

**TPC Benchmark™ C**  
**Full Disclosure Report**  
**for**  
**Dell PowerEdge 2650**  
**Using**  
**Microsoft SQL Server 2000 Standard Edition**  
**and**  
**Microsoft Windows 2003 Server**

Fifth Edition  
Submitted for Review

Updated to reflect repricing.  
March 17, 2004

**Fifth Printing, March 17, 2004**

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

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

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## Abstract

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### Overview

This report documents the methodology and results of the TPC Benchmark™ C test conducted on Dell PowerEdge 2650. The tests were run in a client/server configuration using one PowerEdge 1600SC as a client. The operating system used for the benchmark was Microsoft Windows 2003 Server on the database server and Microsoft Windows 2003 Server on the client. The database was Microsoft SQL Server 2000 Standard Edition. Microsoft COM+ provided the database connection queues. All tests were done in compliance with Revision 5.0 of the Transaction Processing Council's TPC Benchmark™ C Standard Specification. Two standard TPC Benchmark™ C metrics, transactions per second (tpmC) and price per tpmC (\$/tpmC) are reported and referred to in this document. The results from the tests are summarized below.

Hardware	Software	Total System Cost	tpmC	\$/tpmC	Availability Date
Dell PowerEdge 2650	Microsoft Windows 2003 Server with SQL Server 2000 Standard Edition	\$41,250	20,108	\$2.06	Jan 14, 2004

### Auditor

The results of the benchmark and test methodology used to produce the results were audited by Lorna Livingtree of Performance Metrics and have fully met the TPC-C rev 5.2 specifications.

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

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Round Rock, TX 78682  
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# PowerEdge 2650

Client/Server w/1 PE1600SC Front End

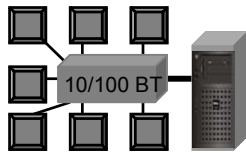
TPC-C Rev 5.2  
Report Date  
**July 13, 2003**  
Revised Date  
**March 17, 2004**

Total System Cost	TPC-C Throughput	Price/Performance	Availability Date	
<b>\$41,250</b>	<b>20,108 tpmC</b>	<b>\$2.06 / tpmC</b>	<b>JAN 14, 2004</b>	
Processors	Database Manager	OS	Other Software	Number of Users
1 x Intel Xeon™ Processors 3.06 GHz 1MB L3 Cache	Microsoft SQL Server 2000 Standard Edition	Microsoft Windows 2003 Server	Windows 2003 Server w/ COM+ Internet Information Server 5.0 Microsoft Visual C++	<b>16,200</b>

## PE2650

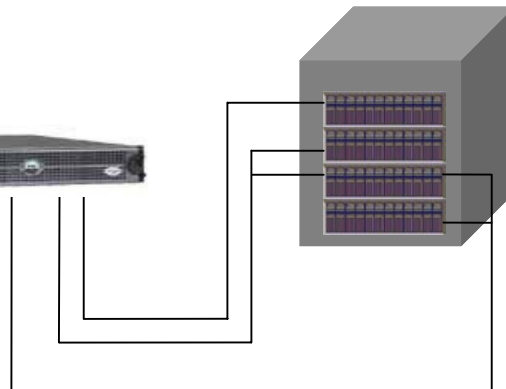
w/ 1 3.06 GHz Intel Xeon CPUs  
w/ 1MB L3 cache,  
2.5GB RAM,  
2 PERC3-DC Controllers, and  
1 On-board Adaptec AIC-7899 RAID  
Controller  
4 36GB 10K RPM U320 SCSI disks  
2 Gigabit Ethernet adapters

4 PV220S Disk Pods  
56 18GB 15K RPM U320 SCSI Disks



### 1 PowerEdge 1600SC Client

2 Intel Xeon @ 2.4GHz  
w/ 512 KB L2  
1024 MB RAM  
1 36 GB Disk  
2 Intel Pro100+ Ethernet NICs



System Component	Server		Each Client	
Processors	1	Intel Xeon @ 3.06GHz	2	Intel Xeon w/ 512 KB L2
Cache		1MB cache		Client @ 2.4 GHz
Memory		2560 MB		1024 MB
Disk Controllers	2	PERC3-DC	1	Adaptec On-Board
	1	Adaptec AIC-7899 On-Board		
Disk Drives	56	18 GB SCSI	1	36 GB
	4	36 GB SCSI		
	1	36GB SCSI		
Total Storage		1100 GB		36 GB
Other	2	2GB NIC	2	10/100MB BT NIC
	1	CD-ROM		
	1	DAT		

Dell		PowerEdge 2650			TPC-C REV 5.2 EXECUTIVE SUMMARY PAGE 2 OF 2				
				Client/Server			Report Date: 13-July-03		
Description	Part Number	Third Party		Unit Price	Qty	Extended Price	3 yr. Maint. Price		
		Brand	Pricing						
<b>Server Hardware</b>									
Dell PowerEdge 2650 3.06GHz/1MB	221-3298			1,332	1	1,332	290		
5 Bay (2+3) Hard Drive Split Backplane	340-3933			299	1	299			
PERC3/Di 128MB (2 int. ch)	340-3943			299	1	299			
2GB SDRAM,4X512MB DIMMs	311-1619			1,049	1	1,049			
512MB RAM, 2x256MB DIMMs	311-2729			470	1	470			
36GB,U320M,SCSI,1 in,10K HD	340-7919			249	1	249			
PV100T,DDS4,20/40G,TBU,NC,INT	340-7297			699	1	699			
Dell E551,15 in Gray (13.8 VIS	320-0960			129	1	129			
PERC3-DC 2-ch SCSI	340-2489			879	2	1,758			
						<b>Subtotal</b>	<b>6,284</b>	<b>290</b>	
<b>PowerVault Disk Subsystem</b>									
PV220S, U3, PS, Tower	220-4477, etc.			2,054	4	8,216	1,604		
2 SCSI Cables	310-0679			99	2	198			
18GB U320M SCSI 15K RPM Hard Drive	340-9472			249	56	13,944			
36GB U320M SCSI 10K RPM Hard Drive	340-9370			249	4	996			
						<b>Subtotal</b>	<b>23,354</b>	<b>1,604</b>	
<b>Server Software</b>									
SQL Server 2000 St. Edition, Per processor licensing **	228-01079	Microsoft	1	4,999	1	4,999	5,850		
Windows 2003 Standard Server **	P73-00295	Microsoft	1	738	1	738			
						<b>Subtotal</b>	<b>5,737</b>	<b>5,850</b>	
<b>Client Hardware</b>									
Dell PowerEdge 1600SC, 2.4 GHz I / 512KB L2/400 FSB	221-2207			277	1	277	290		
Additional processor , 2.4 GHz I / 512KB	311-2456			599	1	599			
1025MB RAM, 2 DIMMs	311-1940			598	1	598			
36GB U160M SCSI 10K RPM Hard Drive	340-7087			249	1	249			
Non-Redundant Power	310-0540			199	1	199			
IntelPro 100S	430-0206			59	1	59			
Dell 15" Monitor	320-0960			129	1	129			
						<b>Subtotal</b>	<b>2,110</b>	<b>290</b>	
<b>Client Software</b>									
Windows 2003 Standard Server **	P73-00295	Microsoft	1	738	1	738			
Visual C++ ** .NET	254-00170	Microsoft	1	109	1	109			
						<b>Subtotal</b>	<b>847</b>		
<b>User Connectivity</b>									
7ft Crossover cable	CBLC5C7	LanAdapter	2	1	3	3			
						<b>Subtotal</b>	<b>3</b>		
						<b>Other Discounts</b>	<b>(\$5,119)</b>		
						<b>Total</b>	<b>\$33,216</b>	<b>\$8,034</b>	
Notes: * Maint. included in PowerVault 210S disk pod or PV650F/630F fibre channel disk pod						<b>Three-Year Cost of Ownership:</b>		<b>\$41,250</b>	
** All Microsoft maintenance is covered by the maintenance costs of Microsoft SQL Server									
*** 10% or minimum 2 spares are added in place of onsite service (products have a five year return-to-vendor warranty) Pricing: 1 - Microsoft 2 - LanAdapter						<b>tpmC Rating:</b>		<b>20108</b>	
<b>Audited by Tom Sawyer, Performance Metrics Inc.</b>						<b>\$ / tpmC:</b>		<b>2.06</b>	
Prices used in TPC benchmarks reflect the actual prices a customer would pay for a one-time purchase of the stated components. Individually negotiated discounts are not permitted. Special prices based on assumptions about past or future purchases are not permitted. All discounts reflect standard pricing policies for the listed components. For complete details, see the pricing sections of the TPC benchmark specifications. If you find that the stated prices are not available according to these items, please inform the TPC at <a href="mailto:pricing@tpc.org">pricing@tpc.org</a> .									

**MQTh**, computed Maximum Qualified Throughput

20,108  
tpmC

**Response Times** (in seconds)

	Average	90 <sup>th</sup>	Max
- Neworder	0.60	0.88	5.52
- Payment	0.29	0.50	4.65
- Delivery (interactive portion)	0.11	0.12	0.70
- Stock-Level	3.24	5.39	12.82
- Order Status	0.44	0.68	5.68
- Delivery (deferred portion)	1.15	1.61	2.67
- Menu	0.11	0.12	0.93

Response time delay added for emulated components

Menu 0.1  
Resp 0.1

**Transaction Mix**, in percent of total transactions

- New-Order	44.88%
- Payment	43.02 %
- Delivery	4.04 %
- Stock-Level	4.05 %
- Order-Status	4.04 %

**Keying/Think Times** (in seconds),

	Min		Average		Max	
- New-Order	18.02	0.0	18.02	12.04	18.03	120.41
- Payment	3.01	0.0	3.02	12.03	3.03	120.41
- Delivery	2.01	0.0	2.02	5.04	2.03	50.40
- Stock-Level	2.01	0.0	2.02	5.05	2.03	50.40
- Order-Status	2.01	0.0	2.02	10.04	2.03	100.40

**Test Duration**

- Ramp-up time	5 minutes
- Measurement interval	120 minutes
- Number of checkpoints	4
- Checkpoint interval	30 minutes
- Number of transactions (all types) completed in measurement interval	5,596,797

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# Introduction

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## **Document Structure**

The TPC Benchmark C Standard Specification Revision 5.2, written and approved by the Transaction Processing Performance Council (TPC), determines the contents of this report. The format of this report is based on this specification. Most sections of this report begin with the specification requirements printed in italic type, immediately followed by the detail in plain type of how Dell complied with the specification. Where extensive listings are required (such as listing of code), a note is included which references an appendix containing the listing.

## **Benchmark Overview**

TPC Benchmark™ C (TPC-C) is an OLTP workload. It is a mixture of read-only and update intensive transactions that simulate the activities found in complex OLTP application environments. It does so by exercising a breadth of system components associated with such environments, which are characterized by:

- The simultaneous execution of multiple transaction types that span a breadth of complexity
- On-line and deferred transaction execution modes
- Multiple on-line terminal sessions
- Moderate system and application execution time
- Significant disk input/output
- Transaction integrity (ACID properties)
- Non-uniform distribution of data access through primary and secondary keys
- Databases consisting of many tables with a wide variety of sizes, attributes, and relationships
- Contention on data access and update

The performance metric reported by TPC-C is a "business throughput" measuring the number of orders processed per minute. Multiple transactions are used to simulate the business activity of processing an order, and each transaction is subject to a response time constraint.

The performance metric for this benchmark is expressed in transactions-per-minute-C (tpmC). To be compliant with the TPC-C standard, all references to tpmC results must include the tpmC rate, the associated price-per-tpmC, and the availability date of the priced configuration.

Although these specifications express implementation in terms of a relational data model with conventional locking scheme, the database may be implemented using any commercially available database management system (DBMS), database server, file system, or other data repository that provides a functionally equivalent implementation. The terms "table", "row", and "column" are used in this document only as examples of logical data structures.

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

Despite the fact that this benchmark offers a rich environment that emulates many OLTP applications, this benchmark does not reflect the entire range of OLTP requirements. In addition, the extent to which a customer can achieve the results reported by a vendor is highly dependent on how closely TPC-C approximates the customer application. The relative performance of

systems derived from this benchmark does not necessarily hold for other workloads or environments. Extrapolations to any other environment are not recommended.

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

## ***System Overview***

The hardware configuration used in this TPC-C test is a Dell PowerEdge 2650 server driven by one Dell PowerEdge 1600 client. The PE2650 has two internal Gigabit Ethernet adapters, of which only one is in use. The client and server are networked together via a cross-over cable. Five remote terminal emulator (RTE) systems (PowerEdge 2200's) emulate 16,200 users executing the standard TPC-C workload. The RTE's are connected to the client through a 10/100 BaseT switch. The switch connects to the client machine at 100 BaseT and to the RTE machines at 10Mbit/sec, half duplex. Microsoft Windows 2003 Server was the operating system used on the server. Microsoft Windows 2003 Server was used on the client. Microsoft SQL Server 2000 Standard Edition was the database on the server machine.

The PowerEdge 2650 motherboard uses the ServerWorks Grand Champion High End chipset and can hold up to two Pentium® 4 processors (3.06 GHz with 1 MB L2 cache each). The system has 3 PCI-X 64-bit/100MHz I/O slots and a single legacy 32-bit/33MHz PCI slot. The measured configuration used 2.50 Gbytes of DDR RAM, which was achieved by using four 512 Mbyte DIMMs and two 256Mbyte DIMMs.

The PowerEdge 2650 has an integrated Adaptec AIC-7899 U160 SCSI controller to which was attached one 18 GB disk drive containing the operating system and 4 36GB hard disks in RAID 10 configuration containing the database log. In addition, three DELL PERC3 2-channel RAID controllers were installed in PCI-X slots. The three PERC3 controllers were connected to four PV220 disk pods enclosing a total of 56 18GB 15K RPM SCSI disks, containing database data. There were no empty PCI-X slots. The legacy 33MHz PCI slot was empty.

The client has dual 2.4GHz Intel Xeon processors with 512 Kbytes of L2 cache. The client has 1024 Mbytes of RAM, one 18 GB hard disk, one intergrated Intel Ether Express Pro100+ PCI Ethernet adapter and one Intel Pro 100 Network Interface Card. The client's Intel Ethernet adapter was connected to the RTE machines through a 10/100 BaseT switch and the Intel Pro NIC was connected to the Database Server through a cross-over cable. The client was driven through twelve network segments to run a total of 16,200 emulated users. The network segments between the switches and RTEs were fixed at 10 Mbit/sec, half duplex.

## General Items

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### **Test Sponsor**

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

Dell was the test sponsor of this TPC Benchmark™ C.

### **Application Code and Definition Statements**

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

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

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

The web Client code is listed in Appendix A.

### **Parameter Settings**

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

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

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

Appendix C contains all the database, Windows 2000 Server, and Internet Information Service parameters used in this benchmark.

Appendix D contains the 60 day space calculations.

## Configuration Diagrams

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

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

**Figure 1: Measured Configuration**

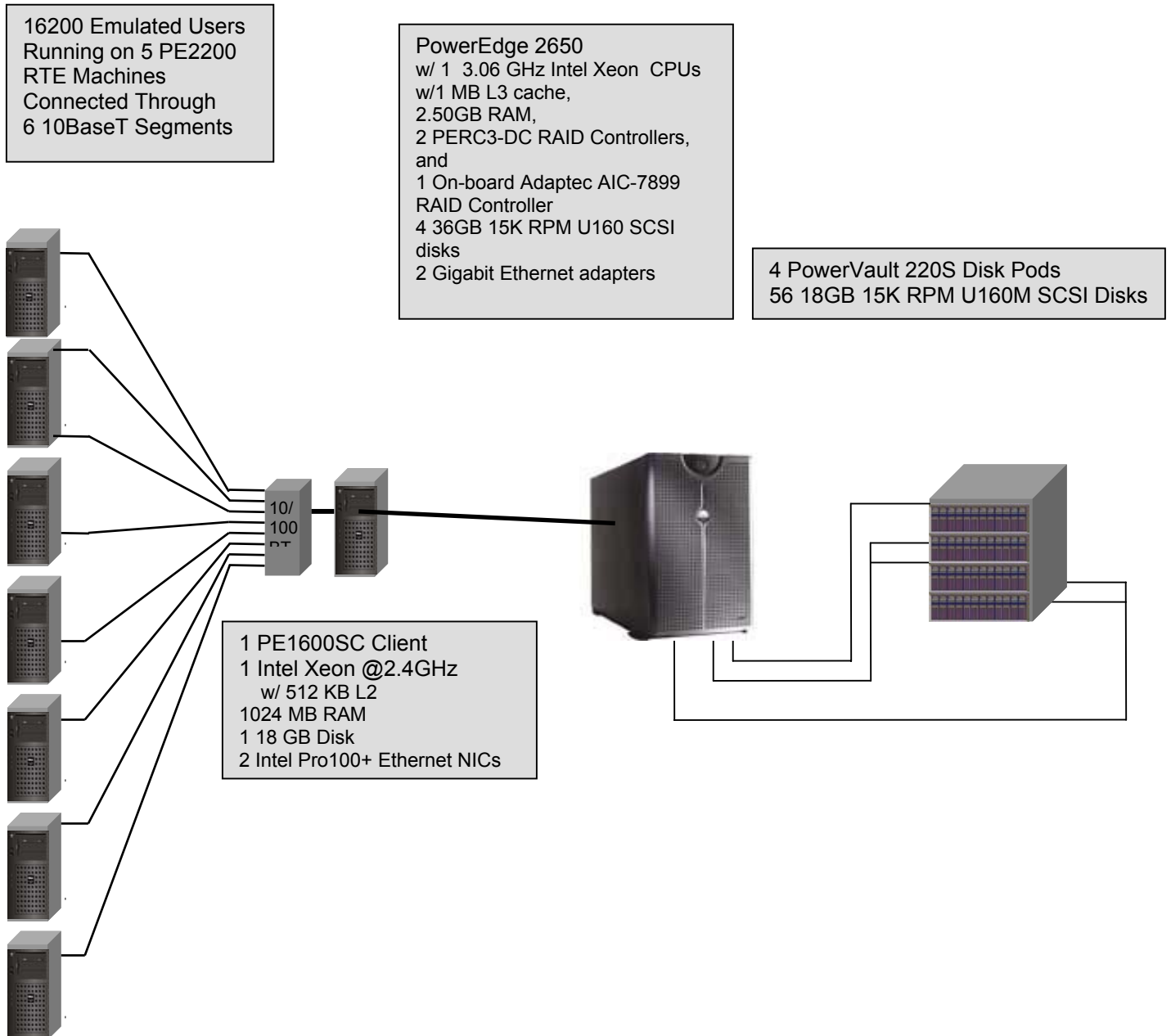
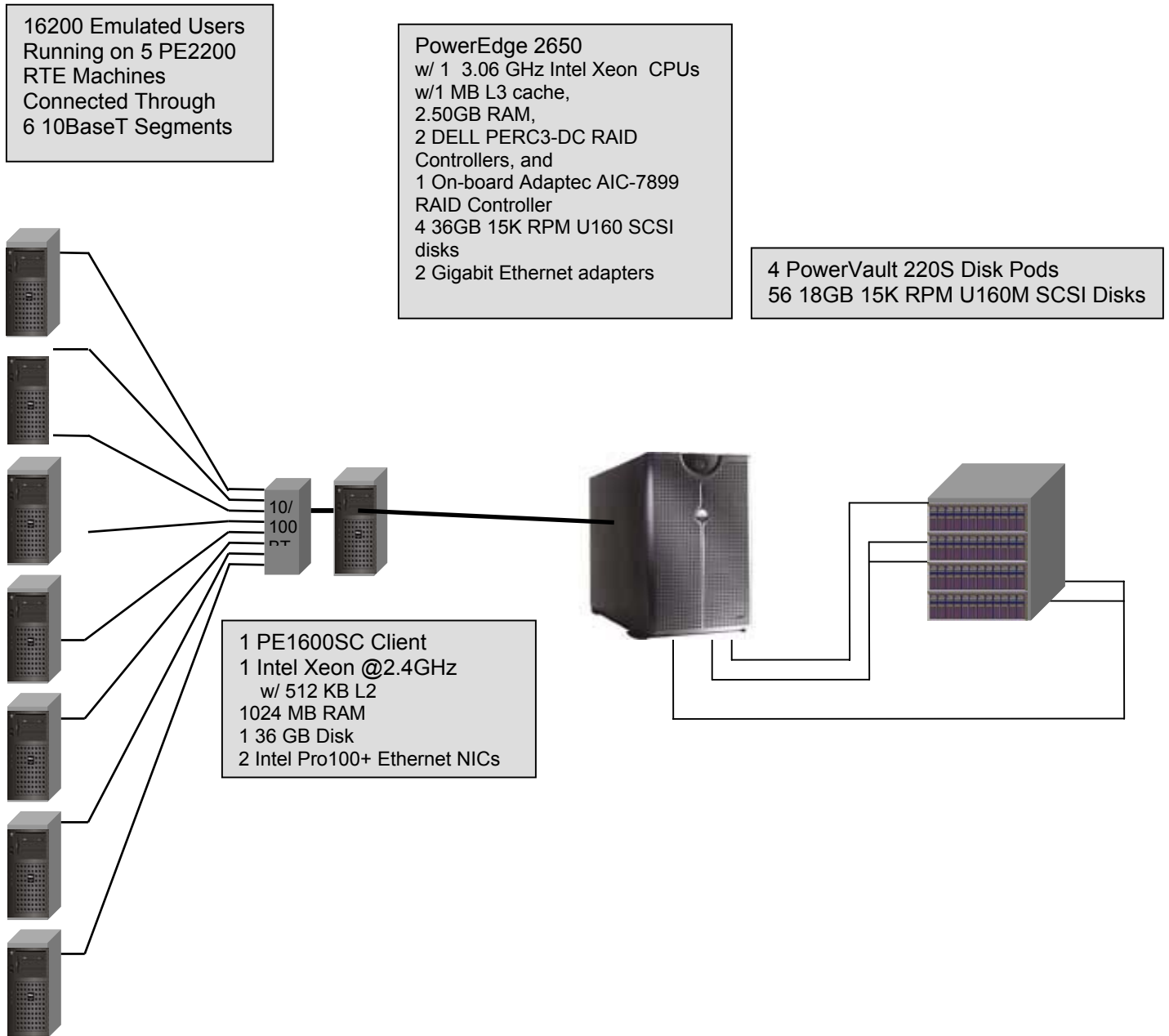


Figure 2: Priced Configuration



## Clause 1 -- Logical Database Design Related Items

---

### **Table Definitions**

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

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

### **Physical Organization of the Database**

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

The measured configuration used 56 disk drives. The organization is shown in Table 5: Data Distribution.

### **Insert and Delete Operations**

*It must be ascertained that insert and/or delete operations to any of the tables can occur concurrently with the TPC-C transaction mix. Furthermore, any restriction in the SUT database implementation that precludes inserts beyond the limits defined in Clause 1.4.11 must be disclosed. This includes the maximum number of rows that can be inserted and the maximum key value for these new rows. (8.1.2.3)*

Insert and delete functionality was fully operational during the benchmark.

### **Horizontal and Vertical Partitioning**

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

Partitioning was not used in this benchmark.

### **Replication**

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

Replication was not used in this benchmark.

### **Table Attributes**

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

No additional attributes were used in this benchmark.



## Clause 2 -- Transaction and Terminal Profiles Related Items

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### **Random Number Generation**

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

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

### **Screen Layout**

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

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

### **Terminal Verification**

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

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

### **Intelligent Terminals**

*Any usage of presentation managers or intelligent terminals must be explained. (8.1.3.4)*

**Comment 1:** *The intent of this clause is to describe any special manipulations performed by a local terminal or workstation to off-load work from the SUT. This includes, but is not limited to: screen presentations, message bundling, and local storage of TPC-C rows.*

**Comment 2:** *This disclosure also requires that all data manipulation functions performed by the local terminal to provide navigational aids for transaction(s) must also be described. Within this disclosure, the purpose of such additional function(s) must be explained.*

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

### **Transaction Profiles**

*The percentage of home and remote order-lines in the New-Order transactions must be disclosed. (8.1.3.5)*

*The percentage of New-Order transactions that were rolled back as a result of an unused item number must be disclosed. (8.1.3.6)*

*The number of items per orders entered by New-Order transactions must be disclosed. (8.1.3.7)*

*The percentage of home and remote Payment transactions must be disclosed. (8.1.3.8)*

*The percentage of Payment and Order-Status transactions that used non-primary key (C\_LAST) access to the database must be disclosed. (8.1.3.9)*

*The percentage of Delivery transactions that were skipped as a result of an insufficient number of rows in the NEW-ORDER table must be disclosed. (8.1.3.10)*

**Table 1: Transaction Statistics**

<b>Transaction</b>	<b>Function</b>	<b>Value</b>
New Order	Home Warehouse Items	99.00%
	Remote Warehouse Items	1.00%
	Rolled Back Transactions	0.99%
	Average Lines Per Order	10.00
Payment	Home Warehouse	84.97%
	Remote Warehouse	15.03%
	Non-Primary Key Access	60.01%
Order Status	Non-Primary Key Access	60.10%
Delivery	Skipped Transactions	0

**Transaction Mix**

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

**Table 2: Transaction mix**

<b>Transaction</b>	<b>Percentage</b>
New Order	44.86%
Payment	43.02%
Order Status	4.03%
Delivery	4.04%
Stock Level	4.05%

**Deferred Delivery Mechanism**

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

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

The source code is listed in Appendix A.

## Clause 3 -- Transaction and System Properties Related Items

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### **ACID Tests**

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

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

### Atomicity

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

### **Completed Transactions**

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

### **Aborted Transactions**

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

### Consistency

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

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

### Isolation

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

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

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

For Isolation test seven, case A was followed.

## Durability

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

### **Durable Media Failure**

Durability from media failure was demonstrated on a 150 warehouse database. The standard driving mechanism was used to generate the transaction load of 1100 users for the Loss of Data.

### **Loss of Data**

Loss of data was demonstrated on the 170 Warehouse database. The standard driving mechanism was used to generate the transaction load of 1500 users for the test. To demonstrate recovery from a permanent failure of durable media containing TPC-C tables, the following steps were executed:

1. The 170 Warehouse database was used for this test.
2. The database was backed up using SQL Server backup facilities.
3. A sum of D\_NEXT\_O\_ID was taken.
4. 1700 users were logged in to the database and ran transactions.
5. One disk drive in the data array was removed causing SQL Server errors.
6. The RTE was allowed to continue running. Completed transactions enroute from the clients were recorded. Error messages began appearing on the RTE screen.
7. The RTE was stopped.
8. SQL Server was stopped and restarted and a dump of the transaction log was taken.
9. SQL Server was stopped, Windows 2003 was shutdown and the machine powered off.
10. The failed disk was replaced.
11. The machine was powered up, Windows 2003 and SQL Server were started.
12. The TPC-C database was dropped and restored from backup.
13. The transaction log was restored and transactions rolled forward.
14. A new count of D\_NEXT\_O\_ID was taken.
15. This number was compared with the number of new orders reported by the RTE.

### **Instantaneous Interruption and Loss of Memory/Loss of Log**

Instantaneous Interruption and Loss of Memory were demonstrated on the full database with 1700 warehouses in a single test. The standard driving mechanism was used to generate the transaction load of 16200 users for the test. To demonstrate recovery an instantaneous system interruption caused by powering off the Server, the following steps were executed:

1. The full database was used.
2. A sum of D\_NEXT\_O\_ID was taken.
3. 16200 users were logged in to the database and ran transactions.
4. The system was run in steady state for 5 minutes
5. One disk drive in the transaction log array was removed with no effect on Windows 2003 or SQL Server.
6. The system ran for an additional 5 minutes.
6. The Server was powered off by normal means, causing instantaneous interruption.

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

## Clause 4 -- Scaling and Database Population Related Items

---

### **Table Cardinality**

The cardinality (e.g., the number of rows) of each table, as it existed at the start of the benchmark run (see Clause 4.2), must be disclosed. If the database was over-scaled and inactive rows of the WAREHOUSE table were deleted (see Clause 4.2.2), the cardinality of the WAREHOUSE table as initially configured and the number of rows deleted must be disclosed. (8.1.5.1)

The database was originally built with 1700 warehouses. The performance run used 1620 warehouses and this is verified by runcheck

**Table 3: Table Cardinality**

<b>Table</b>	<b>Cardinality as Benchmarked</b>
Warehouse	1,700
District	17,000
Customer	51,000,000
History	51,000,000
NewOrder	15,300,000
Orders	45,000,000
OrderLine	510,007,366
Item	100,000
Stock	170,000,000
Deleted Warehouses	0

### **Constant Values**

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

**Table 4: Constant Values**

<b>Function</b>	<b>Constant C Value</b>
C_LAST (Build)	123
C_LAST (Run)	208

## Data Distribution

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

The Database was built using a total of 61 disks: 56 18GB for data, 4 36GB for log, and 1 9GB for OS and application software. The data drives were configured as hardware RAID 0. Logs were configured as hardware RAID 10. DELL PERC3-DC RAID Controllers 2 and 3 were configured with 1 logical drives each. Each logical drive spanned 28 disk drives. PERC3/Di intergrated controller 1 was configured with 1 logical drive spanning 4 36GB SCSI drives. Each Windows 2003 data drive contained 3 partitions: partition 1 for customer/stock, partition 2 for miscellaneous, and partition 3 for backup. Partitions 1 and 2 were RAW file systems and partition 3 was formatted NTFS. The details are shown in Table 5.

**Table 5: Data Distribution**

W2K Disk Administration	Adaptec 7899 Configuration				
Disk 2 8663MB	On-Board Controller # 1				
Partition	On-Board		Channels		
1	Internal	SCSI ID	0		
C: OS NTFS 8663 MB		0	A0-1		
		1			
		2			
		3			

W2K Disk Administration	Adaptec 7899 Configuration				
Disk 2 69417MB	On-Board Controller # 1				
Partition	On-Board		Channels		
1	Internal	SCSI ID		1	
L: LOG RAW 57354 MB		0		A1-1	
		1		A1-2	
		2		A1-3	
		3		A1-4	

W2K Disk Administration			DELL PERC3-DC Configuration					
Disk 0 483779MB			Controller # 2					
Partition			Slot# 1		Channels			
1	2	3		SCSI ID	A	B	C	D
<b>K:</b> <b>CS1</b> <b>Unknown</b> <b>59996MB</b>	<b>Y:</b> <b>MS1</b> <b>Unknown</b> <b>59996MB</b>	<b>Backup1</b> <b>B1</b> <b>NTFS</b> <b>363776MB</b>		0	A1-1	A2-1		
				1	A1-2	A2-2		
				2	A1-3	A2-3		
				3	A1-4	A2-4		
				4	A1-5	A2-5		
				5	A1-6	A2-6		
				8	A1-7	A2-7		
				9	A1-8	A2-8		
				10	A1-9	A2-9		
				11	A1-10	A2-10		
				12	A1-11	A2-11		
				13	A1-12	A2-12		
				14	A1-13	A2-13		
				15	A1-14	A2-14		

W2K Disk Administration			DELL PERC3-DC Configuration					
Disk 1 483779MB			Controller # 3					
Partition			Slot# 2		Channels			
1	2	3		SCSI ID	A	B	C	D
<b>G:</b> <b>CS2</b> <b>Unknown</b> <b>59996MB</b>	<b>H:</b> <b>MS2</b> <b>Unknown</b> <b>59996MB</b>	<b>Backup2</b> <b>B2</b> <b>NTFS</b> <b>363776MB</b>		0	A1-1	A2-1		
				1	A1-2	A2-2		
				2	A1-3	A2-3		
				3	A1-4	A2-4		
				4	A1-5	A2-5		
				5	A1-6	A2-6		
				8	A1-7	A2-7		
				9	A1-8	A2-8		
				10	A1-9	A2-9		
				11	A1-10	A2-10		
				12	A1-11	A2-11		
				13	A1-12	A2-12		
				14	A1-13	A2-13		
				15	A1-14	A2-14		



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

8.1.5.3 A statement must be provided that describes:

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

Microsoft SQL Server 2000 Enterprise Edition is a relational DBMS.

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

### **Partition Mapping**

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

**Comment:** The intent is to provide sufficient detail about partitioning and replication to allow independent reconstruction of the test database. (8.1.5.4)

An description of a database partitioning scheme is presented below as an example. The nomenclature of this example was outlined using the CUSTOMER table (in Clause 8.1.2.1), and has been extended to use the ORDER and ORDER\_LINE tables as well.

The database was not replicated.

### **60 day Space Calculation**

*Details of the 60 day space computations along with proof that the database is configured to sustain 8 hours of growth for the dynamic tables (Order, Order-Line, and History) must be disclosed (see Clause 4.2.3). (8.1.5.5)*

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

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

The results of the above steps yielded a requirement of 100.0368 GB (including mirror) to sustain the log for 8 hours. Space available on the transaction log volume was 135.58GB (including mirror), indicating that enough storage was configured to sustain 8 hours of growth.

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

The details of the 60-day space requirement is shown in Appendix D.

## Clause 5 -- Performance Metrics and Response Time Related Items

---

### Measured TpmC

Measured tpmC must be reported. (8.1.6.1)

Measured TpmC                      20,108  
 Price per TpmC                      \$2.06

### Response Times

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

**Table 6: Transaction Response Times**

Transaction	Average	90%	Maximum
New Order	0.60	0.88	5.52
Payment	0.29	0.50	4.65
Interactive Delivery	0.11	0.12	0.70
Stock Level	3.24	5.39	12.82
Order Status	0.44	0.68	5.68
Deferred Delivery	1.15	1.61	2.67
Menu	0.11	0.12	0.93

### Think Times & Key Times

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

**Table 7: Transaction Key Times**

Transaction	Minimum	Average	Maximum
New Order	18.02	18.02	18.03
Payment	3.01	3.02	3.03
Delivery	2.01	2.02	2.03
Stock Level	2.01	2.02	2.03
Order Status	2.01	2.02	2.03

**Table 8: Transaction Think Times**

Transaction	Minimum	Average	Maximum
New Order	0.00	12.04	120.41
Payment	0.00	12.03	120.41
Delivery	0.00	5.04	50.40
Stock Level	0.00	5.05	50.40
Order Status	0.00	10.04	100.40

### Response Time Distribution Curves

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

Figure 3: New Order Response Time Distribution

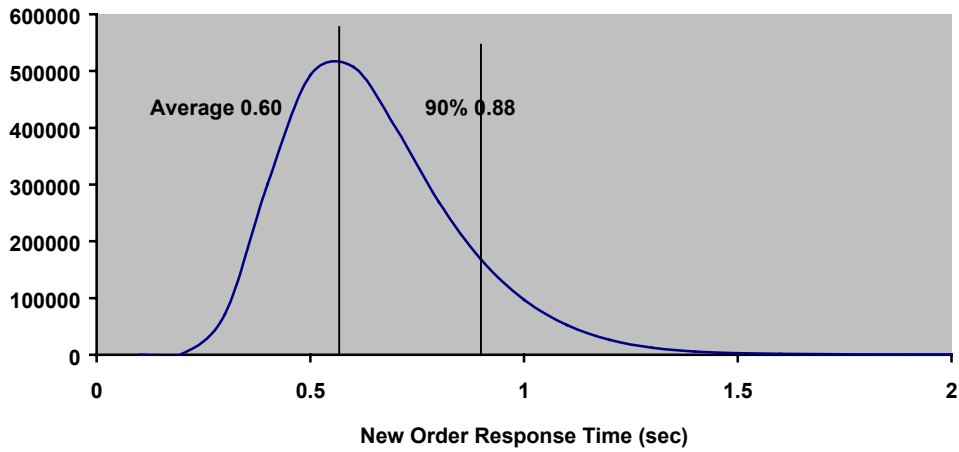
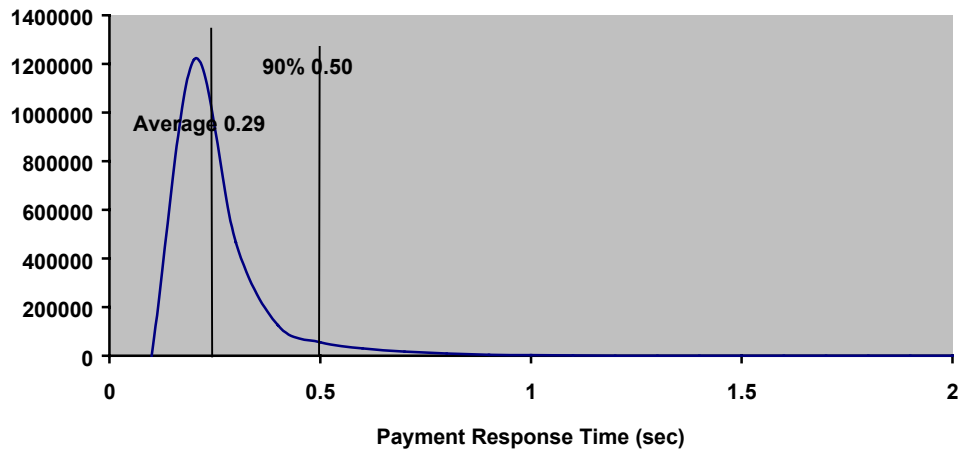


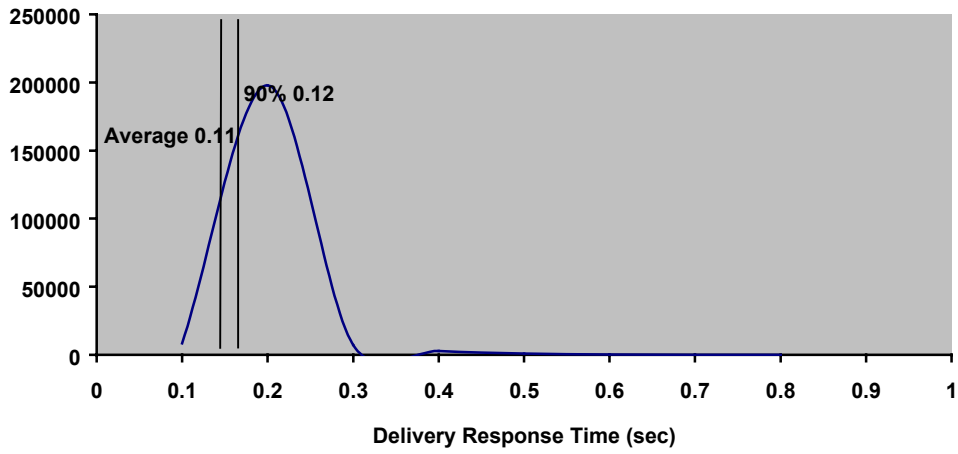
Figure 4: Payment Response Time Distribution



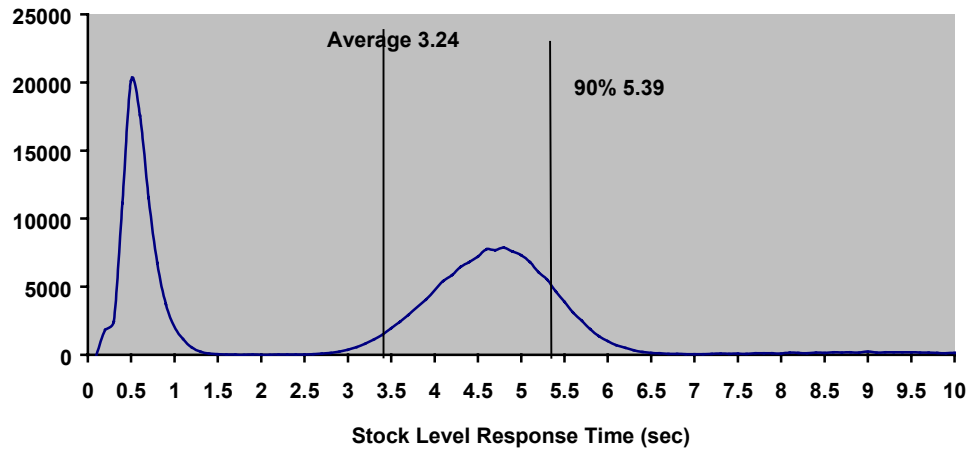
**Figure 5: Order Status Response Time Distribution**



**Figure 6: Delivery Response Time Distribution**



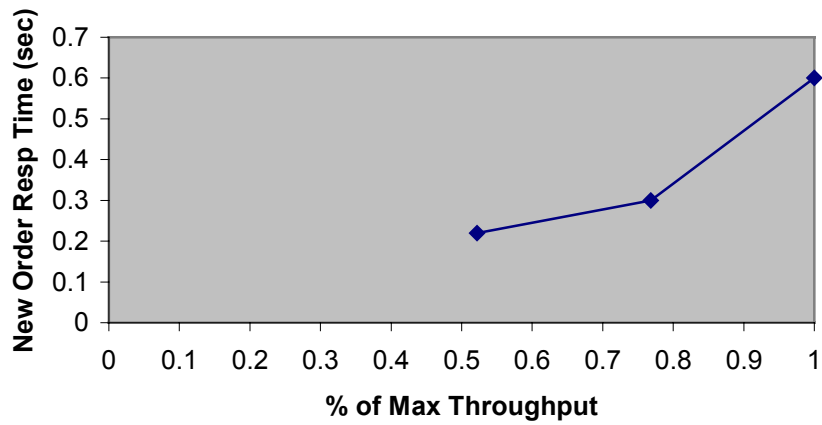
**Figure 7: Stock Level Response Time Distribution**



### **New-Order Response Time vs. Throughput Graph**

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

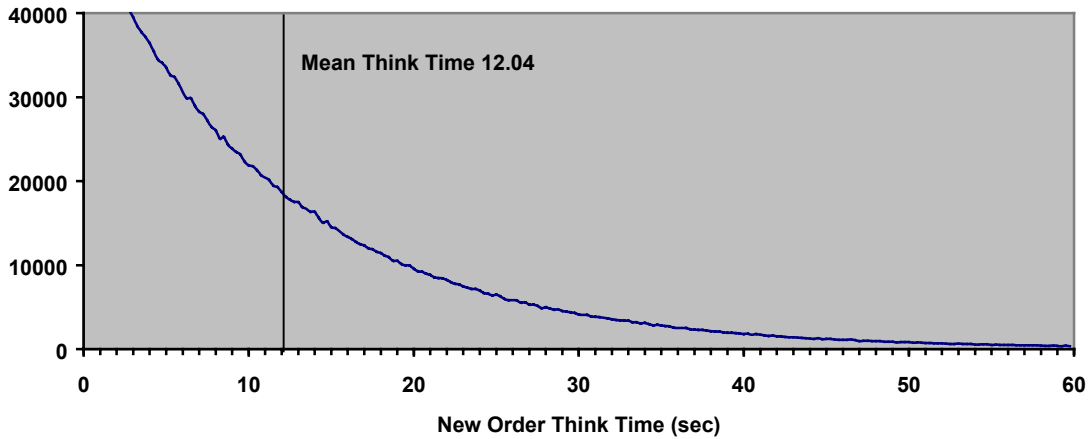
**Figure 8: New Order Response Time vs. Throughput**



### New-Order Think Time Distribution Graph

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

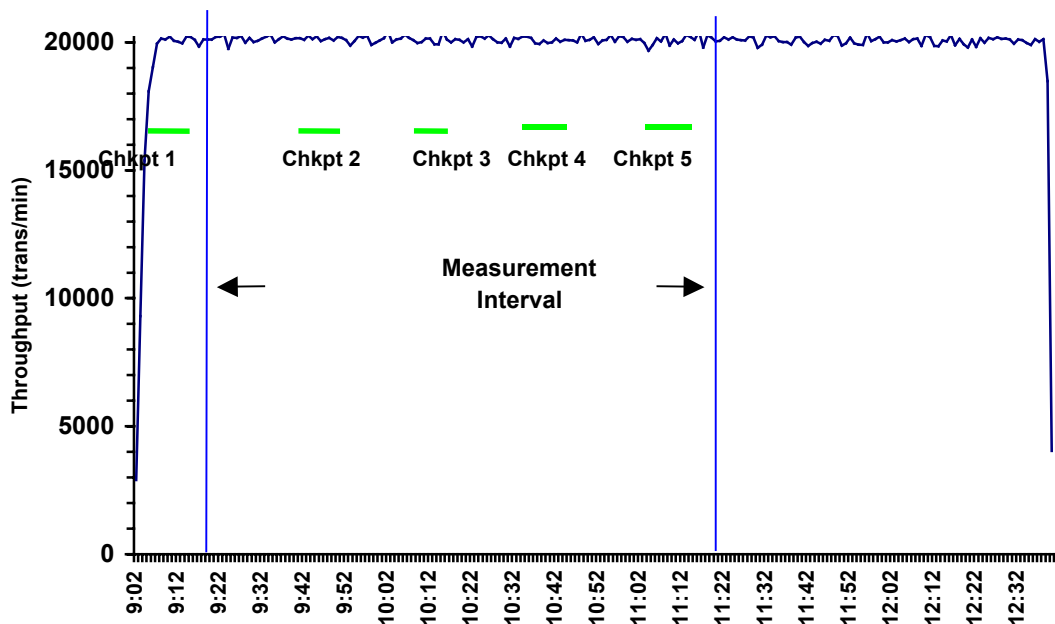
Figure 9: New Order Think Time Distribution



### Steady-State Graph

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

Figure 10: New Order Throughput vs. Time





## **Steady-State Methodology**

*The method used to determine that the SUT had reached a steady state prior to commencing the measurement interval (see Clause 5.5) must be described. (8.1.6.9)*

Steady state was determined using real time monitor utilities from both the operating system and the RTE. Steady state was further confirmed by the throughput data collected during the run and graphed in Figure 10.

