get item data (no one updates item)

                    select    @i_price = i_price,
                              @i_name  = i_name,
                              @i_data  = i_data
                    from      item (tablock repeatableread)
                    where     i_id = @li_id

--  update stock values

                    update    stock
                    set       s_ytd              = s_ytd + @li_qty,
                              @s_quantity        = s_quantity   = s_quantity - @li_qty +
                                                                  case when (s_quantity -
@li_qty < 10) then 91 else 0 end,
                              s_order_cnt        = s_order_cnt + 1,
                              s_remote_cnt       = s_remote_cnt + case when (@li_s_w_id =
@w_id) then 0 else 1 end,
                              @s_data            = s_data,
                              @s_dist            = case @d_id
                                                   when 1  then s_dist_01
                                                   when 2  then s_dist_02
                                                   when 3  then s_dist_03
                                                   when 4  then s_dist_04
                                                   when 5  then s_dist_05
                                                   when 6  then s_dist_06
                                                   when 7  then s_dist_07
                                                   when 8  then s_dist_08
                                                   when 9  then s_dist_09
                                                   when 10 then s_dist_10
                                                   end
                    where     s_i_id             = @li_id and
                              s_w_id             = @li_s_w_id

--  if there actually is a stock (and item) with these ids, go to work

                    if (@@rowcount > 0)
                    begin

--  insert order_line data (using data from item and stock)

                              insert into order_line values(@o_id,
                                                            @d_id,
                                                            @w_id,
                                                            @li_no,
                                                            @li_id,
                                                            @li_s_w_id,
                                                            "dec 31, 1899",
                                                            @li_qty,
                                                            @i_price * @li_qty,
                                                            @s_dist)

--  send line-item data to client
```

```
                        select    @i_name,
                                  @s_quantity,
                                  b_g = case when ( (patindex("%ORIGINAL%",@i_data) > 0)
and
                                                        (patindex("%ORIGINAL%",@s_data)
> 0) )
                                       then "B" else "G" end,
                                  @i_price,
                                  @i_price * @li_qty

                end
                else
                begin

--  no item (or stock) found - triggers rollback condition

                        select "",0,"",0,0
                        select @commit_flag = 0

                end
        end

--  get customer last name, discount, and credit rating

        select    @c_last     = c_last,
                  @c_discount = c_discount,
                  @c_credit   = c_credit,
                  @c_id_local = c_id
        from      customer (repeatableread)
        where     c_id                = @c_id and
                  c_w_id              = @w_id and
                  c_d_id              = @d_id

--  insert fresh row into orders table

        insert into orders values (   @o_id,
                                      @d_id,
                                      @w_id,
                                      @c_id_local,
                                      @o_entry_d,
                                      0,
                                      @o_ol_cnt,
                                      @o_all_local)

--  insert corresponding row into new-order table

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

--  select warehouse tax

        select    @w_tax    = w_tax
        from      warehouse (repeatableread)
        where     w_id      = @w_id

        if (@commit_flag = 1)
                commit transaction n
        else

--  all that work for nuthin!!!

                rollback transaction n

--  return order data to client

        select    @w_tax,
                  @d_tax,
                  @o_id,
                  @c_last,
                  @c_discount,
                  @c_credit,
                  @o_entry_d,
                  @commit_flag

end

go
```

DELIVERY.SQL

```
--  File:     DELIVERY.SQL
--            Microsoft TPC-C Benchmark Kit Ver. 4.21.000
--            Copyright Microsoft, 1999, 2000
--  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. 4.21.000
--            Copyright Microsoft, 1999, 2000
--  Purpose:  Creates order status transaction stored procedure
--
--        Interface Level: 4.10.000
```

APPENDIX B – DATABASE DESIGN

```
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. 4.21.000
--            Copyright Microsoft, 1999, 2000
--  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. 4.21.000
--            Copyright Microsoft, 1999, 2000
--  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. 4.21
//                                   Copyright Microsoft, 1996, 1997, 1998, 1999, 2000
//        Purpose:  Header file for TPC-C database loader


// Build number of TPC Benchmark Kit
#define TPCKIT_VER  "4.21"

// 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
```

APPENDIX B – DATABASE DESIGN

```
#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
```

APPENDIX B – DATABASE DESIGN

```
//                                  Microsoft TPC-C Kit Ver. 4.21
//                                  Copyright Microsoft, 1996, 1997, 1998, 1999, 2000
//        Purpose:  Source file for TPC-C database loader


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

// Defines
#define MAXITEMS                100000
#define MAXITEMS_SCALE_DOWN             100
#define CUSTOMERS_PER_DISTRICT  3000
#define CUSTOMERS_SCALE_DOWN  30
#define DISTRICT_PER_WAREHOUSE  10
#define ORDERS_PER_DISTRICT     3000
#define ORDERS_SCALE_DOWN       30
#define MAX_CUSTOMER_THREADS    2
#define MAX_ORDER_THREADS       3
#define MAX_MAIN_THREADS        4

// Functions declarations

void HandleErrorDBC (SQLHDBC  hdbc1);

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                                      c_balance;
          char                                  c_balance[6];

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

typedef struct
{
          char                                  c_last[LAST_NAME_LEN+1];
```

APPENDIX B – DATABASE DESIGN

```
        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 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;
    char  w_name[W_NAME_LEN+1];
    char  w_street_1[ADDRESS_LEN+1];
    char  w_street_2[ADDRESS_LEN+1];
    char  w_city[ADDRESS_LEN+1];
    char  w_state[STATE_LEN+1];
    char  w_zip[ZIP_LEN+1];
    double          w_tax;
    double          w_ytd;
          char      name[20];
          long      time_start;
          RETCODE   rc;
          DBINT     rcint;
          char      bcphint[128];


          // Seed with unique number
          seed(2);

          printf("Loading warehouse table...\n");

          // if build index before load...
          if ((aptr->build_index == 1) && (aptr->index_order == 1))
                  BuildIndex("idxwarcl");

          InitString(w_name, W_NAME_LEN+1);
          InitAddress(w_street_1, w_street_2, w_city, w_state, w_zip);

          sprintf(name, "%s..%s", aptr->database, "warehouse");

          rc = bcp_init(w_hdbc1, name, NULL, "logs\\whouse.err", DB_IN);
          if (rc != SUCCEED)
                  HandleErrorDBC(w_hdbc1);

          if ((aptr->build_index == 1) && (aptr->index_order == 1))
          {
                  sprintf(bcphint, "tablock, order (w_id), ROWS_PER_BATCH = %d", aptr-
>num_warehouses);
                  rc = bcp_control(w_hdbc1, BCPHINTS, (void*) bcphint);
                  if (rc != SUCCEED)
                          HandleErrorDBC(w_hdbc1);
          }

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

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

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

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

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

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

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

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

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

        time_start = (TimeNow() / MILLI);

        warehouse_rows_loaded = 0;

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

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

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

                w_ytd = 300000.00;

                rc = bcp_sendrow(w_hdbc1);
                if (rc != SUCCEED)
                        HandleErrorDBC(w_hdbc1);

                warehouse_rows_loaded++;
                CheckForCommit(w_hdbc1, i_hstmt1, warehouse_rows_loaded, "warehouse",
&time_start);
        }

        rcint = bcp_done(w_hdbc1);
        if (rcint < 0)
                HandleErrorDBC(w_hdbc1);

        printf("Finished loading warehouse table.\n");

        // if build index after load...
        if ((aptr->build_index == 1) && (aptr->index_order == 0))
                BuildIndex("idxwarcl");

        stock_rows_loaded = 0;
        district_rows_loaded = 0;

        District();
        Stock();

}


//==============================================================================
```

```
//
// Function   : District
//
//==============================================================================

void District()
{
    short d_id;
    short d_w_id;
    char  d_name[D_NAME_LEN+1];
    char  d_street_1[ADDRESS_LEN+1];
    char  d_street_2[ADDRESS_LEN+1];
    char  d_city[ADDRESS_LEN+1];
    char  d_state[STATE_LEN+1];
    char  d_zip[ZIP_LEN+1];
    double          d_tax;
    double          d_ytd;
          char      name[20];
    long  d_next_o_id;
          long      time_start;
          int               w_id;
          RETCODE   rc;
          DBINT     rcint;
          char      bcphint[128];

          // Seed with unique number
          seed(4);

          printf("Loading district table...\n");

          // build index before load
          if ((aptr->build_index == 1) && (aptr->index_order == 1))
                  BuildIndex("idxdiscl");

          InitString(d_name, D_NAME_LEN+1);
          InitAddress(d_street_1, d_street_2, d_city, d_state, d_zip);
          sprintf(name, "%s..%s", aptr->database, "district");

          rc = bcp_init(w_hdbc1, name, NULL, "logs\\district.err", DB_IN);
          if (rc != SUCCEED)
                  HandleErrorDBC(w_hdbc1);

          if ((aptr->build_index == 1) && (aptr->index_order == 1))
          {
                  sprintf(bcphint, "tablock, order (d_w_id, d_id), ROWS_PER_BATCH = %u",
(aptr->num_warehouses * 10));
                  rc = bcp_control(w_hdbc1, BCPHINTS, (void*) bcphint);
                  if (rc != SUCCEED)
                          HandleErrorDBC(w_hdbc1);
          }

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

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

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

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

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

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

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

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

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

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

        rc = bcp_bind(w_hdbc1, (BYTE *) &d_next_o_id, 0, SQL_VARLEN_DATA, NULL, 0, SQLINT4,
11);
        if (rc != SUCCEED)
                HandleErrorDBC(w_hdbc1);

        d_ytd  = 30000.0;

        d_next_o_id = orders_per_district+1;

        time_start = (TimeNow() / MILLI);

        for (w_id = aptr->starting_warehouse; w_id <= aptr->num_warehouses; w_id++)
        {
                d_w_id = w_id;

                for (d_id = 1; d_id <= DISTRICT_PER_WAREHOUSE; d_id++)
                {
                        MakeAlphaString(6,10,D_NAME_LEN, d_name);
                        MakeAddress(d_street_1, d_street_2, d_city, d_state, d_zip);

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

                        rc = bcp_sendrow(w_hdbc1);
                        if (rc != SUCCEED)
                                HandleErrorDBC(w_hdbc1);

                        district_rows_loaded++;
                        CheckForCommit(w_hdbc1, w_hstmt1, district_rows_loaded,
"district", &time_start);
                }
    }

        rcint = bcp_done(w_hdbc1);
        if (rcint < 0)
                HandleErrorDBC(w_hdbc1);

        printf("Finished loading district table.\n");

        // if build index after load...
        if ((aptr->build_index == 1) && (aptr->index_order == 0))
                BuildIndex("idxdiscl");

    return;
}


//============================================================================
//
// Function   : Stock
//
//============================================================================

void Stock()
{
    long  s_i_id;
    short s_w_id;
    short s_quantity;
    char  s_dist_01[S_DIST_LEN+1];
    char  s_dist_02[S_DIST_LEN+1];
    char  s_dist_03[S_DIST_LEN+1];
    char  s_dist_04[S_DIST_LEN+1];
    char  s_dist_05[S_DIST_LEN+1];
    char  s_dist_06[S_DIST_LEN+1];
    char  s_dist_07[S_DIST_LEN+1];
    char  s_dist_08[S_DIST_LEN+1];
    char  s_dist_09[S_DIST_LEN+1];
    char  s_dist_10[S_DIST_LEN+1];
    long  s_ytd;
    short s_order_cnt;
    short s_remote_cnt;
    char  s_data[S_DATA_LEN+1];
    short len;
        char      name[20];
```

```
        long      time_start;
        RETCODE   rc;
        DBINT     rcint;
        char      bcphint[128];

        // Seed with unique number
        seed(3);

        // if build index before load...
        if ((aptr->build_index == 1) && (aptr->index_order == 1))
                BuildIndex("idxstkcl");

        sprintf(name, "%s..%s", aptr->database, "stock");

        rc = bcp_init(w_hdbc1, name, NULL, "logs\\stock.err", DB_IN);
        if (rc != SUCCEED)
                HandleErrorDBC(w_hdbc1);

        if ((aptr->build_index == 1) && (aptr->index_order == 1))
        {
                sprintf(bcphint, "tablock, order (s_i_id, s_w_id), ROWS_PER_BATCH = %u",
(aptr->num_warehouses * 100000));
                rc = bcp_control(w_hdbc1, BCPHINTS, (void*) bcphint);
                if (rc != SUCCEED)
                        HandleErrorDBC(w_hdbc1);
        }

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

        rc = bcp_bind(w_hdbc1, (BYTE *) s_data, 0, S_DATA_LEN, NULL, 0, 0, 17);
        if (rc != SUCCEED)
                HandleErrorDBC(w_hdbc1);

        s_ytd = s_order_cnt = s_remote_cnt = 0;

        time_start = (TimeNow() / MILLI);

        printf("...Loading stock table\n");

        for (s_i_id=1; s_i_id <= max_items; s_i_id++)
        {

                for (s_w_id = (short)aptr->starting_warehouse; s_w_id <= aptr-
>num_warehouses; s_w_id++)
                {
```

```
                        s_quantity = (short)RandomNumber(10L,100L);
                        len = MakeAlphaString(24,24,S_DIST_LEN, s_dist_01);
                        len = MakeAlphaString(24,24,S_DIST_LEN, s_dist_02);
                        len = MakeAlphaString(24,24,S_DIST_LEN, s_dist_03);
                        len = MakeAlphaString(24,24,S_DIST_LEN, s_dist_04);
                        len = MakeAlphaString(24,24,S_DIST_LEN, s_dist_05);
                        len = MakeAlphaString(24,24,S_DIST_LEN, s_dist_06);
                        len = MakeAlphaString(24,24,S_DIST_LEN, s_dist_07);
                        len = MakeAlphaString(24,24,S_DIST_LEN, s_dist_08);
                        len = MakeAlphaString(24,24,S_DIST_LEN, s_dist_09);
                        len = MakeAlphaString(24,24,S_DIST_LEN, s_dist_10);

                        len = MakeOriginalAlphaString(26,50, S_DATA_LEN, s_data,10);

                        rc = bcp_sendrow(w_hdbc1);
                        if (rc != SUCCEED)
                                HandleErrorDBC(w_hdbc1);

                        stock_rows_loaded++;
                        CheckForCommit(w_hdbc1, w_hstmt1, stock_rows_loaded, "stock",
&time_start);

                }
        }

        rcint = bcp_done(w_hdbc1);
        if (rcint < 0)
                HandleErrorDBC(w_hdbc1);

        printf("Finished loading stock table.\n");

        SQLFreeStmt(w_hstmt1, SQL_DROP);
        SQLDisconnect(w_hdbc1);
        SQLFreeConnect(w_hdbc1);

        // if build index after load...
        if ((aptr->build_index == 1) && (aptr->index_order == 0))
                BuildIndex("idxstkcl");

        return;
}


//====================================================================
//
// Function   : LoadCustomer
//
//====================================================================

void LoadCustomer()
{
        LOADER_TIME_STRUCT      customer_time_start;
        LOADER_TIME_STRUCT      history_time_start;
        short                   w_id;
    short                       d_id;
        DWORD                   dwThreadID[MAX_CUSTOMER_THREADS];
        HANDLE                  hThread[MAX_CUSTOMER_THREADS];
        char                    name[20];
        RETCODE                                 rc;
        DBINT                                   rcint;
        char                                    bcphint[128];
        char                                    cmd[256];
        // SQLRETURN                            rc_1;
        // SQLSMALLINT                          recnum, MsgLen;
        // SQLCHAR                                      SqlState[6],
Msg[SQL_MAX_MESSAGE_LENGTH];
        // SQLINTEGER                           NativeError;

        // Seed with unique number
        seed(5);

        printf("Loading customer and history tables...\n");

        // if build index before load...
        if ((aptr->build_index == 1) && (aptr->index_order == 1))
                BuildIndex("idxcuscl");

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

        rc = bcp_init(c_hdbc1, name, NULL, "logs\\customer.err", DB_IN);
        if (rc != SUCCEED)
                HandleErrorDBC(c_hdbc1);

        if ((aptr->build_index == 1) && (aptr->index_order == 1))
        {
                sprintf(bcphint, "tablock, order (c_w_id, c_d_id, c_id), ROWS_PER_BATCH =
%u", (aptr->num_warehouses * 30000));
                rc = bcp_control(c_hdbc1, BCPHINTS, (void*) bcphint);
                if (rc != SUCCEED)
                        HandleErrorDBC(c_hdbc1);
        }

        sprintf(name, "%s..%s", aptr->database, "history");

        rc = bcp_init(c_hdbc2, name, NULL, "logs\\history.err", DB_IN);
        if (rc != SUCCEED)
                HandleErrorDBC(c_hdbc2);

        sprintf(bcphint, "tablock");
        rc = bcp_control(c_hdbc2, BCPHINTS, (void*) bcphint);
        if (rc != SUCCEED)
                HandleErrorDBC(c_hdbc2);

        customer_rows_loaded    = 0;
        history_rows_loaded     = 0;

        CustomerBufInit();
```

```
        customer_time_start.time_start = (TimeNow() / MILLI);
        history_time_start.time_start = (TimeNow() / MILLI);

        for (w_id = (short)aptr->starting_warehouse; w_id <= aptr->num_warehouses; w_id++)
        {
                for (d_id = 1; d_id <= DISTRICT_PER_WAREHOUSE; d_id++)
                {

                        CustomerBufLoad(d_id, w_id);

                        // Start parallel loading threads here...

                        // Start customer table thread

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

                        hThread[0] = CreateThread(NULL,
                                                                                0,
(LPTHREAD_START_ROUTINE) LoadCustomerTable,
&customer_time_start,
                                                                                0,
&dwThreadID[0]);

                        if (hThread[0] == NULL)
                        {
                                printf("Error, failed in creating creating thread =
0.\n");
                                exit(-1);
                        }

                        // Start History table thread

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

                        hThread[1] = CreateThread(NULL,
                                                                                0,
(LPTHREAD_START_ROUTINE) LoadHistoryTable,
&history_time_start,
                                                                                0,
&dwThreadID[1]);

                        if (hThread[1] == NULL)
                        {
                                printf("Error, failed in creating creating thread =
1.\n");
                                exit(-1);
                        }

                        WaitForSingleObject( hThread[0], INFINITE );
                        WaitForSingleObject( hThread[1], INFINITE );

                        if (CloseHandle(hThread[0]) == FALSE)
                        {
                                printf("Error, failed in closing customer thread
handle with errno: %d\n", GetLastError());
                        }

                        if (CloseHandle(hThread[1]) == FALSE)
                        {
                                printf("Error, failed in closing history thread handle
with errno: %d\n", GetLastError());
                        }


                }
        }

        // flush the bulk connection
        rcint = bcp_done(c_hdbc1);
        if (rcint < 0)
                HandleErrorDBC(c_hdbc1);

        rcint = bcp_done(c_hdbc2);
        if (rcint < 0)
                HandleErrorDBC(c_hdbc2);

        printf("Finished loading customer table.\n");

        // if build index after load...
        if ((aptr->build_index == 1) && (aptr->index_order == 0))
                BuildIndex("idxcuscl");

        // build non-clustered index
        if (aptr->build_index == 1)
                BuildIndex("idxcusnc");

        // Output the NURAND used for the loader into C_FIRST for C_ID = 1,
        // C_W_ID = 1, and C_D_ID = 1
        sprintf(cmd, "isql -S%s -U%s -P%s -d%s -e -Q\"update customer set c_first = 'C_LOAD
= %d' where c_id = 1 and c_w_id = 1 and c_d_id = 1\" > logs\\nurand_load.log",
                                        aptr->server,
                                        aptr->user,
                                        aptr->password,
                                        aptr->database,
                                        LOADER_NURAND_C);

        system(cmd);

        SQLFreeStmt(c_hstmt1, SQL_DROP);
        SQLDisconnect(c_hdbc1);
        SQLFreeConnect(c_hdbc1);
```

```
        SQLFreeStmt(c_hstmt2, SQL_DROP);
        SQLDisconnect(c_hdbc2);
        SQLFreeConnect(c_hdbc2);


    return;

}


//====================================================================
//
// Function   : CustomerBufInit
//
//====================================================================

void CustomerBufInit()
{
        int     i;

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

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

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

                //  fix to avoid ODBC float to numeric conversion problem.
                //        customer_buf[i].c_balance = 0;
                strcpy(customer_buf[i].c_balance,"");

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

                strcpy(customer_buf[i].c_data,"");

                customer_buf[i].h_amount = 0;

                strcpy(customer_buf[i].h_data,"");
        }

}


//====================================================================
//
// Function   : CustomerBufLoad
//
// Fills shared buffer for HISTORY and CUSTOMER
//====================================================================

void CustomerBufLoad(int d_id, int w_id)
{
        long                                    i;
    CUSTOMER_SORT_STRUCT    c[CUSTOMERS_PER_DISTRICT];


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

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

                c[i].c_id = i+1;

        }

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

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

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

                customer_buf[i].c_ytd_payment  = 10.0;

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

                // Generate CUSTOMER and HISTORY data

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

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

                customer_buf[i].c_middle[0] = 'O';
```

```
                customer_buf[i].c_middle[1] = 'E';

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

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

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

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


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

                MakeAlphaString(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;
        DWORD                   dwThreadID[MAX_ORDER_THREADS];
        HANDLE                  hThread[MAX_ORDER_THREADS];
        char                    name[20];
        RETCODE                                 rc;
        char                                    bcphint[128];

        // seed with unique number
        seed(6);

        printf("Loading orders...\n");

        // if build index before load...
        if ((aptr->build_index == 1) && (aptr->index_order == 1))
        {
                        BuildIndex("idxordcl");
                        BuildIndex("idxnodcl");
                        BuildIndex("idxodlcl");
        }

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

        rc = bcp_init(o_hdbc1, name, NULL, "logs\\orders.err", DB_IN);
        if (rc != SUCCEED)
                HandleErrorDBC(o_hdbc1);

        if ((aptr->build_index == 1) && (aptr->index_order == 1))
        {
                sprintf(bcphint, "tablock, order (o_w_id, o_d_id, o_id), ROWS_PER_BATCH =
%u", (aptr->num_warehouses * 30000));
                rc = bcp_control(o_hdbc1, BCPHINTS, (void*) bcphint);
                if (rc != SUCCEED)
                        HandleErrorDBC(o_hdbc1);
        }

        sprintf(name, "%s..%s", aptr->database, "new_order");

        rc = bcp_init(o_hdbc2, name, NULL, "logs\\neword.err", DB_IN);
        if (rc != SUCCEED)
```

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```
                    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             rcint;

        // bind ORDER-LINE data
    rc = bcp_bind(o_hdbc3, (BYTE *) &o_id, 0, SQL_VARLEN_DATA, NULL, 0, SQLINT4, 1);
        if (rc != SUCCEED)
                HandleErrorDBC(o_hdbc3);

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

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

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

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

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

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

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

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

    rc = bcp_bind(o_hdbc3, (BYTE *) ol_dist_info, 0, DIST_INFO_LEN, NULL, 0, 0, 10);
        if (rc != SUCCEED)
                HandleErrorDBC(o_hdbc3);

        for (i = 0; i < orders_per_district; i++)
    {
                o_id    = orders_buf[i].o_id;
                o_d_id  = orders_buf[i].o_d_id;
                o_w_id  = orders_buf[i].o_w_id;

                for (j=0; j < orders_buf[i].o_ol_cnt; j++)
                {
                        ol            = orders_buf[i].o_ol[j].ol;
                        ol_i_id       = orders_buf[i].o_ol[j].ol_i_id;
                        ol_supply_w_id = orders_buf[i].o_ol[j].ol_supply_w_id;
                        ol_quantity   = orders_buf[i].o_ol[j].ol_quantity;
                        ol_amount     = orders_buf[i].o_ol[j].ol_amount;

                        strcpy(ol_delivery_d,orders_buf[i].o_ol[j].ol_delivery_d);

                        strcpy(ol_dist_info,orders_buf[i].o_ol[j].ol_dist_info);

                        rc = bcp_sendrow(o_hdbc3);
                        if (rc != SUCCEED)
                                HandleErrorDBC(o_hdbc3);

                        order_line_rows_loaded++;
                        CheckForCommit(o_hdbc3, o_hstmt3, order_line_rows_loaded,
"order_line", &order_line_time_start->time_start);
                }

        }

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

        if ((o_w_id == aptr->num_warehouses) && (o_d_id == 10))
        {
                rcint = bcp_done(o_hdbc3);
                if (rcint < 0)
                        HandleErrorDBC(o_hdbc3);

                SQLFreeStmt(o_hstmt3, SQL_DROP);
                SQLDisconnect(o_hdbc3);
                SQLFreeConnect(o_hdbc3);

                // if build index after load...
                if ((aptr->build_index == 1) && (aptr->index_order == 0))
                        BuildIndex("idxodlcl");

        }

}


//=====================================================================
//
// Function   : GetPermutation
//
```

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```
//=====================================================================

void GetPermutation(int perm[], int n)
{
        int i, r, t;

        for (i=1;i<=n;i++)
                perm[i] = i;

        for (i=1;i<=n;i++)
        {
                r = RandomNumber(i,n);
                t = perm[i];
                perm[i] = perm[r];
                perm[r] = t;
        }

}


//=====================================================================
//
// Function   : CheckForCommit
//
//=====================================================================

void CheckForCommit(HDBC hdbc,
                                        HSTMT hstmt,
                                int rows_loaded,
                                        char *table_name,
                                long *time_start)
{

    long  time_end, time_diff;
          // DBINT  rcint;

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

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

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

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

                *time_start = time_end;
    }
    return;
}


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

void OpenConnections()
{

        RETCODE         rc;

        char                        szDriverString[300];
        char                        szDriverStringOut[1024];
        SQLSMALLINT                 cbDriverStringOut;


        SQLAllocHandle(SQL_HANDLE_ENV, SQL_NULL_HANDLE, &henv );

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

        SQLAllocHandle(SQL_HANDLE_DBC, henv , &i_hdbc1);
        SQLAllocHandle(SQL_HANDLE_DBC, henv , &w_hdbc1);
        SQLAllocHandle(SQL_HANDLE_DBC, henv , &c_hdbc1);
        SQLAllocHandle(SQL_HANDLE_DBC, henv , &c_hdbc2);
        SQLAllocHandle(SQL_HANDLE_DBC, henv , &o_hdbc1);
        SQLAllocHandle(SQL_HANDLE_DBC, henv , &o_hdbc2);
        SQLAllocHandle(SQL_HANDLE_DBC, henv , &o_hdbc3);

        SQLSetConnectAttr(i_hdbc1, SQL_COPT_SS_BCP, (void *)SQL_BCP_ON, SQL_IS_INTEGER );
        SQLSetConnectAttr(w_hdbc1, SQL_COPT_SS_BCP, (void *)SQL_BCP_ON, SQL_IS_INTEGER );

        SQLSetConnectAttr(c_hdbc1, SQL_COPT_SS_BCP, (void *)SQL_BCP_ON, SQL_IS_INTEGER );
        SQLSetConnectAttr(c_hdbc2, SQL_COPT_SS_BCP, (void *)SQL_BCP_ON, SQL_IS_INTEGER );
        SQLSetConnectAttr(o_hdbc1, SQL_COPT_SS_BCP, (void *)SQL_BCP_ON, SQL_IS_INTEGER );
        SQLSetConnectAttr(o_hdbc2, SQL_COPT_SS_BCP, (void *)SQL_BCP_ON, SQL_IS_INTEGER );
        SQLSetConnectAttr(o_hdbc3, SQL_COPT_SS_BCP, (void *)SQL_BCP_ON, SQL_IS_INTEGER );

        // Open connections to SQL Server

        // Connection 1

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

        rc = SQLSetConnectOption (i_hdbc1, SQL_PACKET_SIZE, aptr->pack_size);
        if (rc != SUCCEED)
```

```
                HandleErrorDBC(i_hdbc1);

        rc = SQLDriverConnect ( i_hdbc1,
                                                NULL,
                                                      (SQLCHAR*)&szDriverString[0] ,
                                                      SQL_NTS,
                                                      (SQLCHAR*)&szDriverStringOut[0],
                                                      sizeof(szDriverStringOut),
                                                      &cbDriverStringOut,
                                                      SQL_DRIVER_NOPROMPT );
        if (rc != SUCCEED)
                HandleErrorDBC(i_hdbc1);

        // Connection 2

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

        rc = SQLSetConnectOption (w_hdbc1, SQL_PACKET_SIZE, aptr->pack_size);
        if (rc != SUCCEED)
                HandleErrorDBC(w_hdbc1);

        rc = SQLDriverConnect ( w_hdbc1,
                                                                NULL,

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

        (SQLCHAR*)&szDriverStringOut[0],

        sizeof(szDriverStringOut),
                                                                &cbDriverStringOut,
                                                                SQL_DRIVER_NOPROMPT );
        if (rc != SUCCEED)
                HandleErrorDBC(w_hdbc1);

        // Connection 3

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

        rc = SQLSetConnectOption (c_hdbc1, SQL_PACKET_SIZE, aptr->pack_size);
        if (rc != SUCCEED)
                HandleErrorDBC(c_hdbc1);

        rc = SQLDriverConnect ( c_hdbc1,
                                                                NULL,
(SQLCHAR*)&szDriverString[0] ,
                                                                SQL_NTS,

(SQLCHAR*)&szDriverStringOut[0],

sizeof(szDriverStringOut),
                                                                &cbDriverStringOut,
                                                                SQL_DRIVER_NOPROMPT );
if (rc != SUCCEED)
        HandleErrorDBC(c_hdbc1);

// Connection 4

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

rc = SQLSetConnectOption (c_hdbc2, SQL_PACKET_SIZE, aptr->pack_size);
if (rc != SUCCEED)
        HandleErrorDBC(c_hdbc2);

rc = SQLDriverConnect ( c_hdbc2,
                                                                NULL,

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

(SQLCHAR*)&szDriverStringOut[0],

sizeof(szDriverStringOut),
                                                                &cbDriverStringOut,
                                                                SQL_DRIVER_NOPROMPT );
if (rc != SUCCEED)
        HandleErrorDBC(c_hdbc2);

// Connection 5

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

rc = SQLSetConnectOption (o_hdbc1, SQL_PACKET_SIZE, aptr->pack_size);
if (rc != SUCCEED)
        HandleErrorDBC(o_hdbc1);

rc = SQLDriverConnect ( o_hdbc1,
                                                                NULL,
```

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

        (SQLCHAR*)&szDriverStringOut[0],

        sizeof(szDriverStringOut),
                                                        &cbDriverStringOut,
                                                        SQL_DRIVER_NOPROMPT );
        if (rc != SUCCEED)
                 HandleErrorDBC(o_hdbc1);

        // Connection 6

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

        rc = SQLSetConnectOption (o_hdbc2, SQL_PACKET_SIZE, aptr->pack_size);
        if (rc != SUCCEED)
                 HandleErrorDBC(o_hdbc2);

        rc = SQLDriverConnect ( o_hdbc2,
                                                        NULL,
        (SQLCHAR*)&szDriverString[0] ,
                                                        SQL_NTS,

        (SQLCHAR*)&szDriverStringOut[0],

        sizeof(szDriverStringOut),
                                                        &cbDriverStringOut,
                                                        SQL_DRIVER_NOPROMPT );
        if (rc != SUCCEED)
                 HandleErrorDBC(o_hdbc2);

        // Connection 7

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

        rc = SQLSetConnectOption (o_hdbc3, SQL_PACKET_SIZE, aptr->pack_size);
        if (rc != SUCCEED)
                 HandleErrorDBC(o_hdbc3);

        rc = SQLDriverConnect ( o_hdbc3,
                                                        NULL,
        (SQLCHAR*)&szDriverString[0] ,
                                                        SQL_NTS,

        (SQLCHAR*)&szDriverStringOut[0],

        sizeof(szDriverStringOut),
                                                        &cbDriverStringOut,
                                                        SQL_DRIVER_NOPROMPT );

        if (rc != SUCCEED)
                 HandleErrorDBC(o_hdbc3);

}

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

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

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

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

        system(cmd);

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


void HandleErrorDBC (SQLHDBC  hdbc1)
{

        SQLCHAR             SqlState[6], Msg[SQL_MAX_MESSAGE_LENGTH];
        SQLINTEGER  NativeError;
        SQLSMALLINT i, MsgLen;
        SQLRETURN   rc2;
        char                timebuf[128];
        char                datebuf[128];
        FILE                *fp1;

        i = 1;
        while (( rc2 = SQLGetDiagRec(SQL_HANDLE_DBC , hdbc1, i, SqlState , &NativeError,
                                        Msg, sizeof(Msg) , &MsgLen )) != SQL_NO_DATA )
```

```
        {

                sprintf( szLastError , "%s" ,  Msg );

                _strtime(timebuf);
                _strdate(datebuf);

                printf( "[%s : %s] %s\n" , datebuf, timebuf, szLastError);

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

                i++;

        }
}

void 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   : 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
```

APPENDIX B – DATABASE DESIGN

```
                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
```

APPENDIX B – DATABASE DESIGN

```
//                                  Microsoft TPC-C Kit Ver. 4.21
//                                  Copyright Microsoft, 1996, 1997, 1998, 1999, 2000
//        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. 4.21
//                              Copyright Microsoft, 1996, 1997, 1998, 1999, 2000
//      Purpose:  Random number generation routines for database loader
```