## **Work Performed During Steady State**

*A description of how the work normally performed during a sustained test (for example checkpointing, writing redo/undo log records, etc.), actually occurred during the measurement interval must be reported. (8.1.6.10)*

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

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

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

The RTE transmissions were sent to the web-based application program running on the client machines through Ethernet LANs. These web clients managed the emulated web browser interface as well as all requests to the database on the server. The applications communicated with the database server over another Ethernet LAN using the COM+ transaction monitor and Microsoft SQL Server DBLIB library and RPC calls.

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

At each checkpoint, Microsoft SQL Server wrote to disk all memory pages that had been updated but not yet physically written to disk. Upon completion of the checkpoint, Microsoft SQL Server wrote a special record to the recovery log to indicate that all disk operations had been satisfied to this point.

## **Measurement Interval**

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

The measurement interval was 7200 minutes.

### **Measurement Period Duration and Checkpoint Duration**

*The start time and duration in seconds of at least the four (4) longest checkpoints during the measurement interval must be disclosed (see clause 5.5.2.2(2) ) (8.1.6.11)*

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

	<b>Start</b>	<b>End</b>	<b>Duration</b>
Measurement Interval	09:20:47	11:20:47	7,200
1 <sup>st</sup> Checkpoint	09:40:32	09:45:38	306
2 <sup>nd</sup> Checkpoint	10:10:26	10:15:37	311
3 <sup>rd</sup> Checkpoint	10:40:21	10:45:32	311
4 <sup>th</sup> Checkpoint	11:10:16	11:15:27	311

### **Transaction Mix**

*8.1.6.13 The method of regulation of the transaction mix (e.g., card decks or weighted random distribution) must be described. If weighted distribution is used and the RTE adjusts the weights associated with each transaction type, the maximum adjustments to the weight from the initial value must be disclosed. (8.1.6.13)*

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

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

**Table 9: Transaction Mix**

<b>Transaction</b>	<b>Percentage</b>
New Order	44.86%
Payment	43.02%
Order Status	4.04%
Delivery	4.03%
Stock Level	4.05%

### **Other Metrics**

*The percentage of New-Order transactions rolled back as a result of invalid item number must be disclosed. (8.1.6.15)*

*The average number of order-lines entered per New-Order transaction must be disclosed. (8.1.6.16)*

*The percentage of remote order-lines entered per New-Order transaction must be disclosed. (8.1.6.17)*

*The percentage of remote Payment transactions must be disclosed. (8.1.6.18)*

*The percentage of customer selections by customer last name in the Payment and Order-Status*

transactions must be disclosed. (8.1.6.19)

The percentage of Delivery transactions skipped due to there being fewer than necessary orders in the New-Order table must be disclosed. (8.1.6.20)

**Table 10: Transaction Statistics**

<b>Transaction</b>	<b>Function</b>	<b>Value</b>
New Order	Home Warehouse Items	99.00%
	Remote Warehouse Items	1.00%
	Rolled Back Transactions	0.99%
	Average Lines Per Order	10.00
Payment	Home Warehouse	84.98%
	Remote Warehouse	15.02%
	Non-Primary Key Access	60.01%
Order Status	Non-Primary Key Access	60.10%
Delivery	Skipped Transactions	0

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

---

### **RTE Parameters**

*The RTE input parameters, code fragments, functions, etc. used to generate each transaction input field must be disclosed. (8.1.7.1)*

**Comment:** *The intent is to demonstrate the RTE was configured to generate transaction input data as specified in Clause 2.*

The RTE input parameters are listed in Appendix C - Tunable Parameters.

### **Emulated Components**

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

No components were emulated.

### **Benchmarked and Targeted System Configuration Diagrams**

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

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

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

### **Network Configuration**

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

The network configurations of the benchmarked and priced configurations were identical.

### **Network Bandwidth**

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

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

- 10 BaseT (10 Mbit/sec) network segments between the RTE/Emulated Users and the switch.
- 100 BaseT (100 Mbit/sec) between the Clients and Server.

### **Operator Intervention**

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

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

## Clause 7 -- Pricing Related Items

---

### **Hardware and Software List**

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

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

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

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

### **Availability Date**

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

Hardware Availability Date: July 14, 2003

Software Availability Date: Jan 14, 2004

### **Measured TpmC**

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

Maximum Qualified Throughput: 20,108 tpmC

Price Performance Metric: \$2.04

### **Country Specific Pricing**

*Additional Clause 7 related items may be included in the Full Disclosure Report for each country specific priced configuration. Country specific pricing is subject to Clause 7.1.7. (8.1.8.5)*

This system is priced for the United States of America.

### **Usage Pricing**

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

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

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

The component pricing based on usage is shown below:

- 2 Microsoft Windows 2003 Server Licenses
- 1 Microsoft SQL Server 2000 Standard Edition License.
- 1 Microsoft Visual C++ 32 bit Edition
- 3 Year Support for Hardware Components.

### **System Pricing**

*System pricing should include subtotals for the following components: Server Hardware, Server Software, Client Hardware, Client Software, and Network Components used for terminal connection (see Clause 7.2.2.3). Clause 6.1 describes the Server and Client components. An example of the standard pricing sheet is shown in Appendix B. (8.1.8.7)*

*System pricing must include line item indication where non-sponsoring companies' brands are used. System pricing must also include line item indication of third party pricing. See example in Appendix B. (8.1.8.8)*

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

## Clause 9 -- Audit Related Items

---

### **Auditor**

*The auditor's name, address, phone number, and a copy of the auditor's attestation letter indicating compliance must be included in the Full Disclosure Report. (8.1.9.1)*

*A review of the pricing model is required to ensure that all components required are priced (see Clause 9.2.8). The auditor is not required to review the final Full Disclosure Report or the final pricing prior to issuing the attestations letter. (8.1.9.2)*

This TPC-C benchmark has been audited by Lorna Livingtree of Performance Metrics.

### **Availability of the Full Disclosure Report**

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

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

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

or:

Dell  
One Dell Way  
Round Rock, TX 78682  
Attention: Mike Molloy, PhD



## Auditor's Letter of Attestation

Mike Molloy  
Manager, Enterprise Systems Performance  
Dell  
One Dell Way  
Round Rock, TX 78682

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

Platform: Dell PowerEdge 2650 Server  
Database Manager: Microsoft SQL Server 2000 Enterprise Edition SP3  
Operating System:  
    Server: Microsoft Windows 2003 Server  
    Clients: Microsoft Windows 2003 Server  
Transaction Manager: Microsoft COM+

Server: Dell PowerEdge 2650 Server				
CPU's	Memory	Disks	90% Response	tpmC
1 Intel Xeon @ 3.06 GHz	Main: 2.5 GB Cache: 1MB	57 @ 18 GB 4@36GB	<b>0.88 sec</b>	<b>20,108.79</b>
Clients: 1 Dell PowerEdge 1600SC				
2 Intel Xeon 1 clients @2.4GHz	Main: 1024 MB Cache: 512 KB	1 @ 18 GB	Na	Na

In my opinion, these performance results were produced in compliance with the TPC requirements for the benchmark.

The following attributes of the benchmark were given special attention:

- The transactions were correctly implemented.
- The database files were properly sized and populated.
- The database was properly scaled with 1,700 warehouses. The measurement used 1,620 – see Auditor Notes.
- Input data was generated according to the specified percentages.
- Eight hours of mirrored log space was configured on the measured system.
- Eight hours of dynamic table growth space was configured on the measured system.
- The 60-day space calculation was verified; the measured system had sufficient storage.
- Measurement cycle times included a delay of 0.1 seconds.
- There were 16,200 user contexts present on the system.
- Each group of emulated users started with a different random number seed.
- The NURand constants used for database load and at run time were 123 and 233.
- The steady state portion of the test was 2 hours.
- One checkpoint was taken before the measured interval.
- Four checkpoints were taken during the measured interval.
- The system pricing was checked for major components and maintenance.

Auditor Notes:

The performance run used 1,620 warehouses. An earlier run had used 1,659 warehouses. The warehouses between 1,621 and 1,659 did not have original values for d\_next\_o\_id nor w\_ytd. There was no run prior to the performance run that could demonstrate that these warehouses were unused. An additional run was made which obtained nearly the same tpmC and demonstrated that these warehouses were not used. In addition, the performance run Benchcraft report was examined to show that only 16,200 users were started.

Sincerely,



Lorna Livingtree

# Appendix A - Application Source Code

## Appendix A - Application Source Code

### tpcc.dll ISAPI DLL Source Code

#### isapi\_dll/src/tpcc.def

```
LIBRARY TPCC.DLL

EXPORTS

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

#### Isapi\_dll/src/tpcc.h

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

//VERSION RESOURCE DEFINES
#define _APS_NEXT_RESOURCE_VALUE          101
#define _APS_NEXT_COMMAND_VALUE          40001
#define _APS_NEXT_CONTROL_VALUE          1000
#define _APS_NEXT_SYMED_VALUE            101

#define TP_MAX_RETRIES
50

//note that the welcome form must be processed first as terminal ids assigned here, once
the
//terminal id is assigned then the forms can be processed in any order.
#define WELCOME_FORM                      1
    //beginning form no term id assigned, form id
```

```
#define MAIN_MENU_FORM                    2
    //term id assigned main menu form id
#define NEW_ORDER_FORM                    3
    //new order form id
#define PAYMENT_FORM                      4
    //payment form id
#define DELIVERY_FORM                    5
    //delivery form id
#define ORDER_STATUS_FORM                6
    //order status id
#define STOCK_LEVEL_FORM                  7
    //stock level form id

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

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

    int                iSyncId;
    //synchronization 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;
    //synchronization 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,
```

# Appendix A - Application Source Code

```
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_SUPFW,
ERR_NEWORDER_MISSING_IID_KEY,
ERR_NEWORDER_MISSING_QTY_KEY,
ERR_NEWORDER_MISSING_SUPFW_KEY,
ERR_NEWORDER_NOITEMS_ENTERED,
ERR_NEWORDER_QTY_INVALID,
ERR_NEWORDER_QTY_RANGE,
ERR_NEWORDER_QTY_WITHOUT_SUPFW,
ERR_NEWORDER_SUPFW_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_TOO_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 WINAPI 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);
```

# Appendix A - Application Source Code

```
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

#ifdef _MAC
////////////////////
//
// Version
//

VS_VERSION_INFO VERSIONINFO
FILEVERSION 0,4,0,0
PRODUCTVERSION 0,4,0,0
FILEFLAGSMASK 0x3fL
#ifdef _DEBUG
FILEFLAGS 0x1L
```

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

#endif // !_MAC

#ifdef APSTUDIO_INVOKED
////////////////////
//
// TEXTINCLUDE
//
1 TEXTINCLUDE DISCARDABLE
BEGIN
    "resource.h\0"
END

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

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

#endif // APSTUDIO_INVOKED

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

IDD_DIALOG1 DIALOG DISCARDABLE 0, 0, 186, 95
```

# Appendix A - Application Source Code

```
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 <icapep.h>
#endif

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

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

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

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

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

#define LEN_ERR_STRING 256

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

char szMyComputerName[MAX_COMPUTERNAME_LENGTH+1];

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

// The WEBCLIENT_VERSION string specifies the version level of this web client interface.
```

# Appendix A - Application Source Code

```
// 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 *pTxnLog; //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
DELIVERY_TRANSACTION *pDelBuff = NULL;
DWORD dwDelBuffSize = 100;
DWORD // size of circular buffer for delivery txns
dwDelBuffFreeCount;
DWORD // number of buffers free
dwDelBuffBusyIndex = 0;
DWORD // index position of entry waiting to be delivered
dwDelBuffFreeIndex = 0;
DWORD // 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 WINAPI DllMain(HANDLE hModule, DWORD ul_reason_for_call, LPVOID lpReserved)
{
    DWORD i;
    char szEvent[LEN_ERR_STRING] = "\0";
    char szLogFile[128];
    char szDllName[128];

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

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

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

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

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

                TermInit();

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

                    if (hLibInstanceTm == NULL)
                        throw new CWEBCLNT_ERR(
ERR_LOADDLL_FAILED, szDllName, GetLastError() );

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

# Appendix A - Application Source Code

```
);
    strcat( szDllName, "tpcc_encina.dll");
    hLibInstanceTm = LoadLibrary( szDllName
);
    if (hLibInstanceTm == NULL)
        throw new CWBCLNT_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 CWBCLNT_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 CWBCLNT_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 CWBCLNT_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
CWBCLNT_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
CWBCLNT_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
CWBCLNT_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
CWBCLNT_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
CWBCLNT_ERR( ERR_DELIVERY_THREAD_FAILED );
        }
    }
```



## Appendix A - Application Source Code

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

                // This will do a clean
                CTxnLog *txnDelilogLocal =
                txnDelilog;
                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);
    lstrcpy(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
```

# Appendix A - Application Source Code

```
*
* 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;
            }
            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();
            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;
```

## Appendix A - Application Source Code

```
        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(txnDeliRec != 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,
            e->ErrorText(), Reg.szDbServer, Reg.szDbUser,
            Reg.szDbPassword, Reg.szDbName );
        WriteMessageToEventLog( szTmp );
        delete e;
    }
}

```

## Appendix A - Application Source Code

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

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

                if (index == WAIT_OBJECT_0)
                    goto ErrorExit;

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

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

                LeaveCriticalSection(&DelBuffCriticalSection);

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

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

                txnDeliRec.TxnStartT0 =
                Get64BitTime(&delivery.queue);

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

                //log txn
                txnDeliRec.TxnStatus = ERR_SUCCESS;
                for (int i=0; i<10; i++)
                    txnDeliRec.o_id[i] = pDeliveryData->
                    o_id[i];

                txnDeliRec.DeltaT4 =
                (int)(Get64BitTime(&trans_end) - txnDeliRec.TxnStartT0);
```

```
                txnDeliRec.DeltaTxnExec =
                (int)(Get64BitTime(&trans_end) - Get64BitTime(&trans_start));

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

            WriteMessageToEventLog( szTmp );

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

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

    ErrorExit:
        delete pTxn;
        _endthread();
}

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

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

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

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

## Appendix A - Application Source Code

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

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

        return bError;
    }

/* FUNCTION: ProcessQueryString
 *
 * PURPOSE:      This function extracts the relevant information out of the http
 *               command passed in from
 *               the browser.
 *
 * COMMENTS:     If this is the initial connection i.e. client is at welcome screen
 *               then
 *               there will not be a terminal id or current form
 *               id. If this is the case
 *               then the pTermid and pFormid return values are
 *               undefined.
 */

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

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

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

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

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

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

    // see which command it matches
    for(i=0; ; i++)
```

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

/* FUNCTION: void WelcomeForm
 *
 */

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

    //welcome to tpc-c html form buffer, this is first form client sees.
    strcpy( szBuffer, "<HTML><HEAD><TITLE>TPC-C Web Client</TITLE></HEAD><BODY>"
        "<B><BIG>Microsoft TPC-C Web
Client (ver 4.20)</BIG></B> <BR> <BR>"
        "<font face=\"Courier
New\"><PRE>"
        "Compiled: \"__DATE__",
        "\"__TIME__\" <BR>"
        "Source: \"__FILE__"
        "\"__TIMESTAMP__\" <BR>"
        "</PRE></font>"
        "<FORM ACTION=\"tpcc.dll\"
METHOD=\"GET\">"
        "<INPUT TYPE=\"hidden\"
NAME=\"STATUSID\" VALUE=\"0\">"
        "<INPUT TYPE=\"hidden\"
NAME=\"ERROR\" VALUE=\"0\">"
        "<INPUT TYPE=\"hidden\"
NAME=\"FORMID\" VALUE=\"1\">"
        "<INPUT TYPE=\"hidden\"
NAME=\"TERMID\" VALUE=\"0\">"
        "<INPUT TYPE=\"hidden\"
NAME=\"SYNCID\" VALUE=\"0\">"
        "<INPUT TYPE=\"hidden\"
NAME=\"VERSION\" VALUE=\"\" WEBCLIENT_VERSION \"\">"
        );

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

    strcat( szBuffer, szTmp);
```

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```
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>"
        "DB Server = <INPUT
        "DB User ID = <INPUT
        "DB Password = <INPUT
        "DB Name = <INPUT
        , 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>"
        "DB Server =
        "DB User ID =
        "DB Password =
        "DB Name =
        , Reg.szDbServer, Reg.szDbUser,
        Reg.szDbPassword, Reg.szDbName );
    strcat( szBuffer, szTmp);

    sprintf( szTmp, "Please enter your Warehouse and District for this
session:<BR>"
            "Warehouse ID = <INPUT NAME=\"w_id\" SIZE=4><BR>"
            "District ID = <INPUT
NAME=\"d_id\" SIZE=2><BR>"
            "Submit" );
    strcat( szBuffer, szTmp);
    strcat( szBuffer, "Warehouse ID = <INPUT NAME=\"w_id\" SIZE=4><BR>"
            "District ID = <INPUT
NAME=\"d_id\" SIZE=2><BR>"
            "Submit" );
}

/* 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 CWBCLNT_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 CWBCLNT_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 CWBCLNT_ERR( ERR_D_ID_INVALID );

    iNewTerm = TermAdd();

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

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

# Appendix A - Application Source Code

```

        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 iTotals;

    EnterCriticalSection(&TermCriticalSection);

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

    LeaveCriticalSection(&TermCriticalSection);

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

char *CWEBCLNT_ERR::ErrorText()
{
    static SERRORMSG errorMsgs[] =
    {
        { ERR_COMMAND_UNDEFINED,
        "Command undefined." },
        { ERR_D_ID_INVALID,
        "Invalid District ID Must be 1 to 10." },
        { ERR_DELIVERY_CARRIER_ID_RANGE,
        "Delivery Carrier ID out of range must be 1 - 10." },
        { ERR_DELIVERY_CARRIER_INVALID,
        "Delivery
Carrier ID invalid must be numeric 1 - 10." }
    }
}

```

```

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

```

# Appendix A - Application Source Code

```

        {
            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_TOO_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,
            ""
        },
        {
            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)
        sprintf( 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

```



## Appendix A - Application Source Code

```
*
* key value to look for      char      *pKey
* character array into which to place key's value      *pValue
* 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
*
* key value to look for      char      *pKey
*
* WEBERROR      NoKeyErr      error
value to throw if key not found
```

```
*
* value to throw if value not numeric      WEBERROR      NotIntErr      error
*
* RETURNS:      integer
* ERROR:      if (the pKey value is not found) then
*              if (NoKeyErr != NO_ERR)
*                  throw CWEBCLNT_ERR(err)
*              else
*                  return 0
*              else if (non-numeric char found) then
*                  if (NotIntErr != NO_ERR) then
*                      throw CWEBCLNT_ERR(err)
*                  else
*                      return 0
*
* COMMENTS:      http keys are formatted either KEY=value& or KEY=value\0. This DLL
formats
* TPC-C input fields in such a manner that the keys
can be extracted in the
* above manner.
*/

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

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

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

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

    *pQueryString = ptr;
    return atoi(ptr0);

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

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

## Appendix A - Application Source Code

```
*
*/
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
*
*/
```

# Appendix A - Application Source Code

```
* 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=\"TERMINID\" 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=\"TERMINID\" 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=\"TERMINID\" VALUE=\"%d\">"
"<INPUT TYPE=\"hidden\" NAME=\"SYNCID\" VALUE=\"%d\">"
"<PRE><font face=\"Courier\">
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></PRE><HR>"
"<INPUT TYPE=\"submit\" NAME=\"CMD\" VALUE=\"..NewOrder..\">"

```



# Appendix A - Application Source Code

```

        {
            c += sprintf(szForm+c,
                "%Disc: %5.2f
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:
                " Supp_W Item_Id Item Name Qty
                , 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
                Total: %8.2f ",
                pNewOrderData->total_amount);
            else
                c += wsprintf(szForm+c, "Execution Status: Item number is
                Total:");

            strcpy(szForm+c,
                " <BR></font></PRE><HR>"
                "<INPUT TYPE=\"submit\" NAME=\"CMD\""
                "<INPUT TYPE=\"submit\" NAME=\"CMD\""
                "<INPUT TYPE=\"submit\" NAME=\"CMD\""
                "<INPUT TYPE=\"submit\" NAME=\"CMD\" VALUE=\"..Order-
                Status..\">"
                VALUE=\"..NewOrder..\">"
                VALUE=\"..Payment..\">"
                VALUE=\"..Delivery..\">"
        }
    }
}

```

```

Level..\">"
        "<INPUT TYPE=\"submit\" NAME=\"CMD\" VALUE=\"..Stock-
        "<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=\"TERMINID\" VALUE=\"%d\">"
        "<INPUT TYPE=\"hidden\" NAME=\"SYNCD\" VALUE=\"%d\">"
        "<PRE><font face=\"Courier\">"

        Payment<BR>"
        "Date: "
        , PAYMENT_FORM, iTermId, Term.pClientData[iTermId].iSyncId);

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

    if ( bInput )
    {
        c += wsprintf(szForm+c,
            "<BR> <BR>Warehouse: %4.4d"
            " District: <INPUT NAME=\"DID\"\"
            SIZE=1><BR> <BR> <BR> <BR> <BR>"
            "Customer: <INPUT NAME=\"CID\"\" SIZE=4>"
            "Cust-Warehouse: <INPUT NAME=\"CWI\"\" SIZE=4> "
            "Cust-District: <INPUT NAME=\"CDI\"\" SIZE=1><BR>"
            "Name: <INPUT NAME=\"CLT\"\" SIZE=16>"

            Since:<BR>"
            "
            Credit:<BR>"
            "
            Disc:<BR>"
            "
            Phone:<BR> <BR>"
            "Amount Paid: $<INPUT NAME=\"HAM\"\" SIZE=7>"

            New Cust-Balance:<BR>"
    }
}

```



# Appendix A - Application Source Code

```

" <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 += sprintf(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 += sprintf(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 = sprintf(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=\\"TERMINID\\" VALUE=\\"%d\\">"
        "<INPUT TYPE=\\"hidden\\" NAME=\\"SYCID\\" 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> <BR>"
        </font></PRE><HR>"
            "<INPUT TYPE=\\"submit\\" NAME=\\"CMD\\" VALUE=\\"Process\\">"
            "<INPUT TYPE=\\"submit\\" NAME=\\"CMD\\" VALUE=\\"Menu\\">"
            "</BODY></FORM></HTML>" );
    }
    else
    {
        sprintf( 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> <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,

```

## Appendix A - Application Source Code

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

    PDELIVERY_DATA      pDelivery;

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

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



# Appendix A - Application Source Code

```
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 CWBCLNT_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 CWBCLNT_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 CWBCLNT_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 CWBCLNT_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] )

```

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```
throw new CWBCLNT_ERR(
ERR_NEWORDER_ITEMID_WITHOUT_SUPPW );

    GetKeyValue(&ptr, szQty[i], szTmp, sizeof(szTmp),
ERR_NEWORDER_MISSING_QTY_KEY);
    if ( szTmp[0] )
        throw new CWBCLNT_ERR(
ERR_NEWORDER_QTY_WITHOUT_SUPPW );
    }
    if ( items == 0 )
        throw new CWBCLNT_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 CWBCLNT_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 CWBCLNT_ERR( ERR_PAYMENT_MISSING_CID_CLT );
        _strupr( szTmp );
    }
}
```

```
if ( strlen(pPaymentData->c_last) > LAST_NAME_LEN )
    throw new CWBCLNT_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 CWBCLNT_ERR( ERR_PAYMENT_CID_AND_CLT );
}

    GetKeyValue(&ptr, "HAM*", szTmp, sizeof(szTmp), ERR_PAYMENT_MISSING_HAM_KEY);
    if (!IsDecimal(szTmp))
        throw new CWBCLNT_ERR( ERR_PAYMENT_HAM_INVALID );
    pPaymentData->h_amount = atof(szTmp);
    if ( pPaymentData->h_amount >= 10000.00 || pPaymentData->h_amount < 0 )
        throw new CWBCLNT_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 CWBCLNT_ERR( ERR_ORDERSTATUS_MISSING_CID_CLT );
        _strupr( szTmp );
        if ( strlen(pOrderStatusData->c_last) > LAST_NAME_LEN )
            throw new CWBCLNT_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 CWBCLNT_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 CWBCLNT_ERR( ERR_ORDERSTATUS_CID_AND_CLT );
    }
}

/* FUNCTION: BOOL IsNumeric(char *ptr)
```

## Appendix A - Application Source Code

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

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

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

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

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

    if ( *ptr == 0 )
        return FALSE;

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

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

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

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

### isapi\_dll/src/resource.h

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

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

### common/src/ReadRegistry.cpp

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

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

## Appendix A - Application Source Code

```
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 ( !strcmp(szTmp, szDBNames[ODBC]) )
        pReg->eDB_Protocol = ODBC;
    else if ( !strcmp(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 ( !strcmp(szTmp, szTxnMonNames[TUXEDO]) )
        pReg->eTxnMon = TUXEDO;
    else if ( !strcmp(szTmp, szTxnMonNames[ENCINA]) )
        pReg->eTxnMon = ENCINA;
    else if ( !strcmp(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 ( !strcmp(szTmp, "YES") )
        pReg->bCOM_SinglePool = TRUE;
}

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

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

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

size = sizeof( pReg->szPath );
```

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

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

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

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

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

RegCloseKey(hKey);

return FALSE;
}
```

### common/src/ReadRegistry.h

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

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

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

//This structure defines the data necessary to keep distinct for each terminal or client connection.

```
typedef struct _TPCCREGISTRYDATA
{
    enum DBPROTOCOL eDB_Protocol;
    enum TXNMON eTxnMon;
    BOOL bCOM_SinglePool;
    DWORD dwMaxConnections;
    DWORD dwMaxPendingDeliveries;
```

# Appendix A - Application Source Code

```
    DWORD dwNumberOfDeliveryThreads;
    char szPath[128];
    char szDbServer[32];
    char szDbName[32];
    char szDbUser[32];
    char szDbPassword[32];
} TPCCREGISTRYDATA, *PTPCCREGISTRYDATA;

BOOL ReadTPCCRegistrySettings( TPCCREGISTRYDATA *pReg );
```

## common/src/error.h

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

#pragma once

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

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

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

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

#define ERR_TYPE_LOGIC          -1          //logic error in program; internal error
#define ERR_SUCCESS              0          //success (a non-error error)
#define ERR_BAD_ITEM_ID         1          //expected abort record in txnRecord
#define ERR_TYPE_DELIVERY_POST  2          //expected delivery post failed
```

```
#define ERR_TYPE_WEBDLL          3          //tpcc web generated error
#define ERR_TYPE_SQL             4          //sql server generated error
#define ERR_TYPE_DBLIB           5          //dblib generated error
#define ERR_TYPE_ODBC            6          //odbc generated error
#define ERR_TYPE_SOCKET          7          //error on communication socket client rte only
#define ERR_TYPE_DEADLOCK        8          //dblib and odbc only deadlock condition
#define ERR_TYPE_COM              9          //error from COM call
#define ERR_TYPE_TUXEDO          10         //tuxedo error
#define ERR_TYPE_OS              11         //operating system error
#define ERR_TYPE_MEMORY          12         //memory allocation error
#define ERR_TYPE_TPCC_ODBC       13         //error from tpcc odbc txn module
#define ERR_TYPE_TPCC_DBLIB      14         //error from tpcc dblib txn module
#define ERR_TYPE_DELISRV         15         //delivery server error
#define ERR_TYPE_TXNLOG          16         //txn log error
#define ERR_TYPE_BCCONN          17         //Benchcraft connection class
#define ERR_TYPE_TPCC_CONN       18         //Benchcraft connection class
#define ERR_TYPE_ENCINA          19         //Encina error
#define ERR_TYPE_COMPONENT       20         //error from COM component
#define ERR_TYPE_RTE             21         //Benchcraft rte
#define ERR_TYPE_AUTOMATION      22         //Benchcraft automation errors

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

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

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

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

## Appendix A - Application Source Code

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

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

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

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

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

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

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

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

    if (szStr)
        j = wsprintf(szTmp, "%s\n", szStr);
    if (m_szLoc)
        j += wsprintf(szTmp+j, "Location=%s\n", m_szLoc);
    if (m_szMsg)
        j += wsprintf(szTmp+j, "%s\n", m_szMsg);
}
```

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

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

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

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

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

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

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

# Appendix A - Application Source Code

```
        eRegQueryValueEx,
    };

    CSystemErr(Action eAction, LPCTSTR szLocation);

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

    int          m_errId;
    Action      m_eAction;

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

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

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

## common/src/trans.h

```
/*      FILE:          TRANS.H
 *
 *      Microsoft TPC-C Kit Ver. 4.20.000
 *      Copyright Microsoft, 1999
 *
 *      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 dblink, 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  /* SQLINTEGER */    fraction;
} TIMESTAMP_STRUCT;
#endif

// possible values for exec_status_code after transaction completes
enum EXEC_STATUS
{
    eOK, // 0 "Transaction committed."
    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;
```

# Appendix A - Application Source Code

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

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

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

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

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

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

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

    // output params
    EXEC_STATUS          exec_status_code;
    SYSTEMTIME           queue_time;
    long                 o_id[10];          // id's of
} DELIVERED_ORDERS, *PDELIVERED_ORDERS;

//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
    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
```



# Appendix A - Application Source Code

```
*
*                                     Version 4.10.000 audited by Richard Gimarc,
Performance Metrics, 3/17/99
*
*     PURPOSE:  Header file for TPC-C txn class implementation.
*
* Change history:
*     4.20.000 - updated rev number to match kit
*/

#pragma once

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

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

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

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

## db\_dblib\_dll/src/tpcc\_dblib.cpp

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

## Appendix A - Application Source Code

```

    {
        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
*              int            msgstate
*              int            severity
*              char           *msgtext
*              printable message description
*
* RETURNS:      int            INT_CONTINUE
continue if error is SLETIME else INT_CANCEL action
*
* INT_CANCEL    cancel operation
*
* COMMENTS:     This function also sets the dead lock dbproc variable if necessary.
*/

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

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

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

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

    return 0;
}

/* FUNCTION: void UtilStrCpy(char * pDest, char * pSrc, int n)
*
* PURPOSE:      This function copies n characters from string pSrc to pDst and places
a
*              null character at the end of the destination string.
*
* ARGUMENTS:    char           *pDest    destination string pointer
*              char           *pSrc     source
string pointer
*              int            n
*              number of characters to copy
*

```

```

* RETURNS:      None
*
* COMMENTS:     Unlike strncpy this function ensures that the result string is
*              always null terminated.
*
*/

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

    return;
}

/* FUNCTION: CTPCC_DBLIB_ERR::ErrorText
*
*/

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

    static SERRORMSG errorMsgs[] =
    {
        { ERR_WRONG_SP_VERSION,          "Wrong version of stored
procs on database server"},
        { ERR_INVALID_CUST,              "Invalid Customer id.name."},
        { ERR_NO_SUCH_ORDER,             "No orders found for
customer."},
        { 0,                              },
    };

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

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

    if ( !errorMsgs[i].szMsg[0] )
        return szNotFound;

    else
        return errorMsgs[i].szMsg;
}

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

CTPCC_DBLIB::CTPCC_DBLIB (

```

## Appendix A - Application Source Code

```
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 (dbprocmshandle(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 dblink 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 (dbsqlxexec(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) != SUCCEEDED)
        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 oseerrstr)
{
    delete m_DbLibErr;
    m_DbLibErr = new CDBLIBERR(CDBLIBERR::eUnknown, severity, dberr, oserr);

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

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```
        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))
```

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```
        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 *)
&_txn.StockLevel.w_id); // @w_id smallint
            dbrpcparam(m_dbproc, NULL, 0, SQLINT1, -1, -1, (BYTE *)
&_txn.StockLevel.d_id); // @d_id tinyint
            dbrpcparam(m_dbproc, NULL, 0, SQLINT2, -1, -1, (BYTE *)
&_txn.StockLevel.threshold); // @threshold 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->_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 *)
&_txn.NewOrder.w_id);
            dbrpcparam(m_dbproc, NULL, 0, SQLINT1, -1, -1, (BYTE *)
&_txn.NewOrder.d_id);
            dbrpcparam(m_dbproc, NULL, 0, SQLINT4, -1, -1, (BYTE *)
&_txn.NewOrder.c_id);
            dbrpcparam(m_dbproc, NULL, 0, SQLINT1, -1, -1, (BYTE *)
&_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.o_all_local) // at
                    break;
            }
            dbrpcparam(m_dbproc, NULL, 0, SQLINT1, -1, -1, (BYTE *)
&_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));
            }
        }
    }
}
```

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```
        if (pData=dbdata(m_dbproc, 2))
            m_txn.NewOrder.OL[i].ol_stock =
(* (DBSMALLINT *) pData);
        if (pData=dbdata(m_dbproc, 3))
            UtilStrCpy(m_txn.NewOrder.OL[i].ol_brand_generic, pData, dbdatlen(m_dbproc,
3));
        if (pData=dbdata(m_dbproc, 4))
            dbconvert(m_dbproc, SQLNUMERIC, pData,
dbdatlen(m_dbproc,4),
            SQLFLT8, (BYTE
*)&m_txn.NewOrder.OL[i].ol_i_price, 8);
        if (pData=dbdata(m_dbproc, 5))
            dbconvert(m_dbproc, SQLNUMERIC, pData,
dbdatlen(m_dbproc,5),
            SQLFLT8, (BYTE
*)&m_txn.NewOrder.OL[i].ol_amount, 8);
        m_txn.NewOrder.total_amount =
m_txn.NewOrder.total_amount + m_txn.NewOrder.OL[i].ol_amount;
        DiscardNextRows(0);
    }
    // get remaining values for w_tax, d_tax, o_id, c_last,
c_discount, c_credit, o_entry_d, commit_flag
    if (dbresults(m_dbproc) != SUCCEED)
        ThrowError(CDBLIBERR::eDbResults);
    if (dbnextrow(m_dbproc) != REG_ROW)
        ThrowError(CDBLIBERR::eDbNextRow);
    if (dbnumcols(m_dbproc) != 8)
        ThrowError(CDBLIBERR::eWrongNumCols);
    if (pData=dbdata(m_dbproc, 1))
        dbconvert(m_dbproc, SQLNUMERIC, pData,
dbdatlen(m_dbproc,1), SQLFLT8, (BYTE *)&m_txn.NewOrder.w_tax, 8);
    if (pData=dbdata(m_dbproc, 2))
        dbconvert(m_dbproc, SQLNUMERIC, pData,
dbdatlen(m_dbproc,2), SQLFLT8, (BYTE *)&m_txn.NewOrder.d_tax, 8);
    if (pData=dbdata(m_dbproc, 3))
        m_txn.NewOrder.o_id = (*(DBINT *) pData);
    if (pData=dbdata(m_dbproc, 4))
        UtilStrCpy(m_txn.NewOrder.c_last, pData,
dbdatlen(m_dbproc, 4));
    if (pData=dbdata(m_dbproc, 5))
        dbconvert(m_dbproc, SQLNUMERIC, pData,
dbdatlen(m_dbproc,5), SQLFLT8, (BYTE *)&m_txn.NewOrder.c_discount, 8);
    if (pData=dbdata(m_dbproc, 6))
        UtilStrCpy(m_txn.NewOrder.c_credit, pData,
dbdatlen(m_dbproc, 6));
    if (pData=dbdata(m_dbproc, 7))
    {
        datetime = *((DBDATETIME *) pData);
        dbdatecrack(m_dbproc, &daterec, &datetime);
        m_txn.NewOrder.o_entry_d.year = daterec.year;
        m_txn.NewOrder.o_entry_d.month = daterec.month;
```

```
        m_txn.NewOrder.o_entry_d.day = daterec.day;
        m_txn.NewOrder.o_entry_d.hour = daterec.hour;
        m_txn.NewOrder.o_entry_d.minute = daterec.minute;
        m_txn.NewOrder.o_entry_d.second = daterec.second;
    }
    if (pData=dbdata(m_dbproc, 8))
        commit_flag = (*(DBTINYINT *) pData);
    DiscardNextRows(0);
    DiscardNextResults(0);
    if (commit_flag == 1)
    {
        m_txn.NewOrder.total_amount *= ((1 +
m_txn.NewOrder.w_tax + m_txn.NewOrder.d_tax) * (1 - m_txn.NewOrder.c_discount));
        m_txn.NewOrder.exec_status_code = eOK;
    }
    else
        m_txn.NewOrder.exec_status_code = eInvalidItem;
    return;
}
catch (CSQLERR *e)
{
    if ((e->m_msgno != 1205) || (++iTryCount > iMaxRetries))
        throw;
    // hit deadlock; backoff for increasingly longer period
    delete e;
    Sleep(10 * iTryCount);
}
// while (TRUE)
}

void CTPCC_DBLIB::Payment()
{
    DBDATETIME datetime;
    DBDATEREC daterec;
    int iTryCount = 0;
    const BYTE *pData;
    ResetError();
    while (TRUE)
    {
        try
        {
            dbrpcinit(m_dbproc, "tpcc_payment", 0);
            dbrpcparam(m_dbproc, NULL, 0, SQLINT2, -1, -1, (BYTE *)
&m_txn.Payment.w_id);
            dbrpcparam(m_dbproc, NULL, 0, SQLINT2, -1, -1, (BYTE *)
&m_txn.Payment.c_w_id);
            dbrpcparam(m_dbproc, NULL, 0, SQLFLT8, -1, -1, (BYTE *)
&m_txn.Payment.h_amount);
            dbrpcparam(m_dbproc, NULL, 0, SQLINT1, -1, -1, (BYTE *)
&m_txn.Payment.d_id);
            dbrpcparam(m_dbproc, NULL, 0, SQLINT1, -1, -1, (BYTE *)
&m_txn.Payment.c_d_id);
```

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```
&m_txn.Payment.c_id);
    dbrpcparam(m_dbproc, NULL, 0, SQLINT4, -1, -1, (BYTE *)
    // 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) != SUCCEEDED)
        ThrowError(CDBLIBERR::eDbResults);

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

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

    if (pData=dbdata(m_dbproc, 1))
        m_txn.Payment.c_id = *((DBINT *) pData);
    if (pData=dbdata(m_dbproc, 2))
        UtilStrCpy(m_txn.Payment.c_last, pData,
dbdatlen(m_dbproc, 2));

    if (pData=dbdata(m_dbproc, 3))
    {
        datetime = *((DBDATETIME *) pData);
        dbdatecrack(m_dbproc, &daterec, &datetime);
        m_txn.Payment.h_date.year = daterec.year;
        m_txn.Payment.h_date.month = daterec.month;
        m_txn.Payment.h_date.day = daterec.day;
        m_txn.Payment.h_date.hour = daterec.hour;
        m_txn.Payment.h_date.minute = daterec.minute;
        m_txn.Payment.h_date.second = daterec.second;
    }
    if (pData=dbdata(m_dbproc, 4))
        UtilStrCpy(m_txn.Payment.w_street_1, pData,
dbdatlen(m_dbproc, 4));

    if (pData=dbdata(m_dbproc, 5))
        UtilStrCpy(m_txn.Payment.w_street_2, pData,
dbdatlen(m_dbproc, 5));

    if (pData=dbdata(m_dbproc, 6))
        UtilStrCpy(m_txn.Payment.w_city, pData,
dbdatlen(m_dbproc, 6));

    if (pData=dbdata(m_dbproc, 7))
        UtilStrCpy(m_txn.Payment.w_state, pData,
dbdatlen(m_dbproc, 7));

    if (pData=dbdata(m_dbproc, 8))
        UtilStrCpy(m_txn.Payment.w_zip, pData,
dbdatlen(m_dbproc, 8));

    if (pData=dbdata(m_dbproc, 9))
        UtilStrCpy(m_txn.Payment.d_street_1, pData,
dbdatlen(m_dbproc, 9));

    if (pData=dbdata(m_dbproc, 10))
        UtilStrCpy(m_txn.Payment.d_street_2, pData,
dbdatlen(m_dbproc, 10));

    if (pData=dbdata(m_dbproc, 11))
        UtilStrCpy(m_txn.Payment.d_city, pData,
dbdatlen(m_dbproc, 11));

    if (pData=dbdata(m_dbproc, 12))
        UtilStrCpy(m_txn.Payment.d_state, pData,
```

```

    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;
```

## Appendix A - Application Source Code

```
        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) != SUCCEEDED)
            {
                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

            if (pData=dbdata(m_dbproc, 2))
                m_txn.OrderStatus.OL[i].ol_i_id =

            if (pData=dbdata(m_dbproc, 3))
                m_txn.OrderStatus.OL[i].ol_quantity =

            if (pData=dbdata(m_dbproc, 4))
                dbconvert(m_dbproc, SQLNUMERIC, pData,
SQLFLT8, (BYTE

            if (pData=dbdata(m_dbproc, 5))
            {
                datetime = *((DBDATETIME *) pData);
                dbdatecrack(m_dbproc, &daterec,

                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) != SUCCEEDED)
                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))
```



## Appendix A - Application Source Code

```
        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 =
                m_txn.OrderStatus.o_entry_d.month =
                m_txn.OrderStatus.o_entry_d.day = daterec.day;
            m_txn.OrderStatus.o_entry_d.hour =
                m_txn.OrderStatus.o_entry_d.minute =
                m_txn.OrderStatus.o_entry_d.second =
                daterec.hour;
            daterec.minute;
            daterec.second;
        }
        if (pData=dbdata(m_dbproc, 6))
            m_txn.OrderStatus.o_carrier_id = *(DBSMALLINT *)
        if (pData=dbdata(m_dbproc, 7))
            dbconvert(m_dbproc, SQLNUMERIC, pData,
                SQLFLT8, (BYTE
dbdatlen(m_dbproc, 7),
*) &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)
```

## Appendix A - Application Source Code

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

### db\_dblib\_dll/src/tpcc\_dblib.h

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

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

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

class CSQLERR : public CBaseErr
{
public:

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

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

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

    int ErrorType() {return ERR_TYPE_SQL;};
    int ErrorNum() {return m_msgno;};
};
```

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

class CDBLIBERR : public CBaseErr
{
public:
    enum ACTION
    {
        eNone,
        eUnknown,
        eLogin, // error from
        eDbOpen, // error from dbopen
        eDbUse, // error from dbuse
        eDbSqlExec, // error from
        eDbSet, // error from one
        eDbNextRow, // error from
        eWrongRowCount, // more or less rows returned
        eWrongNumCols, // more or less columns
        eDbResults, // error from
        eDbRpcExec, // error from
        eDbSetMaxProcs, // error from dbsetmaxprocs
        eDbProcHandler // error from either
    };

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

        m_dberrstr = NULL;
        m_oserrstr = NULL;
    };

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

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

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

## Appendix A - Application Source Code

```
};

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

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

    int m_errno;

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

    char *ErrorText();
};

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

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

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

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

    inline PNEW_ORDER_DATA BuffAddr_NewOrder()
{ return &m_txn.NewOrder; };
    inline PPAYMENT_DATA BuffAddr_Payment()
{ return &m_txn.Payment; };
    inline PDELIVERY_DATA BuffAddr_Delivery()
{ return &m_txn.Delivery; };
};
```

```
inline PSTOCK_LEVEL_DATA BuffAddr_StockLevel() { return
&m_txn.StockLevel; };
inline PORDER_STATUS_DATA BuffAddr_OrderStatus() { return
&m_txn.OrderStatus; };

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

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

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

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

### tm\_com\_dll/src/tpcc\_com.cpp

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

// needed for CoinitializeEx
#define _WIN32_WINNT 0x0400

#include <windows.h>

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

#include "..\..\common\src\trans.h" //tpckit transaction header contains
definitions 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"
```

## Appendix A - Application Source Code

```
#include "..\..\tpcc_com_all\src\tpcc_com_all_i.c"

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

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

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

    m_bSinglePool = bSinglePool;

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

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

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

    hr = CoInitializeEx(NULL, COINIT_MULTITHREADED);
    if (FAILED(hr))
    {
        throw new CCOMERR( hr );
    }

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

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

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

        hr = CoCreateInstance(CLSID_Payment, NULL, CLSCTX_SERVER, IID_ITPCC,
        (void **) &m_pPayment);
```

```
        if (FAILED(hr))
            throw new CCOMERR(hr);

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

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

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

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

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

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

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

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

void CTPCC_COM::NewOrder()
{
    VARIANT vTxn_out;

    HRESULT hr = m_pNewOrder->NewOrder(m_vTxn, &vTxn_out);
    if (FAILED(hr))
        throw new CCOMERR( hr );

    memcpy(m_pTxn, (void *)vTxn_out.parray->pvData, vTxn_out.parray->rgsabound[0].cElements);
    SafeArrayDestroy(vTxn_out.parray);

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

# Appendix A - Application Source Code

```
}
void CTPCC_COM::Payment()
{
    VARIANT vTxn_out;

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

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

void CTPCC_COM::StockLevel()
{
    VARIANT vTxn_out;