APPENDIX B – DATABASE DESIGN

```
// 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. 4.21
//                                   Copyright Microsoft, 1996, 1997, 1998, 1999, 2000
//        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             val;
    int             start;

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

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

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

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

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


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

    return strlen(str);
}


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

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

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

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

          str[16] = 0;

    return 16;
}


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

          //MakeZipNumberString is always called MakeZipNumberString(9, 9, 9, string)

          strcpy(str, "OOOO11111");

          itoa(RandomNumber(0, 9999), tmp, 10);
          memcpy(str, tmp, strlen(tmp));

    return 9;
}
```

```
//==============================================================================
//
// Function name: InitString
//
//==============================================================================
void InitString(char *str, int len)
{
#ifdef DEBUG
    printf("[%ld]DBG: Entering InitString()\n", (int) GetCurrentThreadId());
#endif

          memset(str, ' ', len);
    str[len] = 0;
}


//==============================================================================
// Function name: InitAddress
//
// Description:
//
//==============================================================================

void InitAddress(char *street_1, char *street_2, char *city, char *state, char *zip)
{
          memset(street_1, ' ', ADDRESS_LEN+1);
          memset(street_2, ' ', ADDRESS_LEN+1);
          memset(city, ' ', ADDRESS_LEN+1);

    street_1[ADDRESS_LEN+1] = 0;
    street_2[ADDRESS_LEN+1] = 0;
    city[ADDRESS_LEN+1]     = 0;

          memset(state, ' ', STATE_LEN+1);
    state[STATE_LEN+1] = 0;

          memset(zip, ' ', ZIP_LEN+1);
    zip[ZIP_LEN+1] = 0;
}


//==============================================================================
//
// Function name: PaddString
//
//==============================================================================

void PaddString(int max, char *name)
{
          int                len;

          len = strlen(name);
          if ( len < max )
                    memset(name+len, ' ', max - len);
          name[max] = 0;

          return;
}
```

Appendix C Tunable Parameters

C.1 Microsoft Windowns 2000 Datacenter Server Configuration

The following services were disabled in the Windows 2000 Control Panel/Services:

- Alerter
- Computer Browser
- Distributed File System
- Distributed Link Tracking Client
- DNS Client
- Global Array Manager Server
- IPSEC Policy Agent
- License Logging Service
- Messenger
- Microsoft Search
- Print Spooler
- Process Control Service
- Remote Registry Service
- Removable Storage
- Run as Service
- Task scheduler
- World Wide Web Publishing Service

C.2 Server System Configuration Parameters

The following registry key was added to disable the kernel counters for Global and Per-Process I/Os:
[HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Control\Session Manager\I/O System] "CountOperations"=dword:00000000

Microsoft Windows 2000 Datacenter Server System Information Report For LXr8500DC

```
System Information report written at: 12/19/2000 06:20:51 PM
[System Information]

[ Following are sub-categories of this main category ]

[System Summary]

Item      Value
OS Name   Microsoft Windows 2000 Advanced Server
Version   5.0.2195  Build 2195
OS Manufacturer     Microsoft Corporation
System Name         PRF_SUT6
System Manufacturer HP
System Model        HP NetServer LXr 8500
System Type         X86-based PC
Processor x86 Family 6 Model 10 Stepping 0 GenuineIntel ~700 Mhz
Processor x86 Family 6 Model 10 Stepping 0 GenuineIntel ~700 Mhz
Processor x86 Family 6 Model 10 Stepping 0 GenuineIntel ~700 Mhz
Processor x86 Family 6 Model 10 Stepping 0 GenuineIntel ~700 Mhz
Processor x86 Family 6 Model 10 Stepping 0 GenuineIntel ~700 Mhz
Processor x86 Family 6 Model 10 Stepping 0 GenuineIntel ~700 Mhz
Processor x86 Family 6 Model 10 Stepping 0 GenuineIntel ~700 Mhz
Processor x86 Family 6 Model 10 Stepping 0 GenuineIntel ~700 Mhz
BIOS Version        OCPRF100- PhoenixBIOS 4.0 Release 6.0
Windows Directory   C:\WINNT
System Directory    C:\WINNT\System32
Boot Device         \Device\Harddisk0\Partition1
Locale    United States
User Name PRF_SUT6\Administrator
Time Zone Pacific Standard Time
Total Physical Memory        7,863,616 KB
Available Physical Memory    7,681,088 KB
Total Virtual Memory         16,301,960 KB
Available Virtual Memory     16,020,620 KB
Page File Space     8,438,344 KB
Page File C:\pagefile.sys

[Hardware Resources]

[ Following are sub-categories of this main category ]

[Conflicts/Sharing]

Resource  Device
IRQ 10    Compaq PCI Hotplug Controller
IRQ 10    Compaq PCI Hotplug Controller
IRQ 10    Compaq PCI Hotplug Controller
IRQ 10    Compaq PCI Hotplug 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
0x0000-0x0CF7       PCI bus   OK
0x0D00-0x2000       PCI bus   OK
0x4500-0xFFFF       PCI bus   OK
0x1000-0x10FF       Hewlett Packard NetRAID-4M RAID Controller        OK
0x1C00-0x1C1F       HP NetServer 10/100TX PCI LAN Adapter   OK
0x1400-0x14FF       Symbios Logic 896, 22910 PCI SCSI Adapter         OK
0x1800-0x18FF       Symbios Logic 896, 22910 PCI SCSI Adapter         OK
0x03B0-0x03BB       Cirrus Logic 5446 Compatible Graphics Adapter     OK
0x03C0-0x03DF       Cirrus Logic 5446 Compatible Graphics Adapter     OK
0x0A79-0x0A79       ISAPNP Read Data Port         OK
0x0279-0x0279       ISAPNP Read Data Port         OK
0x0274-0x0277       ISAPNP Read Data Port         OK
0x00B3-0x00B3       Motherboard resources         OK
0x0C10-0x0C3F       Motherboard resources         OK
0x0CA8-0x0CAF       Motherboard resources         OK
0x0CC0-0x0CCF       Motherboard resources         OK
0x0010-0x001F       Direct memory access controller         OK
0x0080-0x009F       Direct memory access controller         OK
0x00C0-0x00DF       Direct memory access controller         OK
0x0070-0x0077       System CMOS/real time clock   OK
0x0020-0x0021       Programmable interrupt controller       OK
0x0024-0x0025       Programmable interrupt controller       OK
0x0028-0x0029       Programmable interrupt controller       OK
0x002C-0x002D       Programmable interrupt controller       OK
0x0030-0x0031       Programmable interrupt controller       OK
0x0034-0x0035       Programmable interrupt controller       OK
0x0038-0x0039       Programmable interrupt controller       OK
0x003C-0x003D       Programmable interrupt controller       OK
0x00A0-0x00A1       Programmable interrupt controller       OK
0x00A4-0x00A5       Programmable interrupt controller       OK
0x00A8-0x00A9       Programmable interrupt controller       OK
0x00AC-0x00AD       Programmable interrupt controller       OK
0x00B0-0x00B1       Programmable interrupt controller       OK
0x00B4-0x00B5       Programmable interrupt controller       OK
0x00B8-0x00B9       Programmable interrupt controller       OK
```

APPENDIX C – TUNABLE PARAMETERS

```
0x00BC-0x00BD       Programmable interrupt controller       OK
0x04D0-0x04D1       Programmable interrupt controller       OK
0x00F0-0x00FF       Numeric data processor        OK
0x0040-0x0043       System timer        OK
0x0050-0x0053       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
0x03F2-0x03F5       Standard floppy disk controller         OK
0x03F7-0x03F7       Standard floppy disk controller         OK
0x03F8-0x03FF       Communications Port (COM1)    OK
0x02F8-0x02FF       Communications Port (COM2)    OK
0x1C40-0x1C4F       Intel(r) 82371AB/EB PCI Bus Master IDE Controller OK
0x01F0-0x01F7       Primary IDE Channel OK
0x03F6-0x03F6       Primary IDE Channel OK
0x1C20-0x1C3F       Intel 82371AB/EB PCI to USB Universal Host Controller       OK
0x2000-0x24FF       PCI bus   OK
0x2000-0x24FF       Hewlett Packard NetRAID-4M RAID Controller        OK
0x2400-0x24FF       Hewlett Packard NetRAID-4M RAID Controller        OK
0x3000-0x34FF       PCI bus   OK
0x3000-0x34FF       Hewlett Packard NetRAID-4M RAID Controller        OK
0x3400-0x34FF       Hewlett Packard NetRAID-4M RAID Controller        OK
0x4000-0x44FF       PCI bus   OK
0x4000-0x44FF       Hewlett Packard NetRAID-4M RAID Controller        OK
0x4400-0x44FF       Hewlett Packard NetRAID-4M RAID Controller        OK

[IRQs]

IRQ Number          Device
9         Microsoft ACPI-Compliant System
10        Compaq PCI Hotplug Controller
10        Compaq PCI Hotplug Controller
10        Compaq PCI Hotplug Controller
10        Compaq PCI Hotplug Controller
61        Hewlett Packard NetRAID-4M RAID Controller
54        HP NetServer 10/100TX PCI LAN Adapter
58        Symbios Logic 896, 22910 PCI SCSI Adapter
18        Symbios Logic 896, 22910 PCI SCSI Adapter
8         System CMOS/real time clock
13        Numeric data processor
1         Standard 101/102-Key or Microsoft Natural PS/2 Keyboard
12        Microsoft PS/2 Mouse
6         Standard floppy disk controller
4         Communications Port (COM1)
3         Communications Port (COM2)
14        Primary IDE Channel
49        Intel 82371AB/EB PCI to USB Universal Host Controller
44        Hewlett Packard NetRAID-4M RAID Controller
40        Hewlett Packard NetRAID-4M RAID Controller
32        Hewlett Packard NetRAID-4M RAID Controller
28        Hewlett Packard NetRAID-4M RAID Controller
24        Hewlett Packard NetRAID-4M RAID Controller
20        Hewlett Packard NetRAID-4M RAID Controller

[Memory]

Range     Device    Status
0xA0000-0xBFFFF     PCI bus   OK
0xA0000-0xBFFFF     Cirrus Logic 5446 Compatible Graphics Adapter     OK
0xC8000-0xDFFFF     PCI bus   OK
0xE0000-0xFFFFF     PCI bus   OK
0xF0000000-0xFDFFFFFF         PCI bus   OK
0xFFF00000-0xFFFFFFFF         PCI bus   OK
0xFA007000-0xFA0070FF         Compaq PCI Hotplug Controller OK
0xFA000000-0xFA001FFF         Hewlett Packard NetRAID-4M RAID Controller        OK
0xFA400000-0xFA400FFF         HP NetServer 10/100TX PCI LAN Adapter   OK
0xFA100000-0xFA1FFFFF         HP NetServer 10/100TX PCI LAN Adapter   OK
0xFA007400-0xFA0077FF         Symbios Logic 896, 22910 PCI SCSI Adapter         OK
0xFA002000-0xFA003FFF         Symbios Logic 896, 22910 PCI SCSI Adapter         OK
0xFA007800-0xFA007BFF         Symbios Logic 896, 22910 PCI SCSI Adapter         OK
0xFA004000-0xFA005FFF         Symbios Logic 896, 22910 PCI SCSI Adapter         OK
0xFC000000-0xFDFFFFFF         Cirrus Logic 5446 Compatible Graphics Adapter     OK
0xFA006000-0xFA006FFF         Cirrus Logic 5446 Compatible Graphics Adapter     OK
0xFE000000-0xFE3FFFFF         PCI bus   OK
0xFE000000-0xFE3FFFFF         Hewlett Packard NetRAID-4M RAID Controller        OK
0xFE004000-0xFE0040FF         Compaq PCI Hotplug Controller OK
0xFE002000-0xFE003FFF         Hewlett Packard NetRAID-4M RAID Controller        OK
0xFE400000-0xFE7FFFFF         PCI bus   OK
0xFE400000-0xFE7FFFFF         Hewlett Packard NetRAID-4M RAID Controller        OK
0xFE404000-0xFE4040FF         Compaq PCI Hotplug Controller OK
0xFE402000-0xFE403FFF         Hewlett Packard NetRAID-4M RAID Controller        OK
0xFE800000-0xFEBFFFFF         PCI bus   OK
0xFE800000-0xFEBFFFFF         Hewlett Packard NetRAID-4M RAID Controller        OK
0xFE804000-0xFE8040FF         Compaq PCI Hotplug Controller OK
0xFE802000-0xFE803FFF         Hewlett Packard NetRAID-4M RAID Controller        OK

[Components]

[ Following are sub-categories of this main category ]

[Multimedia]

[ Following are sub-categories of this main category ]

[Audio Codecs]

Codec     Manufacturer        Description         Status    File      Version   Size
          Creation Date
c:\winnt\system32\iac25_32.ax Intel Corporation   Indeo® audio software         OK
          C:\WINNT\System32\IAC25_32.AX 2.05.53   195.00 KB (199,680 bytes)     12/7/1999
4:00:00 AM
c:\winnt\system32\lhacm.acm   Microsoft Corporation                  OK
          C:\WINNT\System32\LHACM.ACM   4.4.3385  33.27 KB (34,064 bytes)       10/27/2000
4:43:52 PM
c:\winnt\system32\msg723.acm  Microsoft Corporation                  OK
          C:\WINNT\System32\MSG723.ACM  4.4.3385  106.77 KB (109,328 bytes)     10/27/2000
4:43:51 PM
c:\winnt\system32\tssoft32.acm          DSP GROUP, INC.               OK
          C:\WINNT\System32\TSSOFT32.ACM          1.01      9.27 KB (9,488 bytes)
          12/7/1999 4:00:00 AM
```

APPENDIX C – TUNABLE PARAMETERS

```
c:\winnt\system32\imaadp32.acm          Microsoft Corporation                   OK
         C:\WINNT\System32\IMAADP32.ACM          5.00.2134.1         16.27 KB (16,656 bytes)
         12/7/1999 4:00:00 AM
c:\winnt\system32\msgsm32.acm Microsoft Corporation                   OK
         C:\WINNT\System32\MSGSM32.ACM 5.00.2134.1         22.27 KB (22,800 bytes)
         12/7/1999 4:00:00 AM
c:\winnt\system32\msadp32.acm Microsoft Corporation                   OK
         C:\WINNT\System32\MSADP32.ACM 5.00.2134.1         14.77 KB (15,120 bytes)
         12/7/1999 4:00:00 AM
c:\winnt\system32\msg711.acm  Microsoft Corporation                   OK
         C:\WINNT\System32\MSG711.ACM  5.00.2134.1         10.27 KB (10,512 bytes)
         12/7/1999 4:00:00 AM

[Video Codecs]

Codec     Manufacturer        Description         Status    File      Version   Size
         Creation Date
c:\winnt\system32\ir50_32.dll Intel Corporation   Indeo® video 5.10   OK
         C:\WINNT\System32\IR50_32.DLL R.5.10.15.2.55      737.50 KB (755,200 bytes)
         12/7/1999 4:00:00 AM
c:\winnt\system32\msh261.drv  Microsoft Corporation                   OK
         C:\WINNT\System32\MSH261.DRV  4.4.3385  163.77 KB (167,696 bytes)     10/27/2000
4:43:51 PM
c:\winnt\system32\msh263.drv  Microsoft Corporation                   OK
         C:\WINNT\System32\MSH263.DRV  4.4.3385  252.27 KB (258,320 bytes)     10/27/2000
4:43:19 PM
c:\winnt\system32\msvidc32.dll          Microsoft Corporation                   OK
         C:\WINNT\System32\MSVIDC32.DLL          5.00.2134.1         27.27 KB (27,920 bytes)
         12/7/1999 4:00:00 AM
c:\winnt\system32\msrle32.dll Microsoft Corporation                   OK
         C:\WINNT\System32\MSRLE32.DLL 5.00.2134.1         10.77 KB (11,024 bytes)
         12/7/1999 4:00:00 AM
c:\winnt\system32\ir32_32.dll Intel(R) Corporation                    OK
         C:\WINNT\System32\IR32_32.DLL Not Available       194.50 KB (199,168 bytes)
         12/7/1999 4:00:00 AM
c:\winnt\system32\iccvid.dll  Radius Inc.                  OK
         C:\WINNT\System32\ICCVID.DLL  1.10.0.6  108.00 KB (110,592 bytes)     12/7/1999
4:00:00 AM

[CD-ROM]

Item      Value
Drive     D:
Description         CD-ROM Drive
Media Loaded        False
Media Type          CD-ROM
Name      TORiSAN CD-ROM CDR_U241
Manufacturer        (Standard CD-ROM drives)
Status    OK
Transfer Rate       Not Available
SCSI Target ID      0
PNP Device ID       IDE\CDROMTORISAN_CD-ROM_CDR_U241_____________1.03____\5&201331&0&0.0.0


[Sound Device]

Item      Value
No sound devices

[Display]

Item      Value
Name      Cirrus Logic 5446 Compatible Graphics Adapter
PNP Device ID       PCI\VEN_1013&DEV_00B8&SUBSYS_00B81013&REV_45\3&267A616A&0&60
Adapter Type        Cirrus Logic 5446BE, Cirrus Logic compatible
Adapter Description Cirrus Logic 5446 Compatible Graphics Adapter
Adapter RAM         2.00 MB (2,097,152 bytes)
Installed Drivers   vga.sys,cirrus.sys,vga256.dll,vga64k.dll
Driver Version      5.00.2146.1
INF File  display.inf (cirrus 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&43B47AD&0
NumberOfFunctionKeys          12


[Pointing Device]

Item      Value
Hardware Type       Microsoft PS/2 Mouse
Number of Buttons   2
Status    OK
PNP Device ID       ACPI\PNP0F03\4&43B47AD&0
Power Management Supported    False
Double Click Threshold        6
Handedness          Right Handed Operation


[Modem]

Item      Value
No modems
```

APPENDIX C – TUNABLE PARAMETERS

```
[Network]

[ Following are sub-categories of this main category ]

[Adapter]

Item      Value
Name      [00000000] 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&267A616A&0&28
Last Reset          12/18/2000 8:29:15 AM
Index     0
Service Name        HPTX
IP Address          15.75.206.170
IP Subnet 255.255.248.0
Default IP Gateway  15.75.200.1
DHCP Enabled        False
DHCP Server         Not Available
DHCP Lease Expires  Not Available
DHCP Lease Obtained Not Available
MAC Address         00:90:27:E7:05:E2
Service Name        HPTX
IRQ Number          54
I/O Port  0x1C00-0x1C1F
Driver    c:\winnt\system32\drivers\hptxnt5.sys (80144, 4.01.67.0000)

Name      [00000001] RAS Async Adapter
Adapter Type        Not Available
Product Name        RAS Async Adapter
Installed True
PNP Device ID       Not Available
Last Reset          12/18/2000 8:29:15 AM
Index     1
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      [00000002] WAN Miniport (L2TP)
Adapter Type        Not Available
Product Name        WAN Miniport (L2TP)
Installed True
PNP Device ID       ROOT\MS_L2TPMINIPORT\0000
Last Reset          12/18/2000 8:29:15 AM
Index     2
Service Name        Rasl2tp
IP Address          Not Available
IP Subnet Not Available
Default IP Gateway  Not Available
DHCP Enabled        False
DHCP Server         Not Available
DHCP Lease Expires  Not Available
DHCP Lease Obtained Not Available
MAC Address         Not Available
Service Name        Rasl2tp
Driver    c:\winnt\system32\drivers\rasl2tp.sys (50800, 5.00.2179.1)

Name      [00000003] 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          12/18/2000 8:29:15 AM
Index     3
Service Name        PptpMiniport
IP Address          Not Available
IP Subnet Not Available
Default IP Gateway  Not Available
DHCP Enabled        False
DHCP Server         Not Available
DHCP Lease Expires  Not Available
DHCP Lease Obtained Not Available
MAC Address         50:50:54:50:30:30
Service Name        PptpMiniport
Driver    c:\winnt\system32\drivers\raspptp.sys (47856, 5.00.2160.1)

Name      [00000004] Direct Parallel
Adapter Type        Not Available
Product Name        Direct Parallel
Installed True
PNP Device ID       ROOT\MS_PTIMINIPORT\0000
Last Reset          12/18/2000 8:29:15 AM
Index     4
Service Name        Raspti
IP Address          Not Available
IP Subnet Not Available
Default IP Gateway  Not Available
DHCP Enabled        False
DHCP Server         Not Available
DHCP Lease Expires  Not Available
DHCP Lease Obtained Not Available
MAC Address         Not Available
Service Name        Raspti
Driver    c:\winnt\system32\drivers\raspti.sys (16880, 5.00.2146.1)

Name      [00000005] WAN Miniport (IP)
Adapter Type        Not Available
Product Name        WAN Miniport (IP)
Installed True
PNP Device ID       ROOT\MS_NDISWANIP\0000
Last Reset          12/18/2000 8:29:15 AM
Index     5
Service Name        NdisWan
IP Address          Not Available
```

APPENDIX C – TUNABLE PARAMETERS

```
IP Subnet Not Available
Default IP Gateway  Not Available
DHCP Enabled        False
DHCP Server         Not Available
DHCP Lease Expires  Not Available
DHCP Lease Obtained Not Available
MAC Address         Not Available
Service Name        NdisWan
Driver    c:\winnt\system32\drivers\ndiswan.sys (90768, 5.00.2184.1)

Name      [00000006] WAN Miniport (Network Monitor)
Adapter Type        Not Available
Product Name        WAN Miniport (Network Monitor)
Installed True
PNP Device ID       ROOT\MS_NDISWANBH\0000
Last Reset          12/18/2000 8:29:15 AM
Index     6
Service Name        NdisWan
IP Address          Not Available
IP Subnet Not Available
Default IP Gateway  Not Available
DHCP Enabled        False
DHCP Server         Not Available
DHCP Lease Expires  Not Available
DHCP Lease Obtained Not Available
MAC Address         Not Available
Service Name        NdisWan
Driver    c:\winnt\system32\drivers\ndiswan.sys (90768, 5.00.2184.1)


[Protocol]

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

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

Name      RSVP UDP Service Provider
ConnectionlessService         True
GuaranteesDelivery  False
GuaranteesSequencing          False
MaximumAddressSize  16 bytes
MaximumMessageSize  65467 bytes
MessageOriented     True
MinimumAddressSize  16 bytes
PseudoStreamOriented          False
SupportsBroadcasting          True
SupportsConnectData False
SupportsDisconnectData        False
SupportsEncryption  True
SupportsExpeditedData         False
SupportsGracefulClosing       False
SupportsGuaranteedBandwidth   False
SupportsMulticasting          True

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

Name      MSAFD NetBIOS [\Device\NetBT_Tcpip_{102FF395-B92C-459A-8815-7CD8C0E95064}] SEQPACKET
0
ConnectionlessService         False
GuaranteesDelivery  True
GuaranteesSequencing          True
MaximumAddressSize  20 bytes
MaximumMessageSize  64000 bytes
```

APPENDIX C – TUNABLE PARAMETERS

```
MessageOriented     True
MinimumAddressSize  20 bytes
PseudoStreamOriented          False
SupportsBroadcasting          False
SupportsConnectData False
SupportsDisconnectData        False
SupportsEncryption  False
SupportsExpeditedData         False
SupportsGracefulClosing       False
SupportsGuaranteedBandwidth   False
SupportsMulticasting          False

Name      MSAFD NetBIOS [\Device\NetBT_Tcpip_{102FF395-B92C-459A-8815-7CD8C0E95064}] DATAGRAM
0
ConnectionlessService         True
GuaranteesDelivery  False
GuaranteesSequencing          False
MaximumAddressSize  20 bytes
MaximumMessageSize  64000 bytes
MessageOriented     True
MinimumAddressSize  20 bytes
PseudoStreamOriented          False
SupportsBroadcasting          True
SupportsConnectData False
SupportsDisconnectData        False
SupportsEncryption  False
SupportsExpeditedData         False
SupportsGracefulClosing       False
SupportsGuaranteedBandwidth   False
SupportsMulticasting          False

Name      MSAFD NetBIOS [\Device\NetBT_Tcpip_{A80BB721-6873-4855-88AE-6039C5501E9D}] SEQPACKET
1
ConnectionlessService         False
GuaranteesDelivery  True
GuaranteesSequencing          True
MaximumAddressSize  20 bytes
MaximumMessageSize  64000 bytes
MessageOriented     True
MinimumAddressSize  20 bytes
PseudoStreamOriented          False
SupportsBroadcasting          False
SupportsConnectData False
SupportsDisconnectData        False
SupportsEncryption  False
SupportsExpeditedData         False
SupportsGracefulClosing       False
SupportsGuaranteedBandwidth   False
SupportsMulticasting          False

Name      MSAFD NetBIOS [\Device\NetBT_Tcpip_{A80BB721-6873-4855-88AE-6039C5501E9D}] DATAGRAM
1
ConnectionlessService         True
GuaranteesDelivery  False
GuaranteesSequencing          False
MaximumAddressSize  20 bytes
MaximumMessageSize  64000 bytes
MessageOriented     True
MinimumAddressSize  20 bytes
PseudoStreamOriented          False
SupportsBroadcasting          True
SupportsConnectData False
SupportsDisconnectData        False
SupportsEncryption  False
SupportsExpeditedData         False
SupportsGracefulClosing       False
SupportsGuaranteedBandwidth   False
SupportsMulticasting          False

Name      MSAFD NetBIOS [\Device\NetBT_Tcpip_{D825D0FD-09A8-46CC-93F4-F40B9EC3A7F8}] SEQPACKET
2
ConnectionlessService         False
GuaranteesDelivery  True
GuaranteesSequencing          True
MaximumAddressSize  20 bytes
MaximumMessageSize  64000 bytes
MessageOriented     True
MinimumAddressSize  20 bytes
PseudoStreamOriented          False
SupportsBroadcasting          False
SupportsConnectData False
SupportsDisconnectData        False
SupportsEncryption  False
SupportsExpeditedData         False
SupportsGracefulClosing       False
SupportsGuaranteedBandwidth   False
SupportsMulticasting          False

Name      MSAFD NetBIOS [\Device\NetBT_Tcpip_{D825D0FD-09A8-46CC-93F4-F40B9EC3A7F8}] DATAGRAM
2
ConnectionlessService         True
GuaranteesDelivery  False
GuaranteesSequencing          False
MaximumAddressSize  20 bytes
MaximumMessageSize  64000 bytes
MessageOriented     True
MinimumAddressSize  20 bytes
PseudoStreamOriented          False
SupportsBroadcasting          True
SupportsConnectData False
SupportsDisconnectData        False
SupportsEncryption  False
SupportsExpeditedData         False
SupportsGracefulClosing       False
SupportsGuaranteedBandwidth   False
SupportsMulticasting          False


[WinSock]

Item      Value
File      c:\winnt\system32\winsock.dll
```

APPENDIX C – TUNABLE PARAMETERS

```
Version   3.10
Size      2.80 KB (2,864 bytes)

File      c:\winnt\system32\wsock32.dll
Version   5.00.2152.1
Size      21.27 KB (21,776 bytes)


[Ports]

[ Following are sub-categories of this main category ]

[Serial]

Item      Value
Name      COM1
Status    OK
PNP Device ID       ACPI\PNP0501\1
Maximum Input Buffer Size     0
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 Error     0
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 Enabled     0
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 Port  0x03F8-0x03FF
Driver    c:\winnt\system32\drivers\serial.sys (62448, 5.00.2134.1)

Name      COM2
Status    OK
PNP Device ID       ACPI\PNP0501\2
Maximum Input Buffer Size     0
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 Error     0
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 Enabled     0
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 Port  0x02F8-0x02FF
Driver    c:\winnt\system32\drivers\serial.sys (62448, 5.00.2134.1)


[Parallel]

Item      Value
No parallel port information

[Storage]

[ Following are sub-categories of this main category ]
```

APPENDIX C – TUNABLE PARAMETERS

```
[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          5.40 GB (5,802,348,544 bytes)
Volume Name
Volume Serial Number          00D4459F
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 B 80-8C02 SCSI Disk Device
Drive BytesPerSector          512
Drive MediaLoaded   True
Drive MediaType     Fixed hard disk media
Drive Partitions    1
Drive SCSIBus       0
Drive SCSILogicalUnit         0
Drive SCSIPort      1
Drive SCSITargetId  11
Drive SectorsPerTrack         63
Drive Size          9097159680 bytes
Drive TotalCylinders          1106
Drive TotalSectors  17767890
Drive TotalTracks   282030
Drive TracksPerCylinder       255

Drive     E:
Description         Local Fixed Disk
Compressed          Not Available
File System         Not Available
Size      Not Available
Free Space          Not Available
Volume Name         Not Available
Volume Serial Number          Not Available
Partition Disk #5, Partition #0
Partition Size      135.59 GB (145,589,518,336 bytes)
Starting Offset     16384 bytes
Drive Description   \\.\PHYSICALDRIVE5
Drive Manufacturer  Not Available
Drive Model         Not Available
Drive BytesPerSector          512
Drive MediaLoaded   True
Drive MediaType     Fixed hard disk media
Drive Partitions    1
Drive SCSIBus       0
Drive SCSILogicalUnit         0
Drive SCSIPort      5
Drive SCSITargetId  0
Drive SectorsPerTrack         32
Drive Size          145590583296 bytes
Drive TotalCylinders          138846
Drive TotalSectors  284356608
Drive TotalTracks   8886144
Drive TracksPerCylinder       64

Drive     F:
Description         Local Fixed Disk
Compressed          Not Available
File System         Not Available
Size      Not Available
Free Space          Not Available
Volume Name         Not Available
Volume Serial Number          Not Available
Partition Disk #1, Partition #0
Partition Size      39.06 GB (41,943,023,616 bytes)
Starting Offset     16384 bytes
Drive Description   \\.\PHYSICALDRIVE1
Drive Manufacturer  Not Available
Drive Model         Not Available
Drive BytesPerSector          512
Drive MediaLoaded   True
Drive MediaType     Fixed hard disk media
Drive Partitions    2
Drive SCSIBus       0
Drive SCSILogicalUnit         0
Drive SCSIPort      3
Drive SCSITargetId  0
Drive SectorsPerTrack         32
Drive Size          64424509440 bytes
Drive TotalCylinders          61440
Drive TotalSectors  125829120
Drive TotalTracks   3932160
Drive TracksPerCylinder       64

Drive     G:
Description         Local Fixed Disk
Compressed          Not Available
File System         Not Available
Size      Not Available
Free Space          Not Available
Volume Name         Not Available
Volume Serial Number          Not Available
Partition Disk #3, Partition #0
Partition Size      39.06 GB (41,943,023,616 bytes)
Starting Offset     16384 bytes
Drive Description   \\.\PHYSICALDRIVE3
Drive Manufacturer  Not Available
Drive Model         Not Available
Drive BytesPerSector          512
Drive MediaLoaded   True
Drive MediaType     Fixed hard disk media
Drive Partitions    2
```

APPENDIX C – TUNABLE PARAMETERS

```
Drive SCSIBus       0
Drive SCSILogicalUnit         0
Drive SCSIPort      4
Drive SCSITargetId  0
Drive SectorsPerTrack         32
Drive Size          64424509440 bytes
Drive TotalCylinders          61440
Drive TotalSectors  125829120
Drive TotalTracks   3932160
Drive TracksPerCylinder       64

Drive     H:
Description         Local Fixed Disk
Compressed          Not Available
File System         Not Available
Size      Not Available
Free Space          Not Available
Volume Name         Not Available
Volume Serial Number          Not Available
Partition Disk #6, Partition #0
Partition Size      54.69 GB (58,720,239,616 bytes)
Starting Offset     16384 bytes
Drive Description   \\.\PHYSICALDRIVE6
Drive Manufacturer  Not Available
Drive Model         Not Available
Drive BytesPerSector          512
Drive MediaLoaded   True
Drive MediaType     Fixed hard disk media
Drive Partitions    2
Drive SCSIBus       0
Drive SCSILogicalUnit         0
Drive SCSIPort      6
Drive SCSITargetId  0
Drive SectorsPerTrack         32
Drive Size          655157624832 bytes
Drive TotalCylinders          624807
Drive TotalSectors  1279604736
Drive TotalTracks   39987648
Drive TracksPerCylinder       64

Drive     I:
Description         Local Fixed Disk
Compressed          Not Available
File System         Not Available
Size      Not Available
Free Space          Not Available
Volume Name         Not Available
Volume Serial Number          Not Available
Partition Disk #7, Partition #0
Partition Size      39.06 GB (41,943,023,616 bytes)
Starting Offset     16384 bytes
Drive Description   \\.\PHYSICALDRIVE7
Drive Manufacturer  Not Available
Drive Model         Not Available
Drive BytesPerSector          512
Drive MediaLoaded   True
Drive MediaType     Fixed hard disk media
Drive Partitions    2
Drive SCSIBus       0
Drive SCSILogicalUnit         0
Drive SCSIPort      7
Drive SCSITargetId  0
Drive SectorsPerTrack         32
Drive Size          64424509440 bytes
Drive TotalCylinders          61440
Drive TotalSectors  125829120
Drive TotalTracks   3932160
Drive TracksPerCylinder       64

Drive     J:
Description         Local Fixed Disk
Compressed          Not Available
File System         Not Available
Size      Not Available
Free Space          Not Available
Volume Name         Not Available
Volume Serial Number          Not Available
Partition Disk #9, Partition #0
Partition Size      39.06 GB (41,943,023,616 bytes)
Starting Offset     16384 bytes
Drive Description   \\.\PHYSICALDRIVE9
Drive Manufacturer  Not Available
Drive Model         Not Available
Drive BytesPerSector          512
Drive MediaLoaded   True
Drive MediaType     Fixed hard disk media
Drive Partitions    2
Drive SCSIBus       0
Drive SCSILogicalUnit         0
Drive SCSIPort      8
Drive SCSITargetId  0
Drive SectorsPerTrack         32
Drive Size          64424509440 bytes
Drive TotalCylinders          61440
Drive TotalSectors  125829120
Drive TotalTracks   3932160
Drive TracksPerCylinder       64

Drive     K:
Description         Local Fixed Disk
Compressed          Not Available
File System         Not Available
Size      Not Available
Free Space          Not Available
Volume Name         Not Available
Volume Serial Number          Not Available
Partition Disk #11, Partition #0
Partition Size      54.69 GB (58,720,239,616 bytes)
Starting Offset     16384 bytes
Drive Description   \\.\PHYSICALDRIVE11
Drive Manufacturer  Not Available
Drive Model         Not Available
```