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

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

void CTPCC_COM::OrderStatus()
{
    VARIANT vTxn_out;

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

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

## tm\_com\_dll/src/tpcc\_com.h

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

```
* 4.20.000 - first version
*/
#pragma once
#include <stdio.h>
#include "..\..\tpcc_com_ps\src\tpcc_com_ps.h"

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

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

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

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

    int m_hr;
    int m_iErrorType;
    int m_iError;

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

    int ErrorNum() {return m_hr;}

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

## Appendix A - Application Source Code

```
};
}
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:
    VARIANT m_vTxn;
    CTPCC_COM(BOOL bSinglePool);
    ~CTPCC_COM(void);

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

    void NewOrder ();
    void Payment ();
    void StockLevel ();
    void OrderStatus ();
    void Delivery () { throw new CCOMERR(E_NOTIMPL); }

// not supported
};

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

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

### tpcc\_com\_all/src/methods.h

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

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

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

    CCOMPONENT_ERR(COMPONENT_ERROR Err, char
*szTextDetail, DWORD dwSystemErr)
    {
        m_Error = Err;
        m_szTextDetail = new
char[strlen(szTextDetail)+1];
```

## Appendix A - Application Source Code

```
        strcpy( m_szTextDetail, szTextDetail );
        m_SystemErr = dwSystemErr;
        m_szErrorText = NULL;
    };

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

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

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

};

static void WriteMessageToEventLog(LPTSTR lpszMsg);

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

    CTPCC_Common();
    ~CTPCC_Common();

// ITPCC
```

```
public:
    HRESULT __stdcall NewOrder(          VARIANT txn_in,
    VARIANT* txn_out);
    HRESULT __stdcall Payment(          VARIANT txn_in,
    VARIANT* txn_out);
    HRESULT __stdcall Delivery(          VARIANT txn_in,
    VARIANT* txn_out) {return E_NOTIMPL;};
    HRESULT __stdcall StockLevel(        VARIANT txn_in, VARIANT*
    txn_out);
    HRESULT __stdcall OrderStatus(       VARIANT txn_in,
    VARIANT* txn_out);

    HRESULT __stdcall CallSetComplete();

// IObjectControl
    STDMETHODCALLTYPE CanBePooled() { return m_bCanBePooled;
}
    STDMETHODCALLTYPE Activate() { return S_OK; } // we don't
support COM Services transactions (no enlistment)
    STDMETHODCALLTYPE Deactivate() { /* nothing to do */ }

// IObjectConstruct
    STDMETHODCALLTYPE 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;
    };

};

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

## Appendix A - Application Source Code

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

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

};

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

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

// ITPCC
public:
// HRESULT __stdcall NewOrder(          VARIANT txn_in,
VARIANT* txn_out) {return E_NOTIMPL;}
    HRESULT __stdcall Payment(          VARIANT txn_in,
VARIANT* txn_out) {return E_NOTIMPL;}
    HRESULT __stdcall StockLevel( VARIANT txn_in, VARIANT*
txn_out) {return E_NOTIMPL;}
    HRESULT __stdcall OrderStatus(      VARIANT txn_in,
VARIANT* txn_out) {return E_NOTIMPL;}
};

////////////////////////////////////
////////////////////////////////////
// COrderStatus
```

```
class COrderStatus :
    public CTPCC_Common,
    public CComCoClass<COrderStatus, &CLSID_OrderStatus>
{
public:
DECLARE_REGISTRY_RESOURCEID(IDR_ORDERSTATUS)

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

// ITPCC
public:
    HRESULT __stdcall NewOrder(          VARIANT txn_in,
VARIANT* txn_out) {return E_NOTIMPL;}
    HRESULT __stdcall Payment(          VARIANT txn_in,
VARIANT* txn_out) {return E_NOTIMPL;}
    HRESULT __stdcall StockLevel( VARIANT txn_in, VARIANT*
txn_out) {return E_NOTIMPL;}
// HRESULT __stdcall OrderStatus(      VARIANT txn_in,
VARIANT* txn_out) {return E_NOTIMPL;}
};

////////////////////////////////////
////////////////////////////////////
// CPayment
class CPayment :
    public CTPCC_Common,
    public CComCoClass<CPayment, &CLSID_Payment>
{
public:
DECLARE_REGISTRY_RESOURCEID(IDR_PAYMENT)

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

// ITPCC
public:
    HRESULT __stdcall NewOrder(          VARIANT txn_in,
VARIANT* txn_out) {return E_NOTIMPL;}
// HRESULT __stdcall Payment(          VARIANT txn_in,
VARIANT* txn_out) {return E_NOTIMPL;}
};
```



## Appendix A - Application Source Code

```
        HRESULT __stdcall StockLevel( VARIANT txn_in, VARIANT*
txn_out) {return E_NOTIMPL;}
        HRESULT __stdcall OrderStatus(          VARIANT txn_in,
VARIANT* txn_out) {return E_NOTIMPL;}
};

////////////////////////////////////
////////
// CStockLevel
class CStockLevel :
    public CTPCC_Common,
    public CComCoClass<CStockLevel, &CLSID_StockLevel>
{
public:
DECLARE_REGISTRY_RESOURCEID(IDR_STOCKLEVEL)

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

// ITPCC
public:
        HRESULT __stdcall NewOrder(          VARIANT txn_in,
VARIANT* txn_out) {return E_NOTIMPL;}
        HRESULT __stdcall Payment(          VARIANT txn_in,
VARIANT* txn_out) {return E_NOTIMPL;}
//        HRESULT __stdcall StockLevel( VARIANT txn_in, VARIANT*
txn_out) {return E_NOTIMPL;}
        HRESULT __stdcall OrderStatus(          VARIANT txn_in,
VARIANT* txn_out) {return E_NOTIMPL;}
};
```

### tpcc\_com\_all/src/resource.h

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

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

### tpcc\_com\_all/src/tpcc\_com\_all.cpp

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

#define STRICT
#define _WIN32_WINNT 0x0400
#define _ATL_APARTMENT_THREADED

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

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

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

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

# Appendix A - Application Source Code

```
#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);
}
```

```
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);
}
```

# Appendix A - Application Source Code

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

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

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

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

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

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

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

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

        (VOID) DeregisterEventSource(hEventSource);
    }
}

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

/* FUNCTION: CCOMPONENT_ERR::ErrorText
 *
 */

char* CCOMPONENT_ERR::ErrorText(void)
```

```
{
    static SERRORMSG errorMsgs[] =
    {
        { ERR_MISSING_REGISTRY_ENTRIES, "Required entries missing
from registry." },
        { ERR_LOADDLL_FAILED, "Load of DLL
failed. DLL=" },
        { ERR_GETPROCADDR_FAILED, "Could not map proc in DLL.
GetProcAddr error. DLL=" },
        { ERR_UNKNOWN_DB_PROTOCOL, "Unknown database protocol
specified in registry." },
        { 0, "" }
    };

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

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

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

CTPCC_Common::CTPCC_Common()
{
    m_pTxn = NULL;
    m_bCanBePooled = TRUE;
}

CTPCC_Common::~CTPCC_Common()
{
    if (m_pTxn)
        delete m_pTxn;
}

HRESULT CTPCC_Common::CallSetComplete()
{
    IObjectContext* pObjectContext = NULL;

    // get our object context
```

## Appendix A - Application Source Code

```

);
HRESULT hr = CoGetObjectContext( IID_IObjectContext, (void **)&pObjectContext
);
pObjectContext->SetComplete();
ReleaseInterface(pObjectContext);
return hr;
}
//
// called by the ctor activator
//
STDMETHODIMP CTPCC_Common::Construct(IDispatch * pUnk)
{
    // Code to access construction string, if needed later...
    // if (!pUnk)
    //     return E_UNEXPECTED;
    // IObjectConstructString * pString = NULL;
    // HRESULT hr = pUnk->QueryInterface(IID_IObjectConstructString, (void
**)&pString);
    // pString->Release();

    try
    {
        if (Reg.eDB_Protocol == ODBC)
            m_pTxn = pCTPCC_ODBC_new( Reg.szDbServer, Reg.szDbUser,
Reg.szDbPassword, szMyComputerName, Reg.szDbName );
        else if (Reg.eDB_Protocol == DBLIB)
            m_pTxn = pCTPCC_DBLIB_new( Reg.szDbServer, Reg.szDbUser,
Reg.szDbPassword, szMyComputerName, Reg.szDbName );
    }
    catch (CBaseErr *e)
    {
        WriteMessageToEventLog(e->ErrorText());
        delete e;
        return E_FAIL;
    }
    catch (...)
    {
        WriteMessageToEventLog(TEXT("Unhandled exception in object
::Construct"));
        return E_FAIL;
    }

    return S_OK;
}

HRESULT CTPCC_Common::NewOrder(VARIANT txn_in, VARIANT* txn_out)
{
    PNEW_ORDER_DATA    pNewOrder;
    COM_DATA            *pData;
    try
    {
        pData = (COM_DATA*)txn_in.parray->pvData;
        pNewOrder = m_pTxn->BuffAddr_NewOrder();

        memcpy(pNewOrder, &pData->u.NewOrder, sizeof(NEW_ORDER_DATA));

        m_pTxn->NewOrder();          // do the actual txn

        VariantInit(txn_out);
        txn_out->vt = VT_SAFEARRAY;
        txn_out->parray = SafeArrayCreateVector(VT_UI1,
txn_in.parray-
>rgsabound->cElements,

```

```

txn_in.parray-
>rgsabound->cElements);
        pData = (COM_DATA*) txn_out->parray->pvData;

        memcpy( &pData->u.NewOrder, pNewOrder, sizeof(NEW_ORDER_DATA));

        pData->retval = ERR_SUCCESS;
        pData->error = 0;
        return S_OK;
    }
    catch (CBaseErr *e)
    {
        // check for lost database connection; if yes, component is toast
        if ( ((e->ErrorType() == ERR_TYPE_DBLIB) && (e->ErrorNum() == 10005))
||
        ((e->ErrorType() == ERR_TYPE_ODBC) && (e->ErrorNum() ==
10054)) )
            m_bCanBePooled = FALSE;

        pData->retval = e->ErrorType();
        pData->error = e->ErrorNum();
        delete e;
        return E_FAIL;
    }
    catch (...)
    {
        WriteMessageToEventLog(TEXT("Unhandled exception."));
        pData->retval = ERR_TYPE_LOGIC;
        pData->error = 0;
        m_bCanBePooled = FALSE;
        return E_FAIL;
    }
}

HRESULT CTPCC_Common::Payment(VARIANT txn_in, VARIANT* txn_out)
{
    PPAYMENT_DATA      pPayment;
    COM_DATA            *pData;
    try
    {
        pData = (COM_DATA*)txn_in.parray->pvData;
        pPayment = m_pTxn->BuffAddr_Payment();

        memcpy(pPayment, &pData->u.Payment, sizeof(PAYMENT_DATA));

        m_pTxn->Payment();          // do the actual txn

        VariantInit(txn_out);
        txn_out->vt = VT_SAFEARRAY;
        txn_out->parray = SafeArrayCreateVector( VT_UI1,
txn_in.parray-
>rgsabound->cElements,
txn_in.parray-
>rgsabound->cElements);
        pData = (COM_DATA*) txn_out->parray->pvData;

        memcpy( &pData->u.Payment, pPayment, sizeof(PAYMENT_DATA));

        pData->retval = ERR_SUCCESS;
        pData->error = 0;
        return S_OK;
    }
    catch (CBaseErr *e)

```

# Appendix A - Application Source Code

```
{
    // check for lost database connection; if yes, component is toast
    if ( ((e->ErrorType() == ERR_TYPE_DBLIB) && (e->ErrorNum() == 10005))
||
10054)) )
        ((e->ErrorType() == ERR_TYPE_ODBC) && (e->ErrorNum() ==
            m_bCanBePooled = FALSE;

        pData->retval = e->ErrorType();
        pData->error = e->ErrorNum();
        delete e;
        return E_FAIL;
    }
    catch (...)
    {
        WriteMessageToEventLog(TEXT("Unhandled exception."));
        pData->retval = ERR_TYPE_LOGIC;
        pData->error = 0;
        m_bCanBePooled = FALSE;
        return E_FAIL;
    }
}

HRESULT CTPCC_Common::StockLevel(VARIANT txn_in, VARIANT* txn_out)
{
    PSTOCK_LEVEL_DATA  pStockLevel;
    COM_DATA            *pData;

    try
    {
        pData = (COM_DATA*)txn_in.parray->pvData;
        pStockLevel = m_pTxn->BuffAddr_StockLevel();

        memcpy(pStockLevel, &pData->u.StockLevel, sizeof(STOCK_LEVEL_DATA));
        m_pTxn->StockLevel();

        VariantInit(txn_out);
        txn_out->vt = VT_SAFEARRAY;
        txn_out->parray = SafeArrayCreateVector( VT_UI1,
            txn_in.parray-
>rgsabound->cElements,
            txn_in.parray-
>rgsabound->cElements);
        pData = (COM_DATA*)txn_out->parray->pvData;

        memcpy( &pData->u.StockLevel, pStockLevel, sizeof(STOCK_LEVEL_DATA));

        pData->retval = ERR_SUCCESS;
        pData->error = 0;
        return S_OK;
    }
    catch (CBaseErr *e)
    {
        // check for lost database connection; if yes, component is toast
        if ( ((e->ErrorType() == ERR_TYPE_DBLIB) && (e->ErrorNum() == 10005))
||
10054)) )
            ((e->ErrorType() == ERR_TYPE_ODBC) && (e->ErrorNum() ==
                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;
    }
}
```

```
        delete e;
        return E_FAIL;
    }
    catch (...)
    {
        WriteMessageToEventLog(TEXT("Unhandled exception."));
        pData->retval = ERR_TYPE_LOGIC;
        pData->error = 0;
        m_bCanBePooled = FALSE;
        return E_FAIL;
    }
}

HRESULT CTPCC_Common::OrderStatus(VARIANT txn_in, VARIANT* txn_out)
{
    PORDER_STATUS_DATA  pOrderStatus;
    COM_DATA            *pData;
    try
    {
        pData = (COM_DATA*)txn_in.parray->pvData;
        pOrderStatus = m_pTxn->BuffAddr_OrderStatus();

        memcpy(pOrderStatus, &pData->u.OrderStatus,
            sizeof(ORDER_STATUS_DATA));

        m_pTxn->OrderStatus();

        VariantInit(txn_out);
        txn_out->vt = VT_SAFEARRAY;
        txn_out->parray = SafeArrayCreateVector( VT_UI1,
            txn_in.parray-
>rgsabound->cElements,
            txn_in.parray-
>rgsabound->cElements);
        pData = (COM_DATA*)txn_out->parray->pvData;

        memcpy( &pData->u.OrderStatus, pOrderStatus,
            sizeof(ORDER_STATUS_DATA));

        pData->retval = ERR_SUCCESS;
        pData->error = 0;
        return S_OK;
    }
    catch (CBaseErr *e)
    {
        // check for lost database connection; if yes, component is toast
        if ( ((e->ErrorType() == ERR_TYPE_DBLIB) && (e->ErrorNum() == 10005))
||
10054)) )
            ((e->ErrorType() == ERR_TYPE_ODBC) && (e->ErrorNum() ==
                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;
    }
}
```

# Appendix A - Application Source Code

```
        return E_FAIL;
    }
}
```

## tpcc\_com\_all/src/tpcc\_com\_all.def

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

LIBRARY      "tpcc_com_all.dll"

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

## tpcc\_com\_all/src/tpcc\_com\_all.h

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

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

/* File created by MIDL compiler version 5.03.0280 */
/* at Sat Apr 08 16:40:18 2000
*/
/* Compiler settings for .\src\tpcc_com_all.idl:
   Oicf (OptLev=12), Wl, 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__
```

```
#ifndef __cplusplus
typedef Class TPCC TPCC;
#else
typedef struct TPCC TPCC;
#endif /* __cplusplus */

#endif /* __TPCC_FWD_DEFINED__ */

#ifndef __NewOrder_FWD_DEFINED__
#define __NewOrder_FWD_DEFINED__

#ifdef __cplusplus
typedef Class NewOrder NewOrder;
#else
typedef struct NewOrder NewOrder;
#endif /* __cplusplus */

#endif /* __NewOrder_FWD_DEFINED__ */

#ifndef __OrderStatus_FWD_DEFINED__
#define __OrderStatus_FWD_DEFINED__

#ifdef __cplusplus
typedef Class OrderStatus OrderStatus;
#else
typedef struct OrderStatus OrderStatus;
#endif /* __cplusplus */

#endif /* __OrderStatus_FWD_DEFINED__ */

#ifndef __Payment_FWD_DEFINED__
#define __Payment_FWD_DEFINED__

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

#endif /* __Payment_FWD_DEFINED__ */

#ifndef __StockLevel_FWD_DEFINED__
#define __StockLevel_FWD_DEFINED__

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

#endif /* __StockLevel_FWD_DEFINED__ */

/* header files for imported files */
#include "oaidl.h"
#include "ocidl.h"
#include "tpcc_com_ps.h"

#ifdef __cplusplus
```

# Appendix A - Application Source Code

```
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;

#ifdef __TPCCLib_LIBRARY_DEFINED__
#define __TPCCLib_LIBRARY_DEFINED__

/* library TPCCLib */
/* [helpstring][version][uuid] */

EXTERN_C const IID LIBID_TPCCLib;

EXTERN_C const CLSID CLSID_TPCC;

#ifdef __cplusplus

class DECLSPEC_UUID("122A3128-2520-11D3-BA71-00C04FBFE08B")
TPCC;
#endif

EXTERN_C const CLSID CLSID_NewOrder;

#ifdef __cplusplus

class DECLSPEC_UUID("975BAABF-84A7-11D2-BA47-00C04FBFE08B")
NewOrder;
#endif

EXTERN_C const CLSID CLSID_OrderStatus;

#ifdef __cplusplus

class DECLSPEC_UUID("266836AD-A50D-11D2-BA4E-00C04FBFE08B")
OrderStatus;
#endif

EXTERN_C const CLSID CLSID_Payment;

#ifdef __cplusplus

class DECLSPEC_UUID("CD02F7EF-A4FA-11D2-BA4E-00C04FBFE08B")
Payment;
#endif

EXTERN_C const CLSID CLSID_StockLevel;
```

```
#ifdef __cplusplus

class DECLSPEC_UUID("2668369E-A50D-11D2-BA4E-00C04FBFE08B")
StockLevel;
#endif
#endif /* __TPCCLib_LIBRARY_DEFINED__ */

/* Additional Prototypes for ALL interfaces */

/* end of Additional Prototypes */

#ifdef __cplusplus
}
#endif

#endif
```

## tpcc\_com\_all/src/tpcc\_com\_all.idl

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

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

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

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

    [
        uuid(122A3128-2520-11D3-BA71-00C04FBFE08B),
```

# Appendix A - Application Source Code

```
        helpstring("All Txns Class")
    }
    coclass TPCC
    {
        [default] interface ITPCC;
    };

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

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

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

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

## tpcc\_com\_all/src/tpcc\_com\_all.rc

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

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

```
//
#include "winres.h"

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

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

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

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

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

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

3 TEXTINCLUDE DISCARDABLE
BEGIN
    "1 TYPELIB \"tpcc_com_all.tlb\"\r\n"
    "\0"
END

#endif // APSTUDIO_INVOKED

#ifdef _MAC
////////////////////////////////////
//
// Version
//

VS_VERSION_INFO VERSIONINFO
FILEVERSION 1,0,0,1
PRODUCTVERSION 1,0,0,1
FILEFLAGS 0x3fL
#ifdef _DEBUG
FILEFLAGS 0x1L
#else
FILEFLAGS 0x0L
#endif
BEGIN
    BLOCK "StringFileInfo"
    BEGIN
        BLOCK "040904B0"
```



# Appendix A - Application Source Code

```
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
BLOCK "VarFileInfo"
BEGIN
  VALUE "Translation", 0x409, 1200
END
#endif // !_MAC

////////////////////////////////////
//
// REGISTRY
//
IDR_TPCC           REGISTRY DISCARDABLE "tpcc_com_all.rgs"
IDR_NEWORDER      REGISTRY DISCARDABLE "tpcc_com_no.rgs"
IDR_ORDERSTATUS   REGISTRY DISCARDABLE "tpcc_com_os.rgs"
IDR_PAYMENT       REGISTRY DISCARDABLE "tpcc_com_pay.rgs"
IDR_STOCKLEVEL    REGISTRY DISCARDABLE "tpcc_com_sl.rgs"

////////////////////////////////////
//
// String Table
//
STRINGTABLE DISCARDABLE
BEGIN
  IDS_PROJNAME      "tpcc_com_all"
END

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

#ifndef APSTUDIO_INVOKED
////////////////////////////////////
//
// Generated from the TEXTINCLUDE 3 resource.
//
1 TYPELIB "tpcc_com_all.tlb"
////////////////////////////////////
#endif // not APSTUDIO_INVOKED
```

## tpcc\_com\_all/src/tpcc\_com\_all.rgs

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

## tpcc\_com\_all/src/tpcc\_com\_all\_i.c

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

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

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

/* File created by MIDL compiler version 5.03.0280 */
/* at Sat Apr 08 16:40:18 2000 */
*/
/* Compiler settings for .\src\tpcc_com_all.idl:
  Oicf (OptLev=i2), Wl, 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( )

#ifdef _M_IA64 && !defined(_M_AXP64)

#ifdef __cplusplus
extern "C"{
#endif
```

# Appendix A - Application Source Code

```
#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_TPCCLib,0x122A3128,0x2520,0x11D3,0xBA,0x71,0x00,0xC0,0x4F,0xBF,0xE0,0x8B);

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

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

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

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

#undef MIDL_DEFINE_GUID

#ifdef __cplusplus
}
#endif

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

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

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

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

/* File created by MIDL compiler version 5.03.0280 */
/* at Sat Apr 08 16:40:18 2000 */
/*
 * Compiler settings for .\src\tpcc_com_all.idl:
 * Oicf (OptLev=i2), Wl, Zp8, env=Win64 (32b run,appending), ms_ext, c_ext, robust
 * error checks: allocation ref bounds_check enum stub_data
 * VC __declspec() decoration level:
 *      __declspec(uuid()), __declspec(selectany), __declspec(novtable)
 *      DECLSPEC_UUID(), MIDL_INTERFACE()
 */
//@@MIDL_FILE_HEADING( )

#if defined(_M_IA64) || defined(_M_AXP64)

#ifdef __cplusplus
extern "C"{
#endif

#include <rpc.h>
#include <rpcndr.h>

#ifdef _MIDL_USE_GUIDDEF_

#ifndef INITGUID
#define INITGUID
#include <guiddef.h>
#undef INITGUID
#else
#include <guiddef.h>
#endif

#define MIDL_DEFINE_GUID(type,name,l,w1,w2,b1,b2,b3,b4,b5,b6,b7,b8) \
    DEFINE_GUID(name,l,w1,w2,b1,b2,b3,b4,b5,b6,b7,b8)

#else // !_MIDL_USE_GUIDDEF_

#ifndef __IID_DEFINED__
#define __IID_DEFINED__

typedef struct _IID
{
```

# Appendix A - Application Source Code

```
    unsigned long x;
    unsigned short s1;
    unsigned short s2;
    unsigned char c[8];
} IID;

#endif // __IID_DEFINED__

#ifndef CLSID_DEFINED
#define CLSID_DEFINED
typedef IID CLSID;
#endif // CLSID_DEFINED

#define MIDL_DEFINE_GUID(type,name,l,w1,w2,b1,b2,b3,b4,b5,b6,b7,b8) \
    const type name = {l,w1,w2,{b1,b2,b3,b4,b5,b6,b7,b8}}

#endif !_MIDL_USE_GUIDDEF_

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

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

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

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

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

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

#undef MIDL_DEFINE_GUID

#ifdef __cplusplus
}
#endif

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

tpcc\_com\_all/src/tpcc\_com\_no.rgs

HKCR

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

tpcc\_com\_all/src/tpcc\_com\_os.rgs

HKCR

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

tpcc\_com\_all/src/tpcc\_com\_pay.rgs

HKCR

```
{
    TPCC.Payment.1 = s 'Payment Class'
```

# Appendix A - Application Source Code

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

## tpcc\_com\_all/src/tpcc\_com\_ps.h

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

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

/* File created by MIDL compiler version 5.03.0280 */
/* at Sat Apr 08 16:40:10 2000 */
*/
/* Compiler settings for .\src\tpcc_com_ps.idl:
Oicf (OptLev=i2), Wl, 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*/
#ifdef __REQUIRED_RPCNDR_H_VERSION__
#define __REQUIRED_RPCNDR_H_VERSION__ 440
#endif

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

#ifdef __RPCNDR_H_VERSION__
#error this stub requires an updated version of <rpcndr.h>
#endif // __RPCNDR_H_VERSION__

#ifdef COM_NO_WINDOWS_H
#include "windows.h"

```

```
#include "ole2.h"
#endif /*COM_NO_WINDOWS_H*/

#ifdef __tpcc_com_ps_h__
#define __tpcc_com_ps_h__

/* Forward Declarations */

#ifdef __ITPCC_FWD_DEFINED__
#define __ITPCC_FWD_DEFINED__
typedef interface ITPCC ITPCC;
#endif /* __ITPCC_FWD_DEFINED__ */

/* header files for imported files */
#include "oaidl.h"
#include "ocidl.h"

#ifdef __cplusplus
extern "C"{
#endif

void __RPC_FAR * __RPC_USER MIDL_user_allocate(size_t);
void __RPC_USER MIDL_user_free( void __RPC_FAR * );

/* interface __MIDL_itf_tpcc_com_ps_0000 */
/* [local] */

extern RPC_IF_HANDLE __MIDL_itf_tpcc_com_ps_0000_v0_0_c_ifspec;
extern RPC_IF_HANDLE __MIDL_itf_tpcc_com_ps_0000_v0_0_s_ifspec;

#ifdef __ITPCC_INTERFACE_DEFINED__
#define __ITPCC_INTERFACE_DEFINED__

/* interface ITPCC */
/* [unique][helpstring][uuid][oleautomation][object] */

EXTERN_C const IID IID_ITPCC;

#ifdef __cplusplus && !defined(CINTERFACE)

MIDL_INTERFACE("FEEE6AA2-84B1-11d2-BA47-00C04FBFE08B")
ITPCC : public IUnknown
{
public:
    virtual HRESULT __stdcall NewOrder(
        /* [in] */ VARIANT txn_in,
        /* [out] */ VARIANT __RPC_FAR *txn_out) = 0;

    virtual HRESULT __stdcall Payment(
        /* [in] */ VARIANT txn_in,
        /* [out] */ VARIANT __RPC_FAR *txn_out) = 0;

    virtual HRESULT __stdcall Delivery(
        /* [in] */ VARIANT txn_in,
        /* [out] */ VARIANT __RPC_FAR *txn_out) = 0;

    virtual HRESULT __stdcall StockLevel(
        /* [in] */ VARIANT txn_in,

```

# Appendix A - Application Source Code

```
/* [out] */ VARIANT __RPC_FAR *txn_out) = 0;

virtual HRESULT __stdcall OrderStatus(
/* [in] */ VARIANT txn_in,
/* [out] */ VARIANT __RPC_FAR *txn_out) = 0;

virtual HRESULT __stdcall CallSetComplete( void) = 0;
};

#else /* C style interface */

typedef struct ITPCCVtbl
{
    BEGIN_INTERFACE

    HRESULT ( STDMETHODCALLTYPE __RPC_FAR *QueryInterface )(
        ITPCC __RPC_FAR * This,
        /* [in] */ REFIID riid,
        /* [iid_is][out] */ void __RPC_FAR * __RPC_FAR *ppvObject);

    ULONG ( STDMETHODCALLTYPE __RPC_FAR *AddRef )(
        ITPCC __RPC_FAR * This);

    ULONG ( STDMETHODCALLTYPE __RPC_FAR *Release )(
        ITPCC __RPC_FAR * This);

    HRESULT ( STDMETHODCALLTYPE __RPC_FAR *NewOrder )(
        ITPCC __RPC_FAR * This,
        /* [in] */ VARIANT txn_in,
        /* [out] */ VARIANT __RPC_FAR *txn_out);

    HRESULT ( STDMETHODCALLTYPE __RPC_FAR *Payment )(
        ITPCC __RPC_FAR * This,
        /* [in] */ VARIANT txn_in,
        /* [out] */ VARIANT __RPC_FAR *txn_out);

    HRESULT ( STDMETHODCALLTYPE __RPC_FAR *Delivery )(
        ITPCC __RPC_FAR * This,
        /* [in] */ VARIANT txn_in,
        /* [out] */ VARIANT __RPC_FAR *txn_out);

    HRESULT ( STDMETHODCALLTYPE __RPC_FAR *StockLevel )(
        ITPCC __RPC_FAR * This,
        /* [in] */ VARIANT txn_in,
        /* [out] */ VARIANT __RPC_FAR *txn_out);

    HRESULT ( STDMETHODCALLTYPE __RPC_FAR *OrderStatus )(
        ITPCC __RPC_FAR * This,
        /* [in] */ VARIANT txn_in,
        /* [out] */ VARIANT __RPC_FAR *txn_out);

    HRESULT ( STDMETHODCALLTYPE __RPC_FAR *CallSetComplete )(
        ITPCC __RPC_FAR * This);

    END_INTERFACE
} ITPCCVtbl;

interface ITPCC
{
    CONST_VTBL struct ITPCCVtbl __RPC_FAR *lpVtbl;
};
```

```
#ifdef COBJMACROS

#define ITPCC_QueryInterface(This,riid,ppvObject) \
    (This)->lpVtbl -> QueryInterface(This,riid,ppvObject)

#define ITPCC_AddRef(This) \
    (This)->lpVtbl -> AddRef(This)

#define ITPCC_Release(This) \
    (This)->lpVtbl -> Release(This)

#define ITPCC_NewOrder(This,txn_in,txn_out) \
    (This)->lpVtbl -> NewOrder(This,txn_in,txn_out)

#define ITPCC_Payment(This,txn_in,txn_out) \
    (This)->lpVtbl -> Payment(This,txn_in,txn_out)

#define ITPCC_Delivery(This,txn_in,txn_out) \
    (This)->lpVtbl -> Delivery(This,txn_in,txn_out)

#define ITPCC_StockLevel(This,txn_in,txn_out) \
    (This)->lpVtbl -> StockLevel(This,txn_in,txn_out)

#define ITPCC_OrderStatus(This,txn_in,txn_out) \
    (This)->lpVtbl -> OrderStatus(This,txn_in,txn_out)

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

#endif /* COBJMACROS */

#endif /* C style interface */

HRESULT __stdcall ITPCC_NewOrder_Proxy(
    ITPCC __RPC_FAR * This,
    /* [in] */ VARIANT txn_in,
    /* [out] */ VARIANT __RPC_FAR *txn_out);

void __RPC_STUB ITPCC_NewOrder_Stub(
    IRpcStubBuffer *This,
    IRpcChannelBuffer *pRpcChannelBuffer,
    PRPC_MESSAGE pRpcMessage,
    DWORD *_pdwStubPhase);

HRESULT __stdcall ITPCC_Payment_Proxy(
    ITPCC __RPC_FAR * This,
    /* [in] */ VARIANT txn_in,
    /* [out] */ VARIANT __RPC_FAR *txn_out);

void __RPC_STUB ITPCC_Payment_Stub(
    IRpcStubBuffer *This,
    IRpcChannelBuffer *pRpcChannelBuffer,
    PRPC_MESSAGE pRpcMessage,
```

# Appendix A - Application Source Code

```
DWORD *_pdwStubPhase);

HRESULT __stdcall ITPCC_Delivery_Proxy(
    ITPCC __RPC_FAR * This,
    /* [in] */ VARIANT txn_in,
    /* [out] */ VARIANT __RPC_FAR *txn_out);

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

HRESULT __stdcall ITPCC_StockLevel_Proxy(
    ITPCC __RPC_FAR * This,
    /* [in] */ VARIANT txn_in,
    /* [out] */ VARIANT __RPC_FAR *txn_out);

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

HRESULT __stdcall ITPCC_OrderStatus_Proxy(
    ITPCC __RPC_FAR * This,
    /* [in] */ VARIANT txn_in,
    /* [out] */ VARIANT __RPC_FAR *txn_out);

void __RPC_STUB ITPCC_OrderStatus_Stub(
    IRpcStubBuffer *This,
    IRpcChannelBuffer *pRpcChannelBuffer,
    PRPC_MESSAGE _pRpcMessage,
    DWORD *_pdwStubPhase);

HRESULT __stdcall ITPCC_CallSetComplete_Proxy(
    ITPCC __RPC_FAR * This);

void __RPC_STUB ITPCC_CallSetComplete_Stub(
    IRpcStubBuffer *This,
    IRpcChannelBuffer *pRpcChannelBuffer,
    PRPC_MESSAGE _pRpcMessage,
    DWORD *_pdwStubPhase);

#endif /* __ITPCC_INTERFACE_DEFINED__ */

/* Additional Prototypes for ALL interfaces */

unsigned long __RPC_USER VARIANT_UserSize( unsigned long __RPC_FAR *,
unsigned long , VARIANT __RPC_FAR * );
unsigned char __RPC_FAR * __RPC_USER VARIANT_UserMarshal( unsigned long __RPC_FAR *,
unsigned char __RPC_FAR *, VARIANT __RPC_FAR * );
```

```
unsigned char __RPC_FAR * __RPC_USER VARIANT_UserUnmarshal(unsigned long __RPC_FAR *,
unsigned char __RPC_FAR *, VARIANT __RPC_FAR * );
void __RPC_USER VARIANT_UserFree( unsigned long __RPC_FAR *,
VARIANT __RPC_FAR * );

/* end of Additional Prototypes */

#ifdef __cplusplus
}
#endif
#endif
```

## tpcc\_com\_all/src/tpcc\_com\_sl.rgs

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

## tpcc\_com\_ps/src/dlldata.c

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

DO NOT ALTER THIS FILE

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

To completely reconstruct this file, delete it and rerun MIDL
on all the IDL files in this DLL, specifying this file for the
```

# Appendix A - Application Source Code

```

    /dlldata command line option
*****
#include <rpcproxy.h>

#ifdef __cplusplus
extern "C" {
#endif

EXTERN_PROXY_FILE( tpcc_com_ps )

PROXYFILE_LIST_START
/* Start of list */
REFERENCE_PROXY_FILE( tpcc_com_ps ),
/* End of list */
PROXYFILE_LIST_END

DLLDATA_ROUTINES( aProxyFileList, GET_DLL_CLSID )

#ifdef __cplusplus
} /*extern "C" */
#endif

/* end of generated dlldata file */
```

## tpcc\_com\_ps/src/tpcc\_com\_ps.def

```

LIBRARY      "tpcc_com_ps"

DESCRIPTION  'Proxy/Stub DLL'

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

## tpcc\_com\_ps/src/tpcc\_com\_ps.h

```

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

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

/* File created by MIDL compiler version 5.03.0280 */
/* at Sat Apr 08 16:40:10 2000
*/
```

```

/* Compiler settings for .\src\tpcc_com_ps.idl:
Oicf (OptLev=i2), Wl, 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*/
#ifdef __REQUIRED_RPCNDR_H_VERSION__
#define __REQUIRED_RPCNDR_H_VERSION__ 440
#endif

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

#ifdef __RPCNDR_H_VERSION__
#error this stub requires an updated version of <rpcndr.h>
#endif // __RPCNDR_H_VERSION__

#ifdef COM_NO_WINDOWS_H
#include "windows.h"
#include "ole2.h"
#endif /*COM_NO_WINDOWS_H*/

#ifdef __tpcc_com_ps_h__
#define __tpcc_com_ps_h__

/* Forward Declarations */

#ifdef __ITPCC_FWD_DEFINED__
#define __ITPCC_FWD_DEFINED__
typedef interface ITPCC ITPCC;
#endif /* __ITPCC_FWD_DEFINED__ */

/* header files for imported files */
#include "oaidl.h"
#include "ocidl.h"

#ifdef __cplusplus
extern "C"{
#endif

void __RPC_FAR * __RPC_USER MIDL_user_allocate(size_t);
void __RPC_USER MIDL_user_free( void __RPC_FAR * );

/* interface __MIDL_itf_tpcc_com_ps_0000 */
/* [local] */

extern RPC_IF_HANDLE __MIDL_itf_tpcc_com_ps_0000_v0_0_c_ifspec;
extern RPC_IF_HANDLE __MIDL_itf_tpcc_com_ps_0000_v0_0_s_ifspec;

#ifdef __ITPCC_INTERFACE_DEFINED__
#define __ITPCC_INTERFACE_DEFINED__

/* interface ITPCC */
/* [unique][helpstring][uuid][oleautomation][object] */
```

# Appendix A - Application Source Code

```
EXTERN_C const IID IID_ITPCC;

#if defined(__cplusplus) && !defined(CINTERFACE)

MIDL_INTERFACE("FEEE6AA2-84B1-11d2-BA47-00C04FBFE08B")
ITPCC : public IUnknown
{
public:
    virtual HRESULT __stdcall NewOrder(
        /* [in] */ VARIANT txn_in,
        /* [out] */ VARIANT __RPC_FAR *txn_out) = 0;

    virtual HRESULT __stdcall Payment(
        /* [in] */ VARIANT txn_in,
        /* [out] */ VARIANT __RPC_FAR *txn_out) = 0;

    virtual HRESULT __stdcall Delivery(
        /* [in] */ VARIANT txn_in,
        /* [out] */ VARIANT __RPC_FAR *txn_out) = 0;

    virtual HRESULT __stdcall StockLevel(
        /* [in] */ VARIANT txn_in,
        /* [out] */ VARIANT __RPC_FAR *txn_out) = 0;

    virtual HRESULT __stdcall OrderStatus(
        /* [in] */ VARIANT txn_in,
        /* [out] */ VARIANT __RPC_FAR *txn_out) = 0;

    virtual HRESULT __stdcall CallSetComplete( void) = 0;
};

#else /* C style interface */

typedef struct ITPCCVtbl
{
    BEGIN_INTERFACE

    HRESULT ( STDMETHODCALLTYPE __RPC_FAR *QueryInterface )(
        ITPCC __RPC_FAR * This,
        /* [in] */ REFIID riid,
        /* [iid_is][out] */ void __RPC_FAR * __RPC_FAR *ppvObject);

    ULONG ( STDMETHODCALLTYPE __RPC_FAR *AddRef )(
        ITPCC __RPC_FAR * This);

    ULONG ( STDMETHODCALLTYPE __RPC_FAR *Release )(
        ITPCC __RPC_FAR * This);

    HRESULT ( STDMETHODCALLTYPE __RPC_FAR *NewOrder )(
        ITPCC __RPC_FAR * This,
        /* [in] */ VARIANT txn_in,
        /* [out] */ VARIANT __RPC_FAR *txn_out);

    HRESULT ( STDMETHODCALLTYPE __RPC_FAR *Payment )(
        ITPCC __RPC_FAR * This,
        /* [in] */ VARIANT txn_in,
        /* [out] */ VARIANT __RPC_FAR *txn_out);

    HRESULT ( STDMETHODCALLTYPE __RPC_FAR *Delivery )(
        ITPCC __RPC_FAR * This,
```

```
        /* [in] */ VARIANT txn_in,
        /* [out] */ VARIANT __RPC_FAR *txn_out);

    HRESULT ( STDMETHODCALLTYPE __RPC_FAR *StockLevel )(
        ITPCC __RPC_FAR * This,
        /* [in] */ VARIANT txn_in,
        /* [out] */ VARIANT __RPC_FAR *txn_out);

    HRESULT ( STDMETHODCALLTYPE __RPC_FAR *OrderStatus )(
        ITPCC __RPC_FAR * This,
        /* [in] */ VARIANT txn_in,
        /* [out] */ VARIANT __RPC_FAR *txn_out);

    HRESULT ( STDMETHODCALLTYPE __RPC_FAR *CallSetComplete )(
        ITPCC __RPC_FAR * This);

    END_INTERFACE
} ITPCCVtbl;

interface ITPCC
{
    CONST_VTBL struct ITPCCVtbl __RPC_FAR *lpVtbl;
};

#ifdef COBJMACROS

#define ITPCC_QueryInterface(This,riid,ppvObject) \
    (This)->lpVtbl -> QueryInterface(This,riid,ppvObject)

#define ITPCC_AddRef(This) \
    (This)->lpVtbl -> AddRef(This)

#define ITPCC_Release(This) \
    (This)->lpVtbl -> Release(This)

#define ITPCC_NewOrder(This,txn_in,txn_out) \
    (This)->lpVtbl -> NewOrder(This,txn_in,txn_out)

#define ITPCC_Payment(This,txn_in,txn_out) \
    (This)->lpVtbl -> Payment(This,txn_in,txn_out)

#define ITPCC_Delivery(This,txn_in,txn_out) \
    (This)->lpVtbl -> Delivery(This,txn_in,txn_out)

#define ITPCC_StockLevel(This,txn_in,txn_out) \
    (This)->lpVtbl -> StockLevel(This,txn_in,txn_out)

#define ITPCC_OrderStatus(This,txn_in,txn_out) \
    (This)->lpVtbl -> OrderStatus(This,txn_in,txn_out)

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

#endif /* COBJMACROS */

#endif /* C style interface */
```



# Appendix A - Application Source Code

```
HRESULT __stdcall ITPCC_NewOrder_Proxy(
    ITPCC __RPC_FAR * This,
    /* [in] */ VARIANT txn_in,
    /* [out] */ VARIANT __RPC_FAR *txn_out);

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

HRESULT __stdcall ITPCC_Payment_Proxy(
    ITPCC __RPC_FAR * This,
    /* [in] */ VARIANT txn_in,
    /* [out] */ VARIANT __RPC_FAR *txn_out);

void __RPC_STUB ITPCC_Payment_Stub(
    IRpcStubBuffer *This,
    IRpcChannelBuffer * pRpcChannelBuffer,
    PRPC_MESSAGE _pRpcMessage,
    DWORD *_pdwStubPhase);

HRESULT __stdcall ITPCC_Delivery_Proxy(
    ITPCC __RPC_FAR * This,
    /* [in] */ VARIANT txn_in,
    /* [out] */ VARIANT __RPC_FAR *txn_out);

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

HRESULT __stdcall ITPCC_StockLevel_Proxy(
    ITPCC __RPC_FAR * This,
    /* [in] */ VARIANT txn_in,
    /* [out] */ VARIANT __RPC_FAR *txn_out);

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

HRESULT __stdcall ITPCC_OrderStatus_Proxy(
    ITPCC __RPC_FAR * This,
    /* [in] */ VARIANT txn_in,
    /* [out] */ VARIANT __RPC_FAR *txn_out);

void __RPC_STUB ITPCC_OrderStatus_Stub(
    IRpcStubBuffer *This,
    IRpcChannelBuffer * pRpcChannelBuffer,
    PRPC_MESSAGE _pRpcMessage,
```

```
DWORD *_pdwStubPhase);

HRESULT __stdcall ITPCC_CallSetComplete_Proxy(
    ITPCC __RPC_FAR * This);

void __RPC_STUB ITPCC_CallSetComplete_Stub(
    IRpcStubBuffer *This,
    IRpcChannelBuffer * pRpcChannelBuffer,
    PRPC_MESSAGE _pRpcMessage,
    DWORD *_pdwStubPhase);

#endif /* __ITPCC_INTERFACE_DEFINED__ */

/* Additional Prototypes for ALL interfaces */

unsigned long __RPC_USER VARIANT_UserSize( unsigned long __RPC_FAR *,
    unsigned long, VARIANT __RPC_FAR * );
unsigned char __RPC_FAR * __RPC_USER VARIANT_UserMarshal( unsigned long __RPC_FAR *,
    unsigned char __RPC_FAR *, VARIANT __RPC_FAR * );
unsigned char __RPC_FAR * __RPC_USER VARIANT_UserUnmarshal( unsigned long __RPC_FAR *,
    unsigned char __RPC_FAR *, VARIANT __RPC_FAR * );
void __RPC_USER VARIANT_UserFree( unsigned long __RPC_FAR *,
    VARIANT __RPC_FAR * );

/* end of Additional Prototypes */

#ifdef __cplusplus
}
#endif

#endif
```

## tpcc\_com\_ps/src/tpcc\_com\_ps.idl

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

## Appendix A - Application Source Code

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

[
    object,
    oleautomation,
    uuid(FEEE6AA2-84B1-11d2-BA47-00C04FBFE08B),
    helpstring("ITPCC Interface"),
    pointer_default(unique)
]
interface ITPCC : IUnknown
{
    HRESULT STDMETHODCALLTYPE NewOrder
        (
            [in] VARIANT txn_in,
            [out] VARIANT *txn_out
        );

    HRESULT STDMETHODCALLTYPE Payment
        (
            [in] VARIANT txn_in,
            [out] VARIANT *txn_out
        );

    HRESULT STDMETHODCALLTYPE Delivery
        (
            [in] VARIANT txn_in,
            [out] VARIANT *txn_out
        );

    HRESULT STDMETHODCALLTYPE StockLevel
        (
            [in] VARIANT txn_in,
            [out] VARIANT *txn_out
        );

    HRESULT STDMETHODCALLTYPE OrderStatus
        (
            [in] VARIANT txn_in,
            [out] VARIANT *txn_out
        );
}
```