APPENDIX C – TUNABLE PARAMETERS

```
Drive BytesPerSector          512
Drive MediaLoaded   True
Drive MediaType     Fixed hard disk media
Drive Partitions    2
Drive SCSIBus       0
Drive SCSILogicalUnit         0
Drive SCSIPort      9
Drive SCSITargetId  0
Drive SectorsPerTrack         32
Drive Size          436743438336 bytes
Drive TotalCylinders          416511
Drive TotalSectors  853014528
Drive TotalTracks   26656704
Drive TracksPerCylinder       64

Drive     O:
Description         Local Fixed Disk
Compressed          Not Available
File System         Not Available
Size      Not Available
Free Space          Not Available
Volume Name         Not Available
Volume Serial Number          Not Available
Partition Disk #1, Partition #1
Partition Size      20.94 GB (22,480,420,864 bytes)
Starting Offset     Not Available
Drive Description   \\.\PHYSICALDRIVE1
Drive Manufacturer  Not Available
Drive Model         Not Available
Drive BytesPerSector          512
Drive MediaLoaded   True
Drive MediaType     Fixed hard disk media
Drive Partitions    2
Drive SCSIBus       0
Drive SCSILogicalUnit         0
Drive SCSIPort      3
Drive SCSITargetId  0
Drive SectorsPerTrack         32
Drive Size          64424509440 bytes
Drive TotalCylinders          61440
Drive TotalSectors  125829120
Drive TotalTracks   3932160
Drive TracksPerCylinder       64

Drive     P:
Description         Local Fixed Disk
Compressed          Not Available
File System         Not Available
Size      Not Available
Free Space          Not Available
Volume Name         Not Available
Volume Serial Number          Not Available
Partition Disk #3, Partition #1
Partition Size      20.94 GB (22,480,420,864 bytes)
Starting Offset     Not Available
Drive Description   \\.\PHYSICALDRIVE3
Drive Manufacturer  Not Available
Drive Model         Not Available
Drive BytesPerSector          512
Drive MediaLoaded   True
Drive MediaType     Fixed hard disk media
Drive Partitions    2
Drive SCSIBus       0
Drive SCSILogicalUnit         0
Drive SCSIPort      4
Drive SCSITargetId  0
Drive SectorsPerTrack         32
Drive Size          64424509440 bytes
Drive TotalCylinders          61440
Drive TotalSectors  125829120
Drive TotalTracks   3932160
Drive TracksPerCylinder       64

Drive     Q:
Description         Local Fixed Disk
Compressed          Not Available
File System         Not Available
Size      Not Available
Free Space          Not Available
Volume Name         Not Available
Volume Serial Number          Not Available
Partition Disk #6, Partition #1
Partition Size      26.37 GB (28,311,552,000 bytes)
Starting Offset     Not Available
Drive Description   \\.\PHYSICALDRIVE6
Drive Manufacturer  Not Available
Drive Model         Not Available
Drive BytesPerSector          512
Drive MediaLoaded   True
Drive MediaType     Fixed hard disk media
Drive Partitions    2
Drive SCSIBus       0
Drive SCSILogicalUnit         0
Drive SCSIPort      6
Drive SCSITargetId  0
Drive SectorsPerTrack         32
Drive Size          655157624832 bytes
Drive TotalCylinders          624807
Drive TotalSectors  1279604736
Drive TotalTracks   39987648
Drive TracksPerCylinder       64

Drive     R:
Description         Local Fixed Disk
Compressed          Not Available
File System         Not Available
Size      Not Available
Free Space          Not Available
Volume Name         Not Available
Volume Serial Number          Not Available
Partition Disk #7, Partition #1
Partition Size      20.94 GB (22,480,420,864 bytes)
```

APPENDIX C – TUNABLE PARAMETERS

```
Starting Offset     Not Available
Drive Description   \\.\PHYSICALDRIVE7
Drive Manufacturer  Not Available
Drive Model         Not Available
Drive BytesPerSector          512
Drive MediaLoaded   True
Drive MediaType     Fixed hard disk media
Drive Partitions    2
Drive SCSIBus       0
Drive SCSILogicalUnit         0
Drive SCSIPort      7
Drive SCSITargetId  0
Drive SectorsPerTrack         32
Drive Size          64424509440 bytes
Drive TotalCylinders          61440
Drive TotalSectors  125829120
Drive TotalTracks   3932160
Drive TracksPerCylinder       64

Drive     S:
Description         Local Fixed Disk
Compressed          Not Available
File System         Not Available
Size      Not Available
Free Space          Not Available
Volume Name         Not Available
Volume Serial Number          Not Available
Partition Disk #9, Partition #1
Partition Size      20.94 GB (22,480,420,864 bytes)
Starting Offset     Not Available
Drive Description   \\.\PHYSICALDRIVE9
Drive Manufacturer  Not Available
Drive Model         Not Available
Drive BytesPerSector          512
Drive MediaLoaded   True
Drive MediaType     Fixed hard disk media
Drive Partitions    2
Drive SCSIBus       0
Drive SCSILogicalUnit         0
Drive SCSIPort      8
Drive SCSITargetId  0
Drive SectorsPerTrack         32
Drive Size          64424509440 bytes
Drive TotalCylinders          61440
Drive TotalSectors  125829120
Drive TotalTracks   3932160
Drive TracksPerCylinder       64

Drive     T:
Description         Local Fixed Disk
Compressed          Not Available
File System         Not Available
Size      Not Available
Free Space          Not Available
Volume Name         Not Available
Volume Serial Number          Not Available
Partition Disk #11, Partition #1
Partition Size      26.37 GB (28,311,552,000 bytes)
Starting Offset     Not Available
Drive Description   \\.\PHYSICALDRIVE11
Drive Manufacturer  Not Available
Drive Model         Not Available
Drive BytesPerSector          512
Drive MediaLoaded   True
Drive MediaType     Fixed hard disk media
Drive Partitions    2
Drive SCSIBus       0
Drive SCSILogicalUnit         0
Drive SCSIPort      9
Drive SCSITargetId  0
Drive SectorsPerTrack         32
Drive Size          436743438336 bytes
Drive TotalCylinders          416511
Drive TotalSectors  853014528
Drive TotalTracks   26656704
Drive TracksPerCylinder       64

Drive     V:
Description         Local Fixed Disk
Compressed          False
File System         NTFS
Size      173.37 GB (186,157,871,104 bytes)
Free Space          72.28 GB (77,607,071,744 bytes)
Volume Name         New Volume
Volume Serial Number          0424EB53
Partition Disk #4, Partition #0
Partition Size      173.37 GB (186,157,875,200 bytes)
Starting Offset     16384 bytes
Drive Description   \\.\PHYSICALDRIVE4
Drive Manufacturer  Not Available
Drive Model         Not Available
Drive BytesPerSector          512
Drive MediaLoaded   True
Drive MediaType     Fixed hard disk media
Drive Partitions    1
Drive SCSIBus       0
Drive SCSILogicalUnit         0
Drive SCSIPort      4
Drive SCSITargetId  1
Drive SectorsPerTrack         32
Drive Size          186158940160 bytes
Drive TotalCylinders          177535
Drive TotalSectors  363591680
Drive TotalTracks   11362240
Drive TracksPerCylinder       64

Drive     W:
Description         Local Fixed Disk
Compressed          False
File System         NTFS
Size      173.37 GB (186,157,871,104 bytes)
Free Space          21.76 GB (23,368,445,952 bytes)
```

APPENDIX C – TUNABLE PARAMETERS

```
Volume Name          New Volume
Volume Serial Number          7CF245AC
Partition Disk #2, Partition #0
Partition Size       173.37 GB (186,157,875,200 bytes)
Starting Offset      16384 bytes
Drive Description    \\.\PHYSICALDRIVE2
Drive Manufacturer   Not Available
Drive Model          Not Available
Drive BytesPerSector          512
Drive MediaLoaded    True
Drive MediaType      Fixed hard disk media
Drive Partitions     1
Drive SCSIBus        0
Drive SCSILogicalUnit         0
Drive SCSIPort       3
Drive SCSITargetId   1
Drive SectorsPerTrack         32
Drive Size           186158940160 bytes
Drive TotalCylinders          177535
Drive TotalSectors   363591680
Drive TotalTracks    11362240
Drive TracksPerCylinder       64

Drive     X:
Description          Local Fixed Disk
Compressed           False
File System          NTFS
Size       173.37 GB (186,157,871,104 bytes)
Free Space           72.28 GB (77,607,096,320 bytes)
Volume Name          New Volume
Volume Serial Number          4CDF2CAA
Partition Disk #8, Partition #0
Partition Size       173.37 GB (186,157,875,200 bytes)
Starting Offset      16384 bytes
Drive Description    \\.\PHYSICALDRIVE8
Drive Manufacturer   Not Available
Drive Model          Not Available
Drive BytesPerSector          512
Drive MediaLoaded    True
Drive MediaType      Fixed hard disk media
Drive Partitions     1
Drive SCSIBus        0
Drive SCSILogicalUnit         0
Drive SCSIPort       7
Drive SCSITargetId   1
Drive SectorsPerTrack         32
Drive Size           186158940160 bytes
Drive TotalCylinders          177535
Drive TotalSectors   363591680
Drive TotalTracks    11362240
Drive TracksPerCylinder       64

Drive     Y:
Description          Local Fixed Disk
Compressed           False
File System          NTFS
Size       173.37 GB (186,157,871,104 bytes)
Free Space           21.76 GB (23,368,491,008 bytes)
Volume Name          New Volume
Volume Serial Number          586D1BB4
Partition Disk #10, Partition #0
Partition Size       173.37 GB (186,157,875,200 bytes)
Starting Offset      16384 bytes
Drive Description    \\.\PHYSICALDRIVE10
Drive Manufacturer   Not Available
Drive Model          Not Available
Drive BytesPerSector          512
Drive MediaLoaded    True
Drive MediaType      Fixed hard disk media
Drive Partitions     1
Drive SCSIBus        0
Drive SCSILogicalUnit         0
Drive SCSIPort       8
Drive SCSITargetId   1
Drive SectorsPerTrack         32
Drive Size           186158940160 bytes
Drive TotalCylinders          177535
Drive TotalSectors   363591680
Drive TotalTracks    11362240
Drive TracksPerCylinder       64

Drive     M:
Description          Network Connection
Provider Name        \\nrddata\g$


[SCSI]

Item       Value
Name       Hewlett Packard NetRAID-4M RAID Controller
Caption    Hewlett Packard NetRAID-4M RAID Controller
Driver     hpnsa
Status     OK
PNP Device ID        PCI\VEN_1011&DEV_0046&SUBSYS_10C2103C&REV_01\3&267A616A&0&20
Device ID PCI\VEN_1011&DEV_0046&SUBSYS_10C2103C&REV_01\3&267A616A&0&20
Device Map           Not Available
Index      Not Available
Max Number Controlled         Not Available
IRQ Number           61
I/O Port   0x1000-0x10FF
Driver     Not Available

Name       Symbios Logic 896, 22910 PCI SCSI Adapter
Caption    Symbios Logic 896, 22910 PCI SCSI Adapter
Driver     sym_hi
Status     OK
PNP Device ID        PCI\VEN_1000&DEV_000B&SUBSYS_10001000&REV_05\3&267A616A&0&50
Device ID PCI\VEN_1000&DEV_000B&SUBSYS_10001000&REV_05\3&267A616A&0&50
Device Map           Not Available
Index      Not Available
Max Number Controlled         Not Available
IRQ Number           58
```

APPENDIX C – TUNABLE PARAMETERS

```
I/O Port  0x1400-0x14FF
Driver    c:\winnt\system32\drivers\sym_hi.sys (21136, 5.00.2134.1)

Name      Symbios Logic 896, 22910 PCI SCSI Adapter
Caption   Symbios Logic 896, 22910 PCI SCSI Adapter
Driver    sym_hi
Status    OK
PNP Device ID       PCI\VEN_1000&DEV_000B&SUBSYS_10001000&REV_05\3&267A616A&0&51
Device ID PCI\VEN_1000&DEV_000B&SUBSYS_10001000&REV_05\3&267A616A&0&51
Device Map          Not Available
Index     Not Available
Max Number Controlled         Not Available
IRQ Number          18
I/O Port  0x1800-0x18FF
Driver    c:\winnt\system32\drivers\sym_hi.sys (21136, 5.00.2134.1)

Name      Hewlett Packard NetRAID-4M RAID Controller
Caption   Hewlett Packard NetRAID-4M RAID Controller
Driver    hpnsa
Status    OK
PNP Device ID       PCI\VEN_1011&DEV_0046&SUBSYS_10C2103C&REV_01\3&13C0B0C5&0&28
Device ID PCI\VEN_1011&DEV_0046&SUBSYS_10C2103C&REV_01\3&13C0B0C5&0&28
Device Map          Not Available
Index     Not Available
Max Number Controlled         Not Available
IRQ Number          44
I/O Port  0x2000-0x24FF
Driver    Not Available

Name      Hewlett Packard NetRAID-4M RAID Controller
Caption   Hewlett Packard NetRAID-4M RAID Controller
Driver    hpnsa
Status    OK
PNP Device ID       PCI\VEN_1011&DEV_0046&SUBSYS_10C2103C&REV_01\3&13C0B0C5&0&30
Device ID PCI\VEN_1011&DEV_0046&SUBSYS_10C2103C&REV_01\3&13C0B0C5&0&30
Device Map          Not Available
Index     Not Available
Max Number Controlled         Not Available
IRQ Number          40
I/O Port  0x2400-0x24FF
Driver    Not Available

Name      Hewlett Packard NetRAID-4M RAID Controller
Caption   Hewlett Packard NetRAID-4M RAID Controller
Driver    hpnsa
Status    OK
PNP Device ID       PCI\VEN_1011&DEV_0046&SUBSYS_10C2103C&REV_01\3&1070020&0&20
Device ID PCI\VEN_1011&DEV_0046&SUBSYS_10C2103C&REV_01\3&1070020&0&20
Device Map          Not Available
Index     Not Available
Max Number Controlled         Not Available
IRQ Number          32
I/O Port  0x3000-0x34FF
Driver    Not Available

Name      Hewlett Packard NetRAID-4M RAID Controller
Caption   Hewlett Packard NetRAID-4M RAID Controller
Driver    hpnsa
Status    OK
PNP Device ID       PCI\VEN_1011&DEV_0046&SUBSYS_10C2103C&REV_01\3&1070020&0&28
Device ID PCI\VEN_1011&DEV_0046&SUBSYS_10C2103C&REV_01\3&1070020&0&28
Device Map          Not Available
Index     Not Available
Max Number Controlled         Not Available
IRQ Number          28
I/O Port  0x3400-0x34FF
Driver    Not Available

Name      Hewlett Packard NetRAID-4M RAID Controller
Caption   Hewlett Packard NetRAID-4M RAID Controller
Driver    hpnsa
Status    OK
PNP Device ID       PCI\VEN_1011&DEV_0046&SUBSYS_10C2103C&REV_01\3&29E81982&0&20
Device ID PCI\VEN_1011&DEV_0046&SUBSYS_10C2103C&REV_01\3&29E81982&0&20
Device Map          Not Available
Index     Not Available
Max Number Controlled         Not Available
IRQ Number          24
I/O Port  0x4000-0x44FF
Driver    Not Available

Name      Hewlett Packard NetRAID-4M RAID Controller
Caption   Hewlett Packard NetRAID-4M RAID Controller
Driver    hpnsa
Status    OK
PNP Device ID       PCI\VEN_1011&DEV_0046&SUBSYS_10C2103C&REV_01\3&29E81982&0&28
Device ID PCI\VEN_1011&DEV_0046&SUBSYS_10C2103C&REV_01\3&29E81982&0&28
Device Map          Not Available
Index     Not Available
Max Number Controlled         Not Available
IRQ Number          20
I/O Port  0x4400-0x44FF
Driver    Not Available


[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
Intel 82371AB/EB PCI to USB Universal Host Controller
          PCI\VEN_8086&DEV_7112&SUBSYS_00000000&REV_01\3&267A616A&0&7A
USB Root Hub        USB\ROOT_HUB\4&B5B4E1B&0
```

APPENDIX C – TUNABLE PARAMETERS

```
[Software Environment]

[ Following are sub-categories of this main category ]

[Drivers]

Name      Description         File      Type      Started   Start Mode          State
          Status    Error Control       Accept Pause        Accept Stop
abiosdsk  Abiosdsk  Not Available       Kernel Driver       False     Disabled  Stopped   OK
          Ignore    False     False
abp480n5  abp480n5  Not Available       Kernel Driver       False     Disabled  Stopped   OK
          Normal    False     False
acpi      Microsoft ACPI Driver         c:\winnt\system32\drivers\acpi.sys     Kernel Driver
          True      Boot      Running   OK        Normal    False     True
acpiec    ACPIEC    c:\winnt\system32\drivers\acpiec.sys    Kernel Driver       False
          Disabled  Stopped   OK        Normal    False     False
adpu160m  adpu160m  Not Available       Kernel Driver       False     Disabled  Stopped   OK
          Normal    False     False
afd       AFD Networking Support Environment      c:\winnt\system32\drivers\afd.sys
          Kernel Driver       True      Auto      Running   OK        Normal    False     True
aha154x   Aha154x   Not Available       Kernel Driver       False     Disabled  Stopped   OK
          Normal    False     False
aic116x   aic116x   Not Available       Kernel Driver       False     Disabled  Stopped   OK
          Normal    False     False
aic78u2   aic78u2   Not Available       Kernel Driver       False     Disabled  Stopped   OK
          Normal    False     False
aic78xx   aic78xx   Not Available       Kernel Driver       False     Disabled  Stopped   OK
          Normal    False     False
amiOnt    amiOnt    Not Available       Kernel Driver       False     Disabled  Stopped   OK
          Normal    False     False
amsint    amsint    Not Available       Kernel Driver       False     Disabled  Stopped   OK
          Normal    False     False
asc       asc       Not Available       Kernel Driver       False     Disabled  Stopped   OK
          Normal    False     False
asc3350p  asc3350p  Not Available       Kernel Driver       False     Disabled  Stopped   OK
          Normal    False     False
asc3550   asc3550   Not Available       Kernel Driver       False     Disabled  Stopped   OK
          Normal    False     False
asyncmac  RAS Asynchronous Media Driver c:\winnt\system32\drivers\asyncmac.sys  Kernel Driver
          False     Manual    Stopped   OK        Normal    False     False
atapi     Standard IDE/ESDI Hard Disk Controller  c:\winnt\system32\drivers\atapi.sys
          Kernel Driver       True      Boot      Running   OK        Normal    False     True
atdisk    Atdisk    Not Available       Kernel Driver       False     Disabled  Stopped   OK
          Ignore    False     False
atmarpc   ATM ARP Client Protocol       c:\winnt\system32\drivers\atmarpc.sys   Kernel Driver
          False     Manual    Stopped   OK        Normal    False     False
audstub   Audio Stub Driver   c:\winnt\system32\drivers\audstub.sys   Kernel Driver       True
          Manual    Running   OK        Normal    False     True
beep      Beep      c:\winnt\system32\drivers\beep.sys      Kernel Driver       True
          System    Running   OK        Normal    False     True
buslogic  BusLogic  Not Available       Kernel Driver       False     Disabled  Stopped   OK
          Normal    False     False
cd20xrnt  cd20xrnt  Not Available       Kernel Driver       False     Disabled  Stopped   OK
          Normal    False     False
cdaudio   Cdaudio   c:\winnt\system32\drivers\cdaudio.sys   Kernel Driver       False
          System    Stopped   OK        Ignore    False     False
cdfs      Cdfs      c:\winnt\system32\drivers\cdfs.sys      File System Driver  True
          Disabled  Running   OK        Normal    False     True
cdrom     CD-ROM Driver       c:\winnt\system32\drivers\cdrom.sys     Kernel Driver       True
          System    Running   OK        Normal    False     True
changer   Changer   Not Available       Kernel Driver       False     System    Stopped   OK
          Ignore    False     False
cirrus    cirrus    c:\winnt\system32\drivers\cirrus.sys    Kernel Driver       True
          Manual    Running   OK        Ignore    False     True
cpqarray  Cpqarray  Not Available       Kernel Driver       False     Disabled  Stopped   OK
          Normal    False     False
cpqarry2  cpqarry2  Not Available       Kernel Driver       False     Disabled  Stopped   OK
          Normal    False     False
cpqfcalm  cpqfcalm  Not Available       Kernel Driver       False     Disabled  Stopped   OK
          Normal    False     False
cpqfws2e  cpqfws2e  Not Available       Kernel Driver       False     Disabled  Stopped   OK
          Normal    False     False
dac960nt  dac960nt  Not Available       Kernel Driver       False     Disabled  Stopped   OK
          Normal    False     False
deckzpsx  deckzpsx  Not Available       Kernel Driver       False     Disabled  Stopped   OK
          Normal    False     False
dfsdriver DfsDriver c:\winnt\system32\drivers\dfs.sys       File System Driver  True      Boot
          Running   OK        Normal    False     True
disk      Disk Driver         c:\winnt\system32\drivers\disk.sys      Kernel Driver       True
          Boot      Running   OK        Normal    False     True
diskperf  Diskperf  c:\winnt\system32\drivers\diskperf.sys  Kernel Driver       True      Boot
          Running   OK        Normal    False     True
dmboot    dmboot    c:\winnt\system32\drivers\dmboot.sys    Kernel Driver       False
          Disabled  Stopped   OK        Normal    False     False
dmio      Logical Disk Manager Driver   c:\winnt\system32\drivers\dmio.sys      Kernel Driver
          True      Boot      Running   OK        Normal    False     True
dmload    dmload    c:\winnt\system32\drivers\dmload.sys    Kernel Driver       True      Boot
          Running   OK        Normal    False     True
efs       EFS       c:\winnt\system32\drivers\efs.sys       File System Driver  True
          Disabled  Running   OK        Normal    False     True
em        em        c:\winnt\system32\drivers\em.sys        Kernel Driver       True
          System    Running   OK        Normal    False     True
fastfat   Fastfat   c:\winnt\system32\drivers\fastfat.sys   File System Driver  True
          Disabled  Running   OK        Normal    False     True
fd16_700  Fd16_700  Not Available       Kernel Driver       False     Disabled  Stopped   OK
          Normal    False     False
fdc       Floppy Disk Controller Driver c:\winnt\system32\drivers\fdc.sys       Kernel Driver
          True      Manual    Running   OK        Normal    False     True
fireport  fireport  Not Available       Kernel Driver       False     Disabled  Stopped   OK
          Normal    False     False
flashpnt  flashpnt  Not Available       Kernel Driver       False     Disabled  Stopped   OK
          Normal    False     False
flpydisk  Floppy Disk Driver  c:\winnt\system32\drivers\flpydisk.sys  Kernel Driver       True
          Manual    Running   OK        Normal    False     True
ftdisk    Volume Manager Driver         c:\winnt\system32\drivers\ftdisk.sys    Kernel Driver
          True      Boot      Running   OK        Normal    False     True
gpc       Generic Packet Classifier     c:\winnt\system32\drivers\msgpc.sys     Kernel Driver
          True      Manual    Running   OK        Normal    False     True
hpndisk   Hewlett Packard NetRAID-4M Disk Driver  c:\winnt\system32\drivers\hpndisk.sys
          Kernel Driver       True      Boot      Running   OK        Normal    False     True
hpnmgt    HPNMgt    c:\winnt\system32\drivers\hpnmgt.sys    Kernel Driver       True      Boot
          Running   OK        Normal    False     True
```

APPENDIX C – TUNABLE PARAMETERS

```
hpnsa       Hewlett Packard NetRAID-4M Driver       c:\winnt\system32\drivers\hpnsa.sys
            Kernel Driver       True      Boot      Running   OK        Normal    False     True
hptx        HP 10/100TX PCI LAN Adapter NT Driver   c:\winnt\system32\drivers\hptxnt5.sys
            Kernel Driver       True      Manual    Running   OK        Normal    False     True
i8042prt    i8042 Keyboard and PS/2 Mouse Port Driver
            c:\winnt\system32\drivers\i8042prt.sys  Kernel Driver       True      System
            Running   OK        Normal    False     True
ini910u     ini910u   Not Available       Kernel Driver       False     Disabled  Stopped   OK
            Normal    False     False
intelide    IntelIde  c:\winnt\system32\drivers\intelide.sys  Kernel Driver       True      Boot
            Running   OK        Normal    False     True
ipfilterdriver      IP Traffic Filter Driver      c:\winnt\system32\drivers\ipfltdrv.sys
            Kernel Driver       False     Manual    Stopped   OK        Normal    False
            False
ipinip      IP in IP Tunnel Driver        c:\winnt\system32\drivers\ipinip.sys    Kernel Driver
            False     Manual    Stopped   OK        Normal    False     False
ipnat       IP Network Address Translator c:\winnt\system32\drivers\ipnat.sys     Kernel Driver
            False     Manual    Stopped   OK        Normal    False     False
ipsec       IPSEC driver        c:\winnt\system32\drivers\ipsec.sys     Kernel Driver
            False     Manual    Stopped   OK        Normal    False     False
ipsraidn    ipsraidn  Not Available       Kernel Driver       False     Disabled  Stopped   OK
            Normal    False     False
isapnp      PnP ISA/EISA Bus Driver       c:\winnt\system32\drivers\isapnp.sys    Kernel Driver
            True      Boot      Running   OK        Critical  False     True
kbdclass    Keyboard Class Driver         c:\winnt\system32\drivers\kbdclass.sys  Kernel Driver
            True      System    Running   OK        Normal    False     True
ksecdd      KSecDD    c:\winnt\system32\drivers\ksecdd.sys    Kernel Driver       True      Boot
            Running   OK        Normal    False     True
lbrtfdc     lbrtfdc   Not Available       Kernel Driver       False     System    Stopped   OK
            Ignore    False     False
lp6nds35    lp6nds35  Not Available       Kernel Driver       False     Disabled  Stopped   OK
            Normal    False     False
mnmdd       mnmdd     c:\winnt\system32\drivers\mnmdd.sys     Kernel Driver       True
            System    Running   OK        Ignore    False     True
modem       Modem     c:\winnt\system32\drivers\modem.sys     Kernel Driver       False
            Manual    Stopped   OK        Ignore    False     False
mouclass    Mouse Class Driver  c:\winnt\system32\drivers\mouclass.sys  Kernel Driver       True
            System    Running   OK        Normal    False     True
mountmgr    MountMgr  c:\winnt\system32\drivers\mountmgr.sys  Kernel Driver       True      Boot
            Running   OK        Normal    False     True
mraid35x    mraid35x  Not Available       Kernel Driver       False     Disabled  Stopped   OK
            Normal    False     False
mrxsmb      MRXSMB    c:\winnt\system32\drivers\mrxsmb.sys    File System Driver  True
            System    Running   OK        Normal    False     True
msfs        Msfs      c:\winnt\system32\drivers\msfs.sys      File System Driver  True
            System    Running   OK        Normal    False     True
mskssrv     Microsoft Streaming Service Proxy       c:\winnt\system32\drivers\mskssrv.sys
            Kernel Driver       False     Manual    Stopped   OK        Normal    False
            False
mspclock    Microsoft Streaming Clock Proxy         c:\winnt\system32\drivers\mspclock.sys
            Kernel Driver       False     Manual    Stopped   OK        Normal    False
            False
mspqm       Microsoft Streaming Quality Manager Proxy
            c:\winnt\system32\drivers\mspqm.sys     Kernel Driver       False     Manual
            Stopped   OK        Normal    False     False
mup         Mup       c:\winnt\system32\drivers\mup.sys       File System Driver  True      Boot
            Running   OK        Normal    False     True
ncrc710     Ncrc710   Not Available       Kernel Driver       False     Disabled  Stopped   OK
            Normal    False     False
ndis        NDIS System Driver  c:\winnt\system32\drivers\ndis.sys      Kernel Driver       True
            Boot      Running   OK        Normal    False     True
ndistapi    Remote Access NDIS TAPI Driver          c:\winnt\system32\drivers\ndistapi.sys
            Kernel Driver       True      Manual    Running   OK        Normal    False     True
ndiswan     Remote Access NDIS WAN Driver c:\winnt\system32\drivers\ndiswan.sys   Kernel Driver
            True      Manual    Running   OK        Normal    False     True
ndproxy     NDIS Proxy          c:\winnt\system32\drivers\ndproxy.sys   Kernel Driver       True
            Manual    Running   OK        Normal    False     True
netbios     NetBIOS Interface   c:\winnt\system32\drivers\netbios.sys   File System Driver  True
            System    Running   OK        Normal    False     True
netbt       NetBios over Tcpip  c:\winnt\system32\drivers\netbt.sys     Kernel Driver       True
            System    Running   OK        Normal    False     True
netdetect   NetDetect c:\winnt\system32\drivers\netdtect.sys  Kernel Driver       False
            Manual    Stopped   OK        Normal    False     False
nm          Network Monitor Driver          c:\winnt\system32\drivers\nmnt.sys      Kernel Driver
            False     Manual    Stopped   OK        Normal    False     False
npfs        Npfs      c:\winnt\system32\drivers\npfs.sys      File System Driver  True
            System    Running   OK        Normal    False     True
ntfs        Ntfs      c:\winnt\system32\drivers\ntfs.sys      File System Driver  True
            Disabled  Running   OK        Normal    False     True
null        Null      c:\winnt\system32\drivers\null.sys      Kernel Driver       True
            System    Running   OK        Normal    False     True
nwlnkflt    IPX Traffic Filter Driver       c:\winnt\system32\drivers\nwlnkflt.sys  Kernel Driver
            False     Manual    Stopped   OK        Normal    False     False
nwlnkfwd    IPX Traffic Forwarder Driver    c:\winnt\system32\drivers\nwlnkfwd.sys  Kernel Driver
            False     Manual    Stopped   OK        Normal    False     False
parallel    Parallel  c:\winnt\system32\drivers\parallel.sys  Kernel Driver       False     Auto
            Stopped   OK        Ignore    False     False
parport     Parport   c:\winnt\system32\drivers\parport.sys   Kernel Driver       False     Auto
            Stopped   OK        Ignore    False     False
partmgr     PartMgr   c:\winnt\system32\drivers\partmgr.sys   Kernel Driver       True      Boot
            Running   OK        Normal    False     True
parvdm      ParVdm    c:\winnt\system32\drivers\parvdm.sys    Kernel Driver       False     Auto
            Stopped   OK        Ignore    False     False
pci         PCI Bus Driver      c:\winnt\system32\drivers\pci.sys       Kernel Driver       True
            Boot      Running   OK        Critical  False     True
pcidump     PCIDump   Not Available       Kernel Driver       False     System    Stopped   OK
            Ignore    False     False
pciide      PCIIde    Not Available       Kernel Driver       False     Disabled  Stopped   OK
            Normal    False     False
pcmcia      Pcmcia    c:\winnt\system32\drivers\pcmcia.sys    Kernel Driver       False
            Disabled  Stopped   OK        Normal    False     False
pdcomp      PDCOMP    Not Available       Kernel Driver       False     Manual    Stopped   OK
            Ignore    False     False
pdframe     PDFRAME   Not Available       Kernel Driver       False     Manual    Stopped   OK
            Ignore    False     False
pdreli      PDRELI    Not Available       Kernel Driver       False     Manual    Stopped   OK
            Ignore    False     False
pdrframe    PDRFRAME  Not Available       Kernel Driver       False     Manual    Stopped   OK
            Ignore    False     False
pptpminiport        WAN Miniport (PPTP) c:\winnt\system32\drivers\raspptp.sys   Kernel Driver
            True      Manual    Running   OK        Normal    False     True
```

APPENDIX C – TUNABLE PARAMETERS

```
ptilink   Direct Parallel Link Driver   c:\winnt\system32\drivers\ptilink.sys   Kernel Driver
          True      Manual    Running   OK        Normal    False     True
ql1080    ql1080    Not Available       Kernel Driver       False     Disabled  Stopped   OK
          Normal    False     False
ql10wnt   Ql10wnt   Not Available       Kernel Driver       False     Disabled  Stopped   OK
          Normal    False     False
ql1240    ql1240    Not Available       Kernel Driver       False     Disabled  Stopped   OK
          Normal    False     False
ql2100    ql2100    Not Available       Kernel Driver       False     Disabled  Stopped   OK
          Normal    False     False
rasacd    Remote Access Auto Connection Driver    c:\winnt\system32\drivers\rasacd.sys
          Kernel Driver       True      System    Running   OK        Normal    False     True
rasl2tp   WAN Miniport (L2TP) c:\winnt\system32\drivers\rasl2tp.sys   Kernel Driver       True
          Manual    Running   OK        Normal    False     True
raspti    Direct Parallel     c:\winnt\system32\drivers\raspti.sys   Kernel Driver       True
          Manual    Running   OK        Normal    False     True
rca       Microsoft Streaming Network Raw Channel Access    c:\winnt\system32\drivers\rca.sys
          Kernel Driver       False     Manual    Stopped   OK        Normal    False
          False
rdbss     Rdbss     c:\winnt\system32\drivers\rdbss.sys     File System Driver  True
          System    Running   OK        Normal    False     True
rdpwd     RDPWD     c:\winnt\system32\drivers\rdpwd.sys     Kernel Driver       False
          Manual    Stopped   OK        Ignore    False     False
redbook   Digital CD Audio Playback Filter Driver c:\winnt\system32\drivers\redbook.sys
          Kernel Driver       False     System    Stopped   OK        Normal    False
          False
serenum   Serenum Filter Driver         c:\winnt\system32\drivers\serenum.sys   Kernel Driver
          True      Manual    Running   OK        Normal    False     True
serial    Serial port driver  c:\winnt\system32\drivers\serial.sys    Kernel Driver       True
          System    Running   OK        Ignore    False     True
sfloppy   Sfloppy   c:\winnt\system32\drivers\sfloppy.sys   Kernel Driver       False
          System    Stopped   OK        Ignore    False     False
sglfb     sglfb     Not Available       Kernel Driver       False     System    Stopped   OK
          Normal    False     False
simbad    Simbad    Not Available       Kernel Driver       False     Disabled  Stopped   OK
          Normal    False     False
sparrow   Sparrow   Not Available       Kernel Driver       False     Disabled  Stopped   OK
          Normal    False     False
spud      Special Purpose Utility Driver          c:\winnt\system32\drivers\spud.sys
          Kernel Driver       True      Manual    Running   OK        Normal    False     True
srv       Srv       c:\winnt\system32\drivers\srv.sys       File System Driver  True
          Manual    Running   OK        Normal    False     True
swenum    Software Bus Driver c:\winnt\system32\drivers\swenum.sys    Kernel Driver       True
          Manual    Running   OK        Normal    False     True
symc810   symc810   Not Available       Kernel Driver       False     Disabled  Stopped   OK
          Normal    False     False
symc8xx   symc8xx   Not Available       Kernel Driver       False     Disabled  Stopped   OK
          Normal    False     False
sym_hi    sym_hi    c:\winnt\system32\drivers\sym_hi.sys    Kernel Driver       True      Boot
          Running   OK        Normal    False     True
tcpip     TCP/IP Protocol Driver        c:\winnt\system32\drivers\tcpip.sys     Kernel Driver
          True      System    Running   OK        Normal    False     True
tdasync   TDASYNC   c:\winnt\system32\drivers\tdasync.sys   Kernel Driver       False
          Manual    Stopped   OK        Ignore    False     False
tdipx     TDIPX     c:\winnt\system32\drivers\tdipx.sys     Kernel Driver       False
          Manual    Stopped   OK        Ignore    False     False
tdnetb    TDNETB    c:\winnt\system32\drivers\tdnetb.sys    Kernel Driver       False
          Manual    Stopped   OK        Ignore    False     False
tdpipe    TDPIPE    c:\winnt\system32\drivers\tdpipe.sys    Kernel Driver       False
          Manual    Stopped   OK        Ignore    False     False
tdspx     TDSPX     c:\winnt\system32\drivers\tdspx.sys     Kernel Driver       False
          Manual    Stopped   OK        Ignore    False     False
tdtcp     TDTCP     c:\winnt\system32\drivers\tdtcp.sys     Kernel Driver       False
          Manual    Stopped   OK        Ignore    False     False
termdd    Terminal Device Driver        c:\winnt\system32\drivers\termdd.sys    Kernel Driver
          False     Disabled  Stopped   OK        Normal    False     False
tga       tga       Not Available       Kernel Driver       False     System    Stopped   OK
          Ignore    False     False
udfs      Udfs      c:\winnt\system32\drivers\udfs.sys      File System Driver  False
          Disabled  Stopped   OK        Normal    False     False
uhcd      Microsoft USB Universal Host Controller Driver    c:\winnt\system32\drivers\uhcd.sys
          Kernel Driver       True      Manual    Running   OK        Normal    False     True
ultra66   ultra66   Not Available       Kernel Driver       False     Disabled  Stopped   OK
          Normal    False     False
update    Microcode Update Driver       c:\winnt\system32\drivers\update.sys    Kernel Driver
          True      Manual    Running   OK        Normal    False     True
usbhub    Microsoft USB Standard Hub Driver       c:\winnt\system32\drivers\usbhub.sys
          Kernel Driver       True      Manual    Running   OK        Normal    False     True
vgasave   VgaSave   c:\winnt\system32\drivers\vga.sys        Kernel Driver       False
          System    Stopped   OK        Ignore    False     False
wanarp    Remote Access IP ARP Driver   c:\winnt\system32\drivers\wanarp.sys    Kernel Driver
          True      Manual    Running   OK        Normal    False     True
wdica     WDICA     Not Available       Kernel Driver       False     Manual    Stopped   OK
          Ignore    False     False

[Environment Variables]

Variable  Value     User Name
ComSpec   %SystemRoot%\system32\cmd.exe <SYSTEM>
Os2LibPath          %SystemRoot%\system32\os2\dll;          <SYSTEM>
Path
          C:\mksnt;C:\WINNT\system32;C:\WINNT;C:\WINNT\System32\Wbem;C:\PROGRA~1\MICROS~3\80\T
ools\BINN;C:\PROGRA~1\MICROS~2\Common\MSDev98\Bin;C:\PROGRA~1\MICROS~2\Common\Tools;C:\PROGRA~
1\MICROS~2\VC98\bin;          <SYSTEM>
windir    %SystemRoot%        <SYSTEM>
OS        Windows_NT          <SYSTEM>
PROCESSOR_ARCHITECTURE        x86       <SYSTEM>
PROCESSOR_LEVEL     6         <SYSTEM>
PROCESSOR_IDENTIFIER          x86 Family 6 Model 10 Stepping 0, GenuineIntel    <SYSTEM>
PROCESSOR_REVISION  0a00      <SYSTEM>
NUMBER_OF_PROCESSORS          8         <SYSTEM>
PATHEXT   .COM;.EXE;.BAT;.CMD;.VBS;.VBE;.JS;.JSE;.WSF;.WSH  <SYSTEM>
TEMP      %SystemRoot%\TEMP   <SYSTEM>
TMP       %SystemRoot%\TEMP   <SYSTEM>
ROOTDIR   C:/       <SYSTEM>
SHELL     C:/mksnt/sh.exe     <SYSTEM>
HOME      C:/       <SYSTEM>
TMPDIR    C:/WINNT/TEMP       <SYSTEM>
TEMP      %USERPROFILE%\Local Settings\Temp       PRF_SUT6\Administrator
TMP       %USERPROFILE%\Local Settings\Temp       PRF_SUT6\Administrator
```

APPENDIX C – TUNABLE PARAMETERS

```
path      C:\Program Files\Microsoft Visual Studio\Common\MSDev98\Bin;C:\Program
Files\Microsoft Visual Studio\Common\Tools;C:\Program Files\Microsoft Visual Studio\VC98\bin
          PRF_SUT6\Administrator
MSDevDir  C:\Program Files\Microsoft Visual Studio\Common\MSDev98     PRF_SUT6\Administrator
include   C:\Program Files\Microsoft Visual Studio\VC98\atl\include;C:\Program Files\Microsoft
Visual Studio\VC98\mfc\include;C:\Program Files\Microsoft Visual Studio\VC98\include
          PRF_SUT6\Administrator
lib       C:\Program Files\Microsoft Visual Studio\VC98\mfc\lib;C:\Program Files\Microsoft
Visual Studio\VC98\lib        PRF_SUT6\Administrator

[Jobs]

[ Following are sub-categories of this main category ]

[Print]

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

[Network Connections]

Local Name          Remote Name         Type      Status    User Name
M:        \\nrddata\g$        Disk      OK        PRF_SUT6\Administrator

[Running Tasks]

Name      Path      Process ID          Priority  Min Working Set     Max Working Set
          Start Time          Version   Size      File Date
system idle process Not Available       0         0         Not Available       Not Available
          Not Available       Unknown   Unknown   Unknown
system    Not Available       8         8         0         1413120   Not Available
          Unknown   Unknown   Unknown
smss.exe  c:\winnt\system32\smss.exe    276       11        204800    1413120   12/18/2000
4:29:45 PM          5.00.2170.1         44.27 KB (45,328 bytes)       12/7/1999 4:00:00 AM
csrss.exe Not Available       304       13        Not Available       Not Available
          12/18/2000 4:29:53 PM         Unknown   Unknown   Unknown
winlogon.exe        c:\winnt\system32\winlogon.exe          324       13        204800
          1413120   12/18/2000 4:29:55 PM         5.00.2182.1         173.27 KB (177,424
bytes)    12/7/1999 4:00:00 AM
services.exe        c:\winnt\system32\services.exe          352       9         204800
          1413120   12/18/2000 4:29:57 PM         5.00.2134.1         86.77 KB (88,848 bytes)
          12/7/1999 4:00:00 AM
lsass.exe c:\winnt\system32\lsass.exe   364       13        204800    1413120   12/18/2000
4:29:57 PM          5.00.2184.1         32.77 KB (33,552 bytes)       12/7/1999 4:00:00 AM
svchost.exe         c:\winnt\system32\svchost.exe 500       8         204800    1413120
          12/18/2000 4:30:00 PM         5.00.2134.1         7.77 KB (7,952 bytes)
          12/7/1999 4:00:00 AM
msdtc.exe c:\winnt\system32\msdtc.exe   528       8         204800    1413120   12/18/2000
4:30:01 PM          1999.9.3421.3       6.77 KB (6,928 bytes)         10/27/2000 9:37:51 AM
svchost.exe         c:\winnt\system32\svchost.exe 776       8         204800    1413120
          12/18/2000 4:30:04 PM         5.00.2134.1         7.77 KB (7,952 bytes)
          12/7/1999 4:00:00 AM
afaagent.exe        c:\program files\hp_raid\hpn\afaagent.exe         792       8
          204800    1413120   12/18/2000 4:30:04 PM         2.4.0.4576          256.27 KB
(262,416 bytes)     12/13/2000 3:08:09 PM
tcpsvcs.exe         c:\winnt\system32\tcpsvcs.exe 856       8         204800    1413120
          12/18/2000 4:30:05 PM         5.00.2134.1         24.77 KB (25,360 bytes)
          12/7/1999 4:00:00 AM
snmp.exe  c:\winnt\system32\snmp.exe    924       8         204800    1413120   12/18/2000
4:30:06 PM          5.00.2173.1         29.77 KB (30,480 bytes)       10/27/2000 9:37:33 AM
winmgmt.exe         c:\winnt\system32\wbem\winmgmt.exe      940       8         204800
          1413120   12/18/2000 4:30:06 PM         1.50.1085.0001      188.05 KB (192,567
bytes)    12/7/1999 4:00:00 AM
wins.exe  c:\winnt\system32\wins.exe    1020      8         204800    1413120   12/18/2000
4:30:06 PM          5.00.2181.1         147.77 KB (151,312 bytes)     10/27/2000 9:37:42 AM
dns.exe   c:\winnt\system32\dns.exe     1032      8         204800    1413120   12/18/2000
4:30:06 PM          5.00.2190.1         312.27 KB (319,760 bytes)     10/27/2000 9:37:43 AM
inetinfo.exe        c:\winnt\system32\inetsrv\inetinfo.exe 1116      8         204800
          1413120   12/18/2000 4:30:10 PM         5.00.0984 14.27 KB (14,608 bytes)
          10/27/2000 9:38:36 AM
mssearch.exe        c:\program files\common files\system\mssearch\bin\mssearch.exe       1260
          8         204800    1413120   12/18/2000 4:30:10 PM         9.107.5512.0
          72.00 KB (73,728 bytes)       10/30/2000 10:29:16 AM
svchost.exe         c:\winnt\system32\svchost.exe 1592      8         204800    1413120
          12/18/2000 4:30:47 PM         5.00.2134.1         7.77 KB (7,952 bytes)
          12/7/1999 4:00:00 AM
locator.exe         c:\winnt\system32\locator.exe 1692      8         204800    1413120
          12/18/2000 4:32:15 PM         5.00.2135.1         70.77 KB (72,464 bytes)
          12/7/1999 4:00:00 AM
explorer.exe        c:\winnt\explorer.exe         1716      8         204800    1413120
          12/18/2000 4:32:58 PM         5.00.2920.0000      232.77 KB (238,352 bytes)
          12/7/1999 4:00:00 AM
sqlmangr.exe        c:\program files\microsoft sql server\80\tools\binn\sqlmangr.exe     1464
          8         204800    1413120   12/18/2000 4:33:01 PM         2000.080.0194.00
          68.00 KB (69,632 bytes)       11/10/2000 11:45:54 AM
cmd.exe   c:\winnt\system32\cmd.exe     1676      8         204800    1413120   12/18/2000
4:33:04 PM          5.00.2144.1         230.77 KB (236,304 bytes)     12/7/1999 4:00:00 AM
cmd.exe   c:\winnt\system32\cmd.exe     1648      8         204800    1413120   12/18/2000
4:48:02 PM          5.00.2144.1         230.77 KB (236,304 bytes)     12/7/1999 4:00:00 AM
mmc.exe   c:\winnt\system32\mmc.exe     1792      8         204800    1413120   12/19/2000
6:18:27 PM          5.00.2153.1         589.27 KB (603,408 bytes)     12/7/1999 4:00:00 AM
rsvp.exe  c:\winnt\system32\rsvp.exe    1844      8         204800    1413120   12/19/2000
6:19:45 PM          5.00.2167.1         172.77 KB (176,912 bytes)     12/7/1999 4:00:00 AM

[Loaded Modules]

Name      Version   Size      File Date Manufacturer        Path
traffic.dll         5.00.2139.1         30.77 KB (31,504 bytes)       12/7/1999 4:00:00 AM
          Microsoft Corporation         c:\winnt\system32\traffic.dll
rsvp.exe  5.00.2167.1         172.77 KB (176,912 bytes)     12/7/1999 4:00:00 AM
          Microsoft Corporation         c:\winnt\system32\rsvp.exe
wbemprox.dll        1.50.1085.0001      40.05 KB (41,016 bytes)       12/7/1999 4:00:00 AM
          Microsoft Corporation         c:\winnt\system32\wbem\wbemprox.dll
rassapi.dll         5.00.2188.1         14.27 KB (14,608 bytes)       12/7/1999 4:00:00 AM
          Microsoft Corporation         c:\winnt\system32\rassapi.dll
```

APPENDIX C – TUNABLE PARAMETERS

```
adsnt.dll 5.00.2191.1         194.27 KB (198,928 bytes)     12/7/1999 4:00:00 AM
          Microsoft Corporation         c:\winnt\system32\adsnt.dll
dbghelp.dll         5.00.2195.1         159.27 KB (163,088 bytes)     12/7/1999 4:00:00 AM
          Microsoft Corporation         c:\winnt\system32\dbghelp.dll
localsec.dll        5.00.2134.1         227.27 KB (232,720 bytes)     12/7/1999 4:00:00 AM
          Microsoft Corporation         c:\winnt\system32\localsec.dll
devmgr.dll          5.00.2166.1         215.77 KB (220,944 bytes)     12/7/1999 4:00:00 AM
          Microsoft Corporation         c:\winnt\system32\devmgr.dll
filemgmt.dll        5.00.2134.1         287.27 KB (294,160 bytes)     12/7/1999 4:00:00 AM
          Microsoft Corporation         c:\winnt\system32\filemgmt.dll
pdh.dll   5.00.2174.1         143.27 KB (146,704 bytes)     12/7/1999 4:00:00 AM
          Microsoft Corporation         c:\winnt\system32\pdh.dll
smlogcfg.dll        5.00.2163.1         273.27 KB (279,824 bytes)     12/7/1999 4:00:00 AM
          Microsoft Corporation         c:\winnt\system32\smlogcfg.dll
cabinet.dll         5.00.2147.1         54.77 KB (56,080 bytes)       12/7/1999 4:00:00 AM
          Microsoft Corporation         c:\winnt\system32\cabinet.dll
msinfo32.dll        5.00.2177.1         312.27 KB (319,760 bytes)     10/27/2000 4:43:47 PM
          Microsoft Corporation         c:\program files\common files\microsoft
shared\msinfo\msinfo32.dll
riched20.dll        5.30.23.1200        421.27 KB (431,376 bytes)     12/7/1999 4:00:00 AM
          Microsoft Corporation         c:\winnt\system32\riched20.dll
riched32.dll        5.00.2134.1         3.77 KB (3,856 bytes)         12/7/1999 4:00:00 AM
          Microsoft Corporation         c:\winnt\system32\riched32.dll
els.dll   5.00.2175.1         151.27 KB (154,896 bytes)     12/7/1999 4:00:00 AM
          Microsoft Corporation         c:\winnt\system32\els.dll
ntmsmgr.dll         1,0,0,1   427.77 KB (438,032 bytes)     12/7/1999 4:00:00 AM
          Microsoft Corporation and HighGround Systems, Inc.
          c:\winnt\system32\ntmsmgr.dll
mmfutil.dll         1.50.1085.0000      32.06 KB (32,829 bytes)       12/7/1999 4:00:00 AM
          Microsoft Corporation         c:\winnt\system32\mmfutil.dll
logdrive.dll        1.50.1085.0000      200.06 KB (204,863 bytes)     12/7/1999 4:00:00 AM
          Microsoft Corporation         c:\winnt\system32\logdrive.dll
dfrgres.dll         5.00.2150.1         27.50 KB (28,160 bytes)       12/7/1999 4:00:00 AM
          Executive Software International, Inc.  c:\winnt\system32\dfrgres.dll
dfrgsnap.dll        5.00.2150.1         41.77 KB (42,768 bytes)       12/7/1999 4:00:00 AM
          Executive Software International, Inc.  c:\winnt\system32\dfrgsnap.dll
dmdskres.dll        2191.1.296.2        119.00 KB (121,856 bytes)     12/7/1999 4:00:00 AM
          Microsoft Corp., VERITAS Software       c:\winnt\system32\dmdskres.dll
dmutil.dll          2191.1.296.2        41.77 KB (42,768 bytes)       12/7/1999 4:00:00 AM
          VERITAS Software Corp.        c:\winnt\system32\dmutil.dll
ntmsapi.dll         5.00.1948.1         50.27 KB (51,472 bytes)       12/7/1999 4:00:00 AM
          Microsoft Corporation         c:\winnt\system32\ntmsapi.dll
dmdskmgr.dll        2191.1.296.2        158.77 KB (162,576 bytes)     12/7/1999 4:00:00 AM
          Microsoft Corp., VERITAS Software       c:\winnt\system32\dmdskmgr.dll
mycomput.dll        5.00.2134.1         107.77 KB (110,352 bytes)     12/7/1999 4:00:00 AM
          Microsoft Corporation         c:\winnt\system32\mycomput.dll
mmcndmgr.dll        5.00.2178.1         815.27 KB (834,832 bytes)     12/7/1999 4:00:00 AM
          Microsoft Corporation         c:\winnt\system32\mmcndmgr.dll
mfc42u.dll          6.00.8665.0         972.05 KB (995,384 bytes)     12/7/1999 4:00:00 AM
          Microsoft Corporation         c:\winnt\system32\mfc42u.dll
mmc.exe   5.00.2153.1         589.27 KB (603,408 bytes)     12/7/1999 4:00:00 AM
          Microsoft Corporation         c:\winnt\system32\mmc.exe
cmd.exe   5.00.2144.1         230.77 KB (236,304 bytes)     12/7/1999 4:00:00 AM
          Microsoft Corporation         c:\winnt\system32\cmd.exe
sqlmangr.rll        2000.080.0194.00    96.00 KB (98,304 bytes)       11/10/2000 11:45:54 AM
          Microsoft Corporation         c:\program files\microsoft sql
server\80\tools\binn\resources\1033\sqlmangr.rll
sqlsvc.rll          2000.080.0194.00    24.00 KB (24,576 bytes)       11/10/2000 11:45:51 AM
          Microsoft Corporation         c:\program files\microsoft sql
server\80\tools\binn\resources\1033\sqlsvc.rll
sqlresld.dll        2000.080.0194.00    28.06 KB (28,738 bytes)       11/10/2000 11:45:51 AM
          Microsoft Corporation         c:\program files\microsoft sql
server\80\tools\binn\sqlresld.dll
odbcbcp.dll          2000.080.0194.00   28.07 KB (28,742 bytes)       10/30/2000 11:02:12 AM
          Microsoft Corporation         c:\winnt\system32\odbcbcp.dll
sqlsvc.dll          2000.080.0194.00    92.06 KB (94,272 bytes)       11/10/2000 11:45:51 AM
          Microsoft Corporation         c:\program files\microsoft sql
server\80\tools\binn\sqlsvc.dll
sqlunirl.dll        2000.080.0194.00    176.06 KB (180,290 bytes)     8/6/2000 2:51:56 AM
          Microsoft Corporation         c:\winnt\system32\sqlunirl.dll
w95scm.dll          2000.080.0194.00    48.06 KB (49,216 bytes)       11/10/2000 11:45:51 AM
          Microsoft Corporation         c:\program files\microsoft sql
server\80\tools\binn\w95scm.dll
sqlmangr.exe        2000.080.0194.00    68.00 KB (69,632 bytes)       11/10/2000 11:45:54 AM
          Microsoft Corporation         c:\program files\microsoft sql
server\80\tools\binn\sqlmangr.exe
imm32.dll 5.00.2180.1         93.77 KB (96,016 bytes)       12/7/1999 4:00:00 AM
          Microsoft Corporation         c:\winnt\system32\imm32.dll
actxprxy.dll        5.00.2920.0000      70.77 KB (72,464 bytes)       12/7/1999 4:00:00 AM
          Microsoft Corporation         c:\winnt\system32\actxprxy.dll
usp10.dll 1.0325.2180.1       307.77 KB (315,152 bytes)     12/7/1999 4:00:00 AM
          Microsoft Corporation         c:\winnt\system32\usp10.dll
faxshell.dll        5.00.2134.1         8.27 KB (8,464 bytes)         12/7/1999 4:00:00 AM
          Microsoft Corporation         c:\winnt\system32\faxshell.dll
msacm32.dll         5.00.2134.1         65.27 KB (66,832 bytes)       12/7/1999 4:00:00 AM
          Microsoft Corporation         c:\winnt\system32\msacm32.dll
avifil32.dll        5.00.2134.1         76.27 KB (78,096 bytes)       12/7/1999 4:00:00 AM
          Microsoft Corporation         c:\winnt\system32\avifil32.dll
msvfw32.dll         5.00.2134.1         113.77 KB (116,496 bytes)     12/7/1999 4:00:00 AM
          Microsoft Corporation         c:\winnt\system32\msvfw32.dll
docprop2.dll        5.00.2178.1         297.77 KB (304,912 bytes)     12/7/1999 4:00:00 AM
          Microsoft Corporation         c:\winnt\system32\docprop2.dll
webvw.dll 5.00.2920.0000      1.06 MB (1,115,408 bytes)     12/7/1999 4:00:00 AM
          Microsoft Corporation         c:\winnt\system32\webvw.dll
msls31.dll          3.10.337.0          145.27 KB (148,752 bytes)     12/7/1999 4:00:00 AM
          Microsoft Corporation         c:\winnt\system32\msls31.dll
shdoclc.dll         5.00.2920.0000      324.50 KB (332,288 bytes)     12/7/1999 4:00:00 AM
          Microsoft Corporation         c:\winnt\system32\shdoclc.dll
wininet.dll         5.00.2920.0000      456.77 KB (467,728 bytes)     12/7/1999 4:00:00 AM
          Microsoft Corporation         c:\winnt\system32\wininet.dll
mshtml.dll          5.00.2920.0000      2.25 MB (2,357,008 bytes)     12/7/1999 4:00:00 AM
          Microsoft Corporation         c:\winnt\system32\mshtml.dll
mlang.dll 5.00.2920.0000      510.77 KB (523,024 bytes)     12/7/1999 4:00:00 AM
          Microsoft Corporation         c:\winnt\system32\mlang.dll
urlmon.dll          5.00.2920.0000      426.77 KB (437,008 bytes)     12/7/1999 4:00:00 AM
          Microsoft Corporation         c:\winnt\system32\urlmon.dll
browselc.dll        5.00.2920.0000      34.50 KB (35,328 bytes)       12/7/1999 4:00:00 AM
          Microsoft Corporation         c:\winnt\system32\browselc.dll
linkinfo.dll        5.00.2134.1         15.77 KB (16,144 bytes)       12/7/1999 4:00:00 AM
          Microsoft Corporation         c:\winnt\system32\linkinfo.dll
```

APPENDIX C – TUNABLE PARAMETERS

```
powrprof.dll        5.00.2920.0000      13.27 KB (13,584 bytes)       12/7/1999 4:00:00 AM
        Microsoft Corporation         c:\winnt\system32\powrprof.dll
batmeter.dll        5.00.2920.0000      20.27 KB (20,752 bytes)       12/7/1999 4:00:00 AM
        Microsoft Corporation         c:\winnt\system32\batmeter.dll
stobject.dll        5.00.2144.1         81.77 KB (83,728 bytes)       12/7/1999 4:00:00 AM
        Microsoft Corporation         c:\winnt\system32\stobject.dll
msi.dll   1.10.1029.0         1.71 MB (1,794,320 bytes)     12/7/1999 4:00:00 AM
        Microsoft Corporation         c:\winnt\system32\msi.dll
webcheck.dll        5.00.2920.0000      251.77 KB (257,808 bytes)     12/7/1999 4:00:00 AM
        Microsoft Corporation         c:\winnt\system32\webcheck.dll
ntshrui.dll         5.00.2134.1         46.77 KB (47,888 bytes)       12/7/1999 4:00:00 AM
        Microsoft Corporation         c:\winnt\system32\ntshrui.dll
mydocs.dll          5.00.2920.0000      55.77 KB (57,104 bytes)       12/7/1999 4:00:00 AM
        Microsoft Corporation         c:\winnt\system32\mydocs.dll
browseui.dll        5.00.2920.0000      793.27 KB (812,304 bytes)     12/7/1999 4:00:00 AM
        Microsoft Corporation         c:\winnt\system32\browseui.dll
shdocvw.dll         5.00.2920.0000      1.05 MB (1,104,144 bytes)     12/7/1999 4:00:00 AM
        Microsoft Corporation         c:\winnt\system32\shdocvw.dll
explorer.exe        5.00.2920.0000      232.77 KB (238,352 bytes)     12/7/1999 4:00:00 AM
        Microsoft Corporation         c:\winnt\explorer.exe
locator.exe         5.00.2135.1         70.77 KB (72,464 bytes)       12/7/1999 4:00:00 AM
        Microsoft Corporation         c:\winnt\system32\locator.exe
tapisrv.dll         5.00.2186.1         168.77 KB (172,816 bytes)     12/7/1999 4:00:00 AM
        Microsoft Corporation         c:\winnt\system32\tapisrv.dll
iprop.dll 5.00.2181.1         4.27 KB (4,368 bytes)         12/7/1999 4:00:00 AM
        Microsoft Corporation         c:\winnt\system32\iprop.dll
srchidx.dll         9.107.5512.0        433.50 KB (443,904 bytes)     10/30/2000 10:29:18 AM
        Microsoft Corporation         c:\progra~1\common~1\system\mssearch\bin\srchidx.dll
propdefs.dll        9.107.5512.0        164.00 KB (167,936 bytes)     10/30/2000 10:29:17 AM
        Microsoft Corporation         c:\progra~1\common~1\system\mssearch\bin\propdefs.dll
lcdetect.dll        9.107.5512.0        31.00 KB (31,744 bytes)       10/30/2000 10:29:16 AM
        Microsoft Corporation         c:\program files\common
files\system\mssearch\bin\lcdetect.dll
tquery.dll          9.107.5512.0        1.61 MB (1,690,112 bytes)     10/30/2000 10:29:18 AM
        Microsoft Corporation         c:\program files\common
files\system\mssearch\bin\tquery.dll
mssrch.dll          9.107.5512.0        1.49 MB (1,566,976 bytes)     10/30/2000 10:29:17 AM
        Microsoft Corporation         c:\progra~1\common~1\system\mssearch\bin\mssrch.dll
mssws.dll 9.107.5512.0        18.94 KB (19,392 bytes)       10/30/2000 10:29:17 AM
        Microsoft Corporation         c:\program files\common
files\system\mssearch\bin\mssws.dll
mssearch.exe        9.107.5512.0        72.00 KB (73,728 bytes)       10/30/2000 10:29:16 AM
        Microsoft Corporation         c:\program files\common
files\system\mssearch\bin\mssearch.exe
ntfsdrv.dll         5.00.0984 36.77 KB (37,648 bytes)       10/27/2000 9:40:37 AM
        Microsoft Corporation         c:\winnt\system32\inetsrv\ntfsdrv.dll
aqueue.dll          5.00.0984 260.27 KB (266,512 bytes)     10/27/2000 9:40:36 AM
        Microsoft Corporation         c:\winnt\system32\inetsrv\aqueue.dll
seo.dll   5.00.0984 230.77 KB (236,304 bytes)     10/27/2000 9:40:37 AM         Microsoft
Corporation         c:\winnt\system32\inetsrv\seo.dll
iscomlog.dll        5.00.0984 24.77 KB (25,360 bytes)       10/27/2000 9:38:37 AM
        Microsoft Corporation         c:\winnt\system32\inetsrv\iscomlog.dll
lonsint.dll         5.00.0984 11.77 KB (12,048 bytes)       10/27/2000 9:38:37 AM
        Microsoft Corporation         c:\winnt\system32\inetsrv\lonsint.dll
inetsloc.dll        5.00.0984 20.27 KB (20,752 bytes)       10/27/2000 9:38:38 AM
        Microsoft Corporation         c:\winnt\system32\inetsloc.dll
staxmem.dll         5.00.0984 8.27 KB (8,464 bytes)         10/27/2000 9:38:36 AM
        Microsoft Corporation         c:\winnt\system32\staxmem.dll
exstrace.dll        5.00.0984 13.77 KB (14,096 bytes)       10/27/2000 9:38:38 AM
        Microsoft Corporation         c:\winnt\system32\exstrace.dll
rwnh.dll  5.00.0984 10.77 KB (11,024 bytes)       10/27/2000 9:40:37 AM         Microsoft
Corporation         c:\winnt\system32\rwnh.dll
fcachdll.dll        5.00.0984 43.77 KB (44,816 bytes)       10/27/2000 9:40:36 AM
        Microsoft Corporation         c:\winnt\system32\fcachdll.dll
iisfecnv.dll        5.00.0984 7.27 KB (7,440 bytes)         10/27/2000 9:38:36 AM
        Microsoft Corporation         c:\winnt\system32\inetsrv\iisfecnv.dll
isatq.dll 5.00.0984 61.27 KB (62,736 bytes)       10/27/2000 9:38:39 AM         Microsoft
Corporation         c:\winnt\system32\inetsrv\isatq.dll
infocomm.dll        5.00.0984 234.27 KB (239,888 bytes)     10/27/2000 9:38:37 AM
        Microsoft Corporation         c:\winnt\system32\inetsrv\infocomm.dll
smtpsvc.dll         5.00.0984 406.27 KB (416,016 bytes)     10/27/2000 9:40:39 AM
        Microsoft Corporation         c:\winnt\system32\inetsrv\smtpsvc.dll
security.dll        5.00.2154.1         5.77 KB (5,904 bytes)         12/7/1999 4:00:00 AM
        Microsoft Corporation         c:\winnt\system32\security.dll
svcext.dll          5.00.0984 39.77 KB (40,720 bytes)       10/27/2000 9:38:37 AM
        Microsoft Corporation         c:\winnt\system32\inetsrv\svcext.dll
admexs.dll          5.00.0984 27.77 KB (28,432 bytes)       10/27/2000 9:38:36 AM
        Microsoft Corporation         c:\winnt\system32\inetsrv\admexs.dll
wamreg.dll          5.00.0984 46.27 KB (47,376 bytes)       10/27/2000 9:38:45 AM
        Microsoft Corporation         c:\winnt\system32\inetsrv\wamreg.dll
metadata.dll        5.00.0984 70.77 KB (72,464 bytes)       10/27/2000 9:38:37 AM
        Microsoft Corporation         c:\winnt\system32\inetsrv\metadata.dll
iismap.dll          5.00.0984 56.27 KB (57,616 bytes)       10/27/2000 9:38:38 AM
        Microsoft Corporation         c:\winnt\system32\iismap.dll
nsepm.dll 5.00.0984 43.27 KB (44,304 bytes)       10/27/2000 9:38:37 AM         Microsoft
Corporation         c:\winnt\system32\inetsrv\nsepm.dll
admwprox.dll        5.00.0984 31.77 KB (32,528 bytes)       10/27/2000 9:38:38 AM
        Microsoft Corporation         c:\winnt\system32\admwprox.dll
coadmin.dll         5.00.0984 39.77 KB (40,720 bytes)       10/27/2000 9:38:39 AM
        Microsoft Corporation         c:\winnt\system32\inetsrv\coadmin.dll
iisadmin.dll        5.00.0984 14.77 KB (15,120 bytes)       10/27/2000 9:38:36 AM
        Microsoft Corporation         c:\winnt\system32\inetsrv\iisadmin.dll
rpcref.dll          5.00.0984 4.27 KB (4,368 bytes)         10/27/2000 9:38:37 AM
        Microsoft Corporation         c:\winnt\system32\inetsrv\rpcref.dll
inetinfo.exe        5.00.0984 14.27 KB (14,608 bytes)       10/27/2000 9:38:36 AM
        Microsoft Corporation         c:\winnt\system32\inetsrv\inetinfo.exe
dns.exe   5.00.2190.1         312.27 KB (319,760 bytes)     10/27/2000 9:37:43 AM
        Microsoft Corporation         c:\winnt\system32\dns.exe
wins.exe  5.00.2181.1         147.77 KB (151,312 bytes)     10/27/2000 9:37:42 AM
        Microsoft Corporation         c:\winnt\system32\wins.exe
wshnetbs.dll        5.00.2134.1         7.77 KB (7,952 bytes)         12/7/1999 4:00:00 AM
        Microsoft Corporation         c:\winnt\system32\wshnetbs.dll
rapilib.dll         5.00.2167.1         25.27 KB (25,872 bytes)       12/7/1999 4:00:00 AM
        Microsoft Corporation         c:\winnt\system32\rapilib.dll
rsvpsp.dll          5.00.2167.1         74.77 KB (76,560 bytes)       12/7/1999 4:00:00 AM
        Microsoft Corporation         c:\winnt\system32\rsvpsp.dll
ntmarta.dll         5.00.2158.1         98.77 KB (101,136 bytes)      12/7/1999 4:00:00 AM
        Microsoft Corporation         c:\winnt\system32\ntmarta.dll
provthrd.dll        1.50.1085.0000      68.07 KB (69,708 bytes)       10/27/2000 4:43:37 PM
        Microsoft Corporation         c:\winnt\system32\wbem\provthrd.dll
ntevt.dll 1.50.1085.0000      192.06 KB (196,669 bytes)     12/7/1999 4:00:00 AM
        Microsoft Corporation         c:\winnt\system32\wbem\ntevt.dll
```