```
HRESULT STDMETHODCALLTYPE CallSetComplete
    (
    );

}; // interface ITPCC
```

### tpcc\_com\_ps/src/tpcc\_com\_ps\_i.c

```
#pragma warning( disable: 4049 ) /* more than 64k source lines */
/* this ALWAYS GENERATED file contains the IIDs and CLSIDs */
/* link this file in with the server and any clients */

/* File created by MIDL compiler version 5.03.0280 */
/* at Sat Apr 08 16:40:10 2000 */
/*
 * Compiler settings for .\src\tpcc_com_ps.idl:
 * Oicf (OptLev=i2), Wl, 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_
```

# Appendix A - Application Source Code

```
#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,0xFEE6AA2,0x84B1,0x11d2,0xBA,0x47,0x00,0xC0,0x4F,0xBF,0xE0,0x8B);

#undef MIDL_DEFINE_GUID

#ifdef __cplusplus
}
#endif

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

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

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

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

/* File created by MIDL compiler version 5.03.0280 */
/* at Sat Apr 08 16:40:10 2000 */
/*
/* Compiler settings for .\src\tpcc_com_ps.idl:
    Oicf (OptLev=i2), Wl, Zp8, env=Win64 (32b run,appending), ms_ext, c_ext, robust
    error checks: allocation ref bounds_check enum stub_data
    VC __declspec() decoration level:
        __declspec(uuid()), __declspec(selectany), __declspec(novtable)
        DECLSPEC_UUID(), MIDL_INTERFACE()
*/
//@@MIDL_FILE_HEADING( )

#ifdef defined(_M_IA64) || defined(_M_AXP64)

#ifdef __cplusplus
extern "C"{
#endif
#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,0xFEE6AA2,0x84B1,0x11d2,0xBA,0x47,0x00,0xC0,0x4F,0xBF,0xE0,0x8B);

#undef MIDL_DEFINE_GUID

#ifdef __cplusplus
}
#endif

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

tpcc\_com\_ps/src/tpcc\_com\_ps\_p.c

# Appendix A - Application Source Code

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

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

/* File created by MIDL compiler version 5.03.0280 */
/* at Sat Apr 08 16:40:10 2000
*/
/* Compiler settings for .\src\tpcc_com ps.idl:
Oicf (OptLev=i2), Wl, Zp8, env=Win32 (32b run), ms_ext, c_ext
error checks: allocation ref bounds_check enum stub_data
VC __declspec() decoration level:
__declspec(uuid()), __declspec(selectany), __declspec(novtable)
DECLSPEC_UUID(), MIDL_INTERFACE()
*/
//@@MIDL_FILE_HEADING( )

#if !defined(_M_IA64) && !defined(_M_AXP64)
#define USE_STUBLESS_PROXY

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

#include "rpcproxy.h"
#ifdef __RPCPROXY_H_VERSION__
#error this stub requires an updated version of <rpcproxy.h>
#endif // __RPCPROXY_H_VERSION__

#include "tpcc_com_ps.h"

#define TYPE_FORMAT_STRING_SIZE 997
#define PROC_FORMAT_STRING_SIZE 193
#define TRANSMIT_AS_TABLE_SIZE 0
#define WIRE_MARSHAL_TABLE_SIZE 1

typedef struct _MIDL_TYPE_FORMAT_STRING
{
    short Pad;
    unsigned char Format[ TYPE_FORMAT_STRING_SIZE ];
} MIDL_TYPE_FORMAT_STRING;

typedef struct _MIDL_PROC_FORMAT_STRING
{
    short Pad;
    unsigned char Format[ PROC_FORMAT_STRING_SIZE ];
} MIDL_PROC_FORMAT_STRING;

extern const MIDL_TYPE_FORMAT_STRING __MIDL_TypeFormatString;
extern const MIDL_PROC_FORMAT_STRING __MIDL_ProcFormatString;

/* Standard interface: __MIDL_itf_tpcc_com_ps_0000, ver. 0.0,
GUID={0x00000000,0x0000,0x0000,{0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00}} */
```

```
/* Object interface: IUnknown, ver. 0.0,
GUID={0x00000000,0x0000,0x0000,{0xC0,0x00,0x00,0x00,0x00,0x00,0x00,0x46}} */

/* Object interface: ITPCC, ver. 0.0,
GUID={0xFEE6AA2,0x84B1,0x11d2,{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 =
{
```

## Appendix A - Application Source Code

```
&IID_ITPCC,
&ITPCC_ServerInfo,
9,
0, /* pure interpreted */
CStdStubBuffer_METHODS
};

extern const USER_MARSHAL_ROUTINE_QUADRUPLE UserMarshalRoutines[ WIRE_MARSHAL_TABLE_SIZE
];

static const MIDL_STUB_DESC Object_StubDesc =
{
0,
NdrOleAllocate,
NdrOleFree,
0,
0,
0,
0,
0,
0,
0,
_MIDL_TypeFormatString.Format,
1, /* -error bounds_check flag */
0x20000, /* Ndr library version */
0,
0x5030118, /* MIDL Version 5.3.280 */
0,
UserMarshalRoutines,
0, /* notify & notify_flag routine table */
0x1, /* MIDL flag */
0, /* Reserved3 */
0, /* Reserved4 */
0 /* Reserved5 */
};

#pragma data_seg(".rdata")

static const USER_MARSHAL_ROUTINE_QUADRUPLE UserMarshalRoutines[ WIRE_MARSHAL_TABLE_SIZE
] =
{
{
{
VARIANT_UserSize
,VARIANT_UserMarshal
,VARIANT_UserUnmarshal
,VARIANT_UserFree
}
}
};

#if !defined(_RPC_WIN32_)
#error Invalid build platform for this stub.
#endif

#if !(TARGET_IS_NT40_OR_LATER)
#error You need a Windows NT 4.0 or later to run this stub because it uses these
features:
#error -Oif or -Oicf, [wire_marshall] or [user_marshall] attribute.
#error However, your C/C++ compilation flags indicate you intend to run this app on
earlier systems.
#error This app will die there with the RPC_X_WRONG_STUB_VERSION error.
#endif
```

```
static const MIDL_PROC_FORMAT_STRING __MIDL_ProcFormatString =
{
0,
{
/* Procedure NewOrder */

0x33, /* FC_AUTO_HANDLE */
0x6c, /* Old Flags: object, Oi2 */

/* 2 */ NdrFcLong( 0x0 ), /* 0 */
/* 6 */ NdrFcShort( 0x3 ), /* 3 */
#ifdef _ALPHA_
#ifdef _PPC_
#if !defined(_MIPS_)
/* 8 */ NdrFcShort( 0x1c ), /* x86 Stack size/offset = 28 */
#else
NdrFcShort( 0x20 ), /* MIPS Stack size/offset = 32 */
#endif
#endif
NdrFcShort( 0x20 ), /* PPC Stack size/offset = 32 */
#endif
NdrFcShort( 0x28 ), /* Alpha Stack size/offset = 40 */
#endif
/* 10 */ NdrFcShort( 0x0 ), /* 0 */
/* 12 */ NdrFcShort( 0x8 ), /* 8 */
/* 14 */ 0x7, /* Oi2 Flags: srv must size, clt must size, has return, */
/* 3 */

/* Parameter txn_in */

/* 16 */ NdrFcShort( 0x8b ), /* Flags: must size, must free, in, by val, */
#ifdef _ALPHA_
#ifdef _PPC_
#if !defined(_MIPS_)
/* 18 */ NdrFcShort( 0x4 ), /* x86 Stack size/offset = 4 */
#else
NdrFcShort( 0x8 ), /* MIPS Stack size/offset = 8 */
#endif
#endif
NdrFcShort( 0x8 ), /* PPC Stack size/offset = 8 */
#endif
NdrFcShort( 0x8 ), /* Alpha Stack size/offset = 8 */
#endif
/* 20 */ NdrFcShort( 0x3c8 ), /* Type Offset=968 */

/* Parameter txn_out */

/* 22 */ NdrFcShort( 0x4113 ), /* Flags: must size, must free, out, simple ref,
srv alloc size=16 */
#ifdef _ALPHA_
#ifdef _PPC_
#if !defined(_MIPS_)
/* 24 */ NdrFcShort( 0x14 ), /* x86 Stack size/offset = 20 */
#else
NdrFcShort( 0x18 ), /* MIPS Stack size/offset = 24 */
#endif
#endif
NdrFcShort( 0x18 ), /* PPC Stack size/offset = 24 */
#endif
NdrFcShort( 0x18 ), /* Alpha Stack size/offset = 24 */
#endif
}
}
```

# Appendix A - Application Source Code

```

                                NdrFcShort( 0x18 ), /* Alpha Stack size/offset = 24 */
#endif
/* 26 */ NdrFcShort( 0x3da ), /* Type Offset=986 */

/* Return value */

/* 28 */ NdrFcShort( 0x70 ), /* Flags: out, return, base type, */
#ifndef _ALPHA_
#ifndef _PPC_
#if !defined( _MIPS_ )
/* 30 */ NdrFcShort( 0x18 ), /* x86 Stack size/offset = 24 */
#else
                                NdrFcShort( 0x1c ), /* MIPS Stack size/offset = 28 */
#endif
#else
                                NdrFcShort( 0x1c ), /* PPC Stack size/offset = 28 */
#endif
#else
                                NdrFcShort( 0x20 ), /* Alpha Stack size/offset = 32 */
#endif
/* 32 */ 0x8, /* FC_LONG */
0x0, /* 0 */

/* Procedure Payment */

/* 34 */ 0x33, /* FC_AUTO_HANDLE */
0x6c, /* Old Flags: object, Oi2 */
/* 36 */ NdrFcLong( 0x0 ), /* 0 */
/* 40 */ NdrFcShort( 0x4 ), /* 4 */
#ifndef _ALPHA_
#ifndef _PPC_
#if !defined( _MIPS_ )
/* 42 */ NdrFcShort( 0x1c ), /* x86 Stack size/offset = 28 */
#else
                                NdrFcShort( 0x20 ), /* MIPS Stack size/offset = 32 */
#endif
#else
                                NdrFcShort( 0x20 ), /* PPC Stack size/offset = 32 */
#endif
#else
                                NdrFcShort( 0x28 ), /* Alpha Stack size/offset = 40 */
#endif
/* 44 */ NdrFcShort( 0x0 ), /* 0 */
/* 46 */ NdrFcShort( 0x8 ), /* 8 */
/* 48 */ 0x7, /* Oi2 Flags: srv must size, clt must size, has return, */
0x3, /* 3 */

/* Parameter txn_in */

/* 50 */ NdrFcShort( 0x8b ), /* Flags: must size, must free, in, by val, */
#ifndef _ALPHA_
#ifndef _PPC_
#if !defined( _MIPS_ )
/* 52 */ NdrFcShort( 0x4 ), /* x86 Stack size/offset = 4 */
#else
                                NdrFcShort( 0x8 ), /* MIPS Stack size/offset = 8 */
#endif
#else
                                NdrFcShort( 0x8 ), /* PPC Stack size/offset = 8 */
#endif
#else
                                NdrFcShort( 0x8 ), /* Alpha Stack size/offset = 8 */
#endif
#endif
```

```

/* 54 */ NdrFcShort( 0x3c8 ), /* Type Offset=968 */

/* Parameter txn_out */

/* 56 */ NdrFcShort( 0x4113 ), /* Flags: must size, must free, out, simple ref,
srv alloc size=16 */
#ifndef _ALPHA_
#ifndef _PPC_
#if !defined( _MIPS_ )
/* 58 */ NdrFcShort( 0x14 ), /* x86 Stack size/offset = 20 */
#else
                                NdrFcShort( 0x18 ), /* MIPS Stack size/offset = 24 */
#endif
#else
                                NdrFcShort( 0x18 ), /* PPC Stack size/offset = 24 */
#endif
#else
                                NdrFcShort( 0x18 ), /* Alpha Stack size/offset = 24 */
#endif
/* 60 */ NdrFcShort( 0x3da ), /* Type Offset=986 */

/* Return value */

/* 62 */ NdrFcShort( 0x70 ), /* Flags: out, return, base type, */
#ifndef _ALPHA_
#ifndef _PPC_
#if !defined( _MIPS_ )
/* 64 */ NdrFcShort( 0x18 ), /* x86 Stack size/offset = 24 */
#else
                                NdrFcShort( 0x1c ), /* MIPS Stack size/offset = 28 */
#endif
#else
                                NdrFcShort( 0x1c ), /* PPC Stack size/offset = 28 */
#endif
#else
                                NdrFcShort( 0x20 ), /* Alpha Stack size/offset = 32 */
#endif
/* 66 */ 0x8, /* FC_LONG */
0x0, /* 0 */

/* Procedure Delivery */

/* 68 */ 0x33, /* FC_AUTO_HANDLE */
0x6c, /* Old Flags: object, Oi2 */
/* 70 */ NdrFcLong( 0x0 ), /* 0 */
/* 74 */ NdrFcShort( 0x5 ), /* 5 */
#ifndef _ALPHA_
#ifndef _PPC_
#if !defined( _MIPS_ )
/* 76 */ NdrFcShort( 0x1c ), /* x86 Stack size/offset = 28 */
#else
                                NdrFcShort( 0x20 ), /* MIPS Stack size/offset = 32 */
#endif
#else
                                NdrFcShort( 0x20 ), /* PPC Stack size/offset = 32 */
#endif
#else
                                NdrFcShort( 0x28 ), /* Alpha Stack size/offset = 40 */
#endif
/* 78 */ NdrFcShort( 0x0 ), /* 0 */
/* 80 */ NdrFcShort( 0x8 ), /* 8 */
/* 82 */ 0x7, /* Oi2 Flags: srv must size, clt must size, has return, */
0x3, /* 3 */
```

# Appendix A - Application Source Code

```
/* Parameter txn_in */

/* 84 */ NdrFcShort( 0x8b ), /* Flags: must size, must free, in, by val, */
#ifdef _ALPHA_
#ifdef _PPC_
#if !defined( _MIPS_ )
/* 86 */ NdrFcShort( 0x4 ), /* x86 Stack size/offset = 4 */
#else
NdrFcShort( 0x8 ), /* MIPS Stack size/offset = 8 */
#endif
#else
NdrFcShort( 0x8 ), /* PPC Stack size/offset = 8 */
#endif
#else
NdrFcShort( 0x8 ), /* Alpha Stack size/offset = 8 */
#endif
/* 88 */ NdrFcShort( 0x3c8 ), /* Type Offset=968 */

/* Parameter txn_out */

/* 90 */ NdrFcShort( 0x4113 ), /* Flags: must size, must free, out, simple ref,
srv alloc size=16 */
#ifdef _ALPHA_
#ifdef _PPC_
#if !defined( _MIPS_ )
/* 92 */ NdrFcShort( 0x14 ), /* x86 Stack size/offset = 20 */
#else
NdrFcShort( 0x18 ), /* MIPS Stack size/offset = 24 */
#endif
#else
NdrFcShort( 0x18 ), /* PPC Stack size/offset = 24 */
#endif
#else
NdrFcShort( 0x18 ), /* Alpha Stack size/offset = 24 */
#endif
/* 94 */ NdrFcShort( 0x3da ), /* Type Offset=986 */

/* Return value */

/* 96 */ NdrFcShort( 0x70 ), /* Flags: out, return, base type, */
#ifdef _ALPHA_
#ifdef _PPC_
#if !defined( _MIPS_ )
/* 98 */ NdrFcShort( 0x18 ), /* x86 Stack size/offset = 24 */
#else
NdrFcShort( 0x1c ), /* MIPS Stack size/offset = 28 */
#endif
#else
NdrFcShort( 0x1c ), /* PPC Stack size/offset = 28 */
#endif
#else
NdrFcShort( 0x20 ), /* Alpha Stack size/offset = 32 */
#endif
/* 100 */ 0x8, /* FC_LONG */
0x0, /* 0 */

/* Procedure StockLevel */

/* 102 */ 0x33, /* FC_AUTO_HANDLE */
0x6c, /* Old Flags: object, Oi2 */
/* 104 */ NdrFcLong( 0x0 ), /* 0 */
/* 108 */ NdrFcShort( 0x6 ), /* 6 */
```

```
#ifndef _ALPHA_
#ifdef _PPC_
#if !defined( _MIPS_ )
/* 110 */ NdrFcShort( 0x1c ), /* x86 Stack size/offset = 28 */
#else
NdrFcShort( 0x20 ), /* MIPS Stack size/offset = 32 */
#endif
#endif
#else
NdrFcShort( 0x20 ), /* PPC Stack size/offset = 32 */
#endif
#endif
NdrFcShort( 0x28 ), /* Alpha Stack size/offset = 40 */
#endif
/* 112 */ NdrFcShort( 0x0 ), /* 0 */
/* 114 */ NdrFcShort( 0x8 ), /* 8 */
/* 116 */ 0x7, /* Oi2 Flags: srv must size, clt must size, has return, */
0x3, /* 3 */

/* Parameter txn_in */

/* 118 */ NdrFcShort( 0x8b ), /* Flags: must size, must free, in, by val, */
#ifdef _ALPHA_
#ifdef _PPC_
#if !defined( _MIPS_ )
/* 120 */ NdrFcShort( 0x4 ), /* x86 Stack size/offset = 4 */
#else
NdrFcShort( 0x8 ), /* MIPS Stack size/offset = 8 */
#endif
#else
NdrFcShort( 0x8 ), /* PPC Stack size/offset = 8 */
#endif
#else
NdrFcShort( 0x8 ), /* Alpha Stack size/offset = 8 */
#endif
/* 122 */ NdrFcShort( 0x3c8 ), /* Type Offset=968 */

/* Parameter txn_out */

/* 124 */ NdrFcShort( 0x4113 ), /* Flags: must size, must free, out, simple ref,
srv alloc size=16 */
#ifdef _ALPHA_
#ifdef _PPC_
#if !defined( _MIPS_ )
/* 126 */ NdrFcShort( 0x14 ), /* x86 Stack size/offset = 20 */
#else
NdrFcShort( 0x18 ), /* MIPS Stack size/offset = 24 */
#endif
#else
NdrFcShort( 0x18 ), /* PPC Stack size/offset = 24 */
#endif
#else
NdrFcShort( 0x18 ), /* Alpha Stack size/offset = 24 */
#endif
/* 128 */ NdrFcShort( 0x3da ), /* Type Offset=986 */

/* Return value */

/* 130 */ NdrFcShort( 0x70 ), /* Flags: out, return, base type, */
#ifdef _ALPHA_
#ifdef _PPC_
#if !defined( _MIPS_ )
/* 132 */ NdrFcShort( 0x18 ), /* x86 Stack size/offset = 24 */
#else
```

# Appendix A - Application Source Code

```

                                NdrFcShort( 0x1c ), /* MIPS Stack size/offset = 28 */
#endif
#else
                                NdrFcShort( 0x1c ), /* PPC Stack size/offset = 28 */
#endif
#else
                                NdrFcShort( 0x20 ), /* Alpha Stack size/offset = 32 */
#endif
/* 134 */ /* 0x8,          /* FC_LONG */
                                0x0,          /* 0 */

                                /* Procedure OrderStatus */

/* 136 */ /* 0x33,          /* FC_AUTO_HANDLE */
                                0x6c,          /* Old Flags: object, Oi2 */
/* 138 */ /* NdrFcLong( 0x0 ), /* 0 */
/* 142 */ /* NdrFcShort( 0x7 ), /* 7 */
#ifdef _ALPHA_
#ifdef _PPC_
#if !defined( MIPS_ )
/* 144 */ /* NdrFcShort( 0x1c ), /* x86 Stack size/offset = 28 */
#else
                                NdrFcShort( 0x20 ), /* MIPS Stack size/offset = 32 */
#endif
#else
                                NdrFcShort( 0x20 ), /* PPC Stack size/offset = 32 */
#endif
#else
                                NdrFcShort( 0x28 ), /* Alpha Stack size/offset = 40 */
#endif
/* 146 */ /* NdrFcShort( 0x0 ), /* 0 */
/* 148 */ /* NdrFcShort( 0x8 ), /* 8 */
/* 150 */ /* 0x7,          /* Oi2 Flags: srv must size, clt must size, has return, */
                                0x3,          /* 3 */

                                /* Parameter txn_in */

/* 152 */ /* NdrFcShort( 0x8b ), /* Flags: must size, must free, in, by val, */
#ifdef _ALPHA_
#ifdef _PPC_
#if !defined( MIPS_ )
/* 154 */ /* NdrFcShort( 0x4 ), /* x86 Stack size/offset = 4 */
#else
                                NdrFcShort( 0x8 ), /* MIPS Stack size/offset = 8 */
#endif
#else
                                NdrFcShort( 0x8 ), /* PPC Stack size/offset = 8 */
#endif
#else
                                NdrFcShort( 0x8 ), /* Alpha Stack size/offset = 8 */
#endif
/* 156 */ /* NdrFcShort( 0x3c8 ), /* Type Offset=968 */

                                /* Parameter txn_out */

/* 158 */ /* NdrFcShort( 0x4113 ), /* Flags: must size, must free, out, simple ref,
srv alloc size=16 */
#ifdef _ALPHA_
#ifdef _PPC_
#if !defined( MIPS_ )
/* 160 */ /* NdrFcShort( 0x14 ), /* x86 Stack size/offset = 20 */
#else
                                NdrFcShort( 0x18 ), /* MIPS Stack size/offset = 24 */

```

```

#endif
#else
                                NdrFcShort( 0x18 ), /* PPC Stack size/offset = 24 */
#endif
#else
                                NdrFcShort( 0x18 ), /* Alpha Stack size/offset = 24 */
#endif
/* 162 */ /* NdrFcShort( 0x3da ), /* Type Offset=986 */

                                /* Return value */

/* 164 */ /* NdrFcShort( 0x70 ), /* Flags: out, return, base type, */
#ifdef _ALPHA_
#ifdef _PPC_
#if !defined( MIPS_ )
/* 166 */ /* NdrFcShort( 0x18 ), /* x86 Stack size/offset = 24 */
#else
                                NdrFcShort( 0x1c ), /* MIPS Stack size/offset = 28 */
#endif
#else
                                NdrFcShort( 0x1c ), /* PPC Stack size/offset = 28 */
#endif
#else
                                NdrFcShort( 0x20 ), /* Alpha Stack size/offset = 32 */
#endif
/* 168 */ /* 0x8,          /* FC_LONG */
                                0x0,          /* 0 */

                                /* Procedure CallSetComplete */

/* 170 */ /* 0x33,          /* FC_AUTO_HANDLE */
                                0x6c,          /* Old Flags: object, Oi2 */
/* 172 */ /* NdrFcLong( 0x0 ), /* 0 */
/* 176 */ /* NdrFcShort( 0x8 ), /* 8 */
#ifdef _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, */
#ifdef _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,
    {

```



# Appendix A - Application Source Code

```
/* 2 */
/* 4 */ NdrFcShort( 0x3b0 ), /* FC_UP */
/* 6 */
/* 8 */ 0x7, /* FC_NON_ENCAPSULATED_UNION */
/* 10 */ NdrFcShort( 0xffff8 ), /* -8 */
/* 12 */ NdrFcShort( 0x2 ), /* Offset= 2 (14) */
/* 14 */ NdrFcShort( 0x10 ), /* 16 */
/* 16 */ NdrFcShort( 0x2b ), /* 43 */
/* 18 */ NdrFcLong( 0x3 ), /* 3 */
/* 22 */ NdrFcShort( 0x8008 ), /* Simple arm type: FC_LONG */
/* 24 */ NdrFcLong( 0x11 ), /* 17 */
/* 28 */ NdrFcShort( 0x8001 ), /* Simple arm type: FC_BYTE */
/* 30 */ NdrFcLong( 0x2 ), /* 2 */
/* 34 */ NdrFcShort( 0x8006 ), /* Simple arm type: FC_SHORT */
/* 36 */ NdrFcLong( 0x4 ), /* 4 */
/* 40 */ NdrFcShort( 0x800a ), /* Simple arm type: FC_FLOAT */
/* 42 */ NdrFcLong( 0x5 ), /* 5 */
/* 46 */ NdrFcShort( 0x800c ), /* Simple arm type: FC_DOUBLE */
/* 48 */ NdrFcLong( 0xb ), /* 11 */
/* 52 */ NdrFcShort( 0x8006 ), /* Simple arm type: FC_SHORT */
/* 54 */ NdrFcLong( 0xa ), /* 10 */
/* 58 */ NdrFcShort( 0x8008 ), /* Simple arm type: FC_LONG */
/* 60 */ NdrFcLong( 0x6 ), /* 6 */
/* 64 */ NdrFcShort( 0xd6 ), /* Offset= 214 (278) */
/* 66 */ NdrFcLong( 0x7 ), /* 7 */
/* 70 */ NdrFcShort( 0x800c ), /* Simple arm type: FC_DOUBLE */
/* 72 */ NdrFcLong( 0x8 ), /* 8 */
/* 76 */ NdrFcShort( 0xd0 ), /* Offset= 208 (284) */
/* 78 */ NdrFcLong( 0xd ), /* 13 */
/* 82 */ NdrFcShort( 0xe2 ), /* Offset= 226 (308) */
/* 84 */ NdrFcLong( 0x9 ), /* 9 */
/* 88 */ NdrFcShort( 0xee ), /* Offset= 238 (326) */
/* 90 */ NdrFcLong( 0x2000 ), /* 8192 */
/* 94 */ NdrFcShort( 0xfa ), /* Offset= 250 (344) */
/* 96 */ NdrFcLong( 0x24 ), /* 36 */
/* 100 */ NdrFcShort( 0x308 ), /* Offset= 776 (876) */
/* 102 */ NdrFcLong( 0x4024 ), /* 16420 */
/* 106 */ NdrFcShort( 0x302 ), /* Offset= 770 (876) */
/* 108 */ NdrFcLong( 0x4011 ), /* 16401 */
/* 112 */ NdrFcShort( 0x300 ), /* Offset= 768 (880) */
/* 114 */ NdrFcLong( 0x4002 ), /* 16386 */
/* 118 */ NdrFcShort( 0x2fe ), /* Offset= 766 (884) */
/* 120 */ NdrFcLong( 0x4003 ), /* 16387 */
/* 124 */ NdrFcShort( 0x2fc ), /* Offset= 764 (888) */
/* 126 */ NdrFcLong( 0x4004 ), /* 16388 */
/* 130 */ NdrFcShort( 0x2fa ), /* Offset= 762 (892) */
/* 132 */ NdrFcLong( 0x4005 ), /* 16389 */
/* 136 */ NdrFcShort( 0x2f8 ), /* Offset= 760 (896) */
/* 138 */ NdrFcLong( 0x400b ), /* 16395 */
/* 142 */ NdrFcShort( 0x2e6 ), /* Offset= 742 (884) */
/* 144 */ NdrFcLong( 0x400a ), /* 16394 */
/* 148 */ NdrFcShort( 0x2e4 ), /* Offset= 740 (888) */
/* 150 */ NdrFcLong( 0x4006 ), /* 16390 */
/* 154 */ NdrFcShort( 0x2ea ), /* Offset= 746 (900) */
/* 156 */ NdrFcLong( 0x4007 ), /* 16391 */
/* 160 */ NdrFcShort( 0x2e0 ), /* Offset= 736 (896) */
/* 162 */ NdrFcLong( 0x4008 ), /* 16392 */
/* 166 */ NdrFcShort( 0x2e2 ), /* Offset= 738 (904) */

/* 168 */ NdrFcLong( 0x400d ), /* 16397 */
/* 172 */ NdrFcShort( 0x2e0 ), /* Offset= 736 (908) */
/* 174 */ NdrFcLong( 0x4009 ), /* 16393 */
/* 178 */ NdrFcShort( 0x2de ), /* Offset= 734 (912) */
/* 180 */ NdrFcLong( 0x6000 ), /* 24576 */
/* 184 */ NdrFcShort( 0x2dc ), /* Offset= 732 (916) */
/* 186 */ NdrFcLong( 0x400c ), /* 16396 */
/* 190 */ NdrFcShort( 0x2da ), /* Offset= 730 (920) */
/* 192 */ NdrFcLong( 0x10 ), /* 16 */
/* 196 */ NdrFcShort( 0x8002 ), /* Simple arm type: FC_CHAR */
/* 198 */ NdrFcLong( 0x12 ), /* 18 */
/* 202 */ NdrFcShort( 0x8006 ), /* Simple arm type: FC_SHORT */
/* 204 */ NdrFcLong( 0x13 ), /* 19 */
/* 208 */ NdrFcShort( 0x8008 ), /* Simple arm type: FC_LONG */
/* 210 */ NdrFcLong( 0x16 ), /* 22 */
/* 214 */ NdrFcShort( 0x8008 ), /* Simple arm type: FC_LONG */
/* 216 */ NdrFcLong( 0x17 ), /* 23 */
/* 220 */ NdrFcShort( 0x8008 ), /* Simple arm type: FC_LONG */
/* 222 */ NdrFcLong( 0xe ), /* 14 */
/* 226 */ NdrFcShort( 0x2be ), /* Offset= 702 (928) */
/* 228 */ NdrFcLong( 0x400e ), /* 16398 */
/* 232 */ NdrFcShort( 0x2c4 ), /* Offset= 708 (940) */
/* 234 */ NdrFcLong( 0x4010 ), /* 16400 */
/* 238 */ NdrFcShort( 0x2c2 ), /* Offset= 706 (944) */
/* 240 */ NdrFcLong( 0x4012 ), /* 16402 */
/* 244 */ NdrFcShort( 0x280 ), /* Offset= 640 (884) */
/* 246 */ NdrFcLong( 0x4013 ), /* 16403 */
/* 250 */ NdrFcShort( 0x27e ), /* Offset= 638 (888) */
/* 252 */ NdrFcLong( 0x4016 ), /* 16406 */
/* 256 */ NdrFcShort( 0x278 ), /* Offset= 632 (888) */
/* 258 */ NdrFcLong( 0x4017 ), /* 16407 */
/* 262 */ NdrFcShort( 0x272 ), /* Offset= 626 (888) */
/* 264 */ NdrFcLong( 0x0 ), /* 0 */
/* 268 */ NdrFcShort( 0x0 ), /* Offset= 0 (268) */
/* 270 */ NdrFcLong( 0x1 ), /* 1 */
/* 274 */ NdrFcShort( 0x0 ), /* Offset= 0 (274) */
/* 276 */ NdrFcShort( 0xffffffff ), /* Offset= -1 (275) */
/* 278 */

/* 280 */ NdrFcShort( 0x8 ), /* 8 */
/* 282 */ 0xb, /* FC_HYPER */
/* 284 */ 0x5b, /* FC_END */

/* 286 */ NdrFcShort( 0xc ), /* FC_UP */
/* 288 */

/* 290 */ NdrFcShort( 0x2 ), /* 2 */
/* 292 */ 0x9, /* Corr desc: FC_ULONG */
/* 294 */ NdrFcShort( 0xffffc ), /* -4 */
/* 296 */ 0x6, /* FC_SHORT */
/* 298 */ 0x5b, /* FC_END */

/* 300 */ NdrFcShort( 0x8 ), /* 8 */
/* 302 */ NdrFcShort( 0xffffffff2 ), /* Offset= -14 (288) */
/* 304 */ 0x8, /* FC_LONG */
/* 306 */ 0x5c, /* FC_PAD */

/* 306 */ 0x15, /* FC_STRUCT */
/* 307 */ 0x7, /* 7 */

/* 284 */ 0x12, 0x0, /* FC_UP */
/* 286 */ NdrFcShort( 0xc ), /* Offset= 12 (298) */
/* 288 */

/* 290 */ 0x1b, /* FC_CARRAY */
/* 291 */ 0x1, /* 1 */

/* 290 */ NdrFcShort( 0x2 ), /* 2 */
/* 292 */ 0x9, /* Corr desc: FC_ULONG */
/* 294 */ NdrFcShort( 0xffffc ), /* -4 */
/* 296 */ 0x6, /* FC_SHORT */
/* 298 */

/* 300 */ NdrFcShort( 0x8 ), /* 8 */
/* 302 */ NdrFcShort( 0xffffffff2 ), /* Offset= -14 (288) */
/* 304 */ 0x8, /* FC_LONG */
/* 306 */ 0x5c, /* FC_PAD */
```

# Appendix A - Application Source Code

```
/* 308 */          0x5b,          /* FC_END */
/* 310 */ NdrFcLong( 0x0 ), /* 0 */
/* 314 */ NdrFcShort( 0x0 ), /* 0 */
/* 316 */ NdrFcShort( 0x0 ), /* 0 */
/* 318 */ 0xc0, /* 192 */
/* 320 */ 0x0, /* 0 */
/* 322 */ 0x0, /* 0 */
/* 324 */ 0x0, /* 0 */
/* 326 */          0x46,          /* 70 */
/* 328 */ NdrFcLong( 0x20400 ), /* 132096 */
/* 332 */ NdrFcShort( 0x0 ), /* 0 */
/* 334 */ NdrFcShort( 0x0 ), /* 0 */
/* 336 */ 0xc0, /* 192 */
/* 338 */ 0x0, /* 0 */
/* 340 */ 0x0, /* 0 */
/* 342 */ 0x0, /* 0 */
/* 344 */          0x46,          /* 70 */
/* 346 */ NdrFcShort( 0x2 ), /* Offset= 2 (348) */
/* 348 */          0x12, 0x10, /* FC_UP [pointer_deref] */
/* 350 */ NdrFcShort( 0x1fc ), /* Offset= 508 (858) */
/* 352 */          0x2a,          /* FC_ENCAPSULATED_UNION */
/* 354 */ NdrFcShort( 0x18 ), /* 24 */
/* 356 */ NdrFcShort( 0xa ), /* 10 */
/* 358 */ NdrFcLong( 0x8 ), /* 8 */
/* 362 */ NdrFcShort( 0x58 ), /* Offset= 88 (450) */
/* 364 */ NdrFcLong( 0xd ), /* 13 */
/* 368 */ NdrFcShort( 0x78 ), /* Offset= 120 (488) */
/* 370 */ NdrFcLong( 0x9 ), /* 9 */
/* 374 */ NdrFcShort( 0x94 ), /* Offset= 148 (522) */
/* 376 */ NdrFcLong( 0xc ), /* 12 */
/* 380 */ NdrFcShort( 0xbc ), /* Offset= 188 (568) */
/* 382 */ NdrFcLong( 0x24 ), /* 36 */
/* 386 */ NdrFcShort( 0x114 ), /* Offset= 276 (662) */
/* 388 */ NdrFcLong( 0x800d ), /* 32781 */
/* 392 */ NdrFcShort( 0x130 ), /* Offset= 304 (696) */
/* 394 */ NdrFcLong( 0x10 ), /* 16 */
/* 398 */ NdrFcShort( 0x148 ), /* Offset= 328 (726) */
/* 400 */ NdrFcLong( 0x2 ), /* 2 */
/* 404 */ NdrFcShort( 0x160 ), /* Offset= 352 (756) */
/* 406 */ NdrFcLong( 0x3 ), /* 3 */
/* 410 */ NdrFcShort( 0x178 ), /* Offset= 376 (786) */
/* 412 */ NdrFcLong( 0x14 ), /* 20 */
/* 416 */ NdrFcShort( 0x190 ), /* Offset= 400 (816) */
/* 418 */ NdrFcShort( 0xffffffff ), /* Offset= -1 (417) */
/* 420 */          0x1b,          /* FC_CARRAY */

/* 422 */ NdrFcShort( 0x4 ), /* 4 */
/* 424 */ 0x19, /* Corr desc: field pointer, FC_ULONG */
/* 426 */ NdrFcShort( 0x0 ), /* 0 */
/* 428 */          0x4b,          /* FC_PP */
/* 430 */          0x5c,          /* FC_PAD */
/* 432 */ NdrFcShort( 0x4 ), /* 4 */
/* 434 */ NdrFcShort( 0x0 ), /* 0 */
/* 436 */ NdrFcShort( 0x1 ), /* 1 */
/* 438 */ NdrFcShort( 0x0 ), /* 0 */
/* 440 */ NdrFcShort( 0x0 ), /* 0 */
/* 442 */ 0x12, 0x0, /* FC_UP */
/* 444 */ NdrFcShort( 0xffffffff6e ), /* Offset= -146 (298) */
/* 446 */          0x5b,          /* FC_END */
/* 448 */ 0x5c, /* FC_LONG */
/* 450 */          0x5b,          /* FC_END */
/* 452 */ NdrFcShort( 0x8 ), /* 8 */
/* 454 */          0x4b,          /* FC_PP */
/* 456 */          0x5c,          /* FC_PAD */
/* 458 */ NdrFcShort( 0x4 ), /* 4 */
/* 460 */ NdrFcShort( 0x4 ), /* 4 */
/* 462 */ 0x11, 0x0, /* FC_RP */
/* 464 */ NdrFcShort( 0xffffffffd4 ), /* Offset= -44 (420) */
/* 466 */          0x5b,          /* FC_END */
/* 468 */ 0x8, /* FC_LONG */
/* 470 */          0x5b,          /* FC_END */
/* 472 */ NdrFcShort( 0x0 ), /* 0 */
/* 474 */ 0x19, /* Corr desc: field pointer, FC_ULONG */
/* 476 */ NdrFcShort( 0x0 ), /* 0 */
/* 478 */ NdrFcLong( 0xffffffff ), /* -1 */
/* 482 */ 0x4c, /* FC_EMBEDDED_COMPLEX */
/* 484 */ NdrFcShort( 0xffffffff50 ), /* Offset= -176 (308) */
/* 486 */ 0x5c, /* FC_PAD */
/* 488 */          0x5b,          /* FC_END */
/* 490 */ NdrFcShort( 0x8 ), /* 8 */
/* 492 */ NdrFcShort( 0x0 ), /* 0 */
/* 494 */ NdrFcShort( 0x6 ), /* Offset= 6 (500) */
```

# Appendix A - Application Source Code

```
/* 496 */ 0x8, /* FC_LONG */
/* 498 */ 0x5c, /* FC_PAD */
/* 500 */ /* FC_END */
/* 502 */ NdrFcShort( 0xffffffff0 ), /* Offset= -32 (470) */
/* 504 */
/* 506 */ NdrFcShort( 0x0 ), /* 0 */
/* 508 */ 0x19, /* Corr desc: field pointer, FC_ULONG */
/* 510 */ NdrFcShort( 0x0 ), /* 0 */
/* 512 */ NdrFcLong( 0xffffffff ), /* -1 */
/* 516 */ 0x4c, /* FC_EMBEDDED_COMPLEX */
/* 518 */ NdrFcShort( 0xffffffff40 ), /* Offset= -192 (326) */
/* 520 */ 0x5c, /* FC_PAD */
/* 522 */
/* 524 */ NdrFcShort( 0x8 ), /* 8 */
/* 526 */ NdrFcShort( 0x0 ), /* 0 */
/* 528 */ NdrFcShort( 0x6 ), /* Offset= 6 (534) */
/* 530 */ 0x8, /* FC_LONG */
/* 532 */ 0x5c, /* FC_PAD */
/* 534 */
/* 536 */ NdrFcShort( 0xffffffff0 ), /* Offset= -32 (504) */
/* 538 */
/* 540 */ NdrFcShort( 0x4 ), /* 4 */
/* 542 */ 0x19, /* Corr desc: field pointer, FC_ULONG */
/* 544 */ NdrFcShort( 0x0 ), /* 0 */
/* 546 */
/* 548 */
/* 550 */ NdrFcShort( 0x4 ), /* 4 */
/* 552 */ NdrFcShort( 0x0 ), /* 0 */
/* 554 */ NdrFcShort( 0x1 ), /* 1 */
/* 556 */ NdrFcShort( 0x0 ), /* 0 */
/* 558 */ NdrFcShort( 0x0 ), /* 0 */
/* 560 */ 0x12, 0x0, /* FC_UP */
/* 562 */ NdrFcShort( 0x182 ), /* Offset= 386 (948) */
/* 564 */
/* 566 */ 0x5c, /* FC_END */
/* 568 */
/* 570 */ NdrFcShort( 0x8 ), /* 8 */
/* 572 */ NdrFcShort( 0x0 ), /* 0 */
/* 574 */ NdrFcShort( 0x6 ), /* Offset= 6 (580) */
/* 576 */ 0x8, /* FC_LONG */
/* 578 */ 0x5c, /* FC_PAD */
/* 580 */ /* FC_END */
/* 582 */ NdrFcShort( 0xffffffffd4 ), /* Offset= -44 (538) */
/* 584 */
/* 586 */ NdrFcLong( 0x2f ), /* 47 */
/* 590 */ NdrFcShort( 0x0 ), /* 0 */
/* 592 */ NdrFcShort( 0x0 ), /* 0 */
/* 594 */ 0xc0, /* 192 */
/* 596 */ 0x0, /* 0 */
/* 598 */ 0x0, /* 0 */
/* 600 */ 0x0, /* 0 */
/* 602 */
/* 604 */ NdrFcShort( 0x1 ), /* 1 */
/* 606 */ 0x19, /* Corr desc: field pointer, FC_ULONG */
/* 608 */ NdrFcShort( 0x4 ), /* 4 */
/* 610 */ 0x1, /* FC_BYTE */
/* 612 */
/* 614 */ NdrFcShort( 0x1a ), /* FC_BOGUS_STRUCT */
/* 616 */ NdrFcShort( 0x0 ), /* 0 */
/* 618 */ NdrFcShort( 0xa ), /* Offset= 10 (628) */
/* 620 */ 0x8, /* FC_LONG */
/* 622 */ 0x4c, /* FC_EMBEDDED_COMPLEX */
/* 624 */ NdrFcShort( 0xffffffffd8 ), /* Offset= -40 (584) */
/* 626 */ 0x36, /* FC_POINTER */
/* 628 */
/* 630 */ NdrFcShort( 0xffffffffe4 ), /* Offset= -28 (602) */
/* 632 */
/* 634 */ NdrFcShort( 0x4 ), /* 4 */
/* 636 */ 0x19, /* Corr desc: field pointer, FC_ULONG */
/* 638 */ NdrFcShort( 0x0 ), /* 0 */
/* 640 */
/* 642 */
/* 644 */ NdrFcShort( 0x4 ), /* 4 */
/* 646 */ NdrFcShort( 0x0 ), /* 0 */
```

# Appendix A - Application Source Code

```
/* 648 */ NdrFcShort( 0x1 ), /* 1 */
/* 650 */ NdrFcShort( 0x0 ), /* 0 */
/* 652 */ NdrFcShort( 0x0 ), /* 0 */
/* 654 */ 0x12, 0x0, /* FC_UP */
/* 656 */ NdrFcShort( 0xffffffffd4 ), /* Offset= -44 (612) */
/* 658 */
                                0x5b, /* FC_END */
                                0x8, /* FC_LONG */
/* 660 */ 0x5c, /* FC_PAD */
                                0x5b, /* FC_END */
/* 662 */
                                0x1a, /* FC_BOGUS_STRUCT */
                                0x3, /* 3 */
/* 664 */ NdrFcShort( 0x8 ), /* 8 */
/* 666 */ NdrFcShort( 0x0 ), /* 0 */
/* 668 */ NdrFcShort( 0x6 ), /* Offset= 6 (674) */
/* 670 */ 0x8, /* FC_LONG */
/* 672 */ 0x5c, /* FC_PAD */
/* 674 */
                                0x36, /* FC_POINTER */
                                0x5b, /* FC_END */
                                0x11, 0x0, /* FC_RP */
/* 676 */ NdrFcShort( 0xffffffffd4 ), /* Offset= -44 (632) */
/* 678 */
                                0x1d, /* FC_SMFARRAY */
                                0x0, /* 0 */
/* 680 */ NdrFcShort( 0x8 ), /* 8 */
/* 682 */ 0x2, /* FC_CHAR */
/* 684 */
                                0x5b, /* FC_END */
                                0x15, /* FC_STRUCT */
                                0x3, /* 3 */
/* 686 */ NdrFcShort( 0x10 ), /* 16 */
/* 688 */ 0x8, /* FC_LONG */
                                0x6, /* FC_SHORT */
/* 690 */ 0x6, /* FC_SHORT */
                                0x4c, /* FC_EMBEDDED_COMPLEX */
/* 692 */ 0x0, /* 0 */
                                NdrFcShort( 0xfffffffff1 ), /* Offset= -15 (678) */
/* 696 */
                                0x5b, /* FC_END */
                                0x1a, /* FC_BOGUS_STRUCT */
                                0x3, /* 3 */
/* 698 */ NdrFcShort( 0x18 ), /* 24 */
/* 700 */ NdrFcShort( 0x0 ), /* 0 */
/* 702 */ NdrFcShort( 0xa ), /* Offset= 10 (712) */
/* 704 */ 0x8, /* FC_LONG */
/* 706 */ 0x4c, /* FC_EMBEDDED_COMPLEX */
                                0x0, /* 0 */
/* 708 */ NdrFcShort( 0xffffffffe8 ), /* Offset= -24 (684) */
/* 710 */ 0x5c, /* FC_PAD */
/* 712 */
                                0x5b, /* FC_END */
                                0x11, 0x0, /* FC_RP */
/* 714 */ NdrFcShort( 0xffffffff0c ), /* Offset= -244 (470) */
/* 716 */
                                0x1b, /* FC_CARRAY */
                                0x0, /* 0 */
/* 718 */ NdrFcShort( 0x1 ), /* 1 */
/* 720 */ 0x19, /* Corr desc: field pointer, FC_ULONG */
                                0x0, /* */