APPENDIX C – TUNABLE PARAMETERS

```
psapi.dll 5.00.2134.1        28.27 KB (28,944 bytes)       12/7/1999 4:00:00 AM
        Microsoft Corporation        c:\winnt\system32\psapi.dll
framedyn.dll        1.50.1085.0000      164.05 KB (167,992 bytes)     12/7/1999 4:00:00 AM
        Microsoft Corporation        c:\winnt\system32\wbem\framedyn.dll
cimwin32.dll        1.50.1085.0000      1.03 MB (1,077,306 bytes)     12/7/1999 4:00:00 AM
        Microsoft Corporation        c:\winnt\system32\wbem\cimwin32.dll
wbemsvc.dll         1.50.1085.0000      140.07 KB (143,430 bytes)     12/7/1999 4:00:00 AM
        Microsoft Corporation        c:\winnt\system32\wbem\wbemsvc.dll
wbemess.dll         1.50.1085.0001      352.05 KB (360,503 bytes)     12/7/1999 4:00:00 AM
        Microsoft Corporation        c:\winnt\system32\wbem\wbemess.dll
fastprox.dll        1.50.1085.0001      144.08 KB (147,534 bytes)     12/7/1999 4:00:00 AM
        Microsoft Corporation        c:\winnt\system32\wbem\fastprox.dll
wbemcore.dll        1.50.1085.0001      632.05 KB (647,224 bytes)     12/7/1999 4:00:00 AM
        Microsoft Corporation        c:\winnt\system32\wbem\wbemcore.dll
wbemcomn.dll        1.50.1085.0001      684.05 KB (700,472 bytes)     12/7/1999 4:00:00 AM
        Microsoft Corporation        c:\winnt\system32\wbem\wbemcomn.dll
winmgmt.exe         1.50.1085.0001      188.05 KB (192,567 bytes)     12/7/1999 4:00:00 AM
        Microsoft Corporation        c:\winnt\system32\wbem\winmgmt.exe
odbcint.dll         3.520.6526.0        88.00 KB (90,112 bytes)       10/30/2000 11:02:08 AM
        Microsoft Corporation        c:\winnt\system32\odbcint.dll
odbc32.dll          3.520.6526.0        216.27 KB (221,456 bytes)     10/30/2000 11:02:07 AM
        Microsoft Corporation        c:\winnt\system32\odbc32.dll
sqlsnmp.dll         2000.080.0194.00    60.00 KB (61,440 bytes)       11/10/2000 11:45:06 AM
        Microsoft Corporation        c:\program files\microsoft sql
server\mssql\binn\sqlsnmp.dll
ftpmib.dll          5.00.0984 6.27 KB (6,416 bytes)         10/27/2000 9:38:45 AM
        Microsoft Corporation        c:\winnt\system32\inetsrv\ftpmib.dll
iisrtl.dll          5.00.0984 120.77 KB (123,664 bytes)     10/27/2000 9:38:38 AM
        Microsoft Corporation        c:\winnt\system32\iisrtl.dll
infoadmn.dll        5.00.0984 12.27 KB (12,560 bytes)       10/27/2000 9:38:38 AM
        Microsoft Corporation        c:\winnt\system32\infoadmn.dll
httpmib.dll         5.00.0984 9.27 KB (9,488 bytes)         10/27/2000 9:38:42 AM
        Microsoft Corporation        c:\winnt\system32\inetsrv\httpmib.dll
loadperf.dll        5.00.2195.1         60.77 KB (62,224 bytes)       12/7/1999 4:00:00 AM
        Microsoft Corporation        c:\winnt\system32\loadperf.dll
iasperf.dll         5.00.2160.1         20.27 KB (20,752 bytes)       12/7/1999 4:00:00 AM
        Microsoft Corporation        c:\winnt\system32\iasperf.dll
dsauth.dll          5.00.2165.1         67.77 KB (69,392 bytes)       12/7/1999 4:00:00 AM
        Microsoft Corporation        c:\winnt\system32\dsauth.dll
dhcpsapi.dll        5.00.2165.1         88.77 KB (90,896 bytes)       12/7/1999 4:00:00 AM
        Microsoft Corporation        c:\winnt\system32\dhcpsapi.dll
dhcpmib.dll         5.00.2134.1         8.77 KB (8,976 bytes)         10/27/2000 4:43:10 PM
        Microsoft Corporation        c:\winnt\system32\dhcpmib.dll
winsrpc.dll         5.00.2134.1         13.27 KB (13,584 bytes)       12/7/1999 4:00:00 AM
        Microsoft Corporation        c:\winnt\system32\winsrpc.dll
winsmib.dll         5.00.2134.1         22.77 KB (23,312 bytes)       10/27/2000 9:37:42 AM
        Microsoft Corporation        c:\winnt\system32\winsmib.dll
rtipxmib.dll        5.00.2168.1         29.77 KB (30,480 bytes)       12/7/1999 4:00:00 AM
        Microsoft Corporation        c:\winnt\system32\rtipxmib.dll
perfos.dll          5.00.2155.1         21.27 KB (21,776 bytes)       12/7/1999 4:00:00 AM
        Microsoft Corporation        c:\winnt\system32\perfos.dll
btpagnt.dll         5.00.2168.1         13.27 KB (13,584 bytes)       12/7/1999 4:00:00 AM
        Microsoft Corporation        c:\winnt\system32\btpagnt.dll
ospfagnt.dll        5.00.2168.1         6.77 KB (6,928 bytes)         12/7/1999 4:00:00 AM
        Microsoft Corporation        c:\winnt\system32\ospfagnt.dll
ripagnt.dll         5.00.2168.1         24.27 KB (24,848 bytes)       12/7/1999 4:00:00 AM
        Microsoft Corporation        c:\winnt\system32\ripagnt.dll
mcastmib.dll        5.00.2168.1         13.27 KB (13,584 bytes)       12/7/1999 4:00:00 AM
        Microsoft Corporation        c:\winnt\system32\mcastmib.dll
igmpagnt.dll        5.00.2168.1         8.77 KB (8,976 bytes)         12/7/1999 4:00:00 AM
        Microsoft Corporation        c:\winnt\system32\igmpagnt.dll
acsmib.dll          5.00.2167.1         11.27 KB (11,536 bytes)       12/7/1999 4:00:00 AM
        Microsoft Corporation        c:\winnt\system32\acsmib.dll
evntagnt.dll        5.00.2167.1         94.77 KB (97,040 bytes)       10/27/2000 9:37:33 AM
        Microsoft Corporation        c:\winnt\system32\evntagnt.dll
snmpmib.dll         5.00.2134.1         5.77 KB (5,904 bytes)         10/27/2000 9:37:33 AM
        Microsoft Corporation        c:\winnt\system32\snmpmib.dll
inetmib1.dll        5.00.2168.1         28.77 KB (29,456 bytes)       12/7/1999 4:00:00 AM
        Microsoft Corporation        c:\winnt\system32\inetmib1.dll
lmmib2.dll          5.00.2134.1         29.27 KB (29,968 bytes)       10/27/2000 9:37:33 AM
        Microsoft Corporation        c:\winnt\system32\lmmib2.dll
snmpapi.dll         5.00.2134.1         17.27 KB (17,680 bytes)       12/7/1999 4:00:00 AM
        Microsoft Corporation        c:\winnt\system32\snmpapi.dll
snmp.exe  5.00.2173.1        29.77 KB (30,480 bytes)       10/27/2000 9:37:33 AM
        Microsoft Corporation        c:\winnt\system32\snmp.exe
simptcp.dll         5.00.2134.1         19.27 KB (19,728 bytes)       10/27/2000 9:37:44 AM
        Microsoft Corporation        c:\winnt\system32\simptcp.dll
tcpsvcs.exe         5.00.2134.1         24.77 KB (25,360 bytes)       12/7/1999 4:00:00 AM
        Microsoft Corporation        c:\winnt\system32\tcpsvcs.exe
afapopup.dll        2.4.0.4576          40.00 KB (40,960 bytes)       12/13/2000 3:08:09 PM
        Adaptec, Inc.       c:\program files\hp_raid\hpn\afapopup.dll
afaappse.dll        2.4.0.4576          176.00 KB (180,224 bytes)     12/13/2000 3:08:08 PM
        Adaptec, Inc.       c:\program files\hp_raid\hpn\afaappse.dll
afaapi.dll          2.4.0.4576          856.27 KB (876,816 bytes)     12/13/2000 3:08:08 PM
        Adaptec, Inc.       c:\program files\hp_raid\hpn\afaapi.dll
rpcns4.dll          5.00.2135.1         23.77 KB (24,336 bytes)       12/7/1999 4:00:00 AM
        Microsoft Corporation        c:\winnt\system32\rpcns4.dll
afaagent.exe        2.4.0.4576          256.27 KB (262,416 bytes)     12/13/2000 3:08:09 PM
        Adaptec, Inc.       c:\program files\hp_raid\hpn\afaagent.exe
wmi.dll   5.00.2191.1        6.27 KB (6,416 bytes)         12/7/1999 4:00:00 AM
        Microsoft Corporation        c:\winnt\system32\wmi.dll
netshell.dll        5.00.2176.1         456.77 KB (467,728 bytes)     12/7/1999 4:00:00 AM
        Microsoft Corporation        c:\winnt\system32\netshell.dll
netman.dll          5.00.2175.1         88.77 KB (90,896 bytes)       12/7/1999 4:00:00 AM
        Microsoft Corporation        c:\winnt\system32\netman.dll
rasdlg.dll          5.00.2194.1         514.27 KB (526,608 bytes)     12/7/1999 4:00:00 AM
        Microsoft Corporation        c:\winnt\system32\rasdlg.dll
netcfgx.dll         5.00.2175.1         533.77 KB (546,576 bytes)     12/7/1999 4:00:00 AM
        Microsoft Corporation        c:\winnt\system32\netcfgx.dll
rasmans.dll         5.00.2188.1         146.77 KB (150,288 bytes)     12/7/1999 4:00:00 AM
        Microsoft Corporation        c:\winnt\system32\rasmans.dll
iashlpr.dll         5.00.2184.1         33.27 KB (34,064 bytes)       12/7/1999 4:00:00 AM
        Microsoft Corporation        c:\winnt\system32\iashlpr.dll
iasacct.dll         5.00.2134.1         28.27 KB (28,944 bytes)       12/7/1999 4:00:00 AM
        Microsoft Corporation        c:\winnt\system32\iasacct.dll
iasuserr.dll        5.00.2134.1         25.77 KB (26,384 bytes)       12/7/1999 4:00:00 AM
        Microsoft Corporation        c:\winnt\system32\iasuserr.dll
iasnap.dll          5.00.2134.1         58.77 KB (60,176 bytes)       12/7/1999 4:00:00 AM
        Microsoft Corporation        c:\winnt\system32\iasnap.dll
iaspipe.dll         5.00.2134.1         41.77 KB (42,768 bytes)       12/7/1999 4:00:00 AM
        Microsoft Corporation        c:\winnt\system32\iaspipe.dll
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APPENDIX C – TUNABLE PARAMETERS

```
expsrv.dll          6.0.8540  370.27 KB (379,152 bytes)     12/7/1999 4:00:00 AM
        Microsoft Corporation         c:\winnt\system32\expsrv.dll
vbajet32.dll        6.1.8268  30.27 KB (30,992 bytes)       12/7/1999 4:00:00 AM
        Microsoft Corporation         c:\winnt\system32\vbajet32.dll
msjtes40.dll        4.00.2927.8       232.27 KB (237,840 bytes)     12/7/1999 4:00:00 AM
        Microsoft Corporation         c:\winnt\system32\msjtes40.dll
oledb32r.dll        2.60.6526.0       68.27 KB (69,904 bytes)       10/30/2000 11:02:08 AM
        Microsoft Corporation         c:\program files\common files\system\ole
db\oledb32r.dll
msdart.dll          2.60.6526.0       144.27 KB (147,728 bytes)     10/30/2000 11:02:06 AM
        Microsoft Corporation         c:\winnt\system32\msdart.dll
oledb32.dll         2.60.6526.0       448.27 KB (459,024 bytes)     10/30/2000 11:02:08 AM
        Microsoft Corporation         c:\program files\common files\system\ole
db\oledb32.dll
msjint40.dll        4.00.2927.2       148.27 KB (151,824 bytes)     12/7/1999 4:00:00 AM
        Microsoft Corporation         c:\winnt\system32\msjint40.dll
msjter40.dll        4.00.2927.2       52.27 KB (53,520 bytes)       12/7/1999 4:00:00 AM
        Microsoft Corporation         c:\winnt\system32\msjter40.dll
mswstr10.dll        4.00.2927.10      600.27 KB (614,672 bytes)     12/7/1999 4:00:00 AM
        Microsoft Corporation         c:\winnt\system32\mswstr10.dll
msjet40.dll         4.00.2927.4       1.43 MB (1,495,312 bytes)     12/7/1999 4:00:00 AM
        Microsoft Corporation         c:\winnt\system32\msjet40.dll
msjetoledb40.dll    4.00.2927.2       340.27 KB (348,432 bytes)     12/7/1999 4:00:00 AM
        Microsoft Corporation         c:\winnt\system32\msjetoledb40.dll
iasrad.dll          5.00.2139.1       94.27 KB (96,528 bytes)       12/7/1999 4:00:00 AM
        Microsoft Corporation         c:\winnt\system32\iasrad.dll
iassam.dll          5.00.2160.1       96.27 KB (98,576 bytes)       12/7/1999 4:00:00 AM
        Microsoft Corporation         c:\winnt\system32\iassam.dll
iasads.dll          5.00.2134.1       73.77 KB (75,536 bytes)       12/7/1999 4:00:00 AM
        Microsoft Corporation         c:\winnt\system32\iasads.dll
iaspolcy.dll        5.00.2134.1       25.27 KB (25,872 bytes)       12/7/1999 4:00:00 AM
        Microsoft Corporation         c:\winnt\system32\iaspolcy.dll
iassvcs.dll         5.00.2160.1       58.77 KB (60,176 bytes)       12/7/1999 4:00:00 AM
        Microsoft Corporation         c:\winnt\system32\iassvcs.dll
iassdo.dll          5.00.2157.1       262.27 KB (268,560 bytes)     12/7/1999 4:00:00 AM
        Microsoft Corporation         c:\winnt\system32\iassdo.dll
sens.dll  5.00.2163.1         36.77 KB (37,648 bytes)       12/7/1999 4:00:00 AM
        Microsoft Corporation         c:\winnt\system32\sens.dll
ias.dll   5.00.2134.1         7.27 KB (7,440 bytes)         12/7/1999 4:00:00 AM
        Microsoft Corporation         c:\winnt\system32\ias.dll
es.dll    1999.9.3422.21      231.77 KB (237,328 bytes)     12/7/1999 4:00:00 AM
        Microsoft Corporation         c:\winnt\system32\es.dll
mtxoci.dll          1999.9.3421.3     109.27 KB (111,888 bytes)     10/27/2000 9:37:52 AM
        Microsoft Corporation         c:\winnt\system32\mtxoci.dll
resutils.dll        5.00.2191.1       39.77 KB (40,720 bytes)       12/7/1999 4:00:00 AM
        Microsoft Corporation         c:\winnt\system32\resutils.dll
clusapi.dll         5.00.2179.1       50.27 KB (51,472 bytes)       12/7/1999 4:00:00 AM
        Microsoft Corporation         c:\winnt\system32\clusapi.dll
msvcp50.dll         5.00.7051 552.50 KB (565,760 bytes)     12/7/1999 4:00:00 AM
        Microsoft Corporation         c:\winnt\system32\msvcp50.dll
xolehlp.dll         1999.9.3421.3     17.27 KB (17,680 bytes)       10/27/2000 9:37:51 AM
        Microsoft Corporation         c:\winnt\system32\xolehlp.dll
msdtclog.dll        1999.9.3421.3     89.77 KB (91,920 bytes)       10/27/2000 9:37:51 AM
        Microsoft Corporation         c:\winnt\system32\msdtclog.dll
mtxclu.dll          1999.9.3421.3     50.27 KB (51,472 bytes)       12/7/1999 4:00:00 AM
        Microsoft Corporation         c:\winnt\system32\mtxclu.dll
msdtcprx.dll        1999.9.3422.10    619.27 KB (634,128 bytes)     10/27/2000 9:37:52 AM
        Microsoft Corporation         c:\winnt\system32\msdtcprx.dll
txfaux.dll          1999.9.3422.24    341.27 KB (349,456 bytes)     10/27/2000 9:37:51 AM
        Microsoft Corporation         c:\winnt\system32\txfaux.dll
msdtctm.dll         1999.9.3422.12    1.02 MB (1,070,864 bytes)     10/27/2000 9:37:51 AM
        Microsoft Corporation         c:\winnt\system32\msdtctm.dll
msdtc.exe 1999.9.3421.3       6.77 KB (6,928 bytes)         10/27/2000 9:37:51 AM
        Microsoft Corporation         c:\winnt\system32\msdtc.exe
winrnr.dll          5.00.2160.1       18.77 KB (19,216 bytes)       12/7/1999 4:00:00 AM
        Microsoft Corporation         c:\winnt\system32\winrnr.dll
rpcss.dll 5.00.2181.1         229.27 KB (234,768 bytes)     12/7/1999 4:00:00 AM
        Microsoft Corporation         c:\winnt\system32\rpcss.dll
svchost.exe         5.00.2134.1       7.77 KB (7,952 bytes)         12/7/1999 4:00:00 AM
        Microsoft Corporation         c:\winnt\system32\svchost.exe
scecli.dll          5.00.2191.1       105.27 KB (107,792 bytes)     12/7/1999 4:00:00 AM
        Microsoft Corporation         c:\winnt\system32\scecli.dll
atl.dll   3.00.8449 57.56 KB (58,938 bytes)       12/7/1999 4:00:00 AM          Microsoft
Corporation         c:\winnt\system32\atl.dll
certcli.dll         5.00.2175.1       132.27 KB (135,440 bytes)     12/7/1999 4:00:00 AM
        Microsoft Corporation         c:\winnt\system32\certcli.dll
mswsock.dll         5.00.2152.1       62.27 KB (63,760 bytes)       12/7/1999 4:00:00 AM
        Microsoft Corporation         c:\winnt\system32\mswsock.dll
ntdsatq.dll         5.00.2181.1       31.27 KB (32,016 bytes)       12/7/1999 4:00:00 AM
        Microsoft Corporation         c:\winnt\system32\ntdsatq.dll
ntdsa.dll 5.00.2195.1         993.27 KB (1,017,104 bytes)   12/7/1999 4:00:00 AM
        Microsoft Corporation         c:\winnt\system32\ntdsa.dll
kdcsvc.dll          5.00.2181.1       133.77 KB (136,976 bytes)     12/7/1999 4:00:00 AM
        Microsoft Corporation         c:\winnt\system32\kdcsvc.dll
sfmapi.dll          5.00.2134.1       38.77 KB (39,696 bytes)       12/7/1999 4:00:00 AM
        Microsoft Corporation         c:\winnt\system32\sfmapi.dll
rassfm.dll          5.00.2168.1       21.27 KB (21,776 bytes)       12/7/1999 4:00:00 AM
        Microsoft Corporation         c:\winnt\system32\rassfm.dll
schannel.dll        5.00.2170.1       139.77 KB (143,120 bytes)     12/7/1999 4:00:00 AM
        Microsoft Corporation         c:\winnt\system32\schannel.dll
netlogon.dll        5.00.2182.1       347.77 KB (356,112 bytes)     12/7/1999 4:00:00 AM
        Microsoft Corporation         c:\winnt\system32\netlogon.dll
msv1_0.dll          5.00.2164.1       94.77 KB (97,040 bytes)       12/7/1999 4:00:00 AM
        Microsoft Corporation         c:\winnt\system32\msv1_0.dll
kerberos.dll        5.00.2181.1       196.77 KB (201,488 bytes)     12/7/1999 4:00:00 AM
        Microsoft Corporation         c:\winnt\system32\kerberos.dll
msprivs.dll         5.00.2154.1       41.50 KB (42,496 bytes)       12/7/1999 4:00:00 AM
        Microsoft Corporation         c:\winnt\system32\msprivs.dll
samsrv.dll          5.00.2192.1       357.77 KB (366,352 bytes)     12/7/1999 4:00:00 AM
        Microsoft Corporation         c:\winnt\system32\samsrv.dll
lsasrv.dll          5.00.2184.1       487.77 KB (499,472 bytes)     12/7/1999 4:00:00 AM
        Microsoft Corporation         c:\winnt\system32\lsasrv.dll
lsass.exe 5.00.2184.1         32.77 KB (33,552 bytes)       12/7/1999 4:00:00 AM
        Microsoft Corporation         c:\winnt\system32\lsass.exe
esent.dll 6.0.3939.6          1.07 MB (1,120,016 bytes)     12/7/1999 4:00:00 AM
        Microsoft Corporation         c:\winnt\system32\esent.dll
rasadhlp.dll        5.00.2168.1       7.27 KB (7,440 bytes)         12/7/1999 4:00:00 AM
        Microsoft Corporation         c:\winnt\system32\rasadhlp.dll
wshtcpip.dll        5.00.2134.1       17.27 KB (17,680 bytes)       12/7/1999 4:00:00 AM
        Microsoft Corporation         c:\winnt\system32\wshtcpip.dll
msafd.dll 5.00.2153.1         54.27 KB (55,568 bytes)       12/7/1999 4:00:00 AM
        Microsoft Corporation         c:\winnt\system32\msafd.dll
```

APPENDIX C – TUNABLE PARAMETERS

```
clbcatq.dll         1999.9.3422.14      479.27 KB (490,768 bytes)     10/27/2000 9:37:44 AM
        Microsoft Corporation           c:\winnt\system32\clbcatq.dll
dhcpcsvc.dll        5.00.2153.1         88.77 KB (90,896 bytes)       12/7/1999 4:00:00 AM
        Microsoft Corporation           c:\winnt\system32\dhcpcsvc.dll
tapi32.dll          5.00.2182.1         123.27 KB (126,224 bytes)     12/7/1999 4:00:00 AM
        Microsoft Corporation           c:\winnt\system32\tapi32.dll
rasman.dll          5.00.2188.1         54.77 KB (56,080 bytes)       12/7/1999 4:00:00 AM
        Microsoft Corporation           c:\winnt\system32\rasman.dll
rasapi32.dll        5.00.2188.1         189.77 KB (194,320 bytes)     12/7/1999 4:00:00 AM
        Microsoft Corporation           c:\winnt\system32\rasapi32.dll
rtutils.dll         5.00.2168.1         43.77 KB (44,816 bytes)       12/7/1999 4:00:00 AM
        Microsoft Corporation           c:\winnt\system32\rtutils.dll
adsldpc.dll         5.00.2172.1         127.77 KB (130,832 bytes)     12/7/1999 4:00:00 AM
        Microsoft Corporation           c:\winnt\system32\adsldpc.dll
activeds.dll        5.00.2172.1         172.77 KB (176,912 bytes)     12/7/1999 4:00:00 AM
        Microsoft Corporation           c:\winnt\system32\activeds.dll
oleaut32.dll        2.40.4512 600.27 KB (614,672 bytes)     12/7/1999 4:00:00 AM
        Microsoft Corporation           c:\winnt\system32\oleaut32.dll
mprapi.dll          5.00.2181.1         79.27 KB (81,168 bytes)       12/7/1999 4:00:00 AM
        Microsoft Corporation           c:\winnt\system32\mprapi.dll
iphlpapi.dll        5.00.2173.2         67.77 KB (69,392 bytes)       12/7/1999 4:00:00 AM
        Microsoft Corporation           c:\winnt\system32\iphlpapi.dll
rnr20.dll 5.00.2152.1         35.77 KB (36,624 bytes)       12/7/1999 4:00:00 AM
        Microsoft Corporation           c:\winnt\system32\rnr20.dll
wmicore.dll         5.00.2178.1         70.77 KB (72,464 bytes)       12/7/1999 4:00:00 AM
        Microsoft Corporation           c:\winnt\system32\wmicore.dll
psbase.dll          5.00.2146.1         111.77 KB (114,448 bytes)     12/7/1999 4:00:00 AM
        Microsoft Corporation           c:\winnt\system32\psbase.dll
cryptsvc.dll        5.00.2181.1         61.77 KB (63,248 bytes)       12/7/1999 4:00:00 AM
        Microsoft Corporation           c:\winnt\system32\cryptsvc.dll
cryptdll.dll        5.00.2135.1         41.27 KB (42,256 bytes)       12/7/1999 4:00:00 AM
        Microsoft Corporation           c:\winnt\system32\cryptdll.dll
wkssvc.dll          5.00.2181.1         95.27 KB (97,552 bytes)       12/7/1999 4:00:00 AM
        Microsoft Corporation           c:\winnt\system32\wkssvc.dll
srvsvc.dll          5.00.2178.1         79.27 KB (81,168 bytes)       12/7/1999 4:00:00 AM
        Microsoft Corporation           c:\winnt\system32\srvsvc.dll
cfgmgr32.dll        5.00.2134.1         16.77 KB (17,168 bytes)       12/7/1999 4:00:00 AM
        Microsoft Corporation           c:\winnt\system32\cfgmgr32.dll
dmserver.dll        2191.1.296.2        11.77 KB (12,048 bytes)       12/7/1999 4:00:00 AM
        VERITAS Software Corp.          c:\winnt\system32\dmserver.dll
winsta.dll          5.00.2134.1         36.27 KB (37,136 bytes)       12/7/1999 4:00:00 AM
        Microsoft Corporation           c:\winnt\system32\winsta.dll
icmp.dll  5.00.2134.1         7.27 KB (7,440 bytes)         12/7/1999 4:00:00 AM
        Microsoft Corporation           c:\winnt\system32\icmp.dll
lmhsvc.dll          5.00.2134.1         9.27 KB (9,488 bytes)         12/7/1999 4:00:00 AM
        Microsoft Corporation           c:\winnt\system32\lmhsvc.dll
eventlog.dll        5.00.2178.1         43.77 KB (44,816 bytes)       12/7/1999 4:00:00 AM
        Microsoft Corporation           c:\winnt\system32\eventlog.dll
ntdsapi.dll         5.00.2160.1         56.27 KB (57,616 bytes)       12/7/1999 4:00:00 AM
        Microsoft Corporation           c:\winnt\system32\ntdsapi.dll
scesrv.dll          5.00.2188.1         225.77 KB (231,184 bytes)     12/7/1999 4:00:00 AM
        Microsoft Corporation           c:\winnt\system32\scesrv.dll
umpnpmgr.dll        5.00.2182.1         86.27 KB (88,336 bytes)       12/7/1999 4:00:00 AM
        Microsoft Corporation           c:\winnt\system32\umpnpmgr.dll
services.exe        5.00.2134.1         86.77 KB (88,848 bytes)       12/7/1999 4:00:00 AM
        Microsoft Corporation           c:\winnt\system32\services.exe
netmsg.dll          5.00.2137.1         152.50 KB (156,160 bytes)     12/7/1999 4:00:00 AM
        Microsoft Corporation           c:\winnt\system32\netmsg.dll
comdlg32.dll        5.00.2920.0000      236.77 KB (242,448 bytes)     12/7/1999 4:00:00 AM
        Microsoft Corporation           c:\winnt\system32\comdlg32.dll
netui2.dll          5.00.2134.1         280.27 KB (286,992 bytes)     12/7/1999 4:00:00 AM
        Microsoft Corporation           c:\winnt\system32\netui2.dll
mprui.dll 5.00.2134.1         54.77 KB (56,080 bytes)       12/7/1999 4:00:00 AM
        Microsoft Corporation           c:\winnt\system32\mprui.dll
netui1.dll          5.00.2134.1         210.27 KB (215,312 bytes)     12/7/1999 4:00:00 AM
        Microsoft Corporation           c:\winnt\system32\netui1.dll
netui0.dll          5.00.2134.1         70.27 KB (71,952 bytes)       12/7/1999 4:00:00 AM
        Microsoft Corporation           c:\winnt\system32\netui0.dll
ntlanman.dll        5.00.2157.1         35.27 KB (36,112 bytes)       12/7/1999 4:00:00 AM
        Microsoft Corporation           c:\winnt\system32\ntlanman.dll
mpr.dll   5.00.2146.1         53.27 KB (54,544 bytes)       12/7/1999 4:00:00 AM
        Microsoft Corporation           c:\winnt\system32\mpr.dll
cscui.dll 5.00.2172.1         227.27 KB (232,720 bytes)     12/7/1999 4:00:00 AM
        Microsoft Corporation           c:\winnt\system32\cscui.dll
winspool.drv        5.00.2167.1         109.77 KB (112,400 bytes)     12/7/1999 4:00:00 AM
        Microsoft Corporation           c:\winnt\system32\winspool.drv
winscard.dll        5.00.2134.1         77.27 KB (79,120 bytes)       12/7/1999 4:00:00 AM
        Microsoft Corporation           c:\winnt\system32\winscard.dll
wlnotify.dll        5.00.2164.1         53.27 KB (54,544 bytes)       12/7/1999 4:00:00 AM
        Microsoft Corporation           c:\winnt\system32\wlnotify.dll
cscdll.dll          5.00.2189.1         98.27 KB (100,624 bytes)      12/7/1999 4:00:00 AM
        Microsoft Corporation           c:\winnt\system32\cscdll.dll
lz32.dll  5.00.2134.1         9.77 KB (10,000 bytes)        12/7/1999 4:00:00 AM
        Microsoft Corporation           c:\winnt\system32\lz32.dll
version.dll         5.00.2134.1         15.77 KB (16,144 bytes)       12/7/1999 4:00:00 AM
        Microsoft Corporation           c:\winnt\system32\version.dll
rsabase.dll         5.00.2150.1         128.77 KB (131,856 bytes)     12/7/1999 4:00:00 AM
        Microsoft Corporation           c:\winnt\system32\rsabase.dll
mscat32.dll         5.131.2134.1        7.77 KB (7,952 bytes)         12/7/1999 4:00:00 AM
        Microsoft Corporation           c:\winnt\system32\mscat32.dll
ole32.dll 5.00.2181.1         966.27 KB (989,456 bytes)     12/7/1999 4:00:00 AM
        Microsoft Corporation           c:\winnt\system32\ole32.dll
imagehlp.dll        5.00.2195.1         125.27 KB (128,272 bytes)     12/7/1999 4:00:00 AM
        Microsoft Corporation           c:\winnt\system32\imagehlp.dll
msasn1.dll          5.00.2134.1         51.27 KB (52,496 bytes)       12/7/1999 4:00:00 AM
        Microsoft Corporation           c:\winnt\system32\msasn1.dll
crypt32.dll         5.131.2173.1        465.77 KB (476,944 bytes)     12/7/1999 4:00:00 AM
        Microsoft Corporation           c:\winnt\system32\crypt32.dll
wintrust.dll        5.131.2143.1        162.27 KB (166,160 bytes)     12/7/1999 4:00:00 AM
        Microsoft Corporation           c:\winnt\system32\wintrust.dll
setupapi.dll        5.00.2183.1         554.27 KB (567,568 bytes)     12/7/1999 4:00:00 AM
        Microsoft Corporation           c:\winnt\system32\setupapi.dll
winmm.dll 5.00.2161.1         184.77 KB (189,200 bytes)     12/7/1999 4:00:00 AM
        Microsoft Corporation           c:\winnt\system32\winmm.dll
comctl32.dll        5.81        540.27 KB (553,232 bytes)     12/7/1999 4:00:00 AM
        Microsoft Corporation           c:\winnt\system32\comctl32.dll
shlwapi.dll         5.00.2920.0000      282.77 KB (289,552 bytes)     12/7/1999 4:00:00 AM
        Microsoft Corporation           c:\winnt\system32\shlwapi.dll
shell32.dll         5.00.2920.0000      2.24 MB (2,352,400 bytes)     12/7/1999 4:00:00 AM
        Microsoft Corporation           c:\winnt\system32\shell32.dll
msgina.dll          5.00.2191.1         309.77 KB (317,200 bytes)     12/7/1999 4:00:00 AM
        Microsoft Corporation           c:\winnt\system32\msgina.dll
```

APPENDIX C – TUNABLE PARAMETERS

```
wsock32.dll         5.00.2152.1         21.27 KB (21,776 bytes)       12/7/1999 4:00:00 AM
        Microsoft Corporation         c:\winnt\system32\wsock32.dll
dnsapi.dll          5.00.2181.1         129.77 KB (132,880 bytes)     12/7/1999 4:00:00 AM
        Microsoft Corporation         c:\winnt\system32\dnsapi.dll
wldap32.dll         5.00.2168.1         155.77 KB (159,504 bytes)     12/7/1999 4:00:00 AM
        Microsoft Corporation         c:\winnt\system32\wldap32.dll
ws2help.dll         5.00.2134.1         17.77 KB (18,192 bytes)       12/7/1999 4:00:00 AM
        Microsoft Corporation         c:\winnt\system32\ws2help.dll
ws2_32.dll          5.00.2134.1         69.77 KB (71,440 bytes)       12/7/1999 4:00:00 AM
        Microsoft Corporation         c:\winnt\system32\ws2_32.dll
samlib.dll          5.00.2160.1         46.27 KB (47,376 bytes)       12/7/1999 4:00:00 AM
        Microsoft Corporation         c:\winnt\system32\samlib.dll
netrap.dll          5.00.2134.1         11.27 KB (11,536 bytes)       12/7/1999 4:00:00 AM
        Microsoft Corporation         c:\winnt\system32\netrap.dll
netapi32.dll        5.00.2194.1         302.77 KB (310,032 bytes)     12/7/1999 4:00:00 AM
        Microsoft Corporation         c:\winnt\system32\netapi32.dll
profmap.dll         5.00.2181.1         29.27 KB (29,968 bytes)       12/7/1999 4:00:00 AM
        Microsoft Corporation         c:\winnt\system32\profmap.dll
secur32.dll         5.00.2154.1         46.77 KB (47,888 bytes)       12/7/1999 4:00:00 AM
        Microsoft Corporation         c:\winnt\system32\secur32.dll
sfc.dll   5.00.2164.1         84.27 KB (86,288 bytes)       12/7/1999 4:00:00 AM
        Microsoft Corporation         c:\winnt\system32\sfc.dll
nddeapi.dll         5.00.2137.1         15.27 KB (15,632 bytes)       12/7/1999 4:00:00 AM
        Microsoft Corporation         c:\winnt\system32\nddeapi.dll
userenv.dll         5.00.2185.1         361.27 KB (369,936 bytes)     12/7/1999 4:00:00 AM
        Microsoft Corporation         c:\winnt\system32\userenv.dll
user32.dll          5.00.2180.1         393.27 KB (402,704 bytes)     12/7/1999 4:00:00 AM
        Microsoft Corporation         c:\winnt\system32\user32.dll
gdi32.dll 5.00.2180.1         228.77 KB (234,256 bytes)     12/7/1999 4:00:00 AM
        Microsoft Corporation         c:\winnt\system32\gdi32.dll
rpcrt4.dll          5.00.2193.1         434.27 KB (444,688 bytes)     12/7/1999 4:00:00 AM
        Microsoft Corporation         c:\winnt\system32\rpcrt4.dll
advapi32.dll        5.00.2191.1         349.27 KB (357,648 bytes)     12/7/1999 4:00:00 AM
        Microsoft Corporation         c:\winnt\system32\advapi32.dll
kernel32.dll        5.00.2191.1         715.27 KB (732,432 bytes)     12/7/1999 4:00:00 AM
        Microsoft Corporation         c:\winnt\system32\kernel32.dll
msvcrt.dll          6.10.8637.0         288.09 KB (295,000 bytes)     12/7/1999 4:00:00 AM
        Microsoft Corporation         c:\winnt\system32\msvcrt.dll
winlogon.exe        5.00.2182.1         173.27 KB (177,424 bytes)     12/7/1999 4:00:00 AM
        Microsoft Corporation         c:\winnt\system32\winlogon.exe
sfcfiles.dll        5.00.2195.1         973.27 KB (996,624 bytes)     12/7/1999 4:00:00 AM
        Microsoft Corporation         c:\winnt\system32\sfcfiles.dll
ntdll.dll 5.00.2163.1         469.77 KB (481,040 bytes)     12/7/1999 4:00:00 AM
        Microsoft Corporation         c:\winnt\system32\ntdll.dll
smss.exe  5.00.2170.1         44.27 KB (45,328 bytes)       12/7/1999 4:00:00 AM
        Microsoft Corporation         c:\winnt\system32\smss.exe

[Services]

Display Name        Name      State     Start Mode          Service Type        Path
        Error Control       Start Name          Tag ID
Alerter   Alerter   Stopped   Manual    Share Process       c:\winnt\system32\services.exe
        Normal    LocalSystem         0
Application Management        AppMgmt   Stopped   Manual    Share Process
        c:\winnt\system32\services.exe          Normal    LocalSystem         0
Computer Browser    Browser   Stopped   Disabled  Share Process
        c:\winnt\system32\services.exe          Normal    LocalSystem         0
Indexing Service    cisvc     Stopped   Manual    Share Process
        c:\winnt\system32\cisvc.exe Normal    LocalSystem         0
ClipBook  ClipSrv   Stopped   Manual    Own Process         c:\winnt\system32\clipsrv.exe
        Normal    LocalSystem         0
Distributed File System       Dfs       Stopped   Disabled  Own Process
        c:\winnt\system32\dfssvc.exe Normal    LocalSystem         0
DHCP Client         Dhcp      Stopped   Disabled  Share Process
        c:\winnt\system32\services.exe          Normal    LocalSystem         0
DHCP Server         DHCPServer          Stopped   Disabled  Share Process
        c:\winnt\system32\tcpsvcs.exe Normal    LocalSystem         0
Logical Disk Manager Administrative Service       dmadmin   Stopped   Manual    Share Process
        c:\winnt\system32\dmadmin.exe /com       Normal    LocalSystem         0
Logical Disk Manager          dmserver  Running   Auto      Share Process
        c:\winnt\system32\services.exe          Normal    LocalSystem         0
DNS Server          DNS       Running   Auto      Own Process
        c:\winnt\system32\dns.exe     Normal    LocalSystem         0
DNS Client          Dnscache  Stopped   Disabled  Share Process
        c:\winnt\system32\services.exe          Normal    LocalSystem         0
Event Log Eventlog  Running   Auto      Share Process       c:\winnt\system32\services.exe
        Normal    LocalSystem         0
COM+ Event System   EventSystem         Running   Manual    Share Process
        c:\winnt\system32\svchost.exe -k netsvcs          Normal    LocalSystem         0
Fax Service         Fax       Stopped   Manual    Own Process
        c:\winnt\system32\faxsvc.exe  Normal    LocalSystem         0
NetRAID-4M Remote Services Agent        HPN_AGENT Running   Auto      Own Process
        c:\program files\hp_raid\hpn\afaagent.exe         Normal    LocalSystem         0
Internet Authentication Service         IAS       Running   Auto      Share Process
        c:\winnt\system32\svchost.exe -k netsvcs          Normal    LocalSystem         0
IIS Admin Service   IISADMIN  Running   Auto      Share Process
        c:\winnt\system32\inetsrv\inetinfo.exe  Normal    LocalSystem         0
Intersite Messaging IsmServ   Stopped   Disabled  Own Process
        c:\winnt\system32\ismserv.exe Normal    LocalSystem         0
Kerberos Key Distribution Center        kdc       Stopped   Disabled  Share Process
        c:\winnt\system32\lsass.exe   Normal    LocalSystem         0
Server    lanmanserver        Running   Auto      Share Process
        c:\winnt\system32\services.exe          Normal    LocalSystem         0
Workstation         lanmanworkstation   Running   Auto      Share Process
        c:\winnt\system32\services.exe          Normal    LocalSystem         0
License Logging Service       LicenseService      Stopped   Disabled  Own Process
        c:\winnt\system32\llssrv.exe  Normal    LocalSystem         0
TCP/IP NetBIOS Helper Service LmHosts   Running   Auto      Share Process
        c:\winnt\system32\services.exe          Normal    LocalSystem         0
Messenger Messenger Stopped   Disabled  Share Process       c:\winnt\system32\services.exe
        Normal    LocalSystem         0
NetMeeting Remote Desktop Sharing       mnmsrvc   Stopped   Manual    Own Process
        c:\winnt\system32\mnmsrvc.exe Normal    LocalSystem         0
Distributed Transaction Coordinator     MSDTC     Running   Auto      Own Process
        c:\winnt\system32\msdtc.exe   Normal    LocalSystem         0
FTP Publishing Service        MSFTPSVC  Stopped   Disabled  Share Process
        c:\winnt\system32\inetsrv\inetinfo.exe  Normal    LocalSystem         0
Windows Installer   MSIServer Stopped   Manual    Share Process
        c:\winnt\system32\msiexec.exe /v        Normal    LocalSystem         0
Microsoft Search    MSSEARCH  Running   Auto      Share Process       "c:\program files\common
files\system\mssearch\bin\mssearch.exe" Normal    LocalSystem         0
```

APPENDIX C – TUNABLE PARAMETERS

```
MSSQLSERVER         MSSQLSERVER         Stopped   Manual    Own Process
        c:\progra~1\micros~3\mssql\binn\sqlservr.exe      Normal    LocalSystem         0
MSSQLServerADHelper MSSQLServerADHelper Stopped   Manual    Own Process         c:\program
files\microsoft sql server\80\tools\binn\sqladhlp.exe      Normal    LocalSystem         0
Network DDE         NetDDE    Stopped   Manual    Share Process
        c:\winnt\system32\netdde.exe  Normal    LocalSystem         0
Network DDE DSDM    NetDDEdsdm          Stopped   Manual    Share Process
        c:\winnt\system32\netdde.exe  Normal    LocalSystem         0
Net Logon Netlogon  Stopped   Manual    Share Process       c:\winnt\system32\lsass.exe
        Normal    LocalSystem         0
Network Connections Netman    Running   Manual    Share Process
        c:\winnt\system32\svchost.exe -k netsvcs          Normal    LocalSystem         0
File Replication    NtFrs     Stopped   Manual    Own Process
        c:\winnt\system32\ntfrs.exe   Ignore    LocalSystem         0
NT LM Security Support Provider         NtLmSsp   Running   Manual    Share Process
        c:\winnt\system32\lsass.exe   Normal    LocalSystem         0
Removable Storage   NtmsSvc   Stopped   Disabled  Share Process
        c:\winnt\system32\svchost.exe -k netsvcs          Normal    LocalSystem         0
Plug and Play       PlugPlay  Running   Auto      Share Process
        c:\winnt\system32\services.exe          Normal    LocalSystem         0
IPSEC Policy Agent  PolicyAgent         Stopped   Disabled  Share Process
        c:\winnt\system32\lsass.exe   Normal    LocalSystem         0
Protected Storage   ProtectedStorage    Running   Auto      Share Process
        c:\winnt\system32\services.exe          Normal    LocalSystem         0
Remote Access Auto Connection Manager   RasAuto   Stopped   Manual    Share Process
        c:\winnt\system32\svchost.exe -k netsvcs          Normal    LocalSystem         0
Remote Access Connection Manager        RasMan    Stopped   Manual    Share Process
        c:\winnt\system32\svchost.exe -k netsvcs          Normal    LocalSystem         0
Routing and Remote Access     RemoteAccess        Stopped   Disabled  Share Process
        c:\winnt\system32\svchost.exe -k netsvcs          Normal    LocalSystem         0
Remote Registry Service       RemoteRegistry      Stopped   Disabled  Own Process
        c:\winnt\system32\regsvc.exe  Normal    LocalSystem         0
Remote Procedure Call (RPC) Locator     RpcLocator          Running   Manual    Own Process
        c:\winnt\system32\locator.exe Normal    LocalSystem         0
Remote Procedure Call (RPC)   RpcSs     Running   Auto      Share Process
        c:\winnt\system32\svchost -k rpcss      Normal    LocalSystem         0
QoS Admission Control (RSVP)  RSVP      Running   Auto      Own Process
        c:\winnt\system32\rsvp.exe -s Normal    LocalSystem         0
Security Accounts Manager     SamSs     Running   Auto      Share Process
        c:\winnt\system32\lsass.exe   Normal    LocalSystem         0
Smart Card Helper   SCardDrv  Stopped   Manual    Share Process
        c:\winnt\system32\scardsvr.exe          Ignore    LocalSystem         0
Smart Card          SCardSvr  Stopped   Manual    Share Process
        c:\winnt\system32\scardsvr.exe          Ignore    LocalSystem         0
Task Scheduler      Schedule  Stopped   Manual    Share Process
        c:\winnt\system32\mstask.exe  Normal    LocalSystem         0
RunAs Service       seclogon  Stopped   Manual    Share Process
        c:\winnt\system32\services.exe          Ignore    LocalSystem         0
System Event Notification     SENS      Running   Auto      Share Process
        c:\winnt\system32\svchost.exe -k netsvcs          Normal    LocalSystem         0
Internet Connection Sharing   SharedAccess        Stopped   Manual    Share Process
        c:\winnt\system32\svchost.exe -k netsvcs          Normal    LocalSystem         0
Simple TCP/IP Services        SimpTcp   Running   Auto      Share Process
        c:\winnt\system32\tcpsvcs.exe Normal    LocalSystem         0
Simple Mail Transport Protocol (SMTP)   SMTPSVC   Running   Auto      Share Process
        c:\winnt\system32\inetsrv\inetinfo.exe  Normal    LocalSystem         0
SNMP Service        SNMP      Running   Auto      Own Process
        c:\winnt\system32\snmp.exe    Normal    LocalSystem         0
SNMP Trap Service   SNMPTRAP  Stopped   Manual    Own Process
        c:\winnt\system32\snmptrap.exe          Normal    LocalSystem         0
Print Spooler       Spooler   Stopped   Disabled  Own Process
        c:\winnt\system32\spoolsv.exe Normal    LocalSystem         0
SQLSERVERAGENT      SQLSERVERAGENT      Stopped   Manual    Own Process
        c:\progra~1\micros~3\mssql\binn\sqlagent.exe      Normal    .\Administrator     0
Performance Logs and Alerts   SysmonLog Stopped   Manual    Own Process
        c:\winnt\system32\smlogsvc.exe          Normal    LocalSystem         0
Telephony TapiSrv   Running   Manual    Share Process       c:\winnt\system32\svchost.exe -k
tapisrv   Normal    LocalSystem         0
Terminal Services   TermService         Stopped   Disabled  Own Process
        c:\winnt\system32\termsrv.exe Normal    LocalSystem         0
Telnet    TlntSvr   Stopped   Manual    Own Process         c:\winnt\system32\tlntsvr.exe
        Normal    LocalSystem         0
Distributed Link Tracking Server        TrkSvr    Stopped   Manual    Share Process
        c:\winnt\system32\services.exe          Normal    LocalSystem         0
Distributed Link Tracking Client        TrkWks    Stopped   Disabled  Share Process
        c:\winnt\system32\services.exe          Normal    LocalSystem         0
Uninterruptible Power Supply  UPS       Stopped   Manual    Own Process
        c:\winnt\system32\ups.exe     Normal    LocalSystem         0
Utility Manager     UtilMan   Stopped   Manual    Own Process
        c:\winnt\system32\utilman.exe Normal    LocalSystem         0
Windows Time        W32Time   Stopped   Manual    Share Process
        c:\winnt\system32\services.exe          Normal    LocalSystem         0
World Wide Web Publishing Service       W3SVC     Stopped   Manual    Share Process
        c:\winnt\system32\inetsrv\inetinfo.exe  Normal    LocalSystem         0
Windows Management Instrumentation      WinMgmt   Running   Auto      Own Process
        c:\winnt\system32\wbem\winmgmt.exe      Ignore    LocalSystem         0
Windows Internet Name Service (WINS)    WINS      Running   Auto      Own Process
        c:\winnt\system32\wins.exe    Normal    LocalSystem         0
Windows Management Instrumentation Driver Extensions        Wmi       Running   Manual
        Share Process       c:\winnt\system32\services.exe          Normal    LocalSystem
        0

[Program Groups]

Group Name          Name      User Name
Accessories         Default User:Accessories      Default User
Accessories\Accessibility     Default User:Accessories\Accessibility  Default User
Accessories\Entertainment     Default User:Accessories\Entertainment  Default User
Accessories\System Tools      Default User:Accessories\System Tools   Default User
Startup   Default User:Startup          Default User
Accessories         All Users:Accessories         All Users
Accessories\Accessibility     All Users:Accessories\Accessibility     All Users
Accessories\Communications    All Users:Accessories\Communications    All Users
Accessories\Entertainment     All Users:Accessories\Entertainment     All Users
Accessories\Games   All Users:Accessories\Games   All Users
Accessories\System Tools      All Users:Accessories\System Tools      All Users
Administrative Tools          All Users:Administrative Tools          All Users
HP_NetRAID-4M       All Users:HP_NetRAID-4M       All Users
Microsoft SQL Server          All Users:Microsoft SQL Server          All Users
Microsoft SQL Server - Switch All Users:Microsoft SQL Server - Switch All Users
Microsoft Visual Studio 6.0   All Users:Microsoft Visual Studio 6.0   All Users
```

APPENDIX C – TUNABLE PARAMETERS

```
Microsoft Visual Studio 6.0\Microsoft Visual Studio 6.0 Tools         All Users:Microsoft
Visual Studio 6.0\Microsoft Visual Studio 6.0 Tools         All Users
MKS Toolkit         All Users:MKS Toolkit         All Users
Startup   All Users:Startup   All Users
VNC       All Users:VNC       All Users
VNC\Administrative Tools      All Users:VNC\Administrative Tools      All Users
Accessories         PRF_SUT6\Administrator:Accessories      PRF_SUT6\Administrator
Accessories\Accessibility     PRF_SUT6\Administrator:Accessories\Accessibility
          PRF_SUT6\Administrator
Accessories\Entertainment     PRF_SUT6\Administrator:Accessories\Entertainment
          PRF_SUT6\Administrator
Accessories\System Tools      PRF_SUT6\Administrator:Accessories\System Tools
          PRF_SUT6\Administrator
Microsoft Web Publishing      PRF_SUT6\Administrator:Microsoft Web Publishing
          PRF_SUT6\Administrator
Startup   PRF_SUT6\Administrator:Startup          PRF_SUT6\Administrator

[Startup Programs]

Program   Command   User Name Location
moderate  moderate.cmd        All Users Common Startup

[OLE Registration]

Object    Local Server
Sound (OLE2)        sndrec32.exe
Media Clip          mplay32.exe
Video Clip          mplay32.exe /avi
MIDI Sequence       mplay32.exe /mid
Sound     Not Available
Media Clip          Not Available
Image Document      "C:\Program Files\Windows NT\Accessories\ImageVue\KodakImg.exe"
WordPad Document    "%ProgramFiles%\Windows NT\Accessories\WORDPAD.EXE"
Windows Media Services DRM Storage object         Not Available
Bitmap Image        C:\WINNT\System32\mspaint.exe

[Internet Explorer 5]

[ Following are sub-categories of this main category ]

[Summary]

Item      Value
Version   5.00.2920.0000
Build     52920
Product ID          51879-270-6637794-05232
Application Path    C:\Program Files\Internet Explorer
Language  English (United States)
Active Printer      Not Available

Cipher Strength     56-bit
Content Advisor     Disabled
IEAK Install        No

[File Versions]

File      Version   Size      Date      Path      Company
advapi32.dll        5.0.2191.1          349 KB    12/7/1999 4:00:00 AM
          C:\WINNT\system32   Microsoft Corporation
advpack.dll         5.0.2920.0          87 KB     12/7/1999 4:00:00 AM
          C:\WINNT\system32   Microsoft Corporation
browselc.dll        5.0.2920.0          35 KB     12/7/1999 4:00:00 AM
          C:\WINNT\system32   Microsoft Corporation
browseui.dll        5.0.2920.0          793 KB    12/7/1999 4:00:00 AM
          C:\WINNT\system32   Microsoft Corporation
ckcnv.exe 5.0.2189.1          9 KB      12/7/1999 4:00:00 AM          C:\WINNT\system32
          Microsoft Corporation
comctl32.dll        5.81.2920.0         540 KB    12/7/1999 4:00:00 AM
          C:\WINNT\system32   Microsoft Corporation
crypt32.dll         5.131.2173.1        466 KB    12/7/1999 4:00:00 AM
          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         5.0.2920.0          57 KB     12/7/1999 4:00:00 AM
          C:\WINNT\system32   Microsoft Corporation
iexplore.exe        5.0.2920.0          59 KB     12/7/1999 4:00:00 AM          C:\Program
Files\Internet Explorer       Microsoft Corporation
imagehlp.dll        5.0.2195.1          125 KB    12/7/1999 4:00:00 AM
          C:\WINNT\system32   Microsoft Corporation
imghelp.dll         <File Missing>      Not Available       Not Available       Not Available
          Not Available
inseng.dll          5.0.2920.0          72 KB     12/7/1999 4:00:00 AM
          C:\WINNT\system32   Microsoft Corporation
jobexec.dll         5.0.0.1   47 KB     12/7/1999 4:00:00 AM          C:\WINNT\system32
          Microsoft Corporation
jscript.dll         5.1.0.4615          476 KB    12/7/1999 4:00:00 AM
          C:\WINNT\system32   Microsoft Corporation
jsproxy.dll         5.0.2920.0          13 KB     12/7/1999 4:00:00 AM
          C:\WINNT\system32   Microsoft Corporation
msaahtml.dll        <File Missing>      Not Available       Not Available       Not Available
          Not Available
mshtml.dll          5.0.2920.0          2302 KB   12/7/1999 4:00:00 AM
          C:\WINNT\system32   Microsoft Corporation
msjava.dll          5.0.3234.0          918 KB    12/7/1999 4:00:00 AM
          C:\WINNT\system32   Microsoft Corporation
msoss.dll <File Missing>      Not Available       Not Available       Not Available       Not
Available
msxml.dll 5.0.2920.0          521 KB    12/7/1999 4:00:00 AM          C:\WINNT\system32
          Microsoft Corporation
occache.dll         5.0.2920.0          86 KB     12/7/1999 4:00:00 AM
          C:\WINNT\system32   Microsoft Corporation
ole32.dll 5.0.2181.1          966 KB    12/7/1999 4:00:00 AM          C:\WINNT\system32
          Microsoft Corporation
oleaut32.dll        2.40.4512.1         600 KB    12/7/1999 4:00:00 AM
          C:\WINNT\system32   Microsoft Corporation
olepro32.dll        5.0.4512.1          160 KB    12/7/1999 4:00:00 AM
          C:\WINNT\system32   Microsoft Corporation
rsabase.dll         5.0.2150.1          129 KB    12/7/1999 4:00:00 AM
          C:\WINNT\system32   Microsoft Corporation
```

APPENDIX C – TUNABLE PARAMETERS

```
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        5.0.2170.0          140 KB    12/7/1999 4:00:00 AM
          C:\WINNT\system32   Microsoft Corporation
shdoc401.dll        <File Missing>      Not Available       Not Available       Not Available
          Not Available
shdocvw.dll         5.0.2920.0          1078 KB   12/7/1999 4:00:00 AM
          C:\WINNT\system32   Microsoft Corporation
shell32.dll         5.0.2920.0          2297 KB   12/7/1999 4:00:00 AM
          C:\WINNT\system32   Microsoft Corporation
shlwapi.dll         5.0.2920.0          283 KB    12/7/1999 4:00:00 AM
          C:\WINNT\system32   Microsoft Corporation
url.dll   5.0.2920.0          82 KB     12/7/1999 4:00:00 AM          C:\WINNT\system32
          Microsoft Corporation
urlmon.dll          5.0.2920.0          427 KB    12/7/1999 4:00:00 AM
          C:\WINNT\system32   Microsoft Corporation
vbscript.dll        5.1.0.4615          428 KB    12/7/1999 4:00:00 AM
          C:\WINNT\system32   Microsoft Corporation
webcheck.dll        5.0.2920.0          252 KB    12/7/1999 4:00:00 AM
          C:\WINNT\system32   Microsoft Corporation
win.com   5.0.2134.1          24 KB     12/7/1999 4:00:00 AM          C:\WINNT\system32
          Microsoft Corporation
wininet.dll         5.0.2920.0          457 KB    12/7/1999 4:00:00 AM
          C:\WINNT\system32   Microsoft Corporation
winsock.dll         3.10.0.103          3 KB      12/7/1999 4:00:00 AM
          C:\WINNT\system32   Microsoft Corporation
wintrust.dll        5.131.2143.1        162 KB    12/7/1999 4:00:00 AM
          C:\WINNT\system32   Microsoft Corporation
wsock.vxd <File Missing>      Not Available       Not Available       Not Available       Not
Available
wsock32.dll         5.0.2152.1          21 KB     12/7/1999 4:00:00 AM
          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 Disabled
AutoConfigURL
Proxy     Enabled
ProxyServer         nsd-prx1.cup.hp.com:8088
ProxyOverride

[Cache]

[ Following are sub-categories of this main category ]

[Summary]

Item      Value
Page Refresh Type   Automatic
Temporary Internet Files Folder         C:\Documents and Settings\Administrator\Local
Settings\Temporary Internet Files
Total Disk Space    8667 MB
Available Disk Space          5533 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 Validity  Signature Algorithm
Administrator       Administrator       10/30/2000 to 10/6/2100       sha1RSA

[Other People Certificates]

Issued To Issued By Validity  Signature Algorithm
No other people certificate information available

[Publishers]

Name
No publisher information available

[Security]
Zone      Security Level
Local intranet      Medium-low
Trusted sites       Low
Internet  Medium
Restricted sites    High
```

C.3 Microsoft SQL Server 8.0 Startup Parameters

```
sqlservr -x -c -T3502 –g100
```

where

-x	Disable the keeping of CPU time and cache-hit ratios.
-c	Start SQLServer independently of the Microsoft Windows 2000 Service Control Manager.
-T3502	Prints a message to the log at the beginning and end of each checkpoint.
-g100	Reserve 100 MB for non-buffer pool allocations.

C.4 Microsoft SQL Server 8.0 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 2000 Datacenter Enterprise Edition to allow 3GB of user and 1GB of kernel virtual address space, rather than the usual 2GB space for each
- /pae to cause Windows 2000 to support more than 4 GB of physical memory.

C.6 User Rights Assignment

The Group Policy Editor of Windows 2000 was used to modify an entry under User Rights Assignment. Specifically, the right to “Lock pages in memory” was given to the Administrators group so that SQL Server 2000 could use large amounts of physical memory.

C.7 Microsoft SQL Server 8.0 Configuration Parameters

Name	minimum	maximum	config_value	run_value
affinity mask	0	2147483647	255	255
allow updates	0	1	1	1
awe enabled	0	1	1	1
c2 audit mode	0	1	0	0
cost threshold for parallelism	0	32767	5	5
cursor threshold	-1	2147483647	-1	-1
default full-text language	0	2147483647	1033	1033
default language	0	9999	0	0
fill factor (%)	0	100	0	0
index create memory (KB)	704	2147483647	0	0
lightweight pooling	0	1	1	1
locks	5000	2147483647	0	0
max degree of parallelism	0	32	1	1
max server memory (MB)	4	2147483647	0	2147483647
max text repl size (B)	0	2147483647	65536	65536
max worker threads	32	32767	235	235
media retention	0	365	0	0
min memory per query (KB)	512	2147483647	1024	1024
min server memory (MB)	0	2147483647	100	100
nested triggers	0	1	1	1
network packet size (B)	512	65535	4096	4096
open objects	0	2147483647	0	0
priority boost	0	1	1	1
query governor cost limit	0	2147483647	0	0
query wait (s)	-1	2147483647	-1	-1
recovery interval (min)	0	32767	24	24
remote access	0	1	1	1
remote login timeout (s)	0	2147483647	20	20
remote proc trans	0	1	0	0
remote query timeout (s)	0	2147483647	0	0
scan for startup procs	0	1	0	0
set working set size	0	1	0	0
show advanced options	0	1	1	1
two digit year cutoff	1753	9999	2049	2049
user connections	0	32767	0	0
user options	0	32767	0	0

C.8 Internal DAC Configuration Parameters

Two sets of registry entries were used with the performance driver.

1) DpcProcessors
   It specifies how many processors are available for Dpc processing.
2) AdapterAffinityMasks
   It assigns the handling of adapter interrupt to a particular processor. In a multiprocessor/multiadapter system with 8 processors and 7 adapters, one processor could service two or more adapter interrupts to get the balancing work load over the 8 processors. The adapter to processor affinitizing is specified by the adapter affinity mask registry entries.

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

```
Key Name:          SYSTEM\CurrentControlSet\Services\hpnsa
Class Name:        <NO CLASS>
Last Write Time:   12/21/2000 - 2:51 PM
Value 0
  Name:            Adapt
  Type:            REG_DWORD
  Data:            0x12

Value 1
  Name:            AdaptAffinityMask0
  Type:            REG_DWORD
  Data:            0x12

Value 2
  Name:            AdaptAffinityMask1
  Type:            REG_DWORD
  Data:            0x12

Value 3
  Name:            AdaptAffinityMask2
  Type:            REG_DWORD
  Data:            0x24

Value 4
  Name:            AdaptAffinityMask3
  Type:            REG_DWORD
  Data:            0x24

Value 5
  Name:            AdaptAffinityMask4
  Type:            REG_DWORD
  Data:            0x81

Value 6
  Name:            AdaptAffinityMask5
  Type:            REG_DWORD
  Data:            0x48

Value 7
  Name:            AdaptAffinityMask6
  Type:            REG_DWORD
  Data:            0x81

Value 8
  Name:            DependOnGroup
  Type:            REG_MULTI_SZ
  Data:            SCSI miniport


Value 9
  Name:            DependOnService
  Type:            REG_MULTI_SZ
  Data:

Value 10
  Name:            DisplayName
  Type:            REG_SZ
  Data:            Hewlett Packard NetRAID-4M Driver

Value 11
  Name:            DpcProcessors
  Type:            REG_DWORD
  Data:            0x8

Value 12
  Name:            ErrorControl
  Type:            REG_DWORD
  Data:            0x1

Value 13
  Name:            Group
  Type:            REG_SZ
  Data:            port

Value 14
  Name:            ImagePath
  Type:            REG_EXPAND_SZ
  Data:            System32\DRIVERS\hpnsa.sys

Value 15
  Name:            Start
  Type:            REG_DWORD
  Data:            0

Value 16
  Name:            Tag
  Type:            REG_DWORD
  Data:            0x1

Value 17
  Name:            Type
  Type:            REG_DWORD
  Data:            0x1


Key Name:          SYSTEM\CurrentControlSet\Services\hpnsa\Enum
Class Name:        <NO CLASS>
```

```
Last Write Time:   12/21/2000 - 2:35 PM
Value 0
  Name:            0
  Type:            REG_SZ
  Data:            PCI\VEN_1011&DEV_0046&SUBSYS_10C2103C&REV_01\3&267a616a&0&20

Value 1
  Name:            1
  Type:            REG_SZ
  Data:            PCI\VEN_1011&DEV_0046&SUBSYS_10C2103C&REV_01\3&13c0b0c5&0&28

Value 2
  Name:            2
  Type:            REG_SZ
  Data:            PCI\VEN_1011&DEV_0046&SUBSYS_10C2103C&REV_01\3&13c0b0c5&0&30

Value 3
  Name:            3
  Type:            REG_SZ
  Data:            PCI\VEN_1011&DEV_0046&SUBSYS_10C2103C&REV_01\3&1070020&0&20

Value 4
  Name:            4
  Type:            REG_SZ
  Data:            PCI\VEN_1011&DEV_0046&SUBSYS_10C2103C&REV_01\3&1070020&0&28

Value 5
  Name:            5
  Type:            REG_SZ
  Data:            PCI\VEN_1011&DEV_0046&SUBSYS_10C2103C&REV_01\3&29e81982&0&20

Value 6
  Name:            6
  Type:            REG_SZ
  Data:            PCI\VEN_1011&DEV_0046&SUBSYS_10C2103C&REV_01\3&29e81982&0&28

Value 7
  Name:            Count
  Type:            REG_DWORD
  Data:            0x7

Value 8
  Name:            NextInstance
  Type:            REG_DWORD
  Data:            0x7


Key Name:          SYSTEM\CurrentControlSet\Services\hpnsa\Parameters
Class Name:        <NO CLASS>
Last Write Time:   10/30/2000 - 9:33 AM

Key Name:          SYSTEM\CurrentControlSet\Services\hpnsa\Parameters\PnpInterface
Class Name:        <NO CLASS>
Last Write Time:   10/30/2000 - 9:33 AM
Value 0
  Name:            5
  Type:            REG_DWORD
  Data:            0x1


Key Name:          SYSTEM\CurrentControlSet\Services\hpnsa\Security
Class Name:        <NO CLASS>
Last Write Time:   10/30/2000 - 9:33 AM
Value 0
  Name:            Security
  Type:            REG_BINARY
  Data:
00000000   01 00 14 80 a0 00 00 00 - ac 00 00 00 14 00 00 00  .... ...¬.......
00000010   30 00 00 00 02 00 1c 00 - 01 00 00 00 02 80 14 00  0...............
00000020   ff 01 0f 00 01 01 00 00 - 00 00 00 01 00 00 00 00   ...............
00000030   02 00 70 00 04 00 00 00 - 00 00 18 00 fd 01 02 00  ..p.........ý...
00000040   01 01 00 00 00 00 00 05 - 12 00 00 00 50 00 5f 00  ............P._.
00000050   00 00 1c 00 ff 01 0f 00 - 01 02 00 00 00 00 00 05  .... ...........
00000060   20 00 00 00 20 02 00 00 - 32 00 66 00 00 00 18 00   ... ...2.f.....
00000070   8d 01 02 00 01 01 00 00 - 00 00 00 05 0b 00 00 00  ................
00000080   20 02 00 00 00 00 1c 00 - fd 01 02 00 01 02 00 00   .......ý.......
00000090   00 00 00 05 20 00 00 00 - 23 02 00 00 32 00 66 00  .... ...#...2.f.
000000a0   01 01 00 00 00 00 00 05 - 12 00 00 00 01 01 00 00  ................
000000b0   00 00 00 05 12 00 00 00 -                          ........
```

C.9 Client System Configuration Parameters

COM+ Settings

```
TPCC.AllTxns:
        Activation:
                Enable Object Pooling selected
                Minimum Pool Size: 30
                Maximum Pool Size: 30
                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:   6/26/2000 - 3:40 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:           0x400
 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 - 5:44 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 - 2:53 PM

Key Name:
SYSTEM\CurrentControlSet\Services\W3SVC\Parameters\ADCLaunch\AdvancedDataFactory
Class Name:       <NO CLASS>
Last Write Time:  11/9/1999 - 2:53 PM

Key Name:
SYSTEM\CurrentControlSet\Services\W3SVC\Parameters\ADCLaunch\RDSServer.DataFactory
Class Name:       <NO CLASS>
Last Write Time:  11/9/1999 - 2:53 PM

Key Name:         SYSTEM\CurrentControlSet\Services\W3SVC\Parameters\Script Map
Class Name:       <NO CLASS>
Last Write Time:  11/9/1999 - 3:05 PM

Key Name:         SYSTEM\CurrentControlSet\Services\W3SVC\Parameters\Virtual Roots
Class Name:       <NO CLASS>
Last Write Time:  9/26/2000 - 3:30 PM
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:  6/23/2000 - 1:13 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:           0x1f40

Value 7
  Name:           MaxPendingDeliveries
  Type:           REG_DWORD
  Data:           0x3e8

Value 8
  Name:           NumberOfDeliveryThreads
  Type:           REG_DWORD
  Data:           0x5

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: 09/05/2000 12:57:04 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         N1_CLIENT1
System Manufacturer Hewlett Packard
System Model        HP NetServer
System Type         X86-based PC
Processor x86 Family 6 Model 7 Stepping 3 GenuineIntel ~600 Mhz
BIOS Version        09/16/99
Windows Directory   C:\WINNT
System Directory    C:\WINNT\System32
Boot Device         \Device\Harddisk0\Partition1
Locale    United States
User Name N1_CLIENT1\Administrator
Time Zone Pacific Daylight Time
Total Physical Memory         523,756 KB
Available Physical Memory     385,488 KB
Total Virtual Memory          1,802,756 KB
Available Virtual Memory      1,555,960 KB
Page File Space     1,279,000 KB
Page File Not Available

[Hardware Resources]

[ Following are sub-categories of this main category ]