/* 722 */ NdrFcShort( 0x0 ), /* 0 */
/* 724 */ 0x1, /* FC_BYTE */
                                0x5b, /* FC_END */
/* 726 */
                                0x16, /* FC_PSTRUCT */
                                0x3, /* 3 */
/* 728 */ NdrFcShort( 0x8 ), /* 8 */
/* 730 */
                                0x4b, /* FC_PP */
                                0x5c, /* FC_PAD */
/* 732 */
                                0x46, /* FC_NO_REPEAT */
                                0x5c, /* FC_PAD */
/* 734 */ NdrFcShort( 0x4 ), /* 4 */
/* 736 */ NdrFcShort( 0x4 ), /* 4 */
/* 738 */ 0x12, 0x0, /* FC_UP */
/* 740 */ NdrFcShort( 0xffffffffe8 ), /* Offset= -24 (716) */
/* 742 */
                                0x5b, /* FC_END */
                                0x8, /* FC_LONG */
/* 744 */ 0x8, /* FC_LONG */
                                0x5b, /* FC_END */
/* 746 */
                                0x1b, /* FC_CARRAY */
                                0x1, /* 1 */
/* 748 */ NdrFcShort( 0x2 ), /* 2 */
/* 750 */ 0x19, /* Corr desc: field pointer, FC_ULONG */
                                0x0, /* */
/* 752 */ NdrFcShort( 0x0 ), /* 0 */
/* 754 */ 0x6, /* FC_SHORT */
/* 756 */
                                0x5b, /* FC_END */
                                0x16, /* FC_PSTRUCT */
                                0x3, /* 3 */
/* 758 */ NdrFcShort( 0x8 ), /* 8 */
/* 760 */
                                0x4b, /* FC_PP */
                                0x5c, /* FC_PAD */
/* 762 */
                                0x46, /* FC_NO_REPEAT */
                                0x5c, /* FC_PAD */
/* 764 */ NdrFcShort( 0x4 ), /* 4 */
/* 766 */ NdrFcShort( 0x4 ), /* 4 */
/* 768 */ 0x12, 0x0, /* FC_UP */
/* 770 */ NdrFcShort( 0xffffffffe8 ), /* Offset= -24 (746) */
/* 772 */
                                0x5b, /* FC_END */
                                0x8, /* FC_LONG */
/* 774 */ 0x8, /* FC_LONG */
                                0x5b, /* FC_END */
/* 776 */
                                0x1b, /* FC_CARRAY */
                                0x3, /* 3 */
/* 778 */ NdrFcShort( 0x4 ), /* 4 */
/* 780 */ 0x19, /* Corr desc: field pointer, FC_ULONG */
                                0x0, /* */
/* 782 */ NdrFcShort( 0x0 ), /* 0 */
/* 784 */ 0x8, /* FC_LONG */
/* 786 */
                                0x5b, /* FC_END */
                                0x16, /* FC_PSTRUCT */
```

# Appendix A - Application Source Code

```
/* 788 */ NdrFcShort( 0x8 ), /* 8 */
/* 790 */
                                0x4b, /* FC_PP */
                                0x5c, /* FC_PAD */
/* 792 */
                                0x46, /* FC_NO_REPEAT */
                                0x5c, /* FC_PAD */
/* 794 */ NdrFcShort( 0x4 ), /* 4 */
/* 796 */ NdrFcShort( 0x4 ), /* 4 */
/* 798 */ 0x12, 0x0, /* FC_UP */
/* 800 */ NdrFcShort( 0xfffffe8 ), /* Offset= -24 (776) */
/* 802 */
                                0x5b, /* FC_END */
/* 804 */ 0x8,
                                0x8, /* FC_LONG */
                                0x5b, /* FC_LONG */
/* 806 */
                                0x1b, /* FC_CARRAY */
                                0x7, /* 7 */
/* 808 */ NdrFcShort( 0x8 ), /* 8 */
/* 810 */ 0x19, /* Corr desc: field pointer, FC_ULONG */
/* 812 */ NdrFcShort( 0x0 ), /* 0 */
/* 814 */ 0xb, /* FC_HYPER */
                                0x5b, /* FC_END */
/* 816 */
                                0x16, /* FC_PSTRUCT */
                                0x3, /* 3 */
/* 818 */ NdrFcShort( 0x8 ), /* 8 */
/* 820 */
                                0x4b, /* FC_PP */
                                0x5c, /* FC_PAD */
/* 822 */
                                0x46, /* FC_NO_REPEAT */
                                0x5c, /* FC_PAD */
/* 824 */ NdrFcShort( 0x4 ), /* 4 */
/* 826 */ NdrFcShort( 0x4 ), /* 4 */
/* 828 */ 0x12, 0x0, /* FC_UP */
/* 830 */ NdrFcShort( 0xfffffe8 ), /* Offset= -24 (806) */
/* 832 */
                                0x5b, /* FC_END */
/* 834 */ 0x8,
                                0x8, /* FC_LONG */
                                0x5b, /* FC_LONG */
/* 836 */
                                0x15, /* FC_STRUCT */
                                0x3, /* 3 */
/* 838 */ NdrFcShort( 0x8 ), /* 8 */
/* 840 */ 0x8, /* FC_LONG */
                                0x8, /* FC_LONG */
                                0x5b, /* FC_PAD */
/* 842 */ 0x5c, /* FC_END */
/* 844 */
                                0x1b, /* FC_CARRAY */
                                0x3, /* 3 */
/* 846 */ NdrFcShort( 0x8 ), /* 8 */
/* 848 */ 0x7, /* Corr desc: FC_USHORT */
                                0x0, /* */
/* 850 */ NdrFcShort( 0xffd8 ), /* -40 */
/* 852 */ 0x4c, /* FC_EMBEDDED_COMPLEX */
                                0x0, /* 0 */
/* 854 */ NdrFcShort( 0xfffffee ), /* Offset= -18 (836) */
/* 856 */ 0x5c, /* FC_PAD */
                                0x5b, /* FC_END */
/* 858 */
                                0x1a, /* FC_BOGUS_STRUCT */
                                0x3, /* 3 */
/* 860 */ NdrFcShort( 0x28 ), /* 40 */
/* 862 */ NdrFcShort( 0xfffffee ), /* Offset= -18 (844) */
/* 864 */ NdrFcShort( 0x0 ), /* Offset= 0 (864) */
/* 866 */ 0x6, /* FC_SHORT */
                                0x6, /* FC_SHORT */
/* 868 */ 0x38, /* FC_ALIGNM4 */
                                0x8, /* FC_LONG */
/* 870 */ 0x8, /* FC_LONG */
                                0x4c, /* FC_EMBEDDED_COMPLEX */
/* 872 */ 0x0, /* 0 */
                                NdrFcShort( 0xffffdf7 ), /* Offset= -521 (352) */
                                0x5b, /* FC_END */
/* 876 */
                                0x12, 0x0, /* FC_UP */
/* 878 */ NdrFcShort( 0xfffffef6 ), /* Offset= -266 (612) */
/* 880 */
                                0x12, 0x8, /* FC_UP [simple_pointer] */
/* 882 */ 0x1, /* FC_BYTE */
                                0x5c, /* FC_PAD */
/* 884 */
                                0x12, 0x8, /* FC_UP [simple_pointer] */
/* 886 */ 0x6, /* FC_SHORT */
                                0x5c, /* FC_PAD */
/* 888 */
                                0x12, 0x8, /* FC_UP [simple_pointer] */
/* 890 */ 0x8, /* FC_LONG */
                                0x5c, /* FC_PAD */
/* 892 */
                                0x12, 0x8, /* FC_UP [simple_pointer] */
/* 894 */ 0xa, /* FC_FLOAT */
                                0x5c, /* FC_PAD */
/* 896 */
                                0x12, 0x8, /* FC_UP [simple_pointer] */
/* 898 */ 0xc, /* FC_DOUBLE */
                                0x5c, /* FC_PAD */
/* 900 */
                                0x12, 0x0, /* FC_UP */
/* 902 */ NdrFcShort( 0xfffffd90 ), /* Offset= -624 (278) */
/* 904 */
                                0x12, 0x10, /* FC_UP [pointer_deref] */
/* 906 */ NdrFcShort( 0xfffffd92 ), /* Offset= -622 (284) */
/* 908 */
                                0x12, 0x10, /* FC_UP [pointer_deref] */
/* 910 */ NdrFcShort( 0xfffffda6 ), /* Offset= -602 (308) */
/* 912 */
                                0x12, 0x10, /* FC_UP [pointer_deref] */
/* 914 */ NdrFcShort( 0xfffffdb4 ), /* Offset= -588 (326) */
/* 916 */
                                0x12, 0x10, /* FC_UP [pointer_deref] */
/* 918 */ NdrFcShort( 0xfffffdc2 ), /* Offset= -574 (344) */
/* 920 */
                                0x12, 0x10, /* FC_UP [pointer_deref] */
/* 922 */ NdrFcShort( 0x2 ), /* Offset= 2 (924) */
/* 924 */
                                0x12, 0x0, /* FC_UP */
/* 926 */ NdrFcShort( 0x16 ), /* Offset= 22 (948) */
```

# Appendix A - Application Source Code

```
/* 928 */
                                0x15,          /* FC_STRUCT */
                                0x7,           /* 7 */
/* 930 */ NdrFcShort( 0x10 ), /* 16 */
/* 932 */ 0x6,              /* FC_SHORT */
                                0x1,          /* FC_BYTE */
/* 934 */ 0x1,              /* FC_BYTE */
                                0x38,         /* FC_ALIGNM4 */
/* 936 */ 0x8,              /* FC_LONG */
                                0x39,         /* FC_ALIGNM8 */
/* 938 */ 0xb,              /* FC_HYPER */
                                0x5b,         /* FC_END */
/* 940 */
                                0x12, 0x0,     /* FC_UP */
/* 942 */ NdrFcShort( 0xffffffff2 ), /* Offset= -14 (928) */
/* 944 */
                                0x12, 0x8,     /* FC_UP [simple_pointer] */
/* 946 */ 0x2,              /* FC_CHAR */
                                0x5c,         /* FC_PAD */
/* 948 */
                                0x1a,          /* FC_BOGUS_STRUCT */
                                0x7,           /* 7 */
/* 950 */ NdrFcShort( 0x20 ), /* 32 */
/* 952 */ NdrFcShort( 0x0 ), /* 0 */
/* 954 */ NdrFcShort( 0x0 ), /* Offset= 0 (954) */
/* 956 */ 0x8,              /* FC_LONG */
                                0x8,          /* FC_LONG */
/* 958 */ 0x6,              /* FC_SHORT */
                                0x6,          /* FC_SHORT */
/* 960 */ 0x6,              /* FC_SHORT */
                                0x6,          /* FC_SHORT */
/* 962 */ 0x4c,             /* FC_EMBEDDED_COMPLEX */
                                0x0,          /* 0 */
/* 964 */ NdrFcShort( 0xffffffff42 ), /* Offset= -958 (6) */
/* 966 */ 0x5c,             /* FC_PAD */
                                0x5b,         /* FC_END */
/* 968 */ 0xb4,             /* FC_USER_MARSHAL */
                                0x83,         /* 131 */
/* 970 */ NdrFcShort( 0x0 ), /* 0 */
/* 972 */ NdrFcShort( 0x10 ), /* 16 */
/* 974 */ NdrFcShort( 0x0 ), /* 0 */
/* 976 */ NdrFcShort( 0xffffffff32 ), /* Offset= -974 (2) */
/* 978 */
                                0x11, 0x4,     /* FC_RP [allocated_on_stack] */
/* 980 */ NdrFcShort( 0x6 ), /* Offset= 6 (986) */
/* 982 */
                                0x13, 0x0,     /* FC_OP */
/* 984 */ NdrFcShort( 0xffffffffdc ), /* Offset= -36 (948) */
/* 986 */ 0xb4,             /* FC_USER_MARSHAL */
                                0x83,         /* 131 */
/* 988 */ NdrFcShort( 0x0 ), /* 0 */
/* 990 */ NdrFcShort( 0x10 ), /* 16 */
/* 992 */ NdrFcShort( 0x0 ), /* 0 */
/* 994 */ NdrFcShort( 0xfffffffff4 ), /* Offset= -12 (982) */
                                0x0
}
};

const CInterfaceProxyVtbl * _tpcc_com_ps_ProxyVtblList[] =
{
    ( CInterfaceProxyVtbl *) &_ITPCCProxyVtbl,
    0
}
```

```
};

const CInterfaceStubVtbl * _tpcc_com_ps_StubVtblList[] =
{
    ( CInterfaceStubVtbl *) &_ITPCCStubVtbl,
    0
};

PCInterfaceName const _tpcc_com_ps_InterfaceNamesList[] =
{
    "ITPCC",
    0
};

#define _tpcc_com_ps_CHECK_IID(n) IID_GENERIC_CHECK_IID( _tpcc_com_ps, pIID, n)

int __stdcall _tpcc_com_ps_IID_Lookup( const IID * pIID, int * pIndex )
{
    if(!_tpcc_com_ps_CHECK_IID(0))
    {
        *pIndex = 0;
        return 1;
    }

    return 0;
}

const ExtendedProxyFileInfo tpcc_com_ps_ProxyFileInfo =
{
    (PCInterfaceProxyVtblList *) &_tpcc_com_ps_ProxyVtblList,
    (PCInterfaceStubVtblList *) &_tpcc_com_ps_StubVtblList,
    (const PCInterfaceName *) &_tpcc_com_ps_InterfaceNamesList,
    0, /* no delegation
    &_tpcc_com_ps_IID_Lookup,
    1,
    2,
    0, /* table of [async_uuid] interfaces */
    0, /* Filler1 */
    0, /* Filler2 */
    0 /* Filler3 */
};

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

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

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

/* File created by MIDL compiler version 5.03.0280 */
/* at Sat Apr 08 16:40:10 2000
*/
/* Compiler settings for .\src\tpcc_com_ps.idl:
Oicf (OptLev=12), W1, Zp8, env=Win64 (32b run,appending), ms_ext, c_ext, robust
error checks: allocation ref bounds_check enum stub_data
VC __declspec() decoration level:
__declspec(uuid()), __declspec(selectany), __declspec(novtable)
DECLSPEC_UUID(), MIDL_INTERFACE()
*/
```

# Appendix A - Application Source Code

```
//@MIDL_FILE_HEADING( )

#if defined(_M_IA64) || defined(_M_XPP64)
#define USE_STUBLESS_PROXY

/* verify that the <rpcproxy.h> version is high enough to compile this file*/
#ifndef __REDQ_RPCPROXY_H_VERSION__
#define __REQUIRED_RPCPROXY_H_VERSION__ 475
#endif

#include "rpcproxy.h"
#ifndef __RPCPROXY_H_VERSION__
#error this stub requires an updated version of <rpcproxy.h>
#endif // __RPCPROXY_H_VERSION__

#include "tpcc_com_ps.h"

#define TYPE_FORMAT_STRING_SIZE 979
#define PROC_FORMAT_STRING_SIZE 253
#define TRANSMIT_AS_TABLE_SIZE 0
#define WIRE_MARSHAL_TABLE_SIZE 1

typedef struct _MIDL_TYPE_FORMAT_STRING
{
    short          Pad;
    unsigned char  Format[ TYPE_FORMAT_STRING_SIZE ];
} MIDL_TYPE_FORMAT_STRING;

typedef struct _MIDL_PROC_FORMAT_STRING
{
    short          Pad;
    unsigned char  Format[ PROC_FORMAT_STRING_SIZE ];
} MIDL_PROC_FORMAT_STRING;

extern const MIDL_TYPE_FORMAT_STRING __MIDL_TypeFormatString;
extern const MIDL_PROC_FORMAT_STRING __MIDL_ProcFormatString;

/* Standard interface: __MIDL_itf_tpcc_com_ps_0000, ver. 0.0,
   GUID={0x00000000,0x0000,0x0000,{0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00}} */

/* Object interface: IUnknown, ver. 0.0,
   GUID={0x00000000,0x0000,0x0000,{0xC0,0x00,0x00,0x00,0x00,0x00,0x00,0x46}} */

/* Object interface: ITPCC, ver. 0.0,
   GUID={0xFEEE6AA2,0x84B1,0x11d2,{0xBA,0x47,0x00,0xC0,0x4F,0xBF,0xE0,0x8B}} */

extern const MIDL_STUB_DESC Object_StubDesc;

extern const MIDL_SERVER_INFO ITPCC_ServerInfo;

#pragma code_seg(".orpc")
static const unsigned short ITPCC_FormatStringOffsetTable[] =
{
    0,

```

```
44,
88,
132,
176,
220
};

static const MIDL_SERVER_INFO ITPCC_ServerInfo =
{
    &Object_StubDesc,
    0,
    __MIDL_ProcFormatString.Format,
    &ITPCC_FormatStringOffsetTable[-3],
    0,
    0,
    0,
    0,
    0
};

static const MIDL_STUBLESS_PROXY_INFO ITPCC_ProxyInfo =
{
    &Object_StubDesc,
    __MIDL_ProcFormatString.Format,
    &ITPCC_FormatStringOffsetTable[-3],
    0,
    0,
    0
};

CINTERFACE_PROXY_VTABLE(9) _ITPCCProxyVtbl =
{
    &ITPCC_ProxyInfo,
    &IID_ITPCC,
    IUnknown_QueryInterface_Proxy,
    IUnknown_AddRef_Proxy,
    IUnknown_Release_Proxy ,
    (void *)-1 /* ITPCC::NewOrder */ ,
    (void *)-1 /* ITPCC::Payment */ ,
    (void *)-1 /* ITPCC::Delivery */ ,
    (void *)-1 /* ITPCC::StockLevel */ ,
    (void *)-1 /* ITPCC::OrderStatus */ ,
    (void *)-1 /* ITPCC::CallSetComplete */
};

const CInterfaceStubVtbl _ITPCCStubVtbl =
{
    &IID_ITPCC,
    &ITPCC_ServerInfo,
    9,
    0, /* pure interpreted */
    CStdStubBuffer_METHODS
};

extern const USER_MARSHAL_ROUTINE_QUADRUPLE UserMarshalRoutines[ WIRE_MARSHAL_TABLE_SIZE ];

static const MIDL_STUB_DESC Object_StubDesc =
{
    0,
    NdrOleAllocate,
    NdrOleFree,
    0,
    0,

```

# Appendix A - Application Source Code

```
0,
0,
0,
_MIDL_TypeFormatString.Format,
1, /* -error bounds_check flag */
0x50002, /* Ndr library version */
0,
0x5030118, /* MIDL Version 5.3.280 */
0,
UserMarshalRoutines,
0, /* notify & notify_flag routine table */
0x1, /* MIDL flag */
0, /* Reserved3 */
0, /* Reserved4 */
0 /* Reserved5 */
};

#pragma data_seg(".rdata")

static const USER_MARSHAL_ROUTINE_QUADRUPLE UserMarshalRoutines[ WIRE_MARSHAL_TABLE_SIZE ] =
{
    {
        VARIANT_UserSize
        ,VARIANT_UserMarshal
        ,VARIANT_UserUnmarshal
        ,VARIANT_UserFree
    }
};

#if !defined(__RPC_WIN64__)
#error Invalid build platform for this stub.
#endif

static const MIDL_PROC_FORMAT_STRING __MIDL_ProcFormatString =
{
    0,
    {
        /* Procedure NewOrder */

        0x33, /* FC_AUTO_HANDLE */
        0x6c, /* Old Flags: object, Oi2 */
/* 2 */ NdrFcLong( 0x0 ), /* 0 */
/* 6 */ NdrFcShort( 0x3 ), /* 3 */
#ifdef _ALPHA_
/* 8 */ NdrFcShort( 0x38 ), /* ia64 Stack size/offset = 56 */
#else
NdrFcShort( 0x30 ), /* axp64 Stack size/offset = 48 */
#endif
/* 10 */ NdrFcShort( 0x0 ), /* 0 */
/* 12 */ NdrFcShort( 0x8 ), /* 8 */
/* 14 */ 0x47, /* Oi2 Flags: srv must size, clt must size, has return,
has ext, */
/* 16 */ 0xa, 0x3, /* 3 */
/* 18 */ 0x7, /* Ext Flags: new corr desc, clt corr
check, srv corr check, */
/* 20 */ NdrFcShort( 0x20 ), /* 32 */
/* 22 */ NdrFcShort( 0x20 ), /* 32 */

```

```
/* 22 */ NdrFcShort( 0x0 ), /* 0 */
/* 24 */ NdrFcShort( 0x0 ), /* 0 */

/* Parameter txn_in */

/* 26 */ NdrFcShort( 0x8b ), /* Flags: must size, must free, in, by val, */
#ifdef _ALPHA_
/* 28 */ NdrFcShort( 0x10 ), /* ia64 Stack size/offset = 16 */
#else
NdrFcShort( 0x8 ), /* axp64 Stack size/offset = 8 */
#endif
/* 30 */ NdrFcShort( 0x3b6 ), /* Type Offset=950 */

/* Parameter txn_out */

/* 32 */ NdrFcShort( 0x6113 ), /* Flags: must size, must free, out, simple ref,
srv alloc size=24 */
#ifdef _ALPHA_
/* 34 */ NdrFcShort( 0x28 ), /* ia64 Stack size/offset = 40 */
#else
NdrFcShort( 0x20 ), /* axp64 Stack size/offset = 32 */
#endif
/* 36 */ NdrFcShort( 0x3c8 ), /* Type Offset=968 */

/* Return value */

/* 38 */ NdrFcShort( 0x70 ), /* Flags: out, return, base type, */
#ifdef _ALPHA_
/* 40 */ NdrFcShort( 0x30 ), /* ia64 Stack size/offset = 48 */
#else
NdrFcShort( 0x28 ), /* axp64 Stack size/offset = 40 */
#endif
/* 42 */ 0x8, /* FC_LONG */
0x0, /* 0 */

/* Procedure Payment */

/* 44 */ 0x33, /* FC_AUTO_HANDLE */
0x6c, /* Old Flags: object, Oi2 */
/* 46 */ NdrFcLong( 0x0 ), /* 0 */
/* 50 */ NdrFcShort( 0x4 ), /* 4 */
#ifdef _ALPHA_
/* 52 */ NdrFcShort( 0x38 ), /* ia64 Stack size/offset = 56 */
#else
NdrFcShort( 0x30 ), /* axp64 Stack size/offset = 48 */
#endif
/* 54 */ NdrFcShort( 0x0 ), /* 0 */
/* 56 */ NdrFcShort( 0x8 ), /* 8 */
/* 58 */ 0x47, /* Oi2 Flags: srv must size, clt must size, has return,
has ext, */
/* 60 */ 0xa, 0x3, /* 3 */
/* 62 */ 0x7, /* Ext Flags: new corr desc, clt corr
check, srv corr check, */
/* 64 */ NdrFcShort( 0x20 ), /* 32 */
/* 66 */ NdrFcShort( 0x20 ), /* 32 */
/* 68 */ NdrFcShort( 0x0 ), /* 0 */

/* Parameter txn_in */

/* 70 */ NdrFcShort( 0x8b ), /* Flags: must size, must free, in, by val, */
#ifdef _ALPHA_

```



# Appendix A - Application Source Code

```
/* 72 */ NdrFcShort( 0x10 ), /* ia64 Stack size/offset = 16 */
#else
                NdrFcShort( 0x8 ), /* axp64 Stack size/offset = 8 */
#endif
/* 74 */ NdrFcShort( 0x3b6 ), /* Type Offset=950 */

        /* Parameter txn_out */

/* 76 */ NdrFcShort( 0x6113 ), /* Flags: must size, must free, out, simple ref,
srv alloc size=24 */
#ifndef ALPHA
/* 78 */ NdrFcShort( 0x28 ), /* ia64 Stack size/offset = 40 */
#else
                NdrFcShort( 0x20 ), /* axp64 Stack size/offset = 32 */
#endif
/* 80 */ NdrFcShort( 0x3c8 ), /* Type Offset=968 */

        /* Return value */

/* 82 */ NdrFcShort( 0x70 ), /* Flags: out, return, base type, */
#ifndef ALPHA
/* 84 */ NdrFcShort( 0x30 ), /* ia64 Stack size/offset = 48 */
#else
                NdrFcShort( 0x28 ), /* axp64 Stack size/offset = 40 */
#endif
/* 86 */ 0x8, /* FC_LONG */
        0x0, /* 0 */

        /* Procedure Delivery */

/* 88 */ 0x33, /* FC_AUTO_HANDLE */
        0x6c, /* Old Flags: object, Oi2 */
/* 90 */ NdrFcLong( 0x0 ), /* 0 */
/* 94 */ NdrFcShort( 0x5 ), /* 5 */
#ifndef ALPHA
/* 96 */ NdrFcShort( 0x38 ), /* ia64 Stack size/offset = 56 */
#else
                NdrFcShort( 0x30 ), /* axp64 Stack size/offset = 48 */
#endif
/* 98 */ NdrFcShort( 0x0 ), /* 0 */
/* 100 */ NdrFcShort( 0x8 ), /* 8 */
/* 102 */ 0x47, /* Oi2 Flags: srv must size, clt must size, has return,
has ext, */
        0x3, /* 3 */
/* 104 */ 0xa, /* 10 */
        0x7, /* Ext Flags: new corr desc, clt corr
check, srv corr check, */
/* 106 */ NdrFcShort( 0x20 ), /* 32 */
/* 108 */ NdrFcShort( 0x20 ), /* 32 */
/* 110 */ NdrFcShort( 0x0 ), /* 0 */
/* 112 */ NdrFcShort( 0x0 ), /* 0 */

        /* Parameter txn_in */

/* 114 */ NdrFcShort( 0x8b ), /* Flags: must size, must free, in, by val, */
#ifndef ALPHA
/* 116 */ NdrFcShort( 0x10 ), /* ia64 Stack size/offset = 16 */
#else
                NdrFcShort( 0x8 ), /* axp64 Stack size/offset = 8 */
#endif
/* 118 */ NdrFcShort( 0x3b6 ), /* Type Offset=950 */

        /* Parameter txn_out */
```

```
/* 120 */ NdrFcShort( 0x6113 ), /* Flags: must size, must free, out, simple ref,
srv alloc size=24 */
#ifndef ALPHA
/* 122 */ NdrFcShort( 0x28 ), /* ia64 Stack size/offset = 40 */
#else
                NdrFcShort( 0x20 ), /* axp64 Stack size/offset = 32 */
#endif
/* 124 */ NdrFcShort( 0x3c8 ), /* Type Offset=968 */

        /* Return value */

/* 126 */ NdrFcShort( 0x70 ), /* Flags: out, return, base type, */
#ifndef ALPHA
/* 128 */ NdrFcShort( 0x30 ), /* ia64 Stack size/offset = 48 */
#else
                NdrFcShort( 0x28 ), /* axp64 Stack size/offset = 40 */
#endif
/* 130 */ 0x8, /* FC_LONG */
        0x0, /* 0 */

        /* Procedure StockLevel */

/* 132 */ 0x33, /* FC_AUTO_HANDLE */
        0x6c, /* Old Flags: object, Oi2 */
/* 134 */ NdrFcLong( 0x0 ), /* 0 */
/* 138 */ NdrFcShort( 0x6 ), /* 6 */
#ifndef ALPHA
/* 140 */ NdrFcShort( 0x38 ), /* ia64 Stack size/offset = 56 */
#else
                NdrFcShort( 0x30 ), /* axp64 Stack size/offset = 48 */
#endif
/* 142 */ NdrFcShort( 0x0 ), /* 0 */
/* 144 */ NdrFcShort( 0x8 ), /* 8 */
/* 146 */ 0x47, /* Oi2 Flags: srv must size, clt must size, has return,
has ext, */
        0x3, /* 3 */
/* 148 */ 0xa, /* 10 */
        0x7, /* Ext Flags: new corr desc, clt corr
check, srv corr check, */
/* 150 */ NdrFcShort( 0x20 ), /* 32 */
/* 152 */ NdrFcShort( 0x20 ), /* 32 */
/* 154 */ NdrFcShort( 0x0 ), /* 0 */
/* 156 */ NdrFcShort( 0x0 ), /* 0 */

        /* Parameter txn_in */

/* 158 */ NdrFcShort( 0x8b ), /* Flags: must size, must free, in, by val, */
#ifndef ALPHA
/* 160 */ NdrFcShort( 0x10 ), /* ia64 Stack size/offset = 16 */
#else
                NdrFcShort( 0x8 ), /* axp64 Stack size/offset = 8 */
#endif
/* 162 */ NdrFcShort( 0x3b6 ), /* Type Offset=950 */

        /* Parameter txn_out */

/* 164 */ NdrFcShort( 0x6113 ), /* Flags: must size, must free, out, simple ref,
srv alloc size=24 */
#ifndef ALPHA
/* 166 */ NdrFcShort( 0x28 ), /* ia64 Stack size/offset = 40 */
#else
                NdrFcShort( 0x20 ), /* axp64 Stack size/offset = 32 */
```

# Appendix A - Application Source Code

```
#endif
/* 168 */ NdrFcShort( 0x3c8 ), /* Type Offset=968 */

/* Return value */

/* 170 */ NdrFcShort( 0x70 ), /* Flags: out, return, base type, */
#ifdef _ALPHA
/* 172 */ NdrFcShort( 0x30 ), /* ia64 Stack size/offset = 48 */
#else
NdrFcShort( 0x28 ), /* axp64 Stack size/offset = 40 */
#endif
/* 174 */ 0x8, /* FC_LONG */
0x0, /* 0 */

/* Procedure OrderStatus */

/* 176 */ 0x33, /* FC_AUTO_HANDLE */
0x6c, /* Old Flags: object, Oi2 */
/* 178 */ NdrFcLong( 0x0 ), /* 0 */
/* 182 */ NdrFcShort( 0x7 ), /* 7 */
#ifdef _ALPHA
/* 184 */ NdrFcShort( 0x38 ), /* ia64 Stack size/offset = 56 */
#else
NdrFcShort( 0x30 ), /* axp64 Stack size/offset = 48 */
#endif
/* 186 */ NdrFcShort( 0x0 ), /* 0 */
/* 188 */ NdrFcShort( 0x8 ), /* 8 */
/* 190 */ 0x47, /* Oi2 Flags: srv must size, clt must size, has return,
has ext, */
0x3, /* 3 */
/* 192 */ 0xa, /* 10 */
0x7, /* Ext Flags: new corr desc, clt corr
check, srv corr check, */
/* 194 */ NdrFcShort( 0x20 ), /* 32 */
/* 196 */ NdrFcShort( 0x20 ), /* 32 */
/* 198 */ NdrFcShort( 0x0 ), /* 0 */
/* 200 */ NdrFcShort( 0x0 ), /* 0 */

/* Parameter txn_in */

/* 202 */ NdrFcShort( 0x8b ), /* Flags: must size, must free, in, by val, */
#ifdef _ALPHA
/* 204 */ NdrFcShort( 0x10 ), /* ia64 Stack size/offset = 16 */
#else
NdrFcShort( 0x8 ), /* axp64 Stack size/offset = 8 */
#endif
/* 206 */ 0x3b6, /* Type Offset=950 */

/* Parameter txn_out */

/* 208 */ NdrFcShort( 0x6113 ), /* Flags: must size, must free, out, simple ref,
srv alloc size=24 */
#ifdef _ALPHA
/* 210 */ NdrFcShort( 0x28 ), /* ia64 Stack size/offset = 40 */
#else
NdrFcShort( 0x20 ), /* axp64 Stack size/offset = 32 */
#endif
/* 212 */ NdrFcShort( 0x3c8 ), /* Type Offset=968 */

/* Return value */

/* 214 */ NdrFcShort( 0x70 ), /* Flags: out, return, base type, */
#ifdef _ALPHA
```

```
/* 216 */ NdrFcShort( 0x30 ), /* ia64 Stack size/offset = 48 */
#else
NdrFcShort( 0x28 ), /* axp64 Stack size/offset = 40 */
#endif
/* 218 */ 0x8, /* FC_LONG */
0x0, /* 0 */

/* Procedure CallSetComplete */

/* 220 */ 0x33, /* FC_AUTO_HANDLE */
0x6c, /* Old Flags: object, Oi2 */
/* 222 */ NdrFcLong( 0x0 ), /* 0 */
/* 226 */ NdrFcShort( 0x8 ), /* 8 */
/* 228 */ NdrFcShort( 0x10 ), /* ia64, axp64 Stack size/offset = 16 */
/* 230 */ NdrFcShort( 0x0 ), /* 0 */
/* 232 */ NdrFcShort( 0x8 ), /* 8 */
/* 234 */ 0x44, /* Oi2 Flags: has return, has ext, */
0x1, /* 1 */
/* 236 */ 0xa, /* 10 */
0x1, /* Ext Flags: new corr desc, */
/* 238 */ NdrFcShort( 0x0 ), /* 0 */
/* 240 */ NdrFcShort( 0x0 ), /* 0 */
/* 242 */ NdrFcShort( 0x0 ), /* 0 */
/* 244 */ NdrFcShort( 0x0 ), /* 0 */

/* Return value */

/* 246 */ NdrFcShort( 0x70 ), /* Flags: out, return, base type, */
/* 248 */ NdrFcShort( 0x8 ), /* ia64, axp64 Stack size/offset = 8 */
/* 250 */ 0x8, /* FC_LONG */
0x0, /* 0 */

0x0

}
};

static const MIDL_TYPE_FORMAT_STRING __MIDL_TypeFormatString =
{
0,
{
/* 2 */
NdrFcShort( 0x0 ), /* 0 */
/* 4 */ NdrFcShort( 0x39e ), /* Offset= 926 (930) */
/* 6 */
0x2b, /* FC_NON_ENCAPSULATED_UNION */
0x9, /* FC_ULONG */
/* 8 */ 0x7, /* Corr desc: FC_USHORT */
0x0, /* */
/* 10 */ NdrFcShort( 0xffff8 ), /* -8 */
/* 12 */ NdrFcShort( 0x1 ), /* Corr flags: early, */
/* 14 */ NdrFcShort( 0x2 ), /* Offset= 2 (16) */
/* 16 */ NdrFcShort( 0x10 ), /* 16 */
/* 18 */ NdrFcShort( 0x2b ), /* 43 */
/* 20 */ NdrFcLong( 0x3 ), /* 3 */
/* 24 */ NdrFcShort( 0x8008 ), /* Simple arm type: FC_LONG */
/* 26 */ NdrFcLong( 0x11 ), /* 17 */
/* 30 */ NdrFcShort( 0x8001 ), /* Simple arm type: FC_BYTE */
/* 32 */ NdrFcLong( 0x2 ), /* 2 */
/* 36 */ NdrFcShort( 0x8006 ), /* Simple arm type: FC_SHORT */
/* 38 */ NdrFcLong( 0x4 ), /* 4 */
/* 42 */ NdrFcShort( 0x800a ), /* Simple arm type: FC_FLOAT */
/* 44 */ NdrFcLong( 0x5 ), /* 5 */
```

# Appendix A - Application Source Code

```
/* 48 */ NdrFcShort( 0x800c ), /* Simple arm type: FC_DOUBLE */
/* 50 */ NdrFcLong( 0xb ), /* 11 */
/* 54 */ NdrFcShort( 0x8006 ), /* Simple arm type: FC_SHORT */
/* 56 */ NdrFcLong( 0xa ), /* 10 */
/* 60 */ NdrFcShort( 0x8008 ), /* Simple arm type: FC_LONG */
/* 62 */ NdrFcLong( 0x6 ), /* 6 */
/* 66 */ NdrFcShort( 0xd6 ), /* Offset= 214 (280) */
/* 68 */ NdrFcLong( 0x7 ), /* 7 */
/* 72 */ NdrFcShort( 0x800c ), /* Simple arm type: FC_DOUBLE */
/* 74 */ NdrFcLong( 0x8 ), /* 8 */
/* 78 */ NdrFcShort( 0xd0 ), /* Offset= 208 (286) */
/* 80 */ NdrFcLong( 0xd ), /* 13 */
/* 84 */ NdrFcShort( 0xe4 ), /* Offset= 228 (312) */
/* 86 */ NdrFcLong( 0x9 ), /* 9 */
/* 90 */ NdrFcShort( 0xf0 ), /* Offset= 240 (330) */
/* 92 */ NdrFcLong( 0x2000 ), /* 8192 */
/* 96 */ NdrFcShort( 0xfc ), /* Offset= 252 (348) */
/* 98 */ NdrFcLong( 0x24 ), /* 36 */
/* 102 */ NdrFcShort( 0x2f4 ), /* Offset= 756 (858) */
/* 104 */ NdrFcLong( 0x4024 ), /* 16420 */
/* 108 */ NdrFcShort( 0x2ee ), /* Offset= 750 (858) */
/* 110 */ NdrFcLong( 0x4011 ), /* 16401 */
/* 114 */ NdrFcShort( 0x2ec ), /* Offset= 748 (862) */
/* 116 */ NdrFcLong( 0x4002 ), /* 16386 */
/* 120 */ NdrFcShort( 0x2ea ), /* Offset= 746 (866) */
/* 122 */ NdrFcLong( 0x4003 ), /* 16387 */
/* 126 */ NdrFcShort( 0x2e8 ), /* Offset= 744 (870) */
/* 128 */ NdrFcLong( 0x4004 ), /* 16388 */
/* 132 */ NdrFcShort( 0x2e6 ), /* Offset= 742 (874) */
/* 134 */ NdrFcLong( 0x4005 ), /* 16389 */
/* 138 */ NdrFcShort( 0x2e4 ), /* Offset= 740 (878) */
/* 140 */ NdrFcLong( 0x400b ), /* 16395 */
/* 144 */ NdrFcShort( 0x2d2 ), /* Offset= 722 (866) */
/* 146 */ NdrFcLong( 0x400a ), /* 16394 */
/* 150 */ NdrFcShort( 0x2d0 ), /* Offset= 720 (870) */
/* 152 */ NdrFcLong( 0x4006 ), /* 16390 */
/* 156 */ NdrFcShort( 0x2d6 ), /* Offset= 726 (882) */
/* 158 */ NdrFcLong( 0x4007 ), /* 16391 */
/* 162 */ NdrFcShort( 0x2cc ), /* Offset= 716 (878) */
/* 164 */ NdrFcLong( 0x4008 ), /* 16392 */
/* 168 */ NdrFcShort( 0x2ce ), /* Offset= 718 (886) */
/* 170 */ NdrFcLong( 0x400d ), /* 16397 */
/* 174 */ NdrFcShort( 0x2cc ), /* Offset= 716 (890) */
/* 176 */ NdrFcLong( 0x4009 ), /* 16393 */
/* 180 */ NdrFcShort( 0x2ca ), /* Offset= 714 (894) */
/* 182 */ NdrFcLong( 0x6000 ), /* 24576 */
/* 186 */ NdrFcShort( 0x2c8 ), /* Offset= 712 (898) */
/* 188 */ NdrFcLong( 0x400c ), /* 16396 */
/* 192 */ NdrFcShort( 0x2c6 ), /* Offset= 710 (902) */
/* 194 */ NdrFcLong( 0x10 ), /* 16 */
/* 198 */ NdrFcShort( 0x8002 ), /* Simple arm type: FC_CHAR */
/* 200 */ NdrFcLong( 0x12 ), /* 18 */
/* 204 */ NdrFcShort( 0x8006 ), /* Simple arm type: FC_SHORT */
/* 206 */ NdrFcLong( 0x13 ), /* 19 */
/* 210 */ NdrFcShort( 0x8008 ), /* Simple arm type: FC_LONG */
/* 212 */ NdrFcLong( 0x16 ), /* 22 */
/* 216 */ NdrFcShort( 0x8008 ), /* Simple arm type: FC_LONG */
/* 218 */ NdrFcLong( 0x17 ), /* 23 */
/* 222 */ NdrFcShort( 0x8008 ), /* Simple arm type: FC_LONG */
/* 224 */ NdrFcLong( 0xe ), /* 14 */
/* 228 */ NdrFcShort( 0x2aa ), /* Offset= 682 (910) */
/* 230 */ NdrFcLong( 0x400e ), /* 16398 */
/* 234 */ NdrFcShort( 0x2b0 ), /* Offset= 688 (922) */

/* 236 */ NdrFcLong( 0x4010 ), /* 16400 */
/* 240 */ NdrFcShort( 0x2ae ), /* Offset= 686 (926) */
/* 242 */ NdrFcLong( 0x4012 ), /* 16402 */
/* 246 */ NdrFcShort( 0x26c ), /* Offset= 620 (866) */
/* 248 */ NdrFcLong( 0x4013 ), /* 16403 */
/* 252 */ NdrFcShort( 0x26a ), /* Offset= 618 (870) */
/* 254 */ NdrFcLong( 0x4016 ), /* 16406 */
/* 258 */ NdrFcShort( 0x264 ), /* Offset= 612 (870) */
/* 260 */ NdrFcLong( 0x4017 ), /* 16407 */
/* 264 */ NdrFcShort( 0x25e ), /* Offset= 606 (870) */
/* 266 */ NdrFcLong( 0x0 ), /* 0 */
/* 270 */ NdrFcShort( 0x0 ), /* Offset= 0 (270) */
/* 272 */ NdrFcLong( 0x1 ), /* 1 */
/* 276 */ NdrFcShort( 0x0 ), /* Offset= 0 (276) */
/* 278 */ NdrFcShort( 0xffffffff ), /* Offset= -1 (277) */
/* 280 */

/* 282 */ NdrFcShort( 0x8 ), /* 8 */
/* 284 */ 0xb, /* FC_HYPER */
/* 286 */

/* 288 */ NdrFcShort( 0xe ), /* FC_UP */
/* 290 */

/* 292 */ NdrFcShort( 0x2 ), /* 2 */
/* 294 */ 0x9, /* Corr desc: FC_ULONG */
/* 296 */ NdrFcShort( 0xffffc ), /* -4 */
/* 298 */ NdrFcShort( 0x1 ), /* Corr flags: early, */
/* 300 */ 0x6, /* FC_SHORT */
/* 302 */

/* 304 */ NdrFcShort( 0x8 ), /* 8 */
/* 306 */ NdrFcShort( 0xffffffff0 ), /* Offset= -16 (290) */
/* 308 */ 0x8, /* FC_LONG */
/* 310 */ 0x5c, /* FC_PAD */
/* 312 */

/* 314 */ NdrFcLong( 0x0 ), /* 0 */
/* 318 */ NdrFcShort( 0x0 ), /* 0 */
/* 320 */ NdrFcShort( 0x0 ), /* 0 */
/* 322 */ 0xc0, /* 192 */
/* 324 */ 0x0, /* 0 */
/* 326 */ 0x0, /* 0 */
/* 328 */ 0x0, /* 0 */
/* 330 */

/* 332 */ NdrFcLong( 0x20400 ), /* FC_IP */
/* 336 */ NdrFcShort( 0x0 ), /* FC_CONSTANT_IID */
/* 338 */ NdrFcShort( 0x0 ), /* 0 */
```

# Appendix A - Application Source Code