[Conflicts/Sharing]

Resource  Device
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]
```

APPENDIX C – TUNABLE PARAMETERS

```
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 controller       OK
0x00A0-0x00A1       Programmable interrupt controller       OK
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 Controller OK
0x01F0-0x01F7       Primary IDE Channel OK
0x03F6-0x03F6       Primary IDE Channel OK
0x0170-0x0177       Secondary IDE Channel         OK
0x0376-0x0376       Secondary IDE Channel         OK
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 #2          OK
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 #2          OK
0xFC000000-0xFC0FFFFF         HP NetServer 10/100TX PCI LAN Adapter #2          OK
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 software         OK
          C:\WINNT\System32\IAC25_32.AX 2.05.53   195.00 KB (199,680 bytes)     9/9/1999
5:00:00 PM
```

APPENDIX C – TUNABLE PARAMETERS

```
c:\winnt\system32\msg723.acm  Microsoft Corporation                  OK
         C:\WINNT\System32\MSG723.ACM  4.4.3385  106.77 KB (109,328 bytes)     11/9/1999
1:53:30 PM
c:\winnt\system32\lhacm.acm   Microsoft Corporation                  OK
         C:\WINNT\System32\LHACM.ACM   4.4.3385  33.27 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\msh261.drv  Microsoft Corporation                  OK
         C:\WINNT\System32\MSH261.DRV  4.4.3385  163.77 KB (167,696 bytes)     11/9/1999
1:53:30 PM
c:\winnt\system32\msh263.drv  Microsoft Corporation                  OK
         C:\WINNT\System32\MSH263.DRV  4.4.3385  252.27 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  1.10.0.6  108.00 KB (110,592 bytes)     9/9/1999
5:00:00 PM
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

[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 File  display.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
```

APPENDIX C – TUNABLE PARAMETERS

```
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
Last Reset          9/5/2000 5:26:16 AM
Index     0
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 Port  0x1860-0x187F
Driver    83.27 KB (85,264 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          9/5/2000 5:26:16 AM
Index     1
Service Name        HPTX
IP Address          15.75.206.171
IP Subnet 255.255.248.0
Default IP Gateway  15.75.200.1
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 Port  0x1800-0x183F
Driver    83.27 KB (85,264 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          9/5/2000 5:26:16 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          9/5/2000 5:26:16 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          9/5/2000 5:26:16 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
```

APPENDIX C – TUNABLE PARAMETERS

```
Adapter Type        Direct Parallel
Product Name        Direct Parallel
Installed True
PNP Device ID       ROOT\MS_PTIMINIPORT\0000
Last Reset          9/5/2000 5:26:16 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          9/5/2000 5:26:16 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
```

APPENDIX C – TUNABLE PARAMETERS

```
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
```

APPENDIX C – TUNABLE PARAMETERS

```
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 Size     0
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 Error     0
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 Enabled     0
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 Port  0x03F8-0x03FF
Driver    60.95 KB (62,416 bytes)

Name      Communications Port (COM2)
```

APPENDIX C – TUNABLE PARAMETERS

```
Status    OK
PNP Device ID       ACPI\PNP0501\2
Maximum Input Buffer Size     0
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 Error     0
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 Enabled     0
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 Port  0x02F8-0x02FF
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          3.59 GB (3,859,812,352 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 9.1OGB A 68-SA4O SCSI Disk Device
Drive BytesPerSector          512
Drive MediaLoaded   True
Drive MediaType     Fixed hard disk media
Drive Partitions    1
Drive SCSIBus       0
Drive SCSILogicalUnit         0
Drive SCSIPort      2
Drive SCSITargetId  0
Drive SectorsPerTrack         63
Drive Size          9097159680 bytes
Drive TotalCylinders          1106
Drive TotalSectors  17767890
Drive TotalTracks   282O3O
Drive TracksPerCylinder       255

Drive     L:
Description         Network Connection
Provider Name       \\nrddata\g$


[SCSI]

Item      Value
Name      Adaptec AHA-294OU/UW Dual/AHA-394xAU/AUW/AUWD PCI SCSI Controller
Caption   Adaptec AHA-294OU/UW Dual/AHA-394xAU/AUW/AUWD PCI SCSI Controller
Driver    aic78xx
Status    OK
PNP Device ID       PCI\VEN_9O04&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 Port  0x1OOO-0x1OFF
Driver    55.58 KB (56,912 bytes)

Name      Adaptec AHA-294OU/UW Dual/AHA-394xAU/AUW/AUWD PCI SCSI Controller
Caption   Adaptec AHA-294OU/UW Dual/AHA-394xAU/AUW/AUWD PCI SCSI Controller
Driver    aic78xx
```

APPENDIX C – TUNABLE PARAMETERS

```
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 Port  0x1400-0x14FF
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
abiosdsk  Abiosdsk   Not Available       Kernel Driver       False     Disabled  Stopped   OK
          Ignore    False     False
abp480n5  abp480n5   Not Available       Kernel Driver       False     Disabled  Stopped   OK
          Normal    False     False
acpi      Microsoft ACPI Driver         c:\winnt\system32\drivers\acpi.sys      Kernel Driver
          True      Boot Start          Running   OK        Normal    False     True
acpiec    ACPIEC    c:\winnt\system32\drivers\acpiec.sys    Kernel Driver       False
          Disabled  Stopped   OK        Normal    False     False
adpu160m  adpu160m  Not Available       Kernel Driver       False     Disabled  Stopped   OK
          Normal    False     False
afd       AFD Networking Support Environment      c:\winnt\system32\drivers\afd.sys
          Kernel 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     Disabled  Stopped   OK
          Normal    False     False
aic116x   aic116x   Not Available       Kernel Driver       False     Disabled  Stopped   OK
          Normal    False     False
aic78u2   aic78u2   Not Available       Kernel Driver       False     Disabled  Stopped   OK
          Normal    False     False
aic78xx   aic78xx   c:\winnt\system32\drivers\aic78xx.sys   Kernel Driver       True      Boot
Start     Running   OK        Normal    False     True
amiOnt    amiOnt    Not Available       Kernel Driver       False     Disabled  Stopped   OK
          Normal    False     False
amsint    amsint    Not Available       Kernel Driver       False     Disabled  Stopped   OK
          Normal    False     False
arp1394   1394 ARP Client Protocol      c:\winnt\system32\drivers\arp1394.sys   Kernel Driver
          False     Demand Start        Stopped   OK        Normal    False     False
asc       asc       Not Available       Kernel Driver       False     Disabled  Stopped   OK
          Normal    False     False
asc3350p  asc3350p  Not Available       Kernel Driver       False     Disabled  Stopped   OK
          Normal    False     False
asc3550   asc3550   Not Available       Kernel Driver       False     Disabled  Stopped   OK
          Normal    False     False
asyncmac  RAS Asynchronous Media Driver c:\winnt\system32\drivers\asyncmac.sys  Kernel Driver
          False     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     Disabled  Stopped   OK
          Ignore    False     False
atirage   atirage   c:\winnt\system32\drivers\atirage.sys   Kernel Driver       True
          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
buslogic  BusLogic  Not Available       Kernel Driver       False     Disabled  Stopped   OK
          Normal    False     False
cd20xrnt  cd20xrnt  Not Available       Kernel Driver       False     Disabled  Stopped   OK
          Normal    False     False
cdaudio   Cdaudio   c:\winnt\system32\drivers\cdaudio.sys   Kernel Driver       False
          System Start        Stopped   OK        Ignore    False     False
cdfs      Cdfs      c:\winnt\system32\drivers\cdfs.sys      File System Driver  True
          Disabled  Running   OK        Normal    False     True
cdrom     CD-ROM Driver       c:\winnt\system32\drivers\cdrom.sys     Kernel Driver       True
          System Start        Running   OK        Normal    False     True
changer   Changer   Not Available       Kernel Driver       False     System Start
          Stopped   OK        Ignore    False     False
cpqarray  Cpqarray  Not Available       Kernel Driver       False     Disabled  Stopped   OK
          Normal    False     False
cpqfcalm  cpqfcalm  Not Available       Kernel Driver       False     Disabled  Stopped   OK
          Normal    False     False
cpqfws2e  cpqfws2e  Not Available       Kernel Driver       False     Disabled  Stopped   OK
          Normal    False     False
dac960nt  dac960nt  Not Available       Kernel Driver       False     Disabled  Stopped   OK
          Normal    False     False
deckzpsx  deckzpsx  Not Available       Kernel Driver       False     Disabled  Stopped   OK
          Normal    False     False
dfsdriver DfsDriver c:\winnt\system32\drivers\dfs.sys       File System Driver  True      Boot
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
diskperf  Diskperf  c:\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
          Disabled  Stopped   OK        Normal    False     False
```

APPENDIX C – TUNABLE PARAMETERS

```
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.sys       File System Driver  True
          Disabled  Running   OK        Normal    False     True
fastfat   Fastfat   c:\winnt\system32\drivers\fastfat.sys    File System Driver  True
          Disabled  Running   OK        Normal    False     True
fd16_700  Fd16_700  Not Available       Kernel Driver       False     Disabled  Stopped   OK
          Normal    False     False
fdc       Floppy Disk Controller Driver c:\winnt\system32\drivers\fdc.sys       Kernel Driver
          True      Demand Start        Running   OK        Normal    False     True
fireport  fireport  Not Available       Kernel Driver       False     Disabled  Stopped   OK
          Normal    False     False
flashpnt  flashpnt  Not Available       Kernel Driver       False     Disabled  Stopped   OK
          Normal    False     False
flpydisk  Floppy Disk Driver  c:\winnt\system32\drivers\flpydisk.sys  Kernel Driver       True
          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 Classifier     c:\winnt\system32\drivers\msgpc.sys     Kernel Driver
          True      Demand Start        Running   OK        Normal    False     True
hptx      HP NetServer 10/100TX PCI LAN Adapter Driver
          c:\winnt\system32\drivers\hptxnt5.sys   Kernel Driver       True      Demand Start
          Running   OK        Normal    False     True
i8042prt  i8042 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     Disabled  Stopped   OK
          Normal    False     False
intelide  Intellde  c:\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
ipsraidn  ipsraidn  Not Available       Kernel Driver       False     Disabled  Stopped   OK
          Normal    False     False
isapnp    PnP ISA/EISA Bus Driver       c:\winnt\system32\drivers\isapnp.sys    Kernel Driver
          True      Boot Start          Running   OK        Critical  False     True
kbdclass  Keyboard 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
lp6nds35  lp6nds35  Not Available       Kernel Driver       False     Disabled  Stopped   OK
          Normal    False     False
mnmdd     mnmdd     c:\winnt\system32\drivers\mnmdd.sys     Kernel Driver       True
          System Start        Running   OK        Ignore    False     True
modem     Modem     c:\winnt\system32\drivers\modem.sys     Kernel Driver       False
          Demand Start        Stopped   OK        Ignore    False     False
mouclass  Mouse Class Driver  c:\winnt\system32\drivers\mouclass.sys  Kernel Driver       True
          System Start        Running   OK        Normal    False     True
mountmgr  MountMgr  c:\winnt\system32\drivers\mountmgr.sys  Kernel Driver       True      Boot
Start     Running   OK        Normal    False     True
mraid35x  mraid35x  Not Available       Kernel Driver       False     Disabled  Stopped   OK
          Normal    False     False
mrxsmb    MRXSMB    c:\winnt\system32\drivers\mrxsmb.sys    File System Driver  True
          System 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
msskssrv  Microsoft Streaming Service Proxy       c:\winnt\system32\drivers\msskssrv.sys
          Kernel Driver       False     Demand Start        Stopped   OK        Normal
          False     False
mspclock  Microsoft 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.sys       File System Driver  True      Boot
Start     Running   OK        Normal    False     True
ncrc710   Ncrc710   Not Available       Kernel Driver       False     Disabled  Stopped   OK
          Normal    False     False
ndis      NDIS System Driver  c:\winnt\system32\drivers\ndis.sys      Kernel Driver       True
          Boot Start          Running   OK        Normal    False     True
ndistapi  Remote 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
          Disabled  Running   OK        Normal    False     True
null      Null      c:\winnt\system32\drivers\null.sys      Kernel Driver       True
          System Start        Running   OK        Normal    False     True
nwlnkflt  IPX Traffic Filter Driver       c:\winnt\system32\drivers\nwlnkflt.sys  Kernel Driver
          False     Demand Start        Stopped   OK        Normal    False     False
nwlnkfwd  IPX Traffic Forwarder Driver    c:\winnt\system32\drivers\nwlnkfwd.sys  Kernel Driver
          False     Demand Start        Stopped   OK        Normal    False     False
parallel  Parallel 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
```

APPENDIX C – TUNABLE PARAMETERS

```
pci       PCI Bus Driver      c:\winnt\system32\drivers\pci.sys      Kernel Driver      True
          Boot Start          Running   OK        Critical  False     True
pcidump   PCIDump   Not Available       Kernel Driver       False     System Start
          Stopped   OK        Ignore    False     False
pciide    PCIIde    Not Available       Kernel Driver       False     Disabled  Stopped   OK
          Normal    False     False
pcmcia    Pcmcia    c:\winnt\system32\drivers\pcmcia.sys    Kernel Driver       False
          Disabled  Stopped   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
pdrframe  PDRFRAME  Not 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     Disabled  Stopped   OK
          Normal    False     False
ql10wnt   Ql10wnt   Not Available       Kernel Driver       False     Disabled  Stopped   OK
          Normal    False     False
ql1240    ql1240    Not Available       Kernel Driver       False     Disabled  Stopped   OK
          Normal    False     False
ql2100    ql2100    Not Available       Kernel Driver       False     Disabled  Stopped   OK
          Normal    False     False
rasacd    Remote Access Auto Connection Driver    c:\winnt\system32\drivers\rasacd.sys
          Kernel Driver       True      System 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.sys
          Kernel 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     Disabled  Stopped   OK
          Normal    False     False
sparrow   Sparrow   Not Available       Kernel Driver       False     Disabled  Stopped   OK
          Normal    False     False
spud      Special Purpose Utility Driver          c:\winnt\system32\drivers\spud.sys
          Kernel Driver       True      Demand Start        Running   OK        Normal
          False     True
srv       Srv       c:\winnt\system32\drivers\srv.sys       File 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     Disabled  Stopped   OK
          Normal    False     False
symc8xx   symc8xx   Not Available       Kernel Driver       False     Disabled  Stopped   OK
          Normal    False     False
sym_hi    sym_hi    Not Available       Kernel Driver       False     Disabled  Stopped   OK
          Normal    False     False
tcpip     TCP/IP Protocol Driver        c:\winnt\system32\drivers\tcpip.sys     Kernel Driver
          True      System 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     Disabled  Stopped   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
          Disabled  Stopped   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     Disabled  Stopped   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 Driver       c:\winnt\system32\drivers\usbhub.sys
          Kernel Driver       True      Demand Start        Running   OK        Normal
          False     True
vgasave   VgaSave   c:\winnt\system32\drivers\vga.sys       Kernel 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]

Variable  Value     User Name
ComSpec   %SystemRoot%\system32\cmd.exe <SYSTEM>
Os2LibPath          %SystemRoot%\system32\os2\dll;          <SYSTEM>
Path      %SystemRoot%\system32;%SystemRoot%;%SystemRoot%\System32\Wbem;C:\Program
Files\Microsoft SQL Server\80\Tools\BINN          <SYSTEM>
```

APPENDIX C – TUNABLE PARAMETERS

```
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\Temp       N1_CLIENT1\Administrator
TMP       %USERPROFILE%\Local Settings\Temp       N1_CLIENT1\Administrator
MSDevDir  K:\Program Files\DevStudio\SharedIDE    N1_CLIENT1\Administrator
path      k:\program files\devstudio\sharedide\bin\ide;k:\program
files\devstudio\sharedide\bin;k:\program files\devstudio\vc\bin       N1_CLIENT1\Administrator
lib       k:\program files\devstudio\vc\lib;k:\program files\devstudio\vc\mfc\lib;%lib%
          N1_CLIENT1\Administrator
include   k:\program files\devstudio\vc\include;k:\program
files\devstudio\vc\atl\include;k:\program files\devstudio\vc\mfc\include;%include%
          N1_CLIENT1\Administrator

[Jobs]

[ Following are sub-categories of this main category ]

[Print]

Document  Size      Owner     Notify    Status    Time Submitted      Start Time
          Until Time          Elapsed Time        Pages Printed       Job ID    Priority
          Parameters          Driver Name         Print Processor     Host Print Queue    Data
Type      Name
No print jobs


[Network Connections]

Local Name          Remote Name         Type      Status    User Name
E:        \\n1_client5\c$     Disk      Error
F:        \\n1_client2\c$     Disk      Error
H:        \\n1_rte1\c$        Disk      Error
I:        \\n1_client3\c$     Disk      Error
J:        \\n1_client4\c$     Disk      Error
K:        \\prf_sut6\c$       Disk      Error
L:        \\nrddata\g$        Disk      OK        N1_CLIENT1\Administrator

[Running Tasks]

Name      Path      Process ID          Priority  Min Working Set     Max Working Set
          Start Time          Version   Size      File Date
system idle process Not Available       0         0         Not Available       Not Available
          Not Available       Unknown   Unknown   Unknown
system    Not Available       8         8         0         1413120   Not Available
          Unknown   Unknown   Unknown
smss.exe  c:\winnt\system32\smss.exe    160       11        204800    1413120   9/5/2000
12:26:37 PM         5.00.2090.1         42.77 KB (43,792 bytes)       Not Available
csrss.exe Not Available       184       13        Not Available       Not Available
          9/5/2000 12:26:47 PM          Unknown   Unknown   Unknown
winlogon.exe        c:\winnt\system32\winlogon.exe          204       13        204800
          1413120   9/5/2000 12:26:49 PM          5.00.2116.1         171.27 KB (175,376
bytes)    Not Available
services.exe        c:\winnt\system32\services.exe          232       9         204800
          1413120   9/5/2000 12:26:51 PM          5.00.2106.1         87.27 KB (89,360 bytes)
          Not Available
lsass.exe c:\winnt\system32\lsass.exe   244       13        204800    1413120   9/5/2000
12:26:51 PM         5.00.2121.1         32.77 KB (33,552 bytes)       Not Available
svchost.exe         c:\winnt\system32\svchost.exe 412       8         204800    1413120
          9/5/2000 12:26:57 PM          5.00.2090.1         7.77 KB (7,952 bytes)         Not
Available
spoolsv.exe         c:\winnt\system32\spoolsv.exe 444       8         204800    1413120
          9/5/2000 12:26:58 PM          5.00.2107.1         43.77 KB (44,816 bytes)       Not
Available
msdtc.exe c:\winnt\system32\msdtc.exe   472       8         204800    1413120   9/5/2000
12:26:58 PM         1999.8.3413.3       6.77 KB (6,928 bytes)         Not Available
svchost.exe         c:\winnt\system32\svchost.exe 580       8         204800    1413120
          9/5/2000 12:27:03 PM          5.00.2090.1         7.77 KB (7,952 bytes)         Not
Available
llssrv.exe          c:\winnt\system32\llssrv.exe  604       9         204800    1413120
          9/5/2000 12:27:03 PM          5.00.2090.1         113.77 KB (116,496 bytes)     Not
Available
regsvc.exe          c:\winnt\system32\regsvc.exe  660       8         204800    1413120
          9/5/2000 12:27:03 PM          5.00.2091.1         63.77 KB (65,296 bytes)       Not
Available
mstask.exe          c:\winnt\system32\mstask.exe  708       8         204800    1413120
          9/5/2000 12:27:05 PM          4.71.2113.1         114.77 KB (117,520 bytes)     Not
Available
tcpsvcs.exe         c:\winnt\system32\tcpsvcs.exe 748       8         204800    1413120
          9/5/2000 12:27:06 PM          5.00.2090.1         24.77 KB (25,360 bytes)       Not
Available
inetinfo.exe        c:\winnt\system32\inetsrv\inetinfo.exe  852       8         204800
          1413120   9/5/2000 12:27:09 PM          5.00.0984 14.27 KB (14,608 bytes)       Not
Available
dfssvc.exe          c:\winnt\system32\dfssvc.exe  876       8         204800    1413120
          9/5/2000 12:27:10 PM          5.00.2124.1         95.77 KB (98,064 bytes)       Not
Available
explorer.exe        c:\winnt\explorer.exe         1028      8         204800    1413120
          9/5/2000 12:27:34 PM          5.00.2919.3800      232.77 KB (238,352 bytes)     Not
Available
hpmon.exe c:\winnt\system32\hpmon.exe   1080      8         204800    1413120   9/5/2000
12:27:38 PM         1.11      28.50 KB (29,184 bytes)       Not Available
svchost.exe         c:\winnt\system32\svchost.exe 1144      8         204800    1413120
          9/5/2000 12:27:52 PM          5.00.2090.1         7.77 KB (7,952 bytes)         Not
Available
mmc.exe   c:\winnt\system32\mmc.exe     504       8         204800    1413120   9/5/2000
12:54:24 PM         5.00.2115.1         589.27 KB (603,408 bytes)     Not Available
winmgmt.exe         c:\winnt\system32\wbem\winmgmt.exe      1120      8         204800
          1413120   9/5/2000 12:54:57 PM          1.50.1025.0015      164.05 KB (167,991
bytes)    Not Available
rsvp.exe  c:\winnt\system32\rsvp.exe    696       8         204800    1413120   9/5/2000
12:55:31 PM         5.00.2120.1         170.77 KB (174,864 bytes)     Not Available

[Loaded Modules]

Name      Version   Size      File Date Manufacturer        Path
```

APPENDIX C – TUNABLE PARAMETERS

```
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.exe  5.00.2120.1         170.77 KB (174,864 bytes)     9/9/1999 5:00:00 PM Microsoft
Corporation         c:\winnt\system32\rsvp.exe
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
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 Software       c:\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 Software       c:\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
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
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
hpmon.exe 1.11      28.50 KB (29,184 bytes)       5/22/2000 2:55:58 PM          Hewlett-
Packard Company     c:\winnt\system32\hpmon.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
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
diskcopy.dll        5.00.2091.1         15.77 KB (16,144 bytes)       9/9/1999 5:00:00 PM
        Microsoft Corporation         c:\winnt\system32\diskcopy.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
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
```

APPENDIX C – TUNABLE PARAMETERS

```
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
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
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
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
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
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.dll  5.00.0984 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
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
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
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
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
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
```

APPENDIX C – TUNABLE PARAMETERS

```
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          6.0.8540  370.27 KB (379,152 bytes)     9/9/1999 5:00:00 PM Microsoft
Corporation         c:\winnt\system32\expsrv.dll
vbajet32.dll        6.1.8268  30.27 KB (30,992 bytes)       9/9/1999 5:00:00 PM Microsoft
Corporation         c:\winnt\system32\vbajet32.dll
msjtes40.dll        4.00.2927.8         232.27 KB (237,840 bytes)     3/13/2000 7:20:46 PM
         Microsoft Corporation         c:\winnt\system32\msjtes40.dll
oledb32r.dll        2.60.4815.0         68.27 KB (69,904 bytes)       3/13/2000 7:20:47 PM
         Microsoft Corporation         c:\program files\common files\system\ole
db\oledb32r.dll
msdart32.dll        2.60.4815.0         84.27 KB (86,288 bytes)       3/13/2000 7:20:45 PM
         Microsoft Corporation         c:\winnt\system32\msdart32.dll
oledb32.dll         2.60.4815.0         460.27 KB (471,312 bytes)     3/13/2000 7:20:47 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
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        4.00.2927.10        600.27 KB (614,672 bytes)     3/13/2000 7:21:06 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.dll    4.00.2927.2         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
sens.dll  5.00.2090.1         35.77 KB (36,624 bytes)       9/9/1999 5:00:00 PM Microsoft
Corporation         c:\winnt\system32\sens.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
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
```

APPENDIX C – TUNABLE PARAMETERS

```
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
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
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
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
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
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
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          5.00.2090.1         17.77 KB (18,192 bytes)       9/9/1999 5:00:00 PM
        Microsoft Corporation         c:\winnt\system32\alrsvc.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
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
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
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
icmp.dll  5.00.2090.1         7.27 KB (7,440 bytes)         9/9/1999 5:00:00 PM Microsoft
Corporation         c:\winnt\system32\icmp.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
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
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
```

APPENDIX C – TUNABLE PARAMETERS

```
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.dll  5.00.2090.1         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
          Microsoft Corporation         c:\winnt\system32\wldap32.dll
ws2help.dll         5.00.2095.1         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.exe  5.00.2090.1         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 Browser    Browser   Running   Auto Start          Share Process
          c:\winnt\system32\services.exe          Normal    LocalSystem         0
Indexing Service    cisvc     Stopped   Demand Start        Share Process
          c:\winnt\system32\cisvc.exe   Normal    LocalSystem         0
ClipBook  ClipSrv   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      Stopped   Disabled  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          dmserver  Running   Auto Start          Share Process
          c:\winnt\system32\services.exe          Normal    LocalSystem         0
DNS Client          Dnscache  Running   Auto Start          Share Process
          c:\winnt\system32\services.exe          Normal    LocalSystem         0
Event Log Eventlog  Running   Auto Start          Share Process
          c:\winnt\system32\services.exe          Normal    LocalSystem         0
```

APPENDIX C – TUNABLE PARAMETERS

```
COM+ Event System   EventSystem         Running   Demand Start        Share Process
        c:\winnt\system32\svchost.exe -k netsvcs          Normal    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 netsvcs          Normal    LocalSystem         0
IIS Admin Service   IISADMIN  Running   Auto Start          Share Process
        c:\winnt\system32\inetsrv\inetinfo.exe  Normal    LocalSystem         0
IMDB Server         ImdbServer          Stopped   Disabled  Own Process
        c:\winnt\system32\imdbsrv.exe Normal    LocalSystem         0
Intersite Messaging IsmServ   Stopped   Disabled  Own Process
        c:\winnt\system32\ismserv.exe Normal    LocalSystem         0
Kerberos Key Distribution Center        kdc         Stopped   Disabled  Share Process
        c:\winnt\system32\lsass.exe   Normal    LocalSystem         0
Server    lanmanserver        Running   Auto 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 Sharing       mnmsrvc   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 /v        Normal    LocalSystem         0
Network DDE         NetDDE    Stopped   Demand Start        Share Process
        c:\winnt\system32\netdde.exe  Normal    LocalSystem         0
Network DDE DSDM    NetDDEdsdm          Stopped   Demand Start        Share Process
        c:\winnt\system32\netdde.exe  Normal    LocalSystem         0
Net Logon Netlogon  Stopped   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 netsvcs          Normal    LocalSystem         0
File Replication    NtFrs     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 netsvcs          Normal    LocalSystem         0
Plug and Play       PlugPlay  Running   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   ProtectedStorage    Running   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 netsvcs          Normal    LocalSystem         0
Remote Access Connection Manager        RasMan      Stopped   Demand Start        Share Process
        c:\winnt\system32\svchost.exe -k netsvcs          Normal    LocalSystem         0
Routing and Remote Access     RemoteAccess        Stopped   Disabled  Share Process
        c:\winnt\system32\svchost.exe -k netsvcs          Normal    LocalSystem         0
Remote Registry Service       RemoteRegistry      Running   Auto 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 Manager     SamSs     Running   Auto Start          Share Process
        c:\winnt\system32\lsass.exe   Normal    LocalSystem         0
Smart Card Helper   SCardDrv  Stopped   Demand Start        Share Process
        c:\winnt\system32\scardsvr.exe          Ignore    LocalSystem         0
Smart Card          SCardSvr  Stopped   Demand Start        Share Process
        c:\winnt\system32\scardsvr.exe          Ignore    LocalSystem         0
Task Scheduler      Schedule  Running   Auto Start          Share Process
        c:\winnt\system32\mstask.exe  Normal    LocalSystem         0
RunAs Service       seclogon  Running   Auto Start          Share Process
        c:\winnt\system32\services.exe          Ignore    LocalSystem         0
System Event Notification     SENS      Running   Auto Start          Share Process
        c:\winnt\system32\svchost.exe -k netsvcs          Normal    LocalSystem         0
Internet Connection Sharing   SharedAccess        Stopped   Demand Start        Share Process
        c:\winnt\system32\svchost.exe -k netsvcs          Normal    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 tapisrv          Normal    LocalSystem         0
Terminal Services   TermService         Stopped   Disabled  Own 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 Server        TrkSvr      Stopped   Demand Start        Share Process
        c:\winnt\system32\services.exe          Normal    LocalSystem         0
Distributed Link Tracking Client        TrkWks      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.exe     Normal    LocalSystem         0
Utility Manager     UtilMan   Stopped   Demand Start        Own Process
        c:\winnt\system32\utilman.exe Normal    LocalSystem         0
Windows Time        W32Time   Stopped   Demand Start        Share Process
        c:\winnt\system32\services.exe          Normal    LocalSystem         0
World Wide Web Publishing Service       W3SVC     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:Accessories      Default User
Accessories\Accessibility     Default User:Accessories\Accessibility  Default User
Accessories\Entertainment     Default User:Accessories\Entertainment  Default User
Accessories\System Tools      Default User:Accessories\System Tools   Default User
Startup   Default User:Startup          Default User
```

APPENDIX C – TUNABLE PARAMETERS

```
Accessories         All Users:Accessories         All Users
Accessories\Accessibility     All Users:Accessories\Accessibility     All Users
Accessories\Communications    All Users:Accessories\Communications    All Users
Accessories\Entertainment     All Users:Accessories\Entertainment     All Users
Accessories\Games   All Users:Accessories\Games   All Users
Accessories\Microsoft Script Debugger   All Users:Accessories\Microsoft Script Debugger   All
Users
Accessories\System Tools      All Users:Accessories\System Tools      All Users
Administrative Tools          All Users:Administrative Tools          All Users
Microsoft SQL Server          All Users:Microsoft SQL Server          All Users
Startup   All Users:Startup   All Users
Accessories         N1_CLIENT1\Administrator:Accessories    N1_CLIENT1\Administrator
Accessories\Accessibility     N1_CLIENT1\Administrator:Accessories\Accessibility
         N1_CLIENT1\Administrator
Accessories\Communications    N1_CLIENT1\Administrator:Accessories\Communications
         N1_CLIENT1\Administrator
Accessories\Communications\HyperTerminal
         N1_CLIENT1\Administrator:Accessories\Communications\HyperTerminal
         N1_CLIENT1\Administrator
Accessories\Entertainment     N1_CLIENT1\Administrator:Accessories\Entertainment
         N1_CLIENT1\Administrator
Accessories\System Tools      N1_CLIENT1\Administrator:Accessories\System Tools
         N1_CLIENT1\Administrator
Administrative Tools          N1_CLIENT1\Administrator:Administrative Tools
         N1_CLIENT1\Administrator
Startup   N1_CLIENT1\Administrator:Startup        N1_CLIENT1\Administrator

[Startup Programs]

Program   Command   User Name Location
mdac_runonce        c:\winnt\system32\runonce.exe All Users
         HKLM\SOFTWARE\Microsoft\Windows\CurrentVersion\Run
HPmon.exe hpmon.exe All Users HKLM\SOFTWARE\Microsoft\Windows\CurrentVersion\Run

[OLE Registration]

Object    Local Server
Sound (OLE2)        sndrec32.exe
Media Clip          mplay32.exe
Video Clip          mplay32.exe /avi
MIDI Sequence       mplay32.exe /mid
Sound     Not Available
Media Clip          Not Available
Image Document      "C:\Program Files\Windows NT\Accessories\ImageVue\KodakImg.exe"
WordPad Document    "%ProgramFiles%\Windows NT\Accessories\WORDPAD.EXE"
Windows Media Services DRM Storage object         Not Available
Bitmap Image        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 Path    C:\Program Files\Internet Explorer
Language  English (United States)
Active Printer      Not Available

Cipher Strength     56-bit
Content Advisor     Disabled
IEAK Install        No

[File Versions]

File      Version   Size      Date      Path      Company
advapi32.dll        5.0.2120.1          338 KB    9/9/1999 5:00:00 PM C:\WINNT\system32
         Microsoft Corporation
advpack.dll         5.0.2919.3800       87 KB     9/9/1999 5:00:00 PM C:\WINNT\system32
         Microsoft Corporation
browselc.dll        5.0.2919.3800       35 KB     9/9/1999 5:00:00 PM C:\WINNT\system32
         Microsoft Corporation
browseui.dll        5.0.2919.3800       792 KB    9/9/1999 5:00:00 PM C:\WINNT\system32
         Microsoft Corporation
ckcnv.exe 5.0.2120.1          9 KB      9/9/1999 5:00:00 PM C:\WINNT\system32   Microsoft
Corporation
comctl32.dll        5.81.2919.3800      540 KB    9/9/1999 5:00:00 PM C:\WINNT\system32
         Microsoft Corporation
crypt32.dll         5.131.2118.1        455 KB    9/9/1999 5:00:00 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 5:00:00 PM C:\WINNT\system32
         Microsoft Corporation
iexplore.exe        5.0.2919.3800       59 KB     9/9/1999 5:00:00 PM C:\Program
Files\Internet Explorer       Microsoft Corporation
imagehlp.dll        5.0.2128.1          41 KB     9/9/1999 5:00:00 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 5:00:00 PM C:\WINNT\system32
         Microsoft Corporation
jobexec.dll         5.0.0.1   47 KB     9/9/1999 5:00:00 PM C:\WINNT\system32   Microsoft
Corporation
jscript.dll         5.1.0.4411          476 KB    9/9/1999 5:00:00 PM C:\WINNT\system32
         Microsoft Corporation
jsproxy.dll         5.0.2919.3800       13 KB     9/9/1999 5:00:00 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 5:00:00 PM C:\WINNT\system32
         Microsoft Corporation
msjava.dll          5.0.3229.0          918 KB    9/9/1999 5:00:00 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 5:00:00 PM C:\WINNT\system32   Microsoft
Corporation
```

APPENDIX C – TUNABLE PARAMETERS