```
/* 340 */ 0xc0, /* 192 */
/* 342 */ 0x0, /* 0 */
/* 344 */ 0x0, /* 0 */
/* 346 */ 0x0, /* 0 */
/* 348 */ 0x46, /* 70 */
/* 350 */ NdrFcShort( 0x2 ), /* FC_UP [pointer_deref] */
/* 352 */ /* Offset= 2 (352) */
/* 354 */ NdrFcShort( 0x1e6 ), /* FC_UP */
/* 356 */ /* Offset= 486 (840) */
/* 358 */ 0x2a, /* FC_ENCAPSULATED_UNION */
/* 360 */ 0x89, /* 137 */
/* 362 */ NdrFcShort( 0x20 ), /* 32 */
/* 364 */ NdrFcShort( 0xa ), /* 10 */
/* 366 */ NdrFcLong( 0x8 ), /* 8 */
/* 368 */ NdrFcShort( 0x50 ), /* Offset= 80 (446) */
/* 370 */ NdrFcLong( 0xd ), /* 13 */
/* 372 */ NdrFcShort( 0x70 ), /* Offset= 112 (484) */
/* 374 */ NdrFcLong( 0x9 ), /* 9 */
/* 376 */ NdrFcShort( 0x90 ), /* Offset= 144 (522) */
/* 378 */ NdrFcLong( 0xc ), /* 12 */
/* 380 */ NdrFcShort( 0xb0 ), /* Offset= 176 (560) */
/* 382 */ NdrFcLong( 0x24 ), /* 36 */
/* 384 */ NdrFcShort( 0x104 ), /* Offset= 260 (650) */
/* 386 */ NdrFcLong( 0x800d ), /* 32781 */
/* 388 */ NdrFcShort( 0x120 ), /* Offset= 288 (684) */
/* 390 */ NdrFcLong( 0x10 ), /* 16 */
/* 392 */ NdrFcShort( 0x13a ), /* Offset= 314 (716) */
/* 394 */ NdrFcLong( 0x2 ), /* 2 */
/* 396 */ NdrFcShort( 0x150 ), /* Offset= 336 (744) */
/* 398 */ NdrFcLong( 0x3 ), /* 3 */
/* 400 */ NdrFcShort( 0x166 ), /* Offset= 358 (772) */
/* 402 */ NdrFcLong( 0x14 ), /* 20 */
/* 404 */ NdrFcShort( 0x17c ), /* Offset= 380 (800) */
/* 406 */ NdrFcShort( 0xfffffff ), /* Offset= -1 (421) */
/* 408 */
/* 410 */ 0x21, /* FC_BOGUS_ARRAY */
/* 412 */ 0x3, /* 3 */
/* 414 */ NdrFcShort( 0x0 ), /* 0 */
/* 416 */ 0x19, /* Corr desc: field pointer, FC_ULONG */
/* 418 */ 0x0, /* */
/* 420 */ NdrFcShort( 0x0 ), /* 0 */
/* 422 */ NdrFcShort( 0x1 ), /* Corr flags: early, */
/* 424 */ NdrFcLong( 0xfffffff ), /* -1 */
/* 426 */ NdrFcShort( 0x0 ), /* Corr flags: */
/* 428 */ 0x4c, /* FC_EMBEDDED_COMPLEX */
/* 430 */ 0x0, /* 0 */
/* 432 */ NdrFcShort( 0xfffffff4 ), /* Offset= -188 (330) */
/* 434 */ 0x5c, /* FC_PAD */
/* 436 */ 0x5b, /* FC_END */
/* 438 */
/* 440 */ 0x1a, /* FC_BOGUS_STRUCT */
/* 442 */ 0x3, /* 3 */
/* 444 */ NdrFcShort( 0x10 ), /* 16 */
/* 446 */ NdrFcShort( 0x0 ), /* 0 */
/* 448 */ NdrFcShort( 0x6 ), /* Offset= 6 (458) */
/* 450 */ 0x8, /* FC_LONG */
/* 452 */ 0x39, /* FC_ALIGNM8 */
/* 454 */
/* 456 */ 0x36, /* FC_POINTER */
/* 458 */ 0x5b, /* FC_END */
/* 460 */ NdrFcShort( 0xfffffddc ), /* FC_RP */
/* 462 */ /* Offset= -36 (424) */
/* 464 */ 0x21, /* FC_BOGUS_ARRAY */
/* 466 */ 0x3, /* 3 */
/* 468 */ NdrFcShort( 0x0 ), /* 0 */
/* 470 */ NdrFcShort( 0x1 ), /* Corr desc: field pointer, FC_ULONG */
/* 472 */ NdrFcLong( 0xfffffff ), /* -1 */
/* 474 */ NdrFcShort( 0x0 ), /* Corr flags: */
/* 476 */ 0x4c, /* FC_EMBEDDED_COMPLEX */
/* 478 */ 0x0, /* 0 */
/* 480 */ NdrFcShort( 0xfffffff58 ), /* Offset= -168 (312) */
/* 482 */ 0x5c, /* FC_PAD */
/* 484 */ 0x5b, /* FC_END */
/* 486 */
/* 488 */ 0x1a, /* FC_BOGUS_STRUCT */
/* 490 */ 0x3, /* 3 */
/* 492 */ NdrFcShort( 0x10 ), /* 16 */
/* 494 */ NdrFcShort( 0x0 ), /* 0 */
/* 496 */ NdrFcShort( 0x6 ), /* Offset= 6 (496) */
/* 498 */ 0x8, /* FC_LONG */
/* 500 */ 0x39, /* FC_ALIGNM8 */
/* 502 */ 0x36, /* FC_POINTER */
/* 504 */ 0x5b, /* FC_END */
/* 506 */
/* 508 */ 0x11, 0x0, /* FC_RP */
/* 510 */ NdrFcShort( 0xfffffddc ), /* Offset= -36 (462) */
/* 512 */
/* 514 */ 0x21, /* FC_BOGUS_ARRAY */
/* 516 */ 0x3, /* 3 */
/* 518 */ NdrFcShort( 0x0 ), /* 0 */
/* 520 */ 0x19, /* Corr desc: field pointer, FC_ULONG */
/* 522 */ 0x0, /* */
/* 524 */ NdrFcShort( 0x0 ), /* 0 */
/* 526 */ NdrFcShort( 0x1 ), /* Corr flags: early, */
/* 528 */ NdrFcLong( 0xfffffff ), /* -1 */
/* 530 */ NdrFcShort( 0x0 ), /* Corr flags: */
/* 532 */ 0x4c, /* FC_EMBEDDED_COMPLEX */
/* 534 */ 0x0, /* 0 */
/* 536 */ NdrFcShort( 0xfffffff44 ), /* Offset= -188 (330) */
/* 538 */ 0x5c, /* FC_PAD */
/* 540 */ 0x5b, /* FC_END */
/* 542 */
/* 544 */ 0x1a, /* FC_BOGUS_STRUCT */
/* 546 */ 0x3, /* 3 */
/* 548 */ NdrFcShort( 0x10 ), /* 16 */
/* 550 */ NdrFcShort( 0x0 ), /* 0 */
/* 552 */ NdrFcShort( 0x6 ), /* Offset= 6 (534) */
/* 554 */ 0x8, /* FC_LONG */
/* 556 */ 0x39, /* FC_ALIGNM8 */
/* 558 */ 0x36, /* FC_POINTER */
/* 560 */ 0x5b, /* FC_END */
/* 562 */
/* 564 */ 0x11, 0x0, /* FC_RP */
/* 566 */ NdrFcShort( 0xfffffddc ), /* Offset= -36 (500) */
/* 568 */
/* 570 */ 0x21, /* FC_BOGUS_ARRAY */
```

# Appendix A - Application Source Code

```
/* 540 */ NdrFcShort( 0x0 ), /* 0 */
/* 542 */ 0x19, /* Corr desc: field pointer, FC_ULONG */
/* 544 */ NdrFcShort( 0x0 ), /* 0 */
/* 546 */ NdrFcShort( 0x1 ), /* Corr flags: early, */
/* 548 */ NdrFcLong( 0xffffffff ), /* -1 */
/* 552 */ NdrFcShort( 0x0 ), /* Corr flags: */
/* 554 */
/* 556 */ NdrFcShort( 0x176 ), /* FC_UP */
/* 558 */ 0x5c, /* Offset= 374 (930) */
/* 560 */
/* 562 */ NdrFcShort( 0x1a ), /* FC_BOGUS_STRUCT */
/* 564 */ 0x3, /* 3 */
/* 566 */ NdrFcShort( 0x10 ), /* 16 */
/* 568 */ NdrFcShort( 0x0 ), /* 0 */
/* 570 */ NdrFcShort( 0x6 ), /* Offset= 6 (572) */
/* 572 */ 0x8, /* FC_LONG */
/* 574 */ 0x39, /* FC_ALIGNM8 */
/* 576 */ 0x5b, /* FC_POINTER */
/* 578 */ NdrFcShort( 0x11, 0x0 ), /* FC_RP */
/* 580 */ 0x2f, /* Offset= -36 (538) */
/* 582 */ 0x5a, /* FC_IP */
/* 584 */ NdrFcLong( 0x2f ), /* FC_CONSTANT_IID */
/* 586 */ NdrFcShort( 0x0 ), /* 0 */
/* 588 */ NdrFcShort( 0x0 ), /* 0 */
/* 590 */ NdrFcShort( 0x0 ), /* 0 */
/* 592 */ NdrFcShort( 0x0 ), /* 0 */
/* 594 */ 0x46, /* 70 */
/* 596 */ NdrFcShort( 0x1b ), /* FC_CARRAY */
/* 598 */ 0x0, /* 0 */
/* 600 */ NdrFcShort( 0x1 ), /* 1 */
/* 602 */ 0x19, /* Corr desc: field pointer, FC_ULONG */
/* 604 */ 0x0, /* 0 */
/* 606 */ NdrFcShort( 0x4 ), /* 4 */
/* 608 */ NdrFcShort( 0x1 ), /* Corr flags: early, */
/* 610 */ 0x1, /* FC_BYTE */
/* 612 */ 0x5b, /* FC_END */
/* 614 */
/* 616 */ NdrFcShort( 0x1a ), /* FC_BOGUS_STRUCT */
/* 618 */ 0x3, /* 3 */
/* 620 */ NdrFcShort( 0x18 ), /* 24 */
/* 622 */ NdrFcShort( 0x0 ), /* 0 */
/* 624 */ NdrFcShort( 0xc ), /* Offset= 12 (624) */
/* 626 */ 0x8, /* FC_LONG */
/* 628 */ 0x8, /* FC_LONG */
/* 630 */ 0x4c, /* FC_EMBEDDED_COMPLEX */
/* 632 */ 0x0, /* 0 */
/* 634 */ NdrFcShort( 0xffffffffd6 ), /* Offset= -42 (576) */
/* 636 */ 0x39, /* FC_ALIGNM8 */
/* 638 */ 0x36, /* FC_POINTER */
/* 640 */
/* 642 */ 0x5c, /* FC_PAD */
/* 644 */ 0x5b, /* FC_END */
/* 646 */ NdrFcShort( 0x12, 0x0 ), /* FC_UP */
/* 648 */ NdrFcShort( 0xffffffe0 ), /* Offset= -32 (594) */
/* 650 */
/* 652 */ NdrFcShort( 0x21 ), /* FC_BOGUS_ARRAY */
/* 654 */ 0x3, /* 3 */
/* 656 */ NdrFcShort( 0x0 ), /* 0 */
/* 658 */ 0x19, /* Corr desc: field pointer, FC_ULONG */
/* 660 */ 0x0, /* 0 */
/* 662 */ NdrFcShort( 0x0 ), /* 0 */
/* 664 */ NdrFcShort( 0x1 ), /* Corr flags: early, */
/* 666 */ NdrFcLong( 0xffffffff ), /* -1 */
/* 668 */ NdrFcShort( 0x0 ), /* Corr flags: */
/* 670 */
/* 672 */ NdrFcShort( 0x12, 0x0 ), /* FC_UP */
/* 674 */ NdrFcShort( 0xffffffd8 ), /* Offset= -40 (606) */
/* 676 */ 0x5c, /* FC_PAD */
/* 678 */ 0x5b, /* FC_END */
/* 680 */
/* 682 */ NdrFcShort( 0x1a ), /* FC_BOGUS_STRUCT */
/* 684 */ 0x3, /* 3 */
/* 686 */ NdrFcShort( 0x10 ), /* 16 */
/* 688 */ NdrFcShort( 0x0 ), /* 0 */
/* 690 */ NdrFcShort( 0x6 ), /* Offset= 6 (662) */
/* 692 */ 0x8, /* FC_LONG */
/* 694 */ 0x39, /* FC_ALIGNM8 */
/* 696 */ 0x5b, /* FC_POINTER */
/* 698 */ 0x5b, /* FC_END */
/* 700 */ NdrFcShort( 0x11, 0x0 ), /* FC_RP */
/* 702 */ NdrFcShort( 0xffffffd6 ), /* Offset= -36 (628) */
/* 704 */ 0x1d, /* FC_SMFARRAY */
/* 706 */ 0x0, /* 0 */
/* 708 */ NdrFcShort( 0x8 ), /* 8 */
/* 710 */ 0x2, /* FC_CHAR */
/* 712 */ 0x5b, /* FC_END */
/* 714 */
/* 716 */ NdrFcShort( 0x15 ), /* FC_STRUCT */
/* 718 */ 0x3, /* 3 */
/* 720 */ NdrFcShort( 0x10 ), /* 16 */
/* 722 */ 0x8, /* FC_LONG */
/* 724 */ 0x6, /* FC_SHORT */
/* 726 */ 0x6, /* FC_SHORT */
/* 728 */ 0x4c, /* FC_EMBEDDED_COMPLEX */
/* 730 */ 0x0, /* 0 */
/* 732 */ NdrFcShort( 0xfffffffff1 ), /* Offset= -15 (666) */
/* 734 */ 0x5b, /* FC_END */
/* 736 */
/* 738 */ NdrFcShort( 0x1a ), /* FC_BOGUS_STRUCT */
/* 740 */ 0x3, /* 3 */
/* 742 */ NdrFcShort( 0x20 ), /* 32 */
/* 744 */ NdrFcShort( 0x0 ), /* 0 */
/* 746 */ NdrFcShort( 0xa ), /* Offset= 10 (700) */
/* 748 */ 0x8, /* FC_LONG */
/* 750 */ 0x39, /* FC_ALIGNM8 */
/* 752 */ 0x36, /* FC_POINTER */
/* 754 */ 0x4c, /* FC_EMBEDDED_COMPLEX */
/* 756 */ 0x0, /* 0 */
/* 758 */ NdrFcShort( 0xffffffe7 ), /* Offset= -25 (672) */
/* 760 */ 0x5b, /* FC_END */
```

# Appendix A - Application Source Code

```
/* 700 */
/* 702 */ NdrFcShort( 0xffffffff10 ), /* FC_RP */ /* Offset= -240 (462) */
/* 704 */
/* 706 */ NdrFcShort( 0x1 ), /* FC_CARRAY */ /* 1 */
/* 708 */ 0x19, /* Corr desc: field pointer, FC_ULONG */ /* 0 */
/* 710 */ NdrFcShort( 0x0 ), /* 0 */
/* 712 */ NdrFcShort( 0x1 ), /* Corr flags: early, */
/* 714 */ 0x1, /* FC_BYTE */
/* 716 */ 0x5b, /* FC_END */
/* 718 */ NdrFcShort( 0x10 ), /* FC_BOGUS_STRUCT */ /* 16 */
/* 720 */ NdrFcShort( 0x0 ), /* 0 */
/* 722 */ NdrFcShort( 0x6 ), /* Offset= 6 (728) */
/* 724 */ 0x8, /* FC_LONG */
/* 726 */ 0x36, /* FC_ALIGNM8 */
/* 728 */ 0x36, /* FC_POINTER */
/* 730 */ NdrFcShort( 0xffffffffe6 ), /* FC_UP */ /* Offset= -26 (704) */
/* 732 */
/* 734 */ NdrFcShort( 0x2 ), /* FC_CARRAY */ /* 2 */
/* 736 */ 0x19, /* Corr desc: field pointer, FC_ULONG */ /* 1 */
/* 738 */ NdrFcShort( 0x0 ), /* 0 */
/* 740 */ NdrFcShort( 0x1 ), /* Corr flags: early, */
/* 742 */ 0x6, /* FC_SHORT */
/* 744 */ 0x5b, /* FC_END */
/* 746 */ NdrFcShort( 0x10 ), /* FC_BOGUS_STRUCT */ /* 16 */
/* 748 */ NdrFcShort( 0x0 ), /* 0 */
/* 750 */ NdrFcShort( 0x6 ), /* Offset= 6 (756) */
/* 752 */ 0x8, /* FC_LONG */
/* 754 */ 0x36, /* FC_ALIGNM8 */
/* 756 */ 0x36, /* FC_POINTER */
/* 758 */ NdrFcShort( 0xffffffffe6 ), /* FC_UP */ /* Offset= -26 (732) */
/* 760 */
/* 762 */ NdrFcShort( 0x4 ), /* FC_CARRAY */ /* 4 */
/* 764 */ 0x19, /* Corr desc: field pointer, FC_ULONG */ /* 3 */
/* 766 */ NdrFcShort( 0x0 ), /* 0 */
/* 768 */ NdrFcShort( 0x1 ), /* Corr flags: early, */
/* 770 */ 0x8, /* FC_LONG */
/* 772 */ 0x5b, /* FC_END */
/* 774 */ NdrFcShort( 0x10 ), /* FC_BOGUS_STRUCT */ /* 16 */
/* 776 */ NdrFcShort( 0x0 ), /* 0 */
/* 778 */ NdrFcShort( 0x6 ), /* Offset= 6 (784) */
/* 780 */ 0x8, /* FC_LONG */
/* 782 */ 0x36, /* FC_ALIGNM8 */
/* 784 */ 0x36, /* FC_POINTER */
/* 786 */ NdrFcShort( 0xffffffffe6 ), /* FC_UP */ /* Offset= -26 (760) */
/* 788 */
/* 790 */ NdrFcShort( 0x8 ), /* FC_CARRAY */ /* 8 */
/* 792 */ 0x19, /* Corr desc: field pointer, FC_ULONG */ /* 7 */
/* 794 */ NdrFcShort( 0x0 ), /* 0 */
/* 796 */ NdrFcShort( 0x1 ), /* Corr flags: early, */
/* 798 */ 0xb, /* FC_HYPER */
/* 800 */ 0x5b, /* FC_END */
/* 802 */ NdrFcShort( 0x10 ), /* FC_BOGUS_STRUCT */ /* 16 */
/* 804 */ NdrFcShort( 0x0 ), /* 0 */
/* 806 */ NdrFcShort( 0x6 ), /* Offset= 6 (812) */
/* 808 */ 0x8, /* FC_LONG */
/* 810 */ 0x36, /* FC_ALIGNM8 */
/* 812 */ 0x36, /* FC_POINTER */
/* 814 */ NdrFcShort( 0xffffffffe6 ), /* FC_UP */ /* Offset= -26 (788) */
/* 816 */
/* 818 */ NdrFcShort( 0x8 ), /* FC_STRUCT */ /* 8 */
/* 820 */ 0x8, /* FC_LONG */
/* 822 */ 0x5c, /* FC_PAD */
/* 824 */ 0x5b, /* FC_LONG */
/* 826 */ NdrFcShort( 0x8 ), /* FC_CARRAY */ /* 8 */
/* 828 */ 0x7, /* Corr desc: FC_USHORT */ /* 3 */
/* 830 */ NdrFcShort( 0xffc8 ), /* -56 */
/* 832 */ NdrFcShort( 0x1 ), /* Corr flags: early, */
/* 834 */ 0x4c, /* FC_EMBEDDED_COMPLEX */
/* 836 */ NdrFcShort( 0xffffffffec ), /* Offset= -20 (816) */
/* 838 */ 0x5c, /* FC_PAD */
/* 840 */ 0x5b, /* FC_END */
/* 842 */ NdrFcShort( 0x38 ), /* FC_BOGUS_STRUCT */ /* 56 */
/* 844 */ NdrFcShort( 0xffffffffec ), /* Offset= -20 (824) */
/* 846 */ NdrFcShort( 0x0 ), /* Offset= 0 (846) */
/* 848 */ 0x6, /* FC_SHORT */
/* 850 */ 0x38, /* FC_ALIGNM4 */
/* 852 */ 0x8, /* FC_SHORT */
/* 854 */ 0x8, /* FC_LONG */
```

# Appendix A - Application Source Code

```
/* 852 */ 0x8,          /* FC_LONG */
/* 854 */ 0x4,          /* FC_EMBEDDED_COMPLEX */
/* 858 */          /* FC_UP [simple_pointer] */
/* 860 */ NdrFcShort( 0xfffffe0d ), /* Offset= -499 (356) */
/* 862 */          /* FC_END */
/* 864 */ 0x12, 0x0,    /* FC_UP */
/* 866 */          /* Offset= -254 (606) */
/* 868 */ 0x12, 0x8,    /* FC_UP [simple_pointer] */
/* 870 */          /* FC_BYTE */
/* 872 */ 0x5c,        /* FC_PAD */
/* 874 */          /* FC_UP [simple_pointer] */
/* 876 */ 0x12, 0x8,    /* FC_UP [simple_pointer] */
/* 878 */          /* FC_SHORT */
/* 880 */ 0x5c,        /* FC_PAD */
/* 882 */          /* FC_UP [simple_pointer] */
/* 884 */ 0x12, 0x8,    /* FC_UP [simple_pointer] */
/* 886 */          /* FC_DOUBLE */
/* 888 */ 0x5c,        /* FC_PAD */
/* 890 */          /* FC_UP */
/* 892 */ NdrFcShort( 0xffffda4 ), /* Offset= -604 (280) */
/* 894 */          /* FC_UP [pointer_deref] */
/* 896 */ 0x12, 0x10,   /* FC_UP [pointer_deref] */
/* 898 */          /* Offset= -602 (286) */
/* 900 */ NdrFcShort( 0xffffdbc ), /* Offset= -580 (312) */
/* 902 */          /* FC_UP [pointer_deref] */
/* 904 */ 0x12, 0x10,   /* FC_UP [pointer_deref] */
/* 906 */          /* Offset= -566 (330) */
/* 908 */ NdrFcShort( 0xffffdca ), /* Offset= -552 (348) */
/* 910 */          /* FC_UP [pointer_deref] */
/* 912 */ 0x12, 0x10,   /* FC_UP [pointer_deref] */
/* 914 */          /* Offset= 2 (906) */
/* 916 */ NdrFcShort( 0x16 ), /* Offset= 22 (930) */
/* 918 */          /* FC_UP */
/* 920 */ 0x15,        /* FC_STRUCT */
/* 922 */ 0x7,         /* FC_UP */
/* 924 */          /* FC_SHORT */
/* 926 */ 0x6,         /* FC_BYTE */
/* 928 */ 0x1,        /* FC_BYTE */
/* 930 */ 0x38,       /* FC_ALIGNM4 */
/* 932 */ 0x8,        /* FC_LONG */
/* 934 */ 0x39,       /* FC_ALIGNM8 */
/* 936 */ 0xb,        /* FC_HYPER */
/* 938 */ 0x5b,       /* FC_END */
/* 940 */          /* FC_UP */
/* 942 */ 0x12, 0x0,    /* FC_UP */
```

```
/* 924 */ NdrFcShort( 0xffffffff2 ), /* Offset= -14 (910) */
/* 926 */          /* FC_UP [simple_pointer] */
/* 928 */ 0x2,        /* FC_CHAR */
/* 930 */ 0x5c,       /* FC_PAD */
/* 932 */          /* FC_BOGUS_STRUCT */
/* 934 */ 0x1a,       /* FC_UP */
/* 936 */          /* Offset= 0 (936) */
/* 938 */ 0x8,        /* FC_LONG */
/* 940 */ 0x6,        /* FC_SHORT */
/* 942 */ 0x6,        /* FC_SHORT */
/* 944 */ 0x4c,       /* FC_EMBEDDED_COMPLEX */
/* 946 */ NdrFcShort( 0xfffffc54 ), /* Offset= -940 (6) */
/* 948 */ 0x5c,       /* FC_PAD */
/* 950 */ 0xb4,       /* FC_USER_MARSHAL */
/* 952 */          /* FC_END */
/* 954 */ NdrFcShort( 0x0 ), /* FC_UP */
/* 956 */ NdrFcShort( 0x18 ), /* FC_UP */
/* 958 */ NdrFcShort( 0x0 ), /* FC_UP */
/* 960 */          /* Offset= -956 (2) */
/* 962 */ NdrFcShort( 0x6 ), /* Offset= 6 (968) */
/* 964 */          /* FC_OP */
/* 966 */ NdrFcShort( 0xfffffdc ), /* Offset= -36 (930) */
/* 968 */ 0xb4,       /* FC_USER_MARSHAL */
/* 970 */          /* FC_UP */
/* 972 */ NdrFcShort( 0x18 ), /* FC_UP */
/* 974 */ NdrFcShort( 0x0 ), /* FC_UP */
/* 976 */ NdrFcShort( 0xfffffff4 ), /* Offset= -12 (964) */
/* 978 */          /* FC_UP */
/* 980 */          /* FC_UP */
/* 982 */          /* FC_UP */
/* 984 */          /* FC_UP */
/* 986 */          /* FC_UP */
/* 988 */          /* FC_UP */
/* 990 */          /* FC_UP */
/* 992 */          /* FC_UP */
/* 994 */          /* FC_UP */
/* 996 */          /* FC_UP */
/* 998 */          /* FC_UP */
/* 1000 */          /* FC_UP */
};

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
};
```

## Appendix A - Application Source Code

```
#define _tpcc_com_ps_CHECK_IID(n) IID_GENERIC_CHECK_IID( _tpcc_com_ps, pIID, n)

int __stdcall _tpcc_com_ps_IID_Lookup( const IID * pIID, int * pIndex )
{
    if(!_tpcc_com_ps_CHECK_IID(0))
    {
        *pIndex = 0;
        return 1;
    }

    return 0;
}

const ExtendedProxyFileInfo tpcc_com_ps_ProxyFileInfo =
{
    (PCInterfaceProxyVtblList *) & _tpcc_com_ps_ProxyVtblList,
    (PCInterfaceStubVtblList *) & _tpcc_com_ps_StubVtblList,
    (const PCInterfaceName *) & _tpcc_com_ps_InterfaceNamesList,
    0, // no delegation
    & _tpcc_com_ps_IID_Lookup,
    1,
    2,
    0, /* table of [async_uuid] interfaces */
    0, /* Filler1 */
    0, /* Filler2 */
    0 /* Filler3 */
};

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

### common/txnlog/include/rtetime.h

```
/* FILE: rtetime.h : header file
 * Copyright 1997 Microsoft Corp., All rights reserved.
 *
 * Authors: Charles Levine, Philip Durr
 *          Microsoft Corp.
 */

#define MAX_JULIAN_TIME 0x7FFFFFFFFFFFFFFF
#define JULIAN_TIME __int64
#define TC_TIME DWORD
extern "C"
{
    BOOL InitJulianTime(LPSYSTEMTIME lpInitTime);
    JULIAN_TIME GetJulianTime(void);
    DWORD MyTickCount(void);
    void GetJulianAndTC(JULIAN_TIME *pJulian, DWORD *pTC);
    JULIAN_TIME ConvertTo64BitTime(int iYear, int iMonth, int iDay, int iHour, int
iMinute, int iSecond);
    JULIAN_TIME Get64BitTime(LPSYSTEMTIME lpInitTime);
    int JulianDay( int yr, int mm, int dd );
}
```

```
void JulianToTime(JULIAN_TIME julianTS, int* yr, int* mm, int* dd, int
*hh, int *mi, int *ss );
void JulianToCalendar( int day, int* yr, int* mm, int* dd );
}
```

### common/txnlog/include/spinlock.h

```
/* FILE: SPINLOCK.H
 *
 * Copyright 1997 Microsoft Corp., All rights reserved.
 *
 * Authors: Mike Parkes, Charles Levine, Philip Durr
 *          Microsoft Corp.
 */

#ifndef _INC_Spinlock

const LONG LockClosed = 1;
const LONG LockOpen = 0;

/*****
 *
 * Spinlock and Semaphore locking.
 *
 * This class provides a very conservative locking scheme.
 * The assumption behind the code is that locks will be
 * held for a very short time. When a lock is taken a memory
 * location is exchanged. All other threads that want this
 * lock wait by spinning and sometimes sleeping on a semaphore
 * until it becomes free again. The only other choice is not
 * to wait at all and move on to do something else. This
 * module should normally be used in conjunction with cache
 * aligned memory in minimize cache line misses.
 *
 *****/

class Spinlock
{
    // Private data.
    HANDLE Semaphore;
    volatile LONG m_Spinlock;
    volatile LONG Waiting;

#ifdef _DEBUG
    // Counters for debugging builds.
    volatile LONG TotalLocks;
    volatile LONG TotalSleeps;
    volatile LONG TotalSpins;
    volatile LONG TotalWaits;
#endif

public:
    // Public functions.
    Spinlock( void );
};
```



## Appendix A - Application Source Code

```
        inline BOOL ClaimLock( BOOL Wait = TRUE );
        inline void ReleaseLock( void );
        ~Spinlock( void );
        // Disabled operations.
        Spinlock( const Spinlock & Copy );
        void operator=( const Spinlock & Copy );

    private:
        // Private functions.
        inline BOOL ClaimSpinlock( volatile LONG *sl );
        void WaitForLock( void );
        void WakeAllSleepers( void );
};

/*****
 *
 * A guaranteed atomic exchange.
 *
 * An attempt is made to claim the Spinlock. This action is
 * guaranteed to be atomic.
 *
 *****/

inline BOOL Spinlock::ClaimSpinlock( volatile LONG *Spinlock )
{
    #ifdef _DEBUG
        InterlockedIncrement( (LPLONG) & TotalLocks );
    #endif
    return ( ((*Spinlock) == LockOpen) && (InterlockedExchange(
(LPLONG) Spinlock, LockClosed) == LockOpen) );
}

/*****
 *
 * Claim the Spinlock.
 *
 * Claim the lock if available else wait or exit.
 *
 *****/

inline BOOL Spinlock::ClaimLock( BOOL Wait )
{
    if ( ! ClaimSpinlock( (volatile LONG*) & m_Spinlock ) )
    {
        if ( Wait )
            WaitForLock();
        return Wait;
    }
    return TRUE;
}

/*****
 *
 * Release the Spinlock.
 *
 * Release the lock and if needed wakeup any sleepers.
 *
 *****/

inline void Spinlock::ReleaseLock( void )
{
    m_Spinlock = LockOpen;
}
```

```
        if ( Waiting > 0 )
            WakeAllSleepers();
    }

    #define _INC_Spinlock

#endif
```

### common/txnlog/include/txnlog.h

```
/* FILE: TXNLOG.H Microsoft TPC-C Kit Ver. 4.10.000
 *
 * NOTE: this file is RTE specific and should not be
 * included in Full Disclosure Reports.
 *
 * Copyright Microsoft, 1999
 *
 * PURPOSE: Structure definitions for logging delivery txn completion stats.
 * Contact: Charles Levine (clevine@microsoft.com)
 */

typedef struct _TXN_NEWORDER
{
    BYTE OL_Count; //range 0 to 31
    BYTE OL_Remote_Count; //range 0 to 31
    WORD c_id;
    int o_id;
} TXN_NEWORDER;

typedef struct _TXN_PAYMENT
{
    BYTE CustByName;
    BYTE IsRemote;
} TXN_PAYMENT;

typedef struct _TXN_ORDERSTATUS
{
    BYTE CustByName;
} TXN_ORDERSTATUS;

typedef union _TXN_DETAILS
{
    TXN_NEWORDER NewOrder;
    TXN_PAYMENT Payment;
    TXN_ORDERSTATUS OrderStatus;
} TXN_DETAILS;

// Common header for all records in txn log. The TxnType field is
// a switch which identifies the particular variant.
#define TXN_REC_TYPE_CONTROL 1 //
```

# Appendix A - Application Source Code

```

#define TXN_REC_TYPE_TPCC                2        // replaces
TRANSACTION_TYPE_TPCC
#define TXN_REC_TYPE_TPCC_DELIV_DEF      3

typedef struct _TXN_RECORD_HEADER
{
    JULIAN_TIME    TxnStartT0;           // start of txn
    BYTE          TxnType;               // one of TXN_REC_TYPE_*
    BYTE          TxnSubType;            // depends on
TxnType
} TXN_RECORD_HEADER, *PTXN_RECORD_HEADER;

typedef struct _TXN_RECORD_CONTROL
{
    // common header; must exactly match TXN_RECORD_HEADER
    JULIAN_TIME    TxnStartT0;           // start of txn
    BYTE          TxnType;               // = TXN_REC_TYPE_CONTROL
    BYTE          TxnSubType;            // depends on
TxnType

    // end of common header

    DWORD         Len;                   // number of bytes
after this field
} TXN_RECORD_CONTROL, *PTXN_RECORD_CONTROL;

// TPC-C Txn Record Layout:
//
// 'TxnStartT0' is a Julian timestamp corresponding to the moment the
// txn is sent to the SUT, i.e., beginning of response time. Deltas
// are in milliseconds. Note that if RTDelay > 0, then the txn was
// delayed by this amount. The delay occurs at the beginning of the
// response time. So if RTDelay > 0, then the txn was actually sent
// at TxnStartT0 + RTDelay.
//
// Graphically:
//
// time -->
//
// |--- Menu ---|--- Keying ---|--- Response ---|--- Think ---|
// |<- DeltaT1 ->|<- DeltaT2 ->|<- DeltaT4 ->|<- DeltaT3 ->|
//
//
// ^
// ^ TxnStartT0
//
// RTDelay is the amount of response time delay included in DeltaT4.
// RTDelay is recorded per txn because this value can be changed on
// the fly, and so may vary from txn to txn.
//
// TxnStatus is the txn completion code. It is used to indicate errors.
// For example, in the New Order txn, 1% of txns abort. TxnStatus will
// reflect this.

typedef struct _TXN_RECORD_TPCC
{
    // common header; must exactly match TXN_RECORD_HEADER
    JULIAN_TIME    TxnStartT0;           // start of txn
    BYTE          TxnType;               // = TXN_REC_TYPE_TPCC
    BYTE          TxnSubType;            // depends on
TxnType

    // end of common header

    int          DeltaT1;                // menu time (ms)

```

```

    int          DeltaT2;                // keying time (ms)
    int          DeltaT3;                // think time (ms)
    int          DeltaT4;                // response time (ms)
    int          RTDelay;                // response time delay (ms)
    int          TxnError;                // error code providing more
detail for TxnStatus
    WORD         w_id;                   // warehouse ID
    BYTE         d_id;                   // assigned district ID for
this thread
    BYTE         d_id_ThisTxn;           // district ID chosen for this
particular
    BYTE         TxnStatus;              // completion status for txn
to indicate errors
    BYTE         reserved;                // for word alignment
    TXN_DETAILS   TxnDetails;            //
} TXN_RECORD_TPCC, *PTXN_RECORD_TPCC;

// TPC-C Deferred Delivery Txn Record Layout:
//
// Incorporating delivery transaction information into the above
// structure would increase the size of TXN_DETAILS from 8 to 42 bytes.
// Hence, we store delivery transaction details in a separate structure.
//
typedef struct _TXN_RECORD_TPCC_DELIV_DEF
{
    // common header; must exactly match TXN_RECORD_HEADER
    JULIAN_TIME    TxnStartT0;           // start of txn
    BYTE          TxnType;               // =
TXN_REC_TYPE_TPCC_DELIV_DEF
    BYTE          TxnSubType;            // = 0
    // end of common header

    int          DeltaT4;                // response time (ms)
    int          DeltaTxnExec;           // execution time (ms)
    WORD         w_id;                   // warehouse ID
    BYTE         TxnStatus;              // completion status for txn
to indicate errors
    BYTE         reserved;                // for word alignment
    short        o_carrier_id;           // carrier id
    long         o_id[10];               // returned delivery transaction ids
} TXN_RECORD_TPCC_DELIV_DEF, *PTXN_RECORD_TPCC_DELIV_DEF;

#define TXN_LOG_VERSION                  1
#define TXN_DATA_START                   4096 // offset in log file where
log records start
#define TXN_LOG_EYE_CATCHER "BC"        // signature bytes at the start of log
file

////////////////////////////////////
// The transaction log has a header as the first 4K block.
//
typedef struct _TXN_LOG_HEADER
{
    char          EyeCatcher[2];          // signature bytes;
should always be "BC"
    int          LogVersion;
    // set to TXN_LOG_VERSION
    JULIAN_TIME   BeginTxnTS;            //
timestamp of first (lowest) txn start

```

# Appendix A - Application Source Code

```

        JULIAN_TIME          EndTxnTS;          // timestamp of
last (highest) txn completion time
        int
        // number of records in log file
        BOOL                iRecCount;
        // file size in bytes
        int                bLogSorted;
        // file size in bytes
        int                iFileSize;

        // the record map provides a fast way to get close to a particular
timestamp in a sorted log file.
        // struct
        // {
        //     JULIAN_TIME          TS;
        //     // timestamp of record
        //     int                iPos;
        //     // byte position in file
        // }
        RecMap[RecMapSize];
//#define          RecMapSize          200

    } TXN_LOG_HEADER, *PTXN_LOG_HEADER;

#define READ_BUFFER_SIZE          64*1024
#define WRITE_BUFFER_SIZE          8*1024

#define NUM_READ_BUFFERS          1
#define NUM_WRITE_BUFFERS          2
#define MAX_NUM_BUFFERS          2

// flags passed in to the constructor
#define TXN_LOG_WRITE          0x01
#define TXN_LOG_READ          0x02
#define TXN_LOG_SORTED          0x04

#define TXN_LOG_OS_ERROR          1
#define TXN_LOG_NOT_SORTED          2

#define SKIP_CTRL_RECS          1

class CTxnLog
{
private:
    DWORD                iBufferSize;          //buffer
allocated size
    DWORD                iBytesFreeInBuffer;    //total bytes
available for use in buffer
    int                iNumBuffers;
    //buffers in use
    int                iActiveBuffer;
    //indicates which buffer is active: 0 or 1
    int                iIoBuffer;
    //buffer for any pending IO operation
    int                iFilePointer;
    //position in file.
    int                iNextRec;
    //when reading, ordinal value of next record

    // A "save point" is remembered each time GetNextRecord is called
with a start time specified.
    // The next time it is called, if start time is after the save point,
we start scanning from the

```

```

        // save point. This is particularly useful in FindBestInterval,
where the log is scanned repeatedly.
        JULIAN_TIME          SavePtTime;
        int                iSavePtFilePointer;
        int                iSavePtNextRec;

        JULIAN_TIME          lastTS;
        //when writing sorted output, used to verify records are sorted
        BOOL                bWrite;
        //writing log file

        BOOL                bLogSorted;
        // is log file sorted? applies to both input and output
        JULIAN_TIME          BeginTxnTS;
        // timestamp of first (lowest) txn start
        JULIAN_TIME          EndTxnTS;
timestamp of last (highest) txn completion time
        int                iRecCount;
        // number of records in log file

        BYTE                *pCurrent;
        //ptr to current buffer
        BYTE                *pBuffer[MAX_NUM_BUFFERS];

        PTXN_RECORD_HEADER *TxnArray;          //transaction
record pointer array for sort

        DWORD                dwError;
        HANDLE                hTxnFile;          //handle
to log file
        HANDLE                hMapFile;          //map
file used when sorting the log
        HANDLE                hIoComplete;      //event
to signify that there are no pending IOs
        HANDLE                hLogFileIo;
        //event to signal the IO thread to write the inactive buffer

        Spinlock          Spin;          //spin
lock to protect the txn log file buffers

        int Write(BYTE *ptr, DWORD Size);
        static void LogFileIO(CTxnLog *);

public:
    CTxnLog::CTxnLog(LPCTSTR szFileName, DWORD dwOpts);
    ~CTxnLog(void);

    int WriteToLog(PTXN_RECORD_TPCC pTxnRcld);
    int WriteToLog(PTXN_RECORD_TPCC_DELIV_DEF pTxnRcld);
    int WriteToLog(PTXN_RECORD_CONTROL pCtrlRec);
    int WriteToLog(PTXN_RECORD_HEADER pCtrlRec);

    int WriteCtrlRecToLog(BYTE SubType, LPTSTR lpStr, DWORD dwLen);

    void CloseTransactionLogFile(void);

    PTXN_RECORD_HEADER GetNextRecord(BOOL bSkipCtrlRecs = FALSE);
    PTXN_RECORD_HEADER GetNextRecord(JULIAN_TIME SeekTimeT0, BOOL
bSkipCtrlRecs = FALSE);

    int Sort(void);
    PTXN_RECORD_HEADER GetSortedRecord(int index);

```

## Appendix A - Application Source Code

---

```
inline BOOL IsSorted(void) { return bLogSorted; };
inline JULIAN_TIME BeginTS(void) { return BeginTxnTS; };
inline JULIAN_TIME EndTS(void) { return EndTxnTS; };
inline int ReCordCount(void) { return iRecCount; };
};

class CTXNLOG_ERR : public CBaseErr
{
public:
enum CTPCC_DBLIB_ERRS
{
ERR_BAD_FILE_FORMAT = 1, // "File format is invalid."
ERR_UNKNOWN_LOG_VERSION, // "Log file version is
unknown."
ERR_BROKEN_LOG_FILE, // "Log file is
broken."
ERR_LOG_NOT_SORTED, // "Log file is not
sorted"
ERR_INVALID_TIME_SEQ, // "Internal Error:
Record Time Sequence invalid."
};

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

int m_errno;

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

// TODO: need to complete...
char *ErrorText() {return ""};
};
```

# Appendix B - Database Design

## Appendix B - Database Design

### Build Scripts

#### setup.cmd

```
ECHO OFF

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

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

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

if '%3'=='full' goto start
if '%3'=='bulddb' goto bulddb
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

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

```
goto end

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

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

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

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

## Appendix B - Database Design

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

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

goto end

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

:-- File: CREATEDB.SQL
:-- Microsoft TPC-C Benchmark Kit Ver. 4.22
:-- Copyright Microsoft, 2001
:-- Purpose: Creates tpcc database and backup files

use master
go

-- Create temporary table for timing

if exists ( select name from sysobjects where name = 'tpcc_timer' )
drop table tpcc_timer
```

```
>
go
create table tpcc_timer
(
start_date char(30),
end_date char(30)
)
insert into tpcc_timer values (0,0)
go
-- Store starting time
update tpcc_timer
set start_date = (select convert(char(30), getdate(),9))
go
-- create main database files
CREATE DATABASE tpcc
ON PRIMARY
(
NAME = MSSQL_tpcc_root,
FILENAME = "C:\MSSQL_tpcc_root.mdf",
SIZE = 8MB,
FILEGROWTH =0),
FILEGROUP MSSQL_misc_fg
(
NAME = MSSQL_misc1,
FILENAME = "K:",
SIZE = 30000MB,
FILEGROWTH = 0),
(
NAME = MSSQL_misc2,
FILENAME = "S:",
SIZE = 30000MB,
FILEGROWTH = 0),
FILEGROUP MSSQL_cs_fg
(
NAME = MSSQL_cs1,
FILENAME = "Y:",
SIZE = 50000MB,
FILEGROWTH = 0),
(
NAME = MSSQL_cs2,
FILENAME = "W:",
SIZE = 50000MB,
FILEGROWTH = 0)
LOG ON
(
NAME =MSSQL_tpcc_log,
FILENAME ="L:",
SIZE =54000MB,
FILEGROWTH =0)
COLLATE Latin1_General_BIN
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
```

# Appendix B - Database Design

```
if exists ( select name from sysobjects where name = 'tpcc_timer' )
    drop table tpcc_timer
go
```

## tables.sql

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

```
use tpcc
go
```

```
if exists ( select name from sysobjects where name = 'warehouse' )
    drop table warehouse
```

```
go
create table warehouse
```

```
(
    w_id                smallint,
    w_name              char(10),
    w_street_1          char(20),
    w_street_2          char(20),
    w_city               char(20),
    w_state             char(2),
    w_zip               char(9),
    w_tax               numeric(4,4),
    w_ytd               numeric(12,2)
) on MSSQL70_misc_fg
go
```

```
if exists ( select name from sysobjects where name = 'district' )
    drop table district
```

```
go
create table district
```

```
(
    d_id                tinyint,
    d_w_id              smallint,
    d_name              char(10),
    d_street_1          char(20),
    d_street_2          char(20),
    d_city              char(20),
    d_state             char(2),
    d_zip               char(9),
    d_tax               numeric(4,4),
    d_ytd               numeric(12,2),
    d_next_o_id         int
) on MSSQL70_misc_fg
go
```

```
if exists ( select name from sysobjects where name = 'customer' )
    drop table customer
```

```
go
create table customer
```

```
(
    c_id                int,
    c_d_id              tinyint,
    c_w_id              smallint,
    c_first              char(16),
```

```
    c_middle            char(2),
    c_last              char(16),
    c_street_1          char(20),
    c_street_2          char(20),
    c_city              char(20),
    c_state             char(2),
    c_zip               char(9),
    c_phone             char(16),
    c_since             datetime,
    c_credit            char(2),
    c_credit_lim        numeric(12,2),
    c_discount          numeric(4,4),
    c_balance           numeric(12,2),
    c_ytd_payment       numeric(12,2),
    c_payment_cnt       smallint,
    c_delivery_cnt      smallint,
    c_data              char(500)
) on MSSQL70_cs_fg
go
```

```
if exists ( select name from sysobjects where name = 'history' )
    drop table history
```

```
go
create table history
```

```
(
    h_c_id              int,
    h_c_d_id            tinyint,
    h_c_w_id            smallint,
    h_d_id              tinyint,
    h_w_id              smallint,
    h_date              datetime,
    h_amount            numeric(6,2),
    h_data              char(24)
) on MSSQL70_misc_fg
go
```

```
if exists ( select name from sysobjects where name = 'new_order' )
    drop table new_order
```

```
go
create table new_order
```

```
(
    no_o_id             int,
    no_d_id             tinyint,
    no_w_id             smallint
) on MSSQL70_misc_fg
go
```

```
if exists ( select name from sysobjects where name = 'orders' )
    drop table orders
```

```
go
create table orders
```

```
(
    o_id                int,
    o_d_id              tinyint,
    o_w_id              smallint,
    o_c_id              int,
    o_entry_d           datetime,
    o_carrier_id        tinyint,
    o_ol_cnt            tinyint,
    o_all_local         tinyint
) on MSSQL70_misc_fg
go
```

## Appendix B - Database Design

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

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

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

### idxcuscl.sql

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

use tpcc
go

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

if exists ( select name from sysindexes where name = 'customer_c1' )
    drop index customer.customer_c1

create unique clustered index customer_c1 on customer(c_w_id, c_d_id, c_id)
on MSSQL70_cs_fg

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

go
```

### idxcusnc.sql

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

use tpcc
go

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

if exists ( select name from sysindexes where name = 'customer_nc1' )
    drop index customer.customer_nc1

create unique nonclustered index customer_nc1 on customer(c_w_id, c_d_id, c_last,
c_first, c_id)
on MSSQL70_cs_fg

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

go
```



# Appendix B - Database Design

---

## idxdiscl.sql

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

use tpcc
go

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

if exists ( select name from sysindexes where name = 'district_c1' )
    drop index district.district_c1

create unique clustered index  district_c1 on district(d_w_id, d_id)
    with fillfactor=100 on MSSQL70_misc_fg

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

go
```

## idxitmcl.sql

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

use tpcc
go

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

if exists ( select name from sysindexes where name = 'item_c1' )
    drop index item.item_c1

create unique clustered index item_c1 on item(i_id)
    on MSSQL70_misc_fg

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

go
```

## idxnodcl.sql

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

use tpcc
go

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

if exists ( select name from sysindexes where name = 'new_order_c1' )
    drop index new_order.new_order_c1

create unique clustered index new_order_c1 on new_order(no_w_id, no_d_id, no_o_id)
    on MSSQL70_misc_fg

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

go
```

## idxodcl.sql

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

use tpcc
go

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

if exists ( select name from sysindexes where name = 'new_order_c1' )
    drop index new_order.new_order_c1

create unique clustered index new_order_c1 on new_order(no_w_id, no_d_id, no_o_id)
    on MSSQL70_misc_fg

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

go
```

## Appendix B - Database Design

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### idxordcl.sql

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

use tpcc
go

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

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

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

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

go
```

### idxstkcl.sql

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

use tpcc
go

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

if exists ( select name from sysindexes where name = 'stock_c1' )
    drop index stock.stock_c1

create unique clustered index stock_c1 on stock(s_i_id, s_w_id)
    on MSSQL70_cs_fg

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

go
```

### idxwarcl.sql

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

use tpcc
go

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

if exists ( select name from sysindexes where name = 'warehouse_c1' )
    drop index warehouse.warehouse_c1

create unique clustered index warehouse_c1 on warehouse(w_id)
    with fillfactor=100 on MSSQL70_misc_fg

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

go
```

### dbopt1.sql

```
-- File:      DBOPT1.SQL
--           Microsoft TPC-C Benchmark Kit Ver. 4.00
--           Copyright Microsoft, 1996
-- Purpose:   Sets database options for data load

use master
go

exec sp_dboption tpcc,'select into/bulkcopy',true
exec sp_dboption tpcc,'trunc. log on chkpt.',true
go

use tpcc
go

checkpoint
go
```

## Appendix B - Database Design

---

### dbopt2.sql

```
-- File:      DBOPT2.SQL
--           Microsoft TPC-C Benchmark Kit Ver. 4.00
--           Copyright Microsoft, 1996
-- Purpose:   Resets database options after data load

use master
go

sp_dboption tpcc,'select ',false
go

sp_dboption tpcc,'trunc. ',false
go

use tpcc
go

checkpoint
go

sp_configure allow,1
go

reconfigure with override
go

/*
/* Set option values for user-defined indexes */
/*
/*

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

Print ' '
Print '*****'
Print 'Pre-specified Locking Hierarchy:'
Print '  Lockflag = 0 ==> No pre-pecified hierarchy'
Print '  Lockflag = 1 ==> Lock at Page-level then Table-level'
Print '  Lockflag = 2 ==> Lock at Row-level then Table-level'
Print '  Lockflag = 3 ==> Lock at Table-level'
Print ' '

select name,lockflags
```

```
from sysindexes
where object_id("warehouse")=id or
      object_id("district")=id or
      object_id("customer")=id or
      object_id("stock")=id or
      object_id("orders")=id or
      object_id("order_line")=id or
      object_id("history")=id or
      object_id("new_order")=id or
      object_id("item")=id

order by lockflags asc
go

sp_configure allow,0
go

reconfigure with override
go

exec sp_dboption tpcc, 'auto update statistics', FALSE
exec sp_dboption tpcc, 'auto create statistics', FALSE
go

exec sp_tableoption "district","pintable",true
exec sp_tableoption "warehouse","pintable",true
exec sp_tableoption "new_order","pintable",true
exec sp_tableoption "item","pintable",true
go
```

### dbopt3.sql

```
use tpcc
go
sp_indexoption 'orders','AllowPageLocks',TRUE
go
sp_indexoption 'orders','AllowRowLocks',FALSE
go
sp_indexoption 'order_line','AllowPageLocks',TRUE
go
sp_indexoption 'order_line','AllowRowLocks',FALSE
go
```

### backup.sql

## Appendix B - Database Design

---

```
-- File:      BACKUP.SQL
--           Microsoft TPC-C Benchmark Kit Ver. 4.22
--           Copyright Microsoft, 2001
-- Purpose:   Creates backup of tpcc database

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

backup database tpcc to tpccback1, tpccback2 with init, stats = 1

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

go
```

### restore.sql

```
-- File:      RESTORE.SQL
--           Microsoft TPC-C Benchmark Kit Ver. 4.22
--           Copyright Microsoft, 2001
-- Purpose:   Loads database backup from backup files

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

load database tpcc from tpccback1, tpccback2 with stats = 1

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

go
```

# Appendix B - Database Design

## Stored Procedures

### neword.sql

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

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

create proc tpcc_neworder

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

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

```
    @i_id14 int = 0, @s_w_id14 smallint =
    @i_id15 int = 0, @s_w_id15 smallint =

    @ol_qty14 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 available 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
```

## Appendix B - Database Design

```
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 - @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
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
else
end
```

## Appendix B - Database Design

```
begin
-- no item (or stock) found - triggers rollback condition
    select "",0,"",0,0
    select @commit_flag = 0
end
end

-- get customer last name, discount, and credit rating
select      @c_last      = c_last,
            @c_discount = c_discount,
            @c_credit   = c_credit,
            @c_id_local = c_id
from customer (repeatableread)
where c_id      = @c_id and
       c_w_id  = @w_id and
       c_d_id  = @d_id

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

-- insert corresponding row into new-order table
insert into new_order values (@o_id,
                              @d_id,
                              @w_id)

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

if (@commit_flag = 1)
    commit transaction n
else
-- all that work for nuthin!!!
    rollback transaction n

-- return order data to client
select  @w_tax,
        @d_tax,
        @o_id,
        @c_last,
        @c_discount,
        @c_credit,
        @o_entry_d,
        @commit_flag
```

```
end
go

payment.sql

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

use tpcc
go

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

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

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

## Appendix B - Database Design

```
@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,
```



## Appendix B - Database Design

```
@w_id_local,
@datetime,
@h_amount,
+ " " + @d_name)
commit tran p
-- return data to client
select @c_id,
        @c_last,
        @datetime,
        @w_street_1,
        @w_street_2,
        @w_city,
        @w_state,
        @w_zip,
        @d_street_1,
        @d_street_2,
        @d_city,
        @d_state,
        @d_zip,
        @c_first,
        @c_middle,
        @c_street_1,
        @c_street_2,
        @c_city,
        @c_state,
        @c_zip,
        @c_phone,
        @c_since,
        @c_credit,
        @c_credit_lim,
        @c_discount,
        @c_balance,
        @screen_data
go
```

### ordstat.sql

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

use tpcc
go

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

create proc tpcc_orderstatus @w_id          smallint,
```

```
        tinyint,
        int,
= ""
as
declare @c_balance      numeric(12,2),
        @c_first       char(16),
        @c_middle      char(2),
        @c_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
        end
```

## Appendix B - Database Design

```
-- 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 (repeatable)
    where ol_o_id = @o_id and
          ol_d_id = @d_id and
          ol_w_id = @w_id
custnotfound:
commit tran o
-- return data to client
select @c_id,
       @c_last,
       @c_first,
       @c_middle,
       @o_entry_d,
       @o_carrier_id,
       @c_balance,
       @o_id
go
```

### delivery.sql

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

```
use tpcc
go
if exists (select name from sysobjects where name = "tpcc_delivery" )
    drop procedure tpcc_delivery
go
create proc tpcc_delivery    @w_id            smallint,
                             @o_carrier_id  smallint
as
declare @d_id tinyint,
        @o_id int,
        @c_id int,
        @total numeric(12,2),
        @oid1 int,
        @oid2 int,
        @oid3 int,
        @oid4 int,
        @oid5 int,
        @oid6 int,
        @oid7 int,
        @oid8 int,
        @oid9 int,
        @oid10 int
select @d_id = 0
begin tran d
    while (@d_id < 10)
    begin
        select @d_id = @d_id + 1,
               @total = 0,
               @o_id = 0
        select top 1 @o_id = no_o_id
        from new_order (serializable)
        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
```

## Appendix B - Database Design

```
-- 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

-- accumulate lineitem amounts for this order into customer

update customer
  set c_balance      = c_balance + @total,
      c_delivery_cnt = c_delivery_cnt + 1
where c_w_id = @w_id and
      c_d_id = @d_id and
      c_id   = @c_id

end

select @oid1 = case @d_id when 1 then @o_id else @oid1 end,
       @oid2 = case @d_id when 2 then @o_id else @oid2 end,
       @oid3 = case @d_id when 3 then @o_id else @oid3 end,
       @oid4 = case @d_id when 4 then @o_id else @oid4 end,
       @oid5 = case @d_id when 5 then @o_id else @oid5 end,
       @oid6 = case @d_id when 6 then @o_id else @oid6 end,
       @oid7 = case @d_id when 7 then @o_id else @oid7 end,
       @oid8 = case @d_id when 8 then @o_id else @oid8 end,
       @oid9 = case @d_id when 9 then @o_id else @oid9 end,
       @oid10 = case @d_id when 10 then @o_id else @oid10 end

end

commit tran d

-- return delivery data to client

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

go
```

### stocklev.sql

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

use tpcc
go
```

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

create proc tpcc_stocklevel @w_id          smallint,
                           @d_id          tinyint,
                           @threshold    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 < @threshold

go
```

### Loader Source Code

#### tpcc.h

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

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

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

// General headers
#include <windows.h>
#include <winbase.h>
#include <stdlib.h>
#include <stdio.h>
#include <process.h>
#include <stddef.h>
#include <stdarg.h>
#include <string.h>
```

# Appendix B - Database Design

```

#include <time.h>
#include <sys\timeb.h>
#include <sys\types.h>

// ODBC headers
#include <sql.h>
#include <sqlext.h>
#include <odbcss.h>

// General constants
#define MILLI 1000
#define FALSE 0
#define TRUE 1
#define UNDEF -1
#define MINPRINTASCII 32
#define MAXPRINTASCII 126

// Default environment constants
#define SERVER ""
#define DATABASE "tpcc"
#define USER "sa"
#define PASSWORD ""

// Default loader arguments
#define BATCH 10000
#define DEFILDPACKSIZE 32768
#define ORDERS_PER_DIST 3000
#define LOADER_RES_FILE "logs\\load.out"
#define LOADER_NURAND_C 123
#define DEF_STARTING_WAREHOUSE 1
#define BUILD_INDEX 1 // build both data
and indexes
#define INDEX_ORDER 1 // build indexes
before load
#define SCALE_DOWN 0 // build a normal scale
database
#define INDEX_SCRIPT_PATH "scripts"

typedef struct
{
    char *server;
    char *database;
    char *user;
    char *password;
    BOOL tables_all;
    // set if loading all tables
    BOOL table_item;
    // set if loading ITEM table specifically
    BOOL table_warehouse; // set if loading
WAREHOUSE, DISTRICT, and STOCK
    BOOL table_customer; // set if
loading CUSTOMER and HISTORY
    BOOL table_orders; // set if
loading NEW-ORDER, ORDERS, ORDER-LINE
    long num_warehouses;
    long batch;
    long verbose;
    long pack_size;
    char *loader_res_file;
    char *synch_servername;
    long case_sensitivity;
    long starting_warehouse;
    long build_index;

```

```

long index_order;
long scale_down;
char *index_script_path;
} TPCCCLR_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();

```

# Appendix B - Database Design

```
void PaddString();
```

## tpccldr.c

```
// File: TPCCLDR.C
// Microsoft TPC-C Kit Ver. 4.00
// Copyright Microsoft, 1996, 1997, 1998
// Purpose: Source file for TPC-C database loader

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

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

// Functions declarations

void HandleErrorDBC (SQLHDBC hdbc1);

long NURand();
void LoadItem();
void LoadWarehouse();

void Stock();
void District();

void LoadCustomer();
void CustomerBufInit();
void CustomerBufLoad();
void LoadCustomerTable();
void LoadHistoryTable();

void LoadOrders();
void OrdersBufInit();
void OrdersBufLoad();
void LoadOrdersTable();
void LoadNewOrderTable();
void LoadOrderLineTable();
void GetPermutation();
void CheckForCommit();
void OpenConnections();
void BuildIndex();
void FormatDate ();
```

```
// Shared memory structures

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

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

typedef struct
{
    long c_id;
    short c_d_id;
    short c_w_id;
    char c_first[FIRST_NAME_LEN+1];
    char c_middle[MIDDLE_NAME_LEN+1];
    char c_last[LAST_NAME_LEN+1];
    char c_street_1[ADDRESS_LEN+1];
    char c_street_2[ADDRESS_LEN+1];
    char c_city[ADDRESS_LEN+1];
    char c_state[STATE_LEN+1];
    char c_zip[ZIP_LEN+1];
    char c_phone[PHONE_LEN+1];
    char c_credit[CREDIT_LEN+1];
    double c_credit_lim;
    double c_discount;
    // fix to avoid ODBC float to numeric conversion problem.
    // double c_balance;
    char c_balance[6];

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

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

typedef struct
{
```

## Appendix B - Database Design

```
    long          time_start;
} LOADER_TIME_STRUCT;

// Global variables

char    szLastError[300];

HENV    henv;

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

HDBC    o_hdbc3;          // for ORDER-LINE

HSTMT   i_hstmt1;
HSTMT   w_hstmt1;
HSTMT   c_hstmt1, c_hstmt2;
HSTMT   o_hstmt1, o_hstmt2, o_hstmt3;

ORDERS_STRUCT  orders_buf[ORDERS_PER_DISTRICT];
CUSTOMER_STRUCT customer_buf[CUSTOMERS_PER_DISTRICT];
long           orders_rows_loaded;
long           new_order_rows_loaded;
long           order_line_rows_loaded;
long           history_rows_loaded;
long           customer_rows_loaded;
long           stock_rows_loaded;
long           district_rows_loaded;
long           item_rows_loaded;
long           warehouse_rows_loaded;
long           main_time_start;
long           main_time_end;
long           max_items;
long           customers_per_district;
long           orders_per_district;
long           first_new_order;
long           last_new_order;

TPCCLDR_ARGS  *aptr, args;

//=====
//
// Function name: main
//
//=====

int main(int argc, char **argv)
{
    DWORD          dwThreadID[MAX_MAIN_THREADS];
    HANDLE         hThread[MAX_MAIN_THREADS];
    FILE           *fLoader;
    char           buffer[255];
    int            i;
```

```
    for (i=0; i<MAX_MAIN_THREADS; i++)
        hThread[i] = NULL;

    printf("\n*****");
    printf("\n*");
    printf("\n*   Microsoft SQL Server   *");
    printf("\n*");
    printf("\n*   TPC-C BENCHMARK KIT: Database loader *");
    printf("\n*   Version %s                *", TPCKIT_VER);
    printf("\n*");
    printf("\n*****\n\n");

    // process command line arguments

    aptr = &args;
    GetArgsLoader(argc, argv, aptr);

    printf("Build interface is ODBC.\n");

    if (aptr->build_index == 0)
        printf("Data load only - no index creation.\n");
    else
        printf("Data load and index creation.\n");

    if (aptr->index_order == 0)
        printf("Clustered indexes will be created after bulk load.\n");
    else
        printf("Clustered indexes will be created before bulk load.\n");

    // set database scale values
    if (aptr->scale_down == 1)
    {
        printf("*** Scaled Down Database ***\n");
        max_items = MAXITEMS_SCALE_DOWN;
        customers_per_district = CUSTOMERS_SCALE_DOWN;
        orders_per_district = ORDERS_SCALE_DOWN;
        first_new_order = 0;
        last_new_order = 30;
    }
    else
    {
        max_items = MAXITEMS;
        customers_per_district = CUSTOMERS_PER_DISTRICT;
        orders_per_district = ORDERS_PER_DISTRICT;
        first_new_order = 2100;
        last_new_order = 3000;
    }

    // open connections to SQL Server
    OpenConnections();

    // open file for loader results
    fLoader = fopen(aptr->loader_res_file, "w");

    if (fLoader == NULL)
    {
        printf("Error, loader result file open failed.");
        exit(-1);
    }

    // start loading data
```

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

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```
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("idxitmc1");

    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 != SUCCEEDED)
        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 != SUCCEEDED)
            HandleErrorDBC(i_hdbc1);
    }

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

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

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

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

    rc = bcp_bind(i_hdbc1, (BYTE *) i_data, 0, I_DATA_LEN, NULL, 0, 0, 5);
    if (rc != SUCCEEDED)
        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 != SUCCEEDED)
        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("idxitmc1");
}

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



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```
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);
```

```
9);
rc = bcp_bind(w_hdbc1, (BYTE *) &w_ytd, 0, SQL_VARLEN_DATA, NULL, 0, SQLFLT8,
);
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];
```

## Appendix B - Database Design

```
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 != SUCCEEDED)
    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 != SUCCEEDED)
        HandleErrorDBC(w_hdbc1);
}

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

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

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

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

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

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

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

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

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

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

SQLINT4, 11); rc = bcp_bind(w_hdbc1, (BYTE *) &d_next_o_id, 0, SQL_VARLEN_DATA, NULL, 0,
if (rc != SUCCEEDED)
    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 != SUCCEEDED)
            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");
```

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```
    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 != SUCCEEDED)
        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 != SUCCEEDED)
            HandleErrorDBC(w_hdbc1);
    }

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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```
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];
    char rc_l;
    // SQLRETURN // SQLSMALLINT // SQLCHAR // SQLINTEGER
    Msg[SQL_MAX_MESSAGE_LENGTH]; // 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("idxxcuscl");

    // 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;
}
```

## Appendix B - Database Design

```
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;
}
```

## Appendix B - Database Design

```
//=====
//
// 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");
```

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

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

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

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

    // fix to avoid ODBC float to numeric conversion problem.
    // double      c_balance;
    char        c_balance[6];

    double      c_ytd_payment;
    short       c_payment_cnt;
    short       c_delivery_cnt;
    char        c_data[C_DATA_LEN+1];
    char        c_since[C_SINCE_LEN+1];
    RETCODE     rc;

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

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

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

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

    rc = bcp_bind(c_hdbc1, (BYTE *) c_middle, 0, MIDDLE_NAME_LEN, NULL, 0, 0, 5);
```

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

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

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

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

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

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

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

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

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

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

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

    rc = bcp_bind(c_hdbc1, (BYTE *) &c_discount, 0, SQL_VARLEN_DATA, NULL, 0, SQLFLT8,
16);
    if (rc != SUCCEEDED)
        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 != SUCCEEDED)
    //     HandleErrorDBC(c_hdbc1);
    rc = bcp_bind(c_hdbc1, (BYTE *) c_balance, 0, 5, NULL, 0, SQLCHARACTER, 17);
    if (rc != SUCCEEDED)
        HandleErrorDBC(c_hdbc1);

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

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

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

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

    rc = bcp_bind(c_hdbc1, (BYTE *) c_data, 0, 500, NULL, 0, 0, 21);
    if (rc != SUCCEEDED)
        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 != SUCCEEDED)
            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 != SUCCEEDED)
        HandleErrorDBC(c_hdbc2);

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

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

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

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

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

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

    rc = bcp_bind(c_hdbc2, (BYTE *) h_data, 0, H_DATA_LEN, NULL, 0, 0, 8);
    if (rc != SUCCEEDED)
        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 != SUCCEEDED)
```



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```
        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 != SUCCEEDED)
        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 != SUCCEEDED)
            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 != SUCCEEDED)
        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 != SUCCEEDED)
                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 != SUCCEEDED)
            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 * 30000));
            rc = bcp_control(o_hdbc3, BCPHINTS, (void*) bcphint);
            if (rc != SUCCEEDED)
                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)
```

## Appendix B - Database Design

```
    {
        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, "");
        }
    }
}

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

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```
// Function : OrdersBufLoad
//
// Fills shared buffer for ORDERS, NEWORDER, and ORDERLINE
//
//=====
void OrdersBufLoad(int d_id, int w_id)
{
    int    cust[ORDERS_PER_DIST+1];
    long   o_id;
    short  ol;

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

    GetPermutation(cust, ORDERS_PER_DIST);

    for (o_id=0;o_id<orders_per_district;o_id++)
    {
        // Generate ORDER and NEW-ORDER data

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

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

        for (ol=0; ol<orders_buf[o_id].o_ol_cnt; ol++)
        {
            orders_buf[o_id].o_ol[ol].ol = ol+1;
            orders_buf[o_id].o_ol[ol].ol_i_id = RandomNumber(1L,
max_items);

            orders_buf[o_id].o_ol[ol].ol_supply_w_id = w_id;
            orders_buf[o_id].o_ol[ol].ol_quantity = 5;
            MakeAlphaString(24, 24, OL_DIST_INFO_LEN,
&orders_buf[o_id].o_ol[ol].ol_dist_info);

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

                during load

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

```
        else
        {
            orders_buf[o_id].o_ol[ol].ol_amount =
RandomNumber(1,999999)/100.0;
            // Added to insure ol_delivery_d set properly

            during load

            // odbc datetime format

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

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

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

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

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

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

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

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

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```
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("idxordc1");

    // 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("idxnodc1");
    }

}

//=====
```

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```
//
// 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 != SUCCEEDED)
        HandleErrorDBC(o_hdbc3);

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

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

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

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

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

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

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

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

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

```
        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 != SUCCEEDED)
                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("idxodlcl1");
    }
}

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

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

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```
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)
```

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```
        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);
```

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```
rc = SQLDriverConnect ( o_hdbc2,
                        NULL,
                        (SQLCHAR*)&szDriverString[0] ,
                        SQL_NTS,
                        (SQLCHAR*)&szDriverStringOut[0],
                        sizeof(szDriverStringOut),
                        &cbDriverStringOut,
                        SQL_DRIVER_NOPROMPT
);
if (rc != SUCCEED)
    HandleErrorDBC(o_hdbc2);

// Connection 7

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

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

rc = SQLDriverConnect ( o_hdbc3,
                        NULL,
                        (SQLCHAR*)&szDriverString[0] ,
                        SQL_NTS,
                        (SQLCHAR*)&szDriverStringOut[0],
                        sizeof(szDriverStringOut),
                        &cbDriverStringOut,
                        SQL_DRIVER_NOPROMPT
);
if (rc != SUCCEED)
    HandleErrorDBC(o_hdbc3);
}

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

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

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

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

    system(cmd);

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

void HandleErrorDBC (SQLHDBC  hdbc1)
{
    SQLCHAR      SqlState[6], Msg[SQL_MAX_MESSAGE_LENGTH];
    SQLINTEGER   NativeError;
    SQLSMALLINT  i, MsgLen;
    SQLRETURN    rc2;
    char         timebuf[128];
    char         datebuf[128];
    FILE         *fp1;

    i = 1;
    while (( rc2 = SQLGetDiagRec(SQL_HANDLE_DBC , hdbc1, i, SqlState ,
    &NativeError,
                                Msg, sizeof(Msg) , &MsgLen ) != SQL_NO_DATA )
    {
        sprintf( szLastError , "%s" , Msg );

        _strtime(timebuf);
        _strdate(datebuf);

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

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

        i++;
    }
}

void FormatDate ( char* szTimeCOutput )
{
    struct tm when;
    time_t now;

    time( &now );
    when = *localtime( &now );

    mktime( &when );

    // odbc datetime format
    strftime( szTimeCOutput , 30 , "%Y-%m-%d %H:%M:%S.000", &when );
}
```



## Appendix B - Database Design

```
        return;
    }
}
```

### getargs.c

```
//      File:          GETARGS.C
//      Microsoft TPC-C Kit Ver. 4.00
//      Copyright Microsoft, 1996, 1997, 1998
//      Purpose: Source file for command line processing

// Includes
#include "tpcc.h"

//=====
//
// Function name: GetArgsLoader
//
//=====

void GetArgsLoader(int argc, char **argv, TPCCLDR_ARGS *pargs)
{
    int    i;
    char  *ptr;

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

    /* init args struct with some useful values */
    pargs->server      = SERVER;
    pargs->user         = USER;
    pargs->password     = PASSWORD;
    pargs->database     = DATABASE;
    pargs->batch        = BATCH;
    pargs->num_warehouses = UNDEF;
    pargs->tables_all   = TRUE;
    pargs->table_item    = FALSE;
    pargs->table_warehouse = FALSE;
    pargs->table_customer = FALSE;
```

```
    pargs->table_orders      = FALSE;
    pargs->loader_res_file   = LOADER_RES_FILE;
    pargs->pack_size         = DEF_LD_PACK_SIZE;
    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 through */
        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 )
```

## Appendix B - Database Design

```
0)
TRUE;

        pargs->table_item = TRUE;
    else if (strcmp(ptr+2,"warehouse") ==
        pargs->table_warehouse =
    else if (strcmp(ptr+2,"customer") == 0)
        pargs->table_customer = TRUE;
    else if (strcmp(ptr+2,"orders") == 0)
        pargs->table_orders = TRUE;
    else
    {
        printf("\nUnrecognized command");
        GetArgsLoaderUsage();
        exit(1);
    }
    break;
}

case 'f':
    pargs->loader_res_file = ptr+2;
    break;

case 'p':
    pargs->pack_size = atol(ptr+2);
    break;

case 'i':
    pargs->build_index = atol(ptr+2);
    break;

case 'o':
    pargs->index_order = atol(ptr+2);
    break;

case 'c':
    pargs->scale_down = atol(ptr+2);
    break;

case 'd':
    pargs->index_script_path = ptr+2;
    break;

default:
    GetArgsLoaderUsage();
    exit(-1);
    break;
}

}

/* check for required args */
if (pargs->num_warehouses == UNDEF )
{
    printf("Number of Warehouses is required\n");
    exit(-2);
}

return;
}

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

```
// Function name: GetArgsLoaderUsage
//
//=====

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

    printf("TPCCLDR:\n\n");
    printf("Parameter                                     Default\n");
    printf("-----\n");
    printf("-W Number of Warehouses to Load                Required \n");
    printf("-S Server                                         %s\n", SERVER);
    printf("-U Username                                       %s\n", USER);
    printf("-P Password                                       %s\n", PASSWORD);
    printf("-D Database                                       %s\n", DATABASE);
    printf("-b Batch Size                                     %ld\n", (long)
BATCH);
    printf("-p TDS packet size                               %ld\n", (long)
DEFLDPACKSIZE);
    printf("-f Loader Results Output Filename              %s\n",
LOADER_RES_FILE);
    printf("-s Starting Warehouse                           %ld\n", (long)
DEF_STARTING_WAREHOUSE);
    printf("-i Build Option (data = 0, data and index = 1)  %ld\n", (long)
BUILD_INDEX);
    printf("-o Cluster Index Build Order (before = 1, after = 0) %ld\n", (long)
INDEX_ORDER);
    printf("-c Build Scaled Database (normal = 0, tiny = 1) %ld\n", (long)
SCALE_DOWN);
    printf("-d Index Script Path                            %s\n",
INDEX_SCRIPT_PATH);
    printf("-t Table to Load                                 all tables \n");
    printf("    [item|warehouse|customer|orders]\n");
    printf("    Notes: \n");
    printf("    - the '-t' parameter may be included multiple times to \n");
    printf("    specify multiple tables to be loaded \n");
    printf("    - 'item' loads ITEM table \n");
    printf("    - 'warehouse' loads WAREHOUSE, DISTRICT, and STOCK tables \n");
    printf("    - 'customer' loads CUSTOMER and HISTORY tables \n");
    printf("    - 'orders' load NEW-ORDER, ORDERS, ORDER-LINE tables \n");

    printf("\nNote: Command line switches are case sensitive.\n");

    exit(0);
}

random.c

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

# Appendix B - Database Design

```
// Purpose: Random number generation routines for database loader

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

// Defines
#define A 16807
#define M 2147483647
#define Q 127773 /* M div A */
#define R 2836 /* M mod A */
#define Thread __declspec(thread)

// Globals
long Thread Seed = 0; /* thread local seed */

/*****
 *
 * random -
 * Implements a GOOD pseudo random number generator. This generator
 * will/should? run the complete period before repeating.
 *
 * Copied from:
 * Random Numbers Generators: Good Ones Are Hard to Find.
 * Communications of the ACM - October 1988 Volume 31 Number 10
 *
 * Machine Dependencies:
 * long must be 2 ^ 31 - 1 or greater.
 *****/

/*****
 * seed - load the Seed value used in irand and drand. Should be used before
 * first call to irand or drand.
 *****/

void seed(long val)
{
#ifdef DEBUG
    printf("[%ld]DBG: Entering seed()...\n", (int) GetCurrentThreadId());
    printf("Old Seed %ld New Seed %ld\n",Seed, val);
#endif

    if ( val < 0 )
        val = abs(val);

    Seed = val;
}

/*****
 *
 * irand - returns a 32 bit integer pseudo random number with a period of
 * 1 to 2 ^ 32 - 1.
 *
 * parameters:
 * none.
 *
 * returns:
 * 32 bit integer - defined as long ( see above ).
 *****/
```

```
*
 * side effects:
 * seed get recomputed.
 *****/

long irand()
{
    register long s; /* copy of seed */
    register long test; /* test flag */
    register long hi; /* tmp value for speed */
    register long lo; /* tmp value for speed */

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

    s = Seed;
    hi = s / Q;
    lo = s % Q;

    test = A * lo - R * hi;
    if ( test > 0 )
        Seed = test;
    else
        Seed = test + M;

    return( Seed );
}

/*****
 *
 * drand - returns a double pseudo random number between 0.0 and 1.0.
 * See irand.
 *****/

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

    return( (double)irand() / 2147483647.0 );
}

//=====
// Function : RandomNumber
//
// Description:
//=====
long RandomNumber(long lower, long upper)
{
    long rand_num;

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

    if ( upper == lower ) /* pgd 08-13-96 perf enhancement */
        return lower;

    upper++;
```

## Appendix B - Database Design

```
    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
//Original code pgd 08/13/96

long RandomNumber(long lower,
                  long upper)
{
    long rand_num;

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

    upper++;

    if ((upper <= lower))
        rand_num = upper;
    else
        rand_num = lower + irand() % ((upper > lower) ? upper - lower :
upper);

#ifdef DEBUG
    printf("[%ld]DBG: RandomNumber between %ld & %ld ==> %ld\n",
           (int) GetCurrentThreadId(), lower, upper,
           rand_num);
#endif

    return rand_num;
}
#endif

//=====
// Function : NURand
//
// Description:
//=====
long NURand(int iConst,
            long x,
            long y,
            long C)
{
    long rand_num;
```

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

    rand_num = (((RandomNumber(0,iConst) | RandomNumber(x,y)) + C) % (y-x+1))+x;

#ifdef DEBUG
    printf("[%ld]DBG: NURand: num = %d\n", (int) GetCurrentThreadId(), rand_num);
#endif

    return rand_num;
}
```

### strings.c

```
// File: STRINGS.C
// Microsoft TPC-C Kit Ver. 4.00
// Copyright Microsoft, 1996, 1997, 1998
// Purpose: Source file for database loader string functions

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

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

void MakeAddress(char *street_1,
                char *street_2,
                char *city,
                char *state,
                char *zip)
{
#ifdef DEBUG
    printf("[%ld]DBG: Entering MakeAddress()\n", (int) GetCurrentThreadId());
#endif

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

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

## Appendix B - Database Design

```
return;
}

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

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

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

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

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

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

    return;
}

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

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

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

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

    len= RandomNumber(x, y);

    for (i=0; i<len; i++)
        str[i] = chArray[RandomNumber(0, chArrayMax)];
    if ( len < z )
        memset(str+len, ' ', z - len);
    str[len] = 0;

    return len;
}

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

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

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

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

## Appendix B - Database Design

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

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

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

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

return strlen(str);
}

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

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

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

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

    str[16] = 0;

    return 16;
}

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

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

    strcpy(str, "000011111");
}
```

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

    return 9;
}

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

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

//=====
// Function name: InitAddress
//
// Description:
//
//=====
void InitAddress(char *street_1, char *street_2, char *city, char *state, char *zip)
{
    memset(street_1, ' ', ADDRESS_LEN+1);
    memset(street_2, ' ', ADDRESS_LEN+1);
    memset(city, ' ', ADDRESS_LEN+1);

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

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

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

//=====
//
// Function name: PaddString
//
//=====
void PaddString(int max, char *name)
{
    int len;

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

## Appendix B - Database Design

---

```
        return;  
    }
```

### time.c

```
//      File:          TIME.C  
//      Microsoft TPC-C Kit Ver. 4.00  
//      Copyright Microsoft, 1996, 1997, 1998  
//      Purpose:  Source file for time functions  
  
// Includes  
#include "tpcc.h"  
  
// Globals  
static long start_sec;  
  
//=====br/>//  
// Function name: TimeNow  
//  
//=====br/>  
long TimeNow()  
{  
    long          time_now;  
    struct _timeb el_time;  
  
#ifdef DEBUG  
    printf("[%ld]DBG: Entering TimeNow()\n", (int) GetCurrentThreadId());  
#endif  
  
    _ftime(&el_time);  
  
    time_now = ((el_time.time - start_sec) * 1000) + el_time.millitm;  
  
    return time_now;  
}
```

# Appendix C – Tunable Parameters

---

## Appendix C - Tunable Parameters

### *Server Configuration Parameters*

#### Microsoft Windows 2003 Server Parameters

The following registry key was added to disable the kernel counters for Global and Per-Process I/Os:

```
[HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Control\Session Manager\I/O System]
"CountOperations"=dword:00000000
```

#### Microsoft Windows 2003 Server Configuration

The following services were disabled on the server:

- Alerter
- Automatic Updates
- Computer Browser
- Cryptographic Services
- DHCP Client
- Distributed File System
- Distributed Link Tracking Client
- DNS Client
- Global Array Manager Server
- Help and Support
- IPSEC Policy Agent
- License Logging Service
- Messenger
- MSSQLserver
- Microsoft Search
- Print Spooler
- Process Control Service
- Remote Registry Service
- Removable Storage
- Run as Service
- System Event Notification
- SSDP Discovery service
- Task Scheduler
- Wireless configuration

#### Microsoft SQL Server 2000 Startup Parameters

Microsoft SQL Server was started with the following command line options