```
occache.dll         5.0.2919.3800       86 KB     9/9/1999 5:00:00 PM C:\WINNT\system32
         Microsoft Corporation
ole32.dll 5.0.2120.1          961 KB    9/9/1999 5:00:00 PM C:\WINNT\system32   Microsoft
Corporation
oleaut32.dll        2.40.4505.1         596 KB    9/9/1999 5:00:00 PM C:\WINNT\system32
         Microsoft Corporation
olepro32.dll        5.0.4505.1          156 KB    9/9/1999 5:00:00 PM C:\WINNT\system32
         Microsoft Corporation
rsabase.dll         5.0.2120.1          128 KB    9/9/1999 5:00:00 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 5:00:00 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 5:00:00 PM C:\WINNT\system32
         Microsoft Corporation
shell32.dll         5.0.2919.3800       2289 KB   9/9/1999 5:00:00 PM C:\WINNT\system32
         Microsoft Corporation
shlwapi.dll         5.0.2919.3800       282 KB    9/9/1999 5:00:00 PM C:\WINNT\system32
         Microsoft Corporation
url.dll   5.0.2919.3800       82 KB     9/9/1999 5:00:00 PM C:\WINNT\system32   Microsoft
Corporation
urlmon.dll          5.0.2919.3800       427 KB    9/9/1999 5:00:00 PM C:\WINNT\system32
         Microsoft Corporation
vbscript.dll        5.1.0.4411          428 KB    9/9/1999 5:00:00 PM C:\WINNT\system32
         Microsoft Corporation
webcheck.dll        5.0.2919.3800       252 KB    9/9/1999 5:00:00 PM C:\WINNT\system32
         Microsoft Corporation
win.com   5.0.2090.1          24 KB     9/9/1999 5:00:00 PM C:\WINNT\system32   Microsoft
Corporation
wininet.dll         5.0.2919.3800       457 KB    9/9/1999 5:00:00 PM C:\WINNT\system32
         Microsoft Corporation
winsock.dll         3.10.0.103          3 KB      9/9/1999 5:00:00 PM C:\WINNT\system32
         Microsoft Corporation
wintrust.dll        5.131.2090.1        161 KB    9/9/1999 5:00:00 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 5:00:00 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         nsd-prxy.cup.hp.com:8088
ProxyOverride       <local>

[Cache]

[ Following are sub-categories of this main category ]

[Summary]

Item      Value
Page Refresh Type   Automatic
Temporary Internet Files Folder         C:\Documents and Settings\Administrator\Local
Settings\Temporary Internet Files
Total Disk Space    8667 MB
Available Disk Space          3681 MB
Maximum Cache Size  270 MB
Available Cache Size          266 MB

[List of Objects]

Program File        Status    CodeBase
No cached object information available

[Content]

[ Following are sub-categories of this main category ]

[Summary]

Item      Value
Content Advisor     Disabled

[Personal Certificates]

Issued To Issued By Validity  Signature Algorithm
Administrator       Administrator       11/9/1999 to 10/15/2099       sha1RSA

[Other People Certificates]

Issued To Issued By Validity  Signature Algorithm
No other people certificate information available

[Publishers]

Name
No publisher information available

[Security]

Zone      Security Level
Local intranet      Medium-low
Trusted sites       Low
```

```
Internet  Medium
Restricted sites    High
```

C.10 RTE Input Parameters

```
Profile:  3780_5cl_14dr
File Path:          C:\benchcrf\3780_5cl_14dr.pro
Version:  1.0.1

          Number of Engines: 14

                    Name: DRIVER1
                    Description: rte1_cpu0
                    Directory: c:\log\n1_rte10.log
                    Machine: n1_rte1
                    Parameter Set: PARAM9
                    Index: 757438
                    Seed: 28814
                    Configured Users: 2700
                    Pipe Name: DRIVER1-1672288046
                    Connect Rate: 250
                    Start Rate: 0
                    CLIENT_NURAND: 208
                    CPU: 0

                    Name: DRIVER10
                    Description: rte5_cpu1
                    Directory: c:\log\n1_rte51.log
                    Machine: n1_rte5
                    Parameter Set: PARAM9
                    Index: 900000000
                    Seed: 28814
                    Configured Users: 2700
                    Pipe Name: DRIVER10156751796
                    Connect Rate: 250
                    Start Rate: 0
                    CLIENT_NURAND: 208
                    CPU: 1

                    Name: DRIVER11
                    Description: rte6_cpu0
                    Directory: c:\log\n1_rte60.log
                    Machine: n1_rte6
                    Parameter Set: PARAM9
                    Index: 1000000000
                    Seed: 28814
                    Configured Users: 2700
                    Pipe Name: DRIVER11156849031
                    Connect Rate: 250
                    Start Rate: 0
                    CLIENT_NURAND: 208
                    CPU: 0

                    Name: DRIVER12
                    Description: rte6_cpu1
                    Directory: c:\log\n1_rte61.log
                    Machine: n1_rte6
                    Parameter Set: PARAM9
                    Index: 1100000000
                    Seed: 28814
                    Configured Users: 2700
                    Pipe Name: DRIVER12156883796
                    Connect Rate: 250
                    Start Rate: 0
                    CLIENT_NURAND: 208
                    CPU: 1

                    Name: DRIVER13
                    Description: rte7_cpu0
                    Directory: c:\log\n1_rte70.log
                    Machine: n1_rte7
                    Parameter Set: PARAM9
                    Index: 1200000000
                    Seed: 28814
                    Configured Users: 2700
                    Pipe Name: DRIVER13156926031
                    Connect Rate: 250
                    Start Rate: 0
                    CLIENT_NURAND: 208
                    CPU: 0

                    Name: DRIVER14
                    Description: rte7_cpu1
                    Directory: c:\log\n1_rte71.log
                    Machine: n1_rte7
                    Parameter Set: PARAM9
                    Index: 1300000000
                    Seed: 28814
                    Configured Users: 2700
                    Pipe Name: DRIVER14156976375
                    Connect Rate: 250
                    Start Rate: 0
                    CLIENT_NURAND: 208
                    CPU: 1

                    Name: DRIVER2
                    Description: rte1_cpu1
                    Directory: c:\log\n1_rte11.log
                    Machine: n1_rte1
                    Parameter Set: PARAM9
                    Index: 100000000
                    Seed: 28814
                    Configured Users: 2700
                    Pipe Name: DRIVER2-1672094593
                    Connect Rate: 250
                    Start Rate: 0
                    CLIENT_NURAND: 208
                    CPU: 1

                    Name: DRIVER3
                    Description: rte2_cpu0
                    Directory: c:\log\n1_rte20.log
                    Machine: n1_rte2
```

APPENDIX C – TUNABLE PARAMETERS

```
Parameter Set: PARAM9
Index: 348392290
Seed: 28814
Configured Users: 2700
Pipe Name: DRIVER3156231531
Connect Rate: 250
Start Rate: 0
CLIENT_NURAND: 208
CPU: 0

Name: DRIVER4
Description: rte2_cpu1
Directory: c:\log\n1_rte21.log
Machine: n1_rte2
Parameter Set: PARAM9
Index: 300000000
Seed: 28814
Configured Users: 2700
Pipe Name: DRIVER4156417500
Connect Rate: 250
Start Rate: 0
CLIENT_NURAND: 208
CPU: 1

Name: DRIVER5
Description: rte3_cpu0
Directory: c:\log\n1_rte30.log
Machine: n1_rte3
Parameter Set: PARAM9
Index: 400000000
Seed: 28814
Configured Users: 2700
Pipe Name: DRIVER5156476640
Connect Rate: 250
Start Rate: 0
CLIENT_NURAND: 208
CPU: 0

Name: DRIVER6
Description: rte3_cpu1
Directory: c:\log\n1_rte31.log
Machine: n1_rte3
Parameter Set: PARAM9
Index: 500000000
Seed: 28814
Configured Users: 2700
Pipe Name: DRIVER6156525906
Connect Rate: 250
Start Rate: 0
CLIENT_NURAND: 208
CPU: 1

Name: DRIVER7
Description: rte4_cpu0
Directory: c:\log\n1_rte40.log
Machine: n1_rte4
Parameter Set: PARAM9
Index: 600000000
Seed: 28814
Configured Users: 2700
Pipe Name: DRIVER7156613875
Connect Rate: 250
Start Rate: 0
CLIENT_NURAND: 208
CPU: 0

Name: DRIVER8
Description: rte4_cpu1
Directory: c:\log\n1_rte41.log
Machine: n1_rte4
Parameter Set: PARAM9
Index: 700000000
Seed: 28814
Configured Users: 2700
Pipe Name: DRIVER8156677015
Connect Rate: 250
Start Rate: 0
CLIENT_NURAND: 208
CPU: 1

Name: DRIVER9
Description: rte5_cpu0
Directory: c:\log\n1_rte50.log
Machine: n1_rte5
Parameter Set: PARAM9
Index: 800000000
Seed: 28814
Configured Users: 2700
Pipe Name: DRIVER9156714062
Connect Rate: 250
Start Rate: 0
CLIENT_NURAND: 208
CPU: 0

Number of User groups: 42

Driver Engine: DRIVER1
IIS Server: n1_clienta
SQL Server: prf_sut6
User: sa
Protocol: Html
w_id Range: 1 - 108
w_id Max Warehouse: 3780
Scale: Normal
User Count: 1080
District id: 1
Scale Down: No

Driver Engine: DRIVER8
IIS Server: n1_clientd
SQL Server: prf_sut6
User: sa
Protocol: Html
w_id Range: 2593 - 2700
```

APPENDIX C – TUNABLE PARAMETERS

```
w_id Max Warehouse: 3780
Scale: Normal
User Count: 1080
District id: 1
Scale Down: No

Driver Engine: DRIVER8
IIS Server: n1_cliente
SQL Server: prf_sut6
User: sa
Protocol: Html
w_id Range: 3349 - 3456
w_id Max Warehouse: 3780
Scale: Normal
User Count: 1080
District id: 1
Scale Down: No

Driver Engine: DRIVER4
IIS Server: n1_clientd
SQL Server: prf_sut6
User: sa
Protocol: Html
w_id Range: 2377 - 2484
w_id Max Warehouse: 3780
Scale: Normal
User Count: 1080
District id: 1
Scale Down: No

Driver Engine: DRIVER8
IIS Server: n1_clientc
SQL Server: prf_sut6
User: sa
Protocol: Html
w_id Range: 1891 - 1944
w_id Max Warehouse: 3780
Scale: Normal
User Count: 540
District id: 1
Scale Down: No

Driver Engine: DRIVER10
IIS Server: n1_clientd
SQL Server: prf_sut6
User: sa
Protocol: Html
w_id Range: 2701 - 2808
w_id Max Warehouse: 3780
Scale: Normal
User Count: 1080
District id: 1
Scale Down: No

Driver Engine: DRIVER9
IIS Server: n1_clienta
SQL Server: prf_sut6
User: sa
Protocol: Html
w_id Range: 433 - 540
w_id Max Warehouse: 3780
Scale: Normal
User Count: 1080
District id: 1
Scale Down: No

Driver Engine: DRIVER2
IIS Server: n1_clientd
SQL Server: prf_sut6
User: sa
Protocol: Html
w_id Range: 2269 - 2376
w_id Max Warehouse: 3780
Scale: Normal
User Count: 1080
District id: 1
Scale Down: No

Driver Engine: DRIVER9
IIS Server: n1_clientb
SQL Server: prf_sut6
User: sa
Protocol: Html
w_id Range: 1189 - 1296
w_id Max Warehouse: 3780
Scale: Normal
User Count: 1080
District id: 1
Scale Down: No

Driver Engine: DRIVER9
IIS Server: n1_clientc
SQL Server: prf_sut6
User: sa
Protocol: Html
w_id Range: 1945 - 1998
w_id Max Warehouse: 3780
Scale: Normal
User Count: 540
District id: 1
Scale Down: No

Driver Engine: DRIVER10
IIS Server: n1_cliente
SQL Server: prf_sut6
User: sa
Protocol: Html
w_id Range: 3457 - 3564
w_id Max Warehouse: 3780
Scale: Normal
User Count: 1080
District id: 1
Scale Down: No
```

APPENDIX C – TUNABLE PARAMETERS

```
Driver Engine: DRIVER6
IIS Server: n1_clientd
SQL Server: prf_sut6
User: sa
Protocol: Html
w_id Range: 2485 - 2592
w_id Max Warehouse: 3780
Scale: Normal
User Count: 1080
District id: 1
Scale Down: No

Driver Engine: DRIVER10
IIS Server: n1_clientc
SQL Server: prf_sut6
User: sa
Protocol: Html
w_id Range: 1999 - 2052
w_id Max Warehouse: 3780
Scale: Normal
User Count: 540
District id: 1
Scale Down: No

Driver Engine: DRIVER12
IIS Server: n1_cliente
SQL Server: prf_sut6
User: sa
Protocol: Html
w_id Range: 3565 - 3672
w_id Max Warehouse: 3780
Scale: Normal
User Count: 1080
District id: 1
Scale Down: No

Driver Engine: DRIVER11
IIS Server: n1_clientc
SQL Server: prf_sut6
User: sa
Protocol: Html
w_id Range: 2053 - 2106
w_id Max Warehouse: 3780
Scale: Normal
User Count: 540
District id: 1
Scale Down: No

Driver Engine: DRIVER4
IIS Server: n1_clientc
SQL Server: prf_sut6
User: sa
Protocol: Html
w_id Range: 1675 - 1728
w_id Max Warehouse: 3780
Scale: Normal
User Count: 540
District id: 1
Scale Down: No

Driver Engine: DRIVER11
IIS Server: n1_clienta
SQL Server: prf_sut6
User: sa
Protocol: Html
w_id Range: 541 - 648
w_id Max Warehouse: 3780
Scale: Normal
User Count: 1080
District id: 1
Scale Down: No

Driver Engine: DRIVER11
IIS Server: n1_clientb
SQL Server: prf_sut6
User: sa
Protocol: Html
w_id Range: 1297 - 1404
w_id Max Warehouse: 3780
Scale: Normal
User Count: 1080
District id: 1
Scale Down: No

Driver Engine: DRIVER13
IIS Server: n1_clientc
SQL Server: prf_sut6
User: sa
Protocol: Html
w_id Range: 2161 - 2214
w_id Max Warehouse: 3780
Scale: Normal
User Count: 540
District id: 1
Scale Down: No

Driver Engine: DRIVER13
IIS Server: n1_clienta
SQL Server: prf_sut6
User: sa
Protocol: Html
w_id Range: 649 - 756
w_id Max Warehouse: 3780
Scale: Normal
User Count: 1080
District id: 1
Scale Down: No

Driver Engine: DRIVER1
IIS Server: n1_clientb
SQL Server: prf_sut6
User: sa
Protocol: Html
w_id Range: 757 - 864
```

APPENDIX C – TUNABLE PARAMETERS

```
w_id Max Warehouse: 3780
Scale: Normal
User Count: 1080
District id: 1
Scale Down: No

Driver Engine: DRIVER13
IIS Server: n1_clientb
SQL Server: prf_sut6
User: sa
Protocol: Html
w_id Range: 1405 - 1512
w_id Max Warehouse: 3780
Scale: Normal
User Count: 1080
District id: 1
Scale Down: No

Driver Engine: DRIVER6
IIS Server: n1_cliente
SQL Server: prf_sut6
User: sa
Protocol: Html
w_id Range: 3241 - 3348
w_id Max Warehouse: 3780
Scale: Normal
User Count: 1080
District id: 1
Scale Down: No

Driver Engine: DRIVER14
IIS Server: n1_clientc
SQL Server: prf_sut6
User: sa
Protocol: Html
w_id Range: 2215 - 2268
w_id Max Warehouse: 3780
Scale: Normal
User Count: 540
District id: 1
Scale Down: No

Driver Engine: DRIVER14
IIS Server: n1_clientd
SQL Server: prf_sut6
User: sa
Protocol: Html
w_id Range: 2917 - 3024
w_id Max Warehouse: 3780
Scale: Normal
User Count: 1080
District id: 1
Scale Down: No

Driver Engine: DRIVER2
IIS Server: n1_cliente
SQL Server: prf_sut6
User: sa
Protocol: Html
w_id Range: 3025 - 3132
w_id Max Warehouse: 3780
Scale: Normal
User Count: 1080
District id: 1
Scale Down: No

Driver Engine: DRIVER2
IIS Server: n1_clientc
SQL Server: prf_sut6
User: sa
Protocol: Html
w_id Range: 1567 - 1620
w_id Max Warehouse: 3780
Scale: Normal
User Count: 540
District id: 1
Scale Down: No

Driver Engine: DRIVER12
IIS Server: n1_clientc
SQL Server: prf_sut6
User: sa
Protocol: Html
w_id Range: 2107 - 2160
w_id Max Warehouse: 3780
Scale: Normal
User Count: 540
District id: 1
Scale Down: No

Driver Engine: DRIVER3
IIS Server: n1_clientb
SQL Server: prf_sut6
User: sa
Protocol: Html
w_id Range: 865 - 972
w_id Max Warehouse: 3780
Scale: Normal
User Count: 1080
District id: 1
Scale Down: No

Driver Engine: DRIVER3
IIS Server: n1_clienta
SQL Server: prf_sut6
User: sa
Protocol: Html
w_id Range: 109 - 216
w_id Max Warehouse: 3780
Scale: Normal
User Count: 1080
District id: 1
Scale Down: No
```

APPENDIX C – TUNABLE PARAMETERS

```
Driver Engine: DRIVER3
IIS Server: n1_clientc
SQL Server: prf_sut6
User: sa
Protocol: Html
w_id Range: 1621 - 1674
w_id Max Warehouse: 3780
Scale: Normal
User Count: 540
District id: 1
Scale Down: No

Driver Engine: DRIVER4
IIS Server: n1_cliente
SQL Server: prf_sut6
User: sa
Protocol: Html
w_id Range: 3133 - 3240
w_id Max Warehouse: 3780
Scale: Normal
User Count: 1080
District id: 1
Scale Down: No

Driver Engine: DRIVER5
IIS Server: n1_clientb
SQL Server: prf_sut6
User: sa
Protocol: Html
w_id Range: 973 - 1080
w_id Max Warehouse: 3780
Scale: Normal
User Count: 1080
District id: 1
Scale Down: No

Driver Engine: DRIVER14
IIS Server: n1_cliente
SQL Server: prf_sut6
User: sa
Protocol: Html
w_id Range: 3673 - 3780
w_id Max Warehouse: 3780
Scale: Normal
User Count: 1080
District id: 1
Scale Down: No

Driver Engine: DRIVER5
IIS Server: n1_clienta
SQL Server: prf_sut6
User: sa
Protocol: Html
w_id Range: 217 - 324
w_id Max Warehouse: 3780
Scale: Normal
User Count: 1080
District id: 1
Scale Down: No

Driver Engine: DRIVER1
IIS Server: n1_clientc
SQL Server: prf_sut6
User: sa
Protocol: Html
w_id Range: 1513 - 1566
w_id Max Warehouse: 3780
Scale: Normal
User Count: 540
District id: 1
Scale Down: No

Driver Engine: DRIVER5
IIS Server: n1_clientc
SQL Server: prf_sut6
User: sa
Protocol: Html
w_id Range: 1729 - 1782
w_id Max Warehouse: 3780
Scale: Normal
User Count: 540
District id: 1
Scale Down: No

Driver Engine: DRIVER6
IIS Server: n1_clientc
SQL Server: prf_sut6
User: sa
Protocol: Html
w_id Range: 1783 - 1836
w_id Max Warehouse: 3780
Scale: Normal
User Count: 540
District id: 1
Scale Down: No

Driver Engine: DRIVER7
IIS Server: n1_clientb
SQL Server: prf_sut6
User: sa
Protocol: Html
w_id Range: 1081 - 1188
w_id Max Warehouse: 3780
Scale: Normal
User Count: 1080
District id: 1
Scale Down: No

Driver Engine: DRIVER7
IIS Server: n1_clienta
SQL Server: prf_sut6
User: sa
Protocol: Html
w_id Range: 325 - 432
```

APPENDIX C – TUNABLE PARAMETERS

```
                w_id Max Warehouse: 3780
                Scale: Normal
                User Count: 1080
                District id: 1
                Scale Down: No

                Driver Engine: DRIVER12
                IIS Server: n1_clientd
                SQL Server: prf_sut6
                User: sa
                Protocol: Html
                w_id Range: 2809 - 2916
                w_id Max Warehouse: 3780
                Scale: Normal
                User Count: 1080
                District id: 1
                Scale Down: No

                Driver Engine: DRIVER7
                IIS Server: n1_clientc
                SQL Server: prf_sut6
                User: sa
                Protocol: Html
                w_id Range: 1837 - 1890
                w_id Max Warehouse: 3780
                Scale: Normal
                User Count: 540
                District id: 1
                Scale Down: No

        Number of Parameter Sets: 6


                PARAM1
                New Parameter Set
                                Txn     Think   Key     RT      RT      Menu
                                Weight  Time    Time    Delay   Fence   Delay
                New Order         44.83         12.04     18.02       0.10      5.00
                Payment           43.05         12.04      3.02       0.10      5.00
                Delivery           4.05          5.04      2.02       0.10      5.00
                Stock Level        4.04          5.04      2.02       0.10     20.00
                Order Status       4.03         10.04      2.02       0.10      5.00

                ~Default
                Default Parameter Set
                                Txn     Think   Key     RT      RT      Menu
                                Weight  Time    Time    Delay   Fence   Delay
                New Order         44.80         12.05     18.01       0.10      5.00
                Payment           43.05         12.05      3.01       0.10      5.00
                Delivery           4.05          5.05      2.01       0.10      5.00
                Stock Level        4.05          5.05      2.01       0.10     20.00
                Order Status       4.05         10.05      2.01       0.10      5.00

                PARAM2
                New Parameter Set
                                Txn     Think   Key     RT      RT      Menu
                                Weight  Time    Time    Delay   Fence   Delay
                New Order         44.83         12.05     18.01       0.10      5.00
                Payment           43.05         12.05      3.01       0.10      5.00
                Delivery           4.05          5.05      2.01       0.10      5.00
                Stock Level        4.04          5.05      2.01       0.10     20.00
                Order Status       4.03         10.05      2.01       0.10      5.00

                PARAM3
                New Parameter Set
                                Txn     Think   Key     RT      RT      Menu
                                Weight  Time    Time    Delay   Fence   Delay
                New Order         44.84         12.05     18.01       0.10      5.00
                Payment           43.04         12.05      3.01       0.10      5.00
                Delivery           4.05          5.05      2.01       0.10      5.00
                Stock Level        4.04          5.05      2.01       0.10     20.00
                Order Status       4.03         10.05      2.01       0.10      5.00

                PARAM4
                New Parameter Set
                                Txn     Think   Key     RT      RT      Menu
                                Weight  Time    Time    Delay   Fence   Delay
                New Order         44.85         12.05     18.01       0.10      5.00
                Payment           43.04         12.05      3.01       0.10      5.00
                Delivery           4.04          5.05      2.01       0.10      5.00
                Stock Level        4.04          5.05      2.01       0.10     20.00
                Order Status       4.03         10.05      2.01       0.10      5.00

                PARAM9
                New Parameter Set
                                Txn     Think   Key     RT      RT      Menu
                                Weight  Time    Time    Delay   Fence   Delay
```

APPENDIX C – TUNABLE PARAMETERS

	New Order	44.84	12.05	18.01	0.10	5.00
0.10						
	Payment	43.04	12.05	3.01	0.10	5.00
0.10						
	Delivery	4.05	5.04	2.01	0.10	5.00
0.10						
	Stock Level	4.04	5.04	2.01	0.10	20.00
0.10						
	Order Status	4.03	10.06	2.01	0.10	5.00
0.10						

Please note that PARAM9 is the one that was used for the performance run.

Appendix D Disk Storage

TPC-C 180 Day Space Requirements						
Warehouses	**3430**				**TpmC**	**43,046.55**
Table	**Rows**	**Data KB**	**Index KB**	**Extra 5% KB**	**8hr Space**	**Total Space KB**
Warehouse	3430	368	48	21		437
District	34300	3,816	56	194		4066
Customer	102900000	74,836,368	4,462,536	3,964,945		83263849
History	102900000	5,716,680	96		1,183,311	5716776
NewOrder	30870000	488,064	1,176			489240
Orders	102900000	3,154,024	1,434,312		1,678,959	4588336
OrderLine	1028999831	64,312,496	136,176		12,919,546	64448672
Item	100000	9,528	72	480		10080
Stock	343000000	109,760,000	205,176	5,498,259		115463435
Total		258,281,344	6,239,648	9,463,898	15,781,816	273,984,890

	MB	
Dynamic Space	71,468	Sum of Data for Order, Orderline and History
Static Space	196,095	Sum of Data+Index+5%-Dynamic Space
Free Space	na	Total Allocated Spac - (Dynamic + Static Space)
Daily Growth	14,351	(Dynamic Space/(W*62.5))*tpmc
Daily Spread	-	(Free Space -1.5*Daily Growth) Zero Assumed

180 Day Space MB	2,779,237					
180 Day Space GB	**2,714.10**	**GB**				
Log Size	48,000	MB				
KB Per New Order	5.1213	KB			**Disk Size**	**Formatted Size**
8 hr log MB	103,338	MB			18GB	16.900
8 hr log GB	**100.9161**	**GB**			9GB	8.470
					4GB	3.999

Space Usage	**GB Needed**	**Disks Measured**	**GB Measured**	**Disks Priced**	**GB Priced**	
180 Day Space DB	2,714.10	36	608.40	36	608.40	
		240	2032.80	240	2032.80	
		0	0.00	0	0.00	
Total DB		**276.00**	**2641.20**		**2641.20**	
8-hr log + mirror	201.8321	16	270.40	16	270.40	
OS, Swap	-	1	8.46	1	8.46	
			included w/log			
Total Storage	**2,915.93**	**GB**	**2,920.06**	**GB**	**2,920.06**	**GB**

tpmC	43,046.55									
	Data Before KB	Index Before KB	Data After KB	Index After KB	Data Grow KB	Index Grow KB	Total Grow KB	KB/New-Order	8-Hr Growth KB	8-Hr Growth MB
History	5,834,424	160	6,009,640	160	175,216	-	175,216	0.0573	1,183,310.66	1,155.58
Order	3,428,416	2,872,576	3,675,560	2,874,040	247,144	1,464	248,608	0.0813	1,678,959.09	1,639.61
Order-Line	66,077,232	272,320	67,990,264	272,320	1,913,032	-	1,913,032	0.6253	12,919,545.87	12,616.74
										15,411.93
	sum(*) Before		sum(*) After		Num New-Order					
d_next_o_id	104,999,406		108,058,935		3,059,529					
						from batch report				
	Before MB		After MB		Grow MB			KB/New-Order	8-Hr Growth MB	8-Hr Growth GB
Log	13402.59		28704.13		15301.54			5.1213	103,338.04	100.92
								5,244.2157		
119999.9922	11.168825		23.920111							
Database tpcc log used (%)		12.751286								

Appendix E Price Quotations

Software House International					
Pricing Proposal					
SHI Account Executive: Matthew Martin **Telephone: (800) 766-6357 ext. 106 Fax: (408) 232-2585**					
HP NetServer LXr 8500 8-way TPC-C					
Description	**Part Number**	**Unit Price**	**Qty**	**Extended Price**	
HP NetServer LXr 8500 Intel Pentium III Xeon 700MHz	P1765AV	$16,800	1	$16,800	
Intel Pentium III Xeon 700MHz 2Mbyte L2	P1763AV	$4,740	7	$33,180	
512MB Dimm for LXr 8500 (to 8GB)	D7138AV	$1,560	16	$24,960	
HP NetRAID4M RAID controller w/64MB cache	D9161A	$1,960	7	$13,720	
HP 9GB, 10krpm Hot-swap disk module	P1168A	$405	1	$405	
HP NetServer 10/100TX PCI LAN Adapter	D5013A	$82	1	$82	
HP 15" VGA Monitor	D2828A	$185	1	$185	
HP NetServer mini-DIN keyboard and mouse	D4950B/ C3751B	$79	1	$79	
HP Rack System/E41 (41 Units usable space)	J1500A	$1,590	2	$3,180	
HP Power Distribution Unit 120-240V	E5929A	$234	4	$936	
HP SureStore DAT24i Internal Tape Drive	C1555D	$790	1	$790	
APC Smart-UPS 3000 + Spares	588293	$1,725	3	$5,175	
HP Support Pack 5 yr Mon-Fri, 4 hr response	H2831E	$3,190	1	$3,190	
	Server Hardware Subtotal				$102,682
HP NetServer Rack Storage/12	D5989B	$1,890	25	$47,250	
HP 9GB, 10krpm Hot-swap disk module	P1168A	$410	240	$98,400	
HP 18GB, 10krpm Hot-swap disk module	P1166A	$590	52	$30,680	
HP SCSI Cable 2.5m UDHTS 68/HDTS 68	D6020A	$97	25	$2,425	
	Storage Subtotal				**$178,755**
Microsoft Windows 2000 Advanced Server, 25 Licences		$2,399	1	$2,399	
Microsoft SQL Server 2000 Enterprise Edition per processor license unlimited users (open program level C)	810-00846	$14,749	8	$117,992	
MS Software Support				$10,475	
	Server Software Subtotal				**$130,866**
HP Netserver E60 Pentium III 600MHz	D9128A	$1,270	5	$6,350	
128MB DRAMs for E60	D7156A	$205	20	$4,100	
HP NetServer 10/100TX PCI LAN Adapter	D5013A	$82	5	$410	
HP 15" VGA Display	D2828A	$185	5	$925	
	Client Hardware Subtotal				**$11,785**
Microsoft Windows 2000 Server	C11-0016	$790	5	$3,950	
Microsoft Visual C++ Professional 6.0 ($549)	716856	$449	1	$449	
	Client Software Subtotal				**$4,399**
HP Procurve Switch 2424M, Llifetime Warranty + 10% spares	J4093A	$979	8	$7,832	
ArkPC 17-port 10baseT hub (16+1 ports) 5 Yr Warranty + 10% spares	CT1017D1	$31	2376	$73,656	
	Connectivity Subtotal				**$81,488**
			Total		**$509,975**

HEWLETT® PACKARD

Hewlett-Packard Company
3000 Hanover Street

January 4, 2001

Mr. Larry Gray
Re: HP NetServer LXr 8500 and E-60 system support

Hewlett-Packard is pleased to submit this formal quote to provide five years of HP SupportPack Hardware Maintenance Service for your HP NetServer LXr 8500, HP NetServer E60 servers and concurrently purchased mass storage subsystem.

HP's support service provides these benefits for your business:
- HP-trained service representatives
- Multiple coverage options from date of purchase
- Multiple options for hardware repair response times
- Technical assistance for installation, product configuration and setup, problem solving and normal operation on your HP product
- Five years of pre-paid support, purchased direct from HP

Terms & Conditions
The following terms and conditions must be met for the SupportPack to be valid:
Required configuration:
- One HP NetServer LXr 8500 with eight Pentium III Xeon processors at 700MHz, 8GB of memory, 7 HP NetRAID4M disk array controller PCI cards (HP p/n D9161A), 1 10/100 NIC (HP p/n D5013A), and one 9GB disk drive (HP p/n P1168A).
- Twenty-five **HP RS/12 SCSI rack storage disk enclosures** (HP p/n D5989B), populated with 240 9 GB disk drives (HP p/n P1168A) and 52 18 GB disk drives (HP p/n P1166A).
- All of the above enclosed in two **HP Rack System/E41** racks.
- Five **HP NetServer E60** systems, each with one **Pentium III 600MHz processor** (HP p/n D9214A) and each with **512MB of RAM** (HP p/n D7156A)
- Peripherals including: **HP SureStore DAT24i** (HP p/n C1555D) and six **HP 15 inch VGA monitors** (HP p/n D2828A)

Support level

This support provides HP's best possible response time during coverage hours of 8 am to 9 pm, Monday through Friday, except HP holidays. An HP Authorized Representative will arrive on-site and begin hardware maintenance service within 4 hours of the call receipt between 8 am and 5 pm local time. The 4 hour on-site response is available to sites within 100 miles of a major metropolitan areas. See chart below.

Distance from Customer-designated Site to primary HP Support Office	Response Time 4-hour Support
0-50 miles	4 hours
51-100 miles	4 hours
101-200 miles	8 hours
201-300 miles	*
Over 300 miles	*

This maintenance agreement is an upgrade to the three year warranty for your new system providing the response shown above with full HP parts replacement for the complete five year term.

This proposal does not include: consumables, user maintenance, non-HP Devices or, any product previously repaired by an unauthorized technician or user.

Your total cost for 5 years of hardware support is $43,900. This is for U.S. customers only. Payment is due upon purchase of the Support Packs for the above products (a discount has been applied for advance payment, and support must be purchased direct from HP at the time of hardware purchase).

The terms of this quotation are good for 90 days from today's date.

Approved by:

Hewlett-Packard North America Marketing Manager

ARK PC Technology, Inc.
dba ARK TECHNOLOGIES
1607 W. Orange Grove Ave., Suite A&B
Orange, CA 92868-1116
Tel: (714) 997-4597 • Fax: (714) 997-4596
www.arkpc.com

January 3, 2001

Attn: Dave Tanis
Hewlett Packard Company
10955 Tantau Avenue
Cupertino, CA 95014
Fax: 408-447-8001

Ref: 010100

Dear Dave:

Thank you for your interest in ARK networking product. The following is the pricing for the product that you interested. Please review.

Model No.	Description	1-9	10-199	200-999	1K+
CT1017D1	17-port 10Mbps Desktop Hub, 16*RJ-45+1*BNC, 120V AC/DC Adapter	$40.00	$33.50	$32.00	$31.00

Terms & Conditions:
1. Pricing is FOB Origin, Orange, California.
2. Lead Time is 45 days from receipt of purchase order.
3. Pricing valid for 90 days.
4. Credit term is pending.
5. Pricing subject to quantity indicated.
6. ARK offers lifetime limited warranty.

If you have any questions concerning the product or pricing, please do not hesitate to contact me at 714-997-4597 or email me at stedson@arkpc.com. Thank you.

Sincerely,

Stedson Lim
Director of Sales & Marketing