```
sqlservr -c -x -T3502 -g100
```

where

-c	Start SQL Server independently of the Microsoft Windows NT Service Control Manager.
----	---



## Appendix C – Tunable Parameters

---

-x	Disable the keeping of CPU time and cache-hit ratio statistics.
-T3502	Prints a message to the log at the beginning and end of each checkpoint.
-g150	Reserve 150 MB for non-buffer pool allocations

### Microsoft SQL Server Stack Size

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

### Microsoft SQL Server 2000 Configuration Parameters

name	minimum	maximum	config_value	run_value
affinity mask	0	2147483647	3	3
allow updates	0	1	1	1
c2 audit mode	0	1	0	0
cost threshold for parallelism	0	32767	5	5
cursor threshold	-1	2147483647	-1	-1
default full-text language	0	2147483647	1033	1033
default language	0	9999	0	0
fill factor (%)	0	100	0	0
index create memory (KB)	704	1600000	0	0
language in cache	3	100	3	3
lightweight pooling	0	1	1	1
locks	5000	2147483647	0	0
max degree of parallelism	0	32	1	1
max server memory (MB)	4	2147483647	2000	2000
max text repl size (B)	0	2147483647	65536	65536
max worker threads	10	1024	320	320
media retention	0	365	0	0
min memory per query (KB)	512	2147483647	1024	1024
min server memory (MB)	0	2147483647	0	0
nested triggers	0	1	1	1
network packet size (B)	512	65535	4096	4096
open objects	0	2147483647	0	0
priority boost	0	1	1	1
query governor cost limit	0	2147483647	0	0
query wait (s)	-1	2147483647	-1	-1
recovery interval (min)	0	32767	32767	32767
remote access	0	1	0	0
remote login timeout (s)	0	2147483647	5	5
remote proc trans	0	1	0	0
remote query timeout (s)	0	2147483647	0	0
scan for startup procs	0	1	0	0
set working set size	0	1	0	0
show advanced options	0	1	1	1
two digit year cutoff	1753	9999	2049	2049
user connections	0	32767	0	0
user options	0	16383	0	0

## Appendix C – Tunable Parameters

---

Windows 2000 Server System Information Report For PE2650

System Information report written at: 07/09/03 15:12:02

System Name: PE2650

[System Summary]

Item Value

OS Name Microsoft(R) Windows(R) Server 2003, Standard Edition

Version 5.2.3790 Build 3790

OS Manufacturer Microsoft Corporation

System Name PE2650

System Manufacturer Dell Computer Corporation

System Model PowerEdge 2650

System Type X86-based PC

Processor x86 Family 15 Model 2 Stepping 5 GenuineIntel ~3056 Mhz

Processor x86 Family 15 Model 2 Stepping 5 GenuineIntel ~3056 Mhz

BIOS Version/Date Dell Computer Corporation X46, 6/23/2003

SMBIOS Version 2.3

Windows Directory C:\WINDOWS

System Directory C:\WINDOWS\system32

Boot Device \Device\HarddiskVolume1

Locale United States

Hardware Abstraction Layer Version = "5.2.3790.0 (srv03\_rtm.030324-2048)"

User Name PE2650\Administrator

Time Zone Central Daylight Time

Total Physical Memory 2,560.00 MB

Available Physical Memory 425.20 MB

Total Virtual Memory 6.85 GB

Available Virtual Memory 2.83 GB

Page File Space 4.35 GB

Page File C:\pagefile.sys

[Hardware Resources]

[Conflicts/Sharing]

Resource Device

Memory Address 0xF0000000-0xFCFFFFFF PCI bus

Memory Address 0xF0000000-0xFCFFFFFF Intel 21154 PCI to PCI bridge

Memory Address 0xF0000000-0xFCFFFFFF Intel 21154 PCI to PCI bridge

Memory Address 0xF0000000-0xFCFFFFFF DELL PERC 3/DC Plus RAID Controller

IRQ 30 Dell PERC 3 RAID (SCSI chip)

IRQ 30 Dell PERC 3/Di RAID Controller

I/O Port 0x00000000-0x000003AF PCI bus

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

IRQ 11 PCI Device

IRQ 11 RAID Controller Component Device

I/O Port 0x00009000-0x00009FFF PCI bus

I/O Port 0x00009000-0x00009FFF PCI standard PCI-to-PCI bridge

IRQ 7 PCI Device

IRQ 7 RAID Controller Component Device

Memory Address 0xFD000000-0xFEBFFFFFF PCI bus

Memory Address 0xFD000000-0xFEBFFFFFF RAGE XL PCI Family (Microsoft Corporation)

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Memory Address 0xE0000000-0xFFFFFFFF PCI bus  
 Memory Address 0xE0000000-0xFFFFFFFF Intel 21154 PCI to PCI bridge  
 Memory Address 0xE0000000-0xFFFFFFFF Intel 21154 PCI to PCI bridge  
 Memory Address 0xE0000000-0xFFFFFFFF DELL PERC 3/DC Plus RAID  
 Controller

Memory Address 0xD0000000-0xDFDFDFDF PCI bus  
 Memory Address 0xD0000000-0xDFDFDFDF Dell PERC 3/Di RAID  
 Controller

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

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

I/O Port 0x0000C000-0x0000CFFF PCI bus  
 I/O Port 0x0000C000-0x0000CFFF Intel 21154 PCI to PCI bridge

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

### [DMA]

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

### [Forced Hardware]

Device	PNP Device ID
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### [I/O]

Resource	Device	Status
0x00000000-0x000003AF	PCI bus	OK
0x00000000-0x000003AF	Direct memory access controller	OK
0x000003B0-0x000003DF	PCI bus	OK
0x000003B0-0x000003DF	RAGE XL PCI Family (Microsoft Corporation)	OK
0x000003E0-0x00000CF7	PCI bus	OK
0x00000D00-0x00000FFF	PCI bus	OK
0x0000E000-0x0000EFFF	PCI bus	OK
0x0000ECF8-0x0000ECFF	PCI Device	OK
0x0000ECE8-0x0000ECEF	PCI Device	OK
0x0000EC80-0x0000ECBF	PCI Device	OK
0x0000ECF4-0x0000ECF7	PCI Device	OK
0x0000E800-0x0000E8FF	RAGE XL PCI Family (Microsoft Corporation)	OK
0x000003C0-0x000003DF	RAGE XL PCI Family (Microsoft Corporation)	OK
0x00000080-0x0000009F	Direct memory access controller	OK

## Appendix C – Tunable Parameters

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0x000000C0-0x000000DF	Direct memory access controller	OK
0x0000040B-0x0000040B	Direct memory access controller	OK
0x000004D6-0x000004D6	Direct memory access controller	OK
0x000000F0-0x000000FF	Numeric data processor	OK
0x00000020-0x0000003F	Programmable interrupt controller	OK
0x000000A0-0x000000BF	Programmable interrupt controller	OK
0x000004D0-0x000004D1	Programmable interrupt controller	OK
0x00000061-0x00000061	System speaker	OK
0x00000040-0x0000005F	System timer	OK
0x000003F0-0x000003F5	Standard floppy disk controller	OK
0x000003F7-0x000003F7	Standard floppy disk controller	OK
0x00000060-0x00000060	Standard 101/102-Key or Microsoft Natural PS/2 Keyboard	OK
0x00000064-0x00000064	Standard 101/102-Key or Microsoft Natural PS/2 Keyboard	OK
0x000003F8-0x000003FF	Communications Port (COM2)	OK
0x000002F8-0x000002FF	Communications Port (COM1)	OK
0x00000070-0x0000007F	System CMOS/real time clock	OK
0x00000800-0x0000089F	System board	OK
0x000008A0-0x000008AF	System board	OK
0x00000C00-0x00000CD7	System board	OK
0x00000F50-0x00000F58	System board	OK
0x000008E0-0x000008E3	System board	OK
0x000000E0-0x000000EF	System board	OK
0x000008B0-0x000008BF	CSB5 IDE Controller	OK
0x000001F0-0x000001F7	Primary IDE Channel	OK
0x000003F6-0x000003F6	Primary IDE Channel	OK
0x00000170-0x00000177	Secondary IDE Channel	OK
0x00000376-0x00000376	Secondary IDE Channel	OK
0x00000A79-0x00000A79	ISAPNP Read Data Port	OK
0x00000279-0x00000279	ISAPNP Read Data Port	OK
0x00000274-0x00000277	ISAPNP Read Data Port	OK
0x00009000-0x00009FFF	PCI bus	OK
0x00009000-0x00009FFF	PCI standard PCI-to-PCI bridge	OK
0x00009C00-0x00009CFF	Dell PERC 3 RAID (SCSI chip)	OK
0x00009800-0x000098FF	Dell PERC 3 RAID (SCSI chip)	OK
0x0000A000-0x0000AFFF	PCI bus	OK
0x0000C000-0x0000CFFF	PCI bus	OK
0x0000C000-0x0000CFFF	Intel 21154 PCI to PCI bridge	OK
0x0000CC00-0x0000CCFF	RAID Controller Component Device	OK
0x0000D000-0x0000DFFF	PCI bus	OK
0x0000D000-0x0000DFFF	Intel 21154 PCI to PCI bridge	OK
0x0000DC00-0x0000DCFF	RAID Controller Component Device	OK

[IRQs]

Resource	Device	Status
IRQ 9	Microsoft ACPI-Compliant System	OK
IRQ 11	PCI Device	OK
IRQ 11	RAID Controller Component Device	OK
IRQ 10	PCI Device	OK
IRQ 7	PCI Device	OK
IRQ 7	RAID Controller Component Device	OK
IRQ 13	Numeric data processor	OK
IRQ 0	System timer	OK

## Appendix C – Tunable Parameters

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IRQ 6	Standard floppy disk controller	OK	
IRQ 1	Standard 101/102-Key or Microsoft Natural PS/2 Keyboard		OK
IRQ 12	PS/2 Compatible Mouse	OK	
IRQ 4	Communications Port (COM2)	OK	
IRQ 3	Communications Port (COM1)	OK	
IRQ 8	System CMOS/real time clock	OK	
IRQ 14	Primary IDE Channel	OK	
IRQ 5	ServerWorks (RCC) PCI to USB Open Host Controller		OK
IRQ 30	Dell PERC 3 RAID (SCSI chip)	OK	
IRQ 30	Dell PERC 3/Di RAID Controller		OK
IRQ 31	Dell PERC 3 RAID (SCSI chip)	OK	
IRQ 28	Broadcom NetXtreme Gigabit Ethernet #3		OK
IRQ 29	Broadcom NetXtreme Gigabit Ethernet #4		OK
IRQ 24	DELL PERC 3/DC Plus RAID Controller	OK	
IRQ 20	DELL PERC 3/DC Plus RAID Controller	OK	

[Memory]

Resource	Device	Status	
0xA0000-0xBFFFF	PCI bus	OK	
0xA0000-0xBFFFF	RAGE XL PCI Family (Microsoft Corporation)		OK
0xD0000-0xE7FFF	PCI bus	OK	
0xFD000000-0xFEBFFFFFF	PCI bus	OK	
0xFD000000-0xFEBFFFFFF	RAGE XL PCI Family (Microsoft Corporation)		OK
0xFEB80000-0xFEB80FFF	PCI Device	OK	
0xFE102000-0xFE102FFF	PCI Device	OK	
0xFEB00000-0xFEB7FFFF	PCI Device	OK	
0xFE101000-0xFE101FFF	RAGE XL PCI Family (Microsoft Corporation)		OK
0xFE100000-0xFE100FFF	ServerWorks (RCC) PCI to USB Open Host Controller	OK	
0xD0000000-0xDFDFFFFFF	PCI bus	OK	
0xD0000000-0xDFDFFFFFF	Dell PERC 3/Di RAID Controller		OK
0xDFC00000-0xDFDFFFFFF	PCI standard PCI-to-PCI bridge		OK
0xDFCFF000-0xDFCFFFFFF	Dell PERC 3 RAID (SCSI chip)		OK
0xDFCFE000-0xDFCFEFFF	Dell PERC 3 RAID (SCSI chip)		OK
0xDFE00000-0xDFFFFFFF	PCI bus	OK	
0xDFF10000-0xDFF1FFFF	Broadcom NetXtreme Gigabit Ethernet #3		OK
0xDFF00000-0xDFF0FFFF	Broadcom NetXtreme Gigabit Ethernet #4		OK
0xE0000000-0xEFFFFFFF	PCI bus	OK	
0xE0000000-0xEFFFFFFF	Intel 21154 PCI to PCI bridge	OK	
0xE0000000-0xEFFFFFFF	Intel 21154 PCI to PCI bridge	OK	
0xE0000000-0xEFFFFFFF	DELL PERC 3/DC Plus RAID Controller	OK	
0xEFD00000-0xEFFFFFFF	Intel 21154 PCI to PCI bridge	OK	
0xEFF00000-0xEFFFFFFF	Intel 21154 PCI to PCI bridge	OK	
0xEFDF0000-0xEFDFFFFF	RAID Controller Component Device		OK
0xF0000000-0xFCFFFFFF	PCI bus	OK	
0xF0000000-0xFCFFFFFF	Intel 21154 PCI to PCI bridge	OK	
0xF0000000-0xFCFFFFFF	Intel 21154 PCI to PCI bridge	OK	
0xF0000000-0xFCFFFFFF	DELL PERC 3/DC Plus RAID Controller	OK	
0xFCD00000-0xFCFFFFFF	Intel 21154 PCI to PCI bridge	OK	
0xFCF00000-0xFCFFFFFF	Intel 21154 PCI to PCI bridge	OK	
0xFCDF0000-0xFCDFFFFF	RAID Controller Component Device		OK

## Appendix C – Tunable Parameters

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[Components]

[Multimedia]

[Audio Codecs]

CODEC	Manufacturer	Description	Status	File	Version	Size
		Creation Date				
c:\windows\system32\msgsm32.acm	Microsoft Corporation		OK			
C:\WINDOWS\system32\MSGSM32.ACM	5.2.3790.0 (srv03_rtm.030324-2048)	20.50 KB (20,992 bytes)	3/29/2003 12:00 AM			
c:\windows\system32\l3codeca.acm	Fraunhofer Institut Integrierte Schaltungen IIS	Fraunhofer IIS MPEG Layer-3 Codec	OK			
C:\WINDOWS\system32\L3CODECA.ACM	1, 9, 0, 0305	284.00 KB (290,816 bytes)	3/29/2003 12:00 AM			
c:\windows\system32\msg711.acm	Microsoft Corporation		OK			
C:\WINDOWS\system32\MSG711.ACM	5.2.3790.0 (srv03_rtm.030324-2048)	10.00 KB (10,240 bytes)	3/29/2003 12:00 AM			
c:\windows\system32\msaud32.acm	Microsoft Corporation	Windows Media Audio Codec	OK			
C:\WINDOWS\system32\MSAUD32.ACM	8.00.00.4487	288.00 KB (294,912 bytes)	3/29/2003 12:00 AM			
c:\windows\system32\imaadp32.acm	Microsoft Corporation		OK			
C:\WINDOWS\system32\IMAADP32.ACM	5.2.3790.0 (srv03_rtm.030324-2048)	15.50 KB (15,872 bytes)	3/29/2003 12:00 AM			
c:\windows\system32\msg723.acm	Microsoft Corporation		OK			
C:\WINDOWS\system32\MSG723.ACM	4.4.4000	116.00 KB (118,784 bytes)	5/30/2003 3:10 PM			
c:\windows\system32\tsssoft32.acm	DSP GROUP, INC.		OK			
C:\WINDOWS\system32\TSSOFT32.ACM	1.01	9.50 KB (9,728 bytes)	3/29/2003 12:00 AM			
c:\windows\system32\sl_anet.acm	Sipro Lab Telecom Inc.	Sipro Lab Telecom Audio Codec	OK			
C:\WINDOWS\system32\SL_ANET.ACM	3.02	84.00 KB (86,016 bytes)	3/29/2003 12:00 AM			
c:\windows\system32\msadp32.acm	Microsoft Corporation		OK			
C:\WINDOWS\system32\MSADP32.ACM	5.2.3790.0 (srv03_rtm.030324-2048)	14.50 KB (14,848 bytes)	3/29/2003 12:00 AM			

[Video Codecs]

CODEC	Manufacturer	Description	Status	File	Version	Size
		Creation Date				
c:\windows\system32\msrle32.dll	Microsoft Corporation		OK			
C:\WINDOWS\system32\MSRLE32.DLL	5.2.3790.0 (srv03_rtm.030324-2048)	10.50 KB (10,752 bytes)	3/29/2003 12:00 AM			
c:\windows\system32\msh261.drv	Microsoft Corporation		OK			
C:\WINDOWS\system32\MSH261.DRV	4.4.4000	180.00 KB (184,320 bytes)	5/30/2003 3:10 PM			
c:\windows\system32\msyuv.dll	Microsoft Corporation		OK			
C:\WINDOWS\system32\MSYUV.DLL	5.2.3790.0 (srv03_rtm.030324-2048)	16.50 KB (16,896 bytes)	3/24/2003 7:49 PM			

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c:\windows\system32\iyuv\_32.dll Microsoft Corporation OK  
C:\WINDOWS\system32\IYUV\_32.DLL 5.2.3790.0 (srv03\_rtm.030324-2048) 45.00 KB (46,080 bytes) 3/24/2003 7:49 PM  
c:\windows\system32\msvidc32.dll Microsoft Corporation OK  
C:\WINDOWS\system32\MSVIDC32.DLL 5.2.3790.0 (srv03\_rtm.030324-2048) 26.50 KB (27,136 bytes) 3/29/2003 12:00 AM  
c:\windows\system32\tsbyuv.dll Microsoft Corporation OK  
C:\WINDOWS\system32\TSBYUV.DLL 5.2.3790.0 (srv03\_rtm.030324-2048) 8.00 KB (8,192 bytes) 3/24/2003 7:50 PM  
c:\windows\system32\msh263.drv Microsoft Corporation OK  
C:\WINDOWS\system32\MSH263.DRV 4.4.4000 284.00 KB (290,816 bytes) 3/24/2003 7:46 PM

[CD-ROM]

Item Value  
Drive D:  
Description CD-ROM Drive  
Media Loaded No  
Media Type CD-ROM  
Name SAMSUNG CD-ROM SN-124  
Manufacturer (Standard CD-ROM drives)  
Status OK  
Transfer Rate Not Available  
SCSI Target ID 0  
PNP Device ID IDE\CDROMSAMSUNG\_CD-ROM\_SN-124\Q009\5&3125DC91&0&0.0.0  
Driver c:\windows\system32\drivers\cdrom.sys (5.2.3790.0 (srv03\_rtm.030324-2048), 49.50 KB (50,688 bytes), 3/29/2003 12:00 AM)

[Sound Device]

Item Value

[Display]

Item Value  
Name RAGE XL PCI Family (Microsoft Corporation)  
PNP Device ID PCI\VEN\_1002&DEV\_4752&SUBSYS\_01211028&REV\_27\3&13C0B0C5&0&70  
Adapter Type ATI RAGE XL PCI (B41), ATI Technologies Inc. compatible  
Adapter Description RAGE XL PCI Family (Microsoft Corporation)  
Adapter RAM 8.00 MB (8,388,608 bytes)  
Installed Drivers ati2drad.dll  
Driver Version 5.10.3663.6013  
INF File atiixpad.inf (ati2mpad section)  
Color Planes 1  
Color Table Entries 65536  
Resolution 1024 x 768 x 60 hertz  
Bits/Pixel 16  
Memory Address 0xFD000000-0xFEBFFFFFF  
I/O Port 0x0000E800-0x0000E8FF  
Memory Address 0xFE101000-0xFE101FFF  
I/O Port 0x000003B0-0x000003DF

## Appendix C – Tunable Parameters

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I/O Port 0x000003C0-0x000003DF  
Memory Address 0xA0000-0xBFFFF  
Driver c:\windows\system32\drivers\ati2mpad.sys (5.10.3663.6013,  
335.38 KB (343,424 bytes), 5/30/2003 10:02 AM)

[Infrared]

Item Value

[Input]

[Keyboard]

Item Value  
Description Standard 101/102-Key or Microsoft Natural PS/2 Keyboard  
Name Enhanced (101- or 102-key)  
Layout 00000409  
PNP Device ID ACPI\PNP0303\4&25F73A82&0  
Number of Function Keys 12  
I/O Port 0x00000060-0x00000060  
I/O Port 0x00000064-0x00000064  
IRQ Channel IRQ 1  
Driver c:\windows\system32\drivers\i8042prt.sys (5.2.3790.0  
(srv03\_rtm.030324-2048), 68.50 KB (70,144 bytes), 3/29/2003 12:00 AM)

[Pointing Device]

Item Value  
Hardware Type PS/2 Compatible Mouse  
Number of Buttons 3  
Status OK  
PNP Device ID ACPI\PNP0F13\4&25F73A82&0  
Power Management Supported No  
Double Click Threshold 6  
Handedness Right Handed Operation  
IRQ Channel IRQ 12  
Driver c:\windows\system32\drivers\i8042prt.sys (5.2.3790.0  
(srv03\_rtm.030324-2048), 68.50 KB (70,144 bytes), 3/29/2003 12:00 AM)

[Modem]

Item Value

[Network]

[Adapter]

Item Value  
Name [00000001] Broadcom NetXtreme Gigabit Ethernet  
Adapter Type Not Available  
Product Type Broadcom NetXtreme Gigabit Ethernet



## Appendix C – Tunable Parameters

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Installed Yes  
PNP Device ID Not Available  
Last Reset 7/8/2003 5:05 PM  
Index 1  
Service Name b57w2k  
IP Address Not Available  
IP Subnet Not Available  
Default IP Gateway Not Available  
DHCP Enabled No  
DHCP Server Not Available  
DHCP Lease Expires Not Available  
DHCP Lease Obtained Not Available  
MAC Address Not Available

Name [00000002] Broadcom NetXtreme Gigabit Ethernet  
Adapter Type Not Available  
Product Type Broadcom NetXtreme Gigabit Ethernet  
Installed Yes  
PNP Device ID Not Available  
Last Reset 7/8/2003 5:05 PM  
Index 2  
Service Name b57w2k  
IP Address Not Available  
IP Subnet Not Available  
Default IP Gateway Not Available  
DHCP Enabled No  
DHCP Server Not Available  
DHCP Lease Expires Not Available  
DHCP Lease Obtained Not Available  
MAC Address Not Available

Name [00000003] RAS Async Adapter  
Adapter Type Not Available  
Product Type RAS Async Adapter  
Installed Yes  
PNP Device ID Not Available  
Last Reset 7/8/2003 5:05 PM  
Index 3  
Service Name AsyncMac  
IP Address Not Available  
IP Subnet Not Available  
Default IP Gateway Not Available  
DHCP Enabled No  
DHCP Server Not Available  
DHCP Lease Expires Not Available  
DHCP Lease Obtained Not Available  
MAC Address Not Available

Name [00000004] WAN Miniport (L2TP)  
Adapter Type Not Available  
Product Type WAN Miniport (L2TP)  
Installed Yes  
PNP Device ID ROOT\MS\_L2TPMINIPOINT\0000  
Last Reset 7/8/2003 5:05 PM  
Index 4

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Service Name Rasl2tp  
IP Address Not Available  
IP Subnet Not Available  
Default IP Gateway Not Available  
DHCP Enabled No  
DHCP Server Not Available  
DHCP Lease Expires Not Available  
DHCP Lease Obtained Not Available  
MAC Address Not Available  
Driver c:\windows\system32\drivers\rasl2tp.sys (5.2.3790.0  
(srv03\_rtm.030324-2048), 77.00 KB (78,848 bytes), 3/29/2003 12:00 AM)

Name [00000005] WAN Miniport (PPTP)  
Adapter Type Wide Area Network (WAN)  
Product Type WAN Miniport (PPTP)  
Installed Yes  
PNP Device ID ROOT\MS\_PPTPMINIPOINT\0000  
Last Reset 7/8/2003 5:05 PM  
Index 5  
Service Name PptpMiniport  
IP Address Not Available  
IP Subnet Not Available  
Default IP Gateway Not Available  
DHCP Enabled No  
DHCP Server Not Available  
DHCP Lease Expires Not Available  
DHCP Lease Obtained Not Available  
MAC Address 50:50:54:50:30:30  
Driver c:\windows\system32\drivers\raspptp.sys (5.2.3790.0  
(srv03\_rtm.030324-2048), 70.50 KB (72,192 bytes), 3/29/2003 12:00 AM)

Name [00000006] WAN Miniport (PPPOE)  
Adapter Type Wide Area Network (WAN)  
Product Type WAN Miniport (PPPOE)  
Installed Yes  
PNP Device ID ROOT\MS\_PPPOEMINIPOINT\0000  
Last Reset 7/8/2003 5:05 PM  
Index 6  
Service Name RasPppoe  
IP Address Not Available  
IP Subnet Not Available  
Default IP Gateway Not Available  
DHCP Enabled No  
DHCP Server Not Available  
DHCP Lease Expires Not Available  
DHCP Lease Obtained Not Available  
MAC Address 33:50:6F:45:30:30  
Driver c:\windows\system32\drivers\rasppoe.sys (5.2.3790.0  
(srv03\_rtm.030324-2048), 38.00 KB (38,912 bytes), 3/29/2003 12:00 AM)

Name [00000007] Direct Parallel  
Adapter Type Not Available  
Product Type Direct Parallel  
Installed Yes  
PNP Device ID ROOT\MS\_PTIMINIPOINT\0000

## Appendix C – Tunable Parameters

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Last Reset 7/8/2003 5:05 PM  
Index 7  
Service Name Raspti  
IP Address Not Available  
IP Subnet Not Available  
Default IP Gateway Not Available  
DHCP Enabled No  
DHCP Server Not Available  
DHCP Lease Expires Not Available  
DHCP Lease Obtained Not Available  
MAC Address Not Available  
Driver c:\windows\system32\drivers\raspti.sys (5.2.3790.0  
(srv03\_rtm.030324-2048), 18.50 KB (18,944 bytes), 3/29/2003 12:00 AM)

Name [00000008] WAN Miniport (IP)  
Adapter Type Not Available  
Product Type WAN Miniport (IP)  
Installed Yes  
PNP Device ID ROOT\MS\_NDISWANIP\0000  
Last Reset 7/8/2003 5:05 PM  
Index 8  
Service Name NdisWan  
IP Address Not Available  
IP Subnet Not Available  
Default IP Gateway Not Available  
DHCP Enabled No  
DHCP Server Not Available  
DHCP Lease Expires Not Available  
DHCP Lease Obtained Not Available  
MAC Address Not Available  
Driver c:\windows\system32\drivers\ndiswan.sys (5.2.3790.0  
(srv03\_rtm.030324-2048), 96.50 KB (98,816 bytes), 3/29/2003 12:00 AM)

Name [00000009] Broadcom NetXtreme Gigabit Ethernet  
Adapter Type Ethernet 802.3  
Product Type Broadcom NetXtreme Gigabit Ethernet  
Installed Yes  
PNP Device ID  
PCI\VEN\_14E4&DEV\_16A7&SUBSYS\_01211028&REV\_02\3&172E68DD&0&30  
Last Reset 7/8/2003 5:05 PM  
Index 9  
Service Name b57w2k  
IP Address 192.1.10.78  
IP Subnet 255.255.255.0  
Default IP Gateway Not Available  
DHCP Enabled No  
DHCP Server Not Available  
DHCP Lease Expires Not Available  
DHCP Lease Obtained Not Available  
MAC Address 00:06:5B:F8:5D:AA  
Memory Address 0xDFF10000-0xDFF1FFFF  
IRQ Channel IRQ 28  
Driver c:\windows\system32\drivers\b57xp32.sys (2.91.0.0 built by:  
WinDDK, 137.00 KB (140,288 bytes), 5/30/2003 10:02 AM)

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Name [00000010] Broadcom NetXtreme Gigabit Ethernet  
Adapter Type Ethernet 802.3  
Product Type Broadcom NetXtreme Gigabit Ethernet  
Installed Yes  
PNP Device ID  
PCI\VEN\_14E4&DEV\_16A7&SUBSYS\_01211028&REV\_02\3&172E68DD&0&40  
Last Reset 7/8/2003 5:05 PM  
Index 10  
Service Name b57w2k  
IP Address 192.1.1.78  
IP Subnet 255.255.255.0  
Default IP Gateway Not Available  
DHCP Enabled No  
DHCP Server Not Available  
DHCP Lease Expires Not Available  
DHCP Lease Obtained Not Available  
MAC Address 00:06:5B:F8:5D:AB  
Memory Address 0xDFF00000-0xDFF0FFFF  
IRQ Channel IRQ 29  
Driver c:\windows\system32\drivers\b57xp32.sys (2.91.0.0 built by:  
WinDDK, 137.00 KB (140,288 bytes), 5/30/2003 10:02 AM)

[Protocol]

Item Value  
Name MSAFD Tcpi [TCP/IP]  
Connectionless Service No  
Guarantees Delivery Yes  
Guarantees Sequencing Yes  
Maximum Address Size 16 bytes  
Maximum Message Size 0 bytes  
Message Oriented No  
Minimum Address Size 16 bytes  
Pseudo Stream Oriented No  
Supports Broadcasting No  
Supports Connect Data No  
Supports Disconnect Data No  
Supports Encryption No  
Supports Expedited Data Yes  
Supports Graceful Closing Yes  
Supports Guaranteed Bandwidth No  
Supports Multicasting No

Name MSAFD Tcpi [UDP/IP]  
Connectionless Service Yes  
Guarantees Delivery No  
Guarantees Sequencing No  
Maximum Address Size 16 bytes  
Maximum Message Size 63.93 KB (65,467 bytes)  
Message Oriented Yes  
Minimum Address Size 16 bytes  
Pseudo Stream Oriented No  
Supports Broadcasting Yes  
Supports Connect Data No  
Supports Disconnect Data No

## Appendix C – Tunable Parameters

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Supports Encryption No  
Supports Expedited Data No  
Supports Graceful Closing No  
Supports Guaranteed Bandwidth No  
Supports Multicasting Yes

Name RSVP UDP Service Provider  
Connectionless Service Yes  
Guarantees Delivery No  
Guarantees Sequencing No  
Maximum Address Size 16 bytes  
Maximum Message Size 63.93 KB (65,467 bytes)  
Message Oriented Yes  
Minimum Address Size 16 bytes  
Pseudo Stream Oriented No  
Supports Broadcasting Yes  
Supports Connect Data No  
Supports Disconnect Data No  
Supports Encryption Yes  
Supports Expedited Data No  
Supports Graceful Closing No  
Supports Guaranteed Bandwidth No  
Supports Multicasting Yes

Name RSVP TCP Service Provider  
Connectionless Service No  
Guarantees Delivery Yes  
Guarantees Sequencing Yes  
Maximum Address Size 16 bytes  
Maximum Message Size 0 bytes  
Message Oriented No  
Minimum Address Size 16 bytes  
Pseudo Stream Oriented No  
Supports Broadcasting No  
Supports Connect Data No  
Supports Disconnect Data No  
Supports Encryption Yes  
Supports Expedited Data Yes  
Supports Graceful Closing Yes  
Supports Guaranteed Bandwidth No  
Supports Multicasting No

Name MSAFD NetBIOS [\\Device\NetBT\_Tcpip\_{2EF7CB45-6E02-4028-A9B2-7207ECD6BD5B}] SEQPACKET 5  
Connectionless Service No  
Guarantees Delivery Yes  
Guarantees Sequencing Yes  
Maximum Address Size 20 bytes  
Maximum Message Size 62.50 KB (64,000 bytes)  
Message Oriented Yes  
Minimum Address Size 20 bytes  
Pseudo Stream Oriented No  
Supports Broadcasting No  
Supports Connect Data No  
Supports Disconnect Data No

## Appendix C – Tunable Parameters

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Supports Encryption No  
Supports Expedited Data No  
Supports Graceful Closing No  
Supports Guaranteed Bandwidth No  
Supports Multicasting No

Name MSAFD NetBIOS [\Device\NetBT\_Tcpip\_{2EF7CB45-6E02-4028-A9B2-7207ECD6BD5B}] DATAGRAM 5  
Connectionless Service Yes  
Guarantees Delivery No  
Guarantees Sequencing No  
Maximum Address Size 20 bytes  
Maximum Message Size 62.50 KB (64,000 bytes)  
Message Oriented Yes  
Minimum Address Size 20 bytes  
Pseudo Stream Oriented No  
Supports Broadcasting Yes  
Supports Connect Data No  
Supports Disconnect Data No  
Supports Encryption No  
Supports Expedited Data No  
Supports Graceful Closing No  
Supports Guaranteed Bandwidth No  
Supports Multicasting No

Name MSAFD NetBIOS [\Device\NetBT\_Tcpip\_{D6D57ED7-08E8-4E49-AE34-29F7F2B4AC24}] SEQPACKET 4  
Connectionless Service No  
Guarantees Delivery Yes  
Guarantees Sequencing Yes  
Maximum Address Size 20 bytes  
Maximum Message Size 62.50 KB (64,000 bytes)  
Message Oriented Yes  
Minimum Address Size 20 bytes  
Pseudo Stream Oriented No  
Supports Broadcasting No  
Supports Connect Data No  
Supports Disconnect Data No  
Supports Encryption No  
Supports Expedited Data No  
Supports Graceful Closing No  
Supports Guaranteed Bandwidth No  
Supports Multicasting No

Name MSAFD NetBIOS [\Device\NetBT\_Tcpip\_{D6D57ED7-08E8-4E49-AE34-29F7F2B4AC24}] DATAGRAM 4  
Connectionless Service Yes  
Guarantees Delivery No  
Guarantees Sequencing No  
Maximum Address Size 20 bytes  
Maximum Message Size 62.50 KB (64,000 bytes)  
Message Oriented Yes  
Minimum Address Size 20 bytes  
Pseudo Stream Oriented No  
Supports Broadcasting Yes

## Appendix C – Tunable Parameters

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Supports Connect Data No  
Supports Disconnect Data No  
Supports Encryption No  
Supports Expedited Data No  
Supports Graceful Closing No  
Supports Guaranteed Bandwidth No  
Supports Multicasting No

Name MSAFD NetBIOS [\Device\NetBT\_Tcpip\_{6068DFB2-35CC-4334-A1CD-99BF402C2EB1}] SEQPACKET 0  
Connectionless Service No  
Guarantees Delivery Yes  
Guarantees Sequencing Yes  
Maximum Address Size 20 bytes  
Maximum Message Size 62.50 KB (64,000 bytes)  
Message Oriented Yes  
Minimum Address Size 20 bytes  
Pseudo Stream Oriented No  
Supports Broadcasting No  
Supports Connect Data No  
Supports Disconnect Data No  
Supports Encryption No  
Supports Expedited Data No  
Supports Graceful Closing No  
Supports Guaranteed Bandwidth No  
Supports Multicasting No

Name MSAFD NetBIOS [\Device\NetBT\_Tcpip\_{6068DFB2-35CC-4334-A1CD-99BF402C2EB1}] DATAGRAM 0  
Connectionless Service Yes  
Guarantees Delivery No  
Guarantees Sequencing No  
Maximum Address Size 20 bytes  
Maximum Message Size 62.50 KB (64,000 bytes)  
Message Oriented Yes  
Minimum Address Size 20 bytes  
Pseudo Stream Oriented No  
Supports Broadcasting Yes  
Supports Connect Data No  
Supports Disconnect Data No  
Supports Encryption No  
Supports Expedited Data No  
Supports Graceful Closing No  
Supports Guaranteed Bandwidth No  
Supports Multicasting No

Name MSAFD NetBIOS [\Device\NetBT\_Tcpip\_{84CBEDAE-78F6-4C0F-A714-0B9A6BAD30DA}] SEQPACKET 1  
Connectionless Service No  
Guarantees Delivery Yes  
Guarantees Sequencing Yes  
Maximum Address Size 20 bytes  
Maximum Message Size 62.50 KB (64,000 bytes)  
Message Oriented Yes  
Minimum Address Size 20 bytes

## Appendix C – Tunable Parameters

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Pseudo Stream Oriented No  
Supports Broadcasting No  
Supports Connect Data No  
Supports Disconnect Data No  
Supports Encryption No  
Supports Expedited Data No  
Supports Graceful Closing No  
Supports Guaranteed Bandwidth No  
Supports Multicasting No

Name MSAFD NetBIOS [\Device\NetBT\_Tcpip\_{84CBEDAE-78F6-4C0F-A714-0B9A6BAD30DA}] DATAGRAM 1  
Connectionless Service Yes  
Guarantees Delivery No  
Guarantees Sequencing No  
Maximum Address Size 20 bytes  
Maximum Message Size 62.50 KB (64,000 bytes)  
Message Oriented Yes  
Minimum Address Size 20 bytes  
Pseudo Stream Oriented No  
Supports Broadcasting Yes  
Supports Connect Data No  
Supports Disconnect Data No  
Supports Encryption No  
Supports Expedited Data No  
Supports Graceful Closing No  
Supports Guaranteed Bandwidth No  
Supports Multicasting No

Name MSAFD NetBIOS [\Device\NetBT\_Tcpip\_{D5B83B02-01EF-4E50-9720-1B8E810DE871}] SEQPACKET 2  
Connectionless Service No  
Guarantees Delivery Yes  
Guarantees Sequencing Yes  
Maximum Address Size 20 bytes  
Maximum Message Size 62.50 KB (64,000 bytes)  
Message Oriented Yes  
Minimum Address Size 20 bytes  
Pseudo Stream Oriented No  
Supports Broadcasting No  
Supports Connect Data No  
Supports Disconnect Data No  
Supports Encryption No  
Supports Expedited Data No  
Supports Graceful Closing No  
Supports Guaranteed Bandwidth No  
Supports Multicasting No

Name MSAFD NetBIOS [\Device\NetBT\_Tcpip\_{D5B83B02-01EF-4E50-9720-1B8E810DE871}] DATAGRAM 2  
Connectionless Service Yes  
Guarantees Delivery No  
Guarantees Sequencing No  
Maximum Address Size 20 bytes  
Maximum Message Size 62.50 KB (64,000 bytes)



## Appendix C – Tunable Parameters

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Message Oriented Yes  
Minimum Address Size 20 bytes  
Pseudo Stream Oriented No  
Supports Broadcasting Yes  
Supports Connect Data No  
Supports Disconnect Data No  
Supports Encryption No  
Supports Expedited Data No  
Supports Graceful Closing No  
Supports Guaranteed Bandwidth No  
Supports Multicasting No

Name MSAFD NetBIOS [\Device\NetBT\_Tcpip\_{AA843776-1681-4379-B2C9-EC445DC298EF}] SEQPACKET 3

Connectionless Service No  
Guarantees Delivery Yes  
Guarantees Sequencing Yes  
Maximum Address Size 20 bytes  
Maximum Message Size 62.50 KB (64,000 bytes)  
Message Oriented Yes  
Minimum Address Size 20 bytes  
Pseudo Stream Oriented No  
Supports Broadcasting No  
Supports Connect Data No  
Supports Disconnect Data No  
Supports Encryption No  
Supports Expedited Data No  
Supports Graceful Closing No  
Supports Guaranteed Bandwidth No  
Supports Multicasting No

Name MSAFD NetBIOS [\Device\NetBT\_Tcpip\_{AA843776-1681-4379-B2C9-EC445DC298EF}] DATAGRAM 3

Connectionless Service Yes  
Guarantees Delivery No  
Guarantees Sequencing No  
Maximum Address Size 20 bytes  
Maximum Message Size 62.50 KB (64,000 bytes)  
Message Oriented Yes  
Minimum Address Size 20 bytes  
Pseudo Stream Oriented No  
Supports Broadcasting Yes  
Supports Connect Data No  
Supports Disconnect Data No  
Supports Encryption No  
Supports Expedited Data No  
Supports Graceful Closing No  
Supports Guaranteed Bandwidth No  
Supports Multicasting No

[WinSock]

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

## Appendix C – Tunable Parameters

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Version 3.10

File c:\windows\system32\wsock32.dll  
Size 22.00 KB (22,528 bytes)  
Version 5.2.3790.0 (srv03\_rtm.030324-2048)

[Ports]

[Serial]

Item	Value
Name	Communications Port (COM2)
Status	OK
PNP Device ID	ACPI\PNP0501\1
Maximum Input Buffer Size	0
Maximum Output Buffer Size	No
Settable Baud Rate	Yes
Settable Data Bits	Yes
Settable Flow Control	Yes
Settable Parity	Yes
Settable Parity Check	Yes
Settable Stop Bits	Yes
Settable RLSD	Yes
Supports RLSD	Yes
Supports 16 Bit Mode	No
Supports Special Characters	No
Baud Rate	9600
Bits/Byte	8
Stop Bits	1
Parity	None
Busy	No
Abort Read/Write on Error	No
Binary Mode Enabled	Yes
Continue Xmit on XOff	No
CTS Outflow Control	No
Discard NULL Bytes	No
DSR Outflow Control	0
DSR Sensitivity	0
DTR Flow Control Type	Enable
EOF Character	0
Error Replace Character	0
Error Replacement Enabled	No
Event Character	0
Parity Check Enabled	No
RTS Flow Control Type	Enable
XOff Character	19
XOffXmit Threshold	512
XOn Character	17
XOnXmit Threshold	2048
XOnXOff InFlow Control	0
XOnXOff OutFlow Control	0
I/O Port	0x000003F8-0x000003FF
IRQ Channel	IRQ 4

## Appendix C – Tunable Parameters

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Driver c:\windows\system32\drivers\serial.sys (5.2.3790.0  
(srv03\_rtm.030324-2048), 76.00 KB (77,824 bytes), 3/29/2003 12:00 AM)

Name Communications Port (COM1)

Status OK

PNP Device ID ACPI\PNP0501\2

Maximum Input Buffer Size 0

Maximum Output Buffer Size No

Settable Baud Rate Yes

Settable Data Bits Yes

Settable Flow Control Yes

Settable Parity Yes

Settable Parity Check Yes

Settable Stop Bits Yes

Settable RLSD Yes

Supports RLSD Yes

Supports 16 Bit Mode No

Supports Special Characters No

Baud Rate 9600

Bits/Byte 8

Stop Bits 1

Parity None

Busy No

Abort Read/Write on Error No

Binary Mode Enabled Yes

Continue XMit on XOff No

CTS Outflow Control No

Discard NULL Bytes No

DSR Outflow Control 0

DSR Sensitivity 0

DTR Flow Control Type Enable

EOF Character 0

Error Replace Character 0

Error Replacement Enabled No

Event Character 0

Parity Check Enabled No

RTS Flow Control Type Enable

XOff Character 19

XOffXMit Threshold 512

XOn Character 17

XOnXMit Threshold 2048

XOnXOff InFlow Control 0

XOnXOff OutFlow Control 0

I/O Port 0x000002F8-0x000002FF

IRQ Channel IRQ 3

Driver c:\windows\system32\drivers\serial.sys (5.2.3790.0

(srv03\_rtm.030324-2048), 76.00 KB (77,824 bytes), 3/29/2003 12:00 AM)

[Parallel]

Item Value

[Storage]

## Appendix C – Tunable Parameters

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[Drives]

Item Value

Drive A:

Description 3 1/2 Inch Floppy Drive

Drive C:

Description Local Fixed Disk

Compressed No

File System NTFS

Size 8.79 GB (9,434,361,856 bytes)

Free Space 4.30 GB (4,615,680,000 bytes)

Volume Name

Volume Serial Number 18A97566

Drive D:

Description CD-ROM Disc

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

Drive L:

Description Local Fixed Disk

Compressed Not Available

File System Not Available

Size Not Available

Free Space Not Available

Volume Name Not Available

Volume Serial Number Not Available

Drive 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

Drive W:

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

## Appendix C – Tunable Parameters

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Drive Y:  
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

[Disks]

Item Value  
Description Disk drive  
Manufacturer (Standard disk drives)  
Model DELL Container SCSI Disk Device  
Bytes/Sector 512  
Media Loaded Yes  
Media Type Fixed hard disk  
Partitions 2  
SCSI Bus 4  
SCSI Logical Unit 0  
SCSI Port 6  
SCSI Target ID 0  
Sectors/Track 63  
Size 67.79 GB (72,793,728,000 bytes)  
Total Cylinders 8,850  
Total Sectors 142,175,250  
Total Tracks 2,256,750  
Tracks/Cylinder 255  
Partition Disk #2, Partition #0  
Partition Size 8.79 GB (9,434,363,904 bytes)  
Partition Starting Offset 32,256 bytes  
Partition Disk #2, Partition #1  
Partition Size 59.01 GB (63,359,331,840 bytes)  
Partition Starting Offset 9,434,396,160 bytes

Description Disk drive  
Manufacturer (Standard disk drives)  
Model PERC LD 0 PERCRAID SCSI Disk Device  
Bytes/Sector 512  
Media Loaded Yes  
Media Type Fixed hard disk  
Partitions 3  
SCSI Bus 3  
SCSI Logical Unit 0  
SCSI Port 2  
SCSI Target ID 0  
Sectors/Track 63  
Size 472.44 GB (507,277,693,440 bytes)  
Total Cylinders 61,673  
Total Sectors 990,776,745  
Total Tracks 15,726,615  
Tracks/Cylinder 255  
Partition Disk #0, Partition #0  
Partition Size 58.59 GB (62,915,134,464 bytes)

## Appendix C – Tunable Parameters

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Partition Starting Offset 32,256 bytes  
Partition Disk #0, Partition #1  
Partition Size 58.59 GB (62,915,166,720 bytes)  
Partition Starting Offset 62,915,166,720 bytes  
Partition Disk #0, Partition #2  
Partition Size 355.25 GB (381,447,360,000 bytes)  
Partition Starting Offset 125,830,333,440 bytes

Description Disk drive  
Manufacturer (Standard disk drives)  
Model PERC LD 0 PERCRAID SCSI Disk Device  
Bytes/Sector 512  
Media Loaded Yes  
Media Type Fixed hard disk  
Partitions 3  
SCSI Bus 3  
SCSI Logical Unit 0  
SCSI Port 3  
SCSI Target ID 0  
Sectors/Track 63  
Size 472.44 GB (507,277,693,440 bytes)  
Total Cylinders 61,673  
Total Sectors 990,776,745  
Total Tracks 15,726,615  
Tracks/Cylinder 255  
Partition Disk #1, Partition #0  
Partition Size 58.59 GB (62,915,134,464 bytes)  
Partition Starting Offset 32,256 bytes  
Partition Disk #1, Partition #1  
Partition Size 58.59 GB (62,915,166,720 bytes)  
Partition Starting Offset 62,915,166,720 bytes  
Partition Disk #1, Partition #2  
Partition Size 355.25 GB (381,447,360,000 bytes)  
Partition Starting Offset 125,830,333,440 bytes

[SCSI]

Item Value  
Name Dell PERC 3 RAID (SCSI chip)  
Manufacturer Dell  
Status OK  
PNP Device ID  
PCI\VEN\_9005&DEV\_00C5&SUBSYS\_00C51028&REV\_01\4&22300438&0&3040  
I/O Port 0x00009C00-0x00009CFF  
Memory Address 0xDFCFF000-0xDFCFFFFF  
IRQ Channel IRQ 30  
Driver c:\windows\system32\drivers\perc2.sys (5.2.3646.0  
(Lab01\_N(portbld).020612-1346), 27.63 KB (28,288 bytes), 3/29/2003  
12:00 AM)

Name Dell PERC 3 RAID (SCSI chip)  
Manufacturer Dell  
Status OK  
PNP Device ID  
PCI\VEN\_9005&DEV\_00C5&SUBSYS\_00C51028&REV\_01\4&22300438&0&3140

## Appendix C – Tunable Parameters

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I/O Port 0x00009800-0x000098FF  
Memory Address 0xDFCFE000-0xDFCFEFFF  
IRQ Channel IRQ 31  
Driver c:\windows\system32\drivers\perc2.sys (5.2.3646.0  
(Lab01\_N(portbld).020612-1346), 27.63 KB (28,288 bytes), 3/29/2003  
12:00 AM)

Name Dell PERC 3/Di RAID Controller  
Manufacturer Dell  
Status OK  
PNP Device ID  
PCI\VEN\_1028&DEV\_000A&SUBSYS\_01211028&REV\_01\3&474B838&0&41  
Memory Address 0xD0000000-0xDFDFFFFF  
IRQ Channel IRQ 30  
Driver c:\windows\system32\drivers\perc2.sys (5.2.3646.0  
(Lab01\_N(portbld).020612-1346), 27.63 KB (28,288 bytes), 3/29/2003  
12:00 AM)

Name DELL PERC 3/DC Plus RAID Controller  
Manufacturer DELL  
Status OK  
PNP Device ID  
PCI\VEN\_101E&DEV\_1960&SUBSYS\_04931028&REV\_20\5&179BE7CD&0&000030  
Memory Address 0xE0000000-0xEFFFFFFF  
IRQ Channel IRQ 24  
Driver c:\windows\system32\drivers\mraid35x.sys (5.2.22.4 built  
by: WinDDK, 17.88 KB (18,304 bytes), 6/20/2003 9:36 PM)

Name DELL PERC 3/DC Plus RAID Controller  
Manufacturer DELL  
Status OK  
PNP Device ID  
PCI\VEN\_101E&DEV\_1960&SUBSYS\_04931028&REV\_20\5&EF02CB5&0&000040  
Memory Address 0xF0000000-0xFCFFFFFF  
IRQ Channel IRQ 20  
Driver c:\windows\system32\drivers\mraid35x.sys (5.2.22.4 built  
by: WinDDK, 17.88 KB (18,304 bytes), 6/20/2003 9:36 PM)

[IDE]

Item Value  
Name CSB5 IDE Controller  
Manufacturer ServerWorks  
Status OK  
PNP Device ID  
PCI\VEN\_1166&DEV\_0212&SUBSYS\_02121166&REV\_93\3&13C0B0C5&0&79  
I/O Port 0x000008B0-0x000008BF  
Driver c:\windows\system32\drivers\pciide.sys (5.2.3790.0  
(srv03\_rtm.030324-2048), 5.50 KB (5,632 bytes), 3/29/2003 12:00 AM)

Name Primary IDE Channel  
Manufacturer (Standard IDE ATA/ATAPI controllers)  
Status OK  
PNP Device ID PCIIDE\IDECHANNEL\4&10A8249&0&0  
I/O Port 0x000001F0-0x000001F7

## Appendix C – Tunable Parameters

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I/O Port 0x000003F6-0x000003F6  
IRQ Channel IRQ 14  
Driver c:\windows\system32\drivers\atapi.sys (5.2.3790.0  
(srv03\_rtm.030324-2048), 89.00 KB (91,136 bytes), 3/29/2003 12:00 AM)

Name Secondary IDE Channel  
Manufacturer (Standard IDE ATA/ATAPI controllers)  
Status OK  
PNP Device ID PCIIDE\IDECHANNEL\4&10A8249&0&1  
I/O Port 0x00000170-0x00000177  
I/O Port 0x00000376-0x00000376  
Driver c:\windows\system32\drivers\atapi.sys (5.2.3790.0  
(srv03\_rtm.030324-2048), 89.00 KB (91,136 bytes), 3/29/2003 12:00 AM)

[Printing]

Name	Driver	Port Name	Server Name
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[Problem Devices]

Device	PNP Device ID	Error Code
PCI Device	PCI\VEN_1028&DEV_000C&SUBSYS_000C1028&REV_00\3&13C0B0C5&0&20	The drivers for this device are not installed.
PCI Device	PCI\VEN_1028&DEV_0008&SUBSYS_00081028&REV_00\3&13C0B0C5&0&21	The drivers for this device are not installed.
PCI Device	PCI\VEN_1028&DEV_000D&SUBSYS_000D1028&REV_00\3&13C0B0C5&0&22	The drivers for this device are not installed.

[USB]

Device	PNP Device ID
ServerWorks (RCC) PCI to USB Open Host Controller	PCI\VEN_1166&DEV_0220&SUBSYS_02201166&REV_05\3&13C0B0C5&0&7A
USB Root Hub	USB\ROOT_HUB\4&1A0F8909&0

[Software Environment]

[System Drivers]

Name	Description	File	Type	Started	Start Mode	State	Status		
	Error Control		Accept	Pause		Accept	Stop		
abiosdsk	Abiosdsk		Not Available		Kernel Driver		No		
	Disabled	Stopped	OK	Ignore	No	No			
acpi	Microsoft ACPI Driver	c:\windows\system32\drivers\acpi.sys	Kernel Driver	Yes	Boot	Running	OK	Normal	No
	Yes								
acpiec	ACPIEC	c:\windows\system32\drivers\acpiec.sys	Kernel Driver	No	Disabled	Stopped	OK	Normal	
	No	No							



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adpu160m	adpu160m	Not Available	Kernel Driver	No			
	Disabled	Stopped	OK	Normal	No	No	
adpu320	adpu320	Not Available	Kernel Driver	No			
	Disabled	Stopped	OK	Normal	No	No	
afcnt	afcnt	Not Available	Kernel Driver	No	Disabled		
	Stopped	OK	Normal	No	No		
afd	AFD Networking Support Environment						
	c:\windows\system32\drivers\afd.sys	Kernel Driver	Yes	Auto			
	Running	OK	Normal	No	Yes		
aha154x	Aha154x	Not Available	Kernel Driver	No			
	Disabled	Stopped	OK	Normal	No	No	
aic78u2	aic78u2	Not Available	Kernel Driver	No			
	Disabled	Stopped	OK	Normal	No	No	
aic78xx	aic78xx	Not Available	Kernel Driver	No			
	Disabled	Stopped	OK	Normal	No	No	
aliide	AliIde	Not Available	Kernel Driver	No			
	Disabled	Stopped	OK	Normal	No	No	
asyncmac	RAS Asynchronous Media Driver						
	c:\windows\system32\drivers\asyncmac.sys	Kernel Driver	No				
	Manual	Stopped	OK	Normal	No	No	
ataapi	Standard IDE/ESDI Hard Disk Controller						
	c:\windows\system32\drivers\ataapi.sys	Kernel Driver	Yes				
	Boot	Running	OK	Normal	No	Yes	
atdisk	Atdisk	Not Available	Kernel Driver	No			
	Disabled	Stopped	OK	Ignore	No	No	
ati2mpad	ati2mpad	c:\windows\system32\drivers\ati2mpad.sys					
	Kernel Driver	Yes	Manual	Running	OK	Ignore	
	No	Yes					
atmarpc	ATM ARP Client Protocol						
	c:\windows\system32\drivers\atmarpc.sys	Kernel Driver	No				
	Manual	Stopped	OK	Normal	No	No	
audstub	Audio Stub Driver c:\windows\system32\drivers\audstub.sys						
	Kernel Driver	Yes	Manual	Running	OK	Normal	
	No	Yes					
b57w2k	Broadcom NetXtreme Gigabit Ethernet						
	c:\windows\system32\drivers\b57xp32.sys	Kernel Driver	Yes				
	Manual	Running	OK	Normal	No	Yes	
beep	Beep	c:\windows\system32\drivers\beep.sys				Kernel Driver	
	Yes	System	Running	OK	Normal	No	Yes
cbidf2k	cbidf2k	c:\windows\system32\drivers\cbidf2k.sys					
	Kernel Driver	No	Disabled	Stopped	OK	Normal	
	No	No					
cd20xrnt	cd20xrnt	Not Available	Kernel Driver	No			
	Disabled	Stopped	OK	Normal	No	No	
cdfs	Cdfs	c:\windows\system32\drivers\cdfs.sys				File System	
Driver	Yes	Disabled	Running	OK	Normal	No	Yes
cdrom	CD-ROM Driver c:\windows\system32\drivers\cdrom.sys						
	Kernel Driver	Yes	System	Running	OK	Normal	
	No	Yes					
changer	Changer	Not Available	Kernel Driver	No			
	System	Stopped	OK	Ignore	No	No	
clusdisk	Cluster Disk Driver						
	c:\windows\system32\drivers\clusdisk.sys	Kernel Driver	No				
	Disabled	Stopped	OK	Normal	No	No	

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cmdide	CmdIde	Not Available	Kernel Driver	No			
	Disabled	Stopped	OK	Normal	No	No	
cpqarray	Cpqarray	Not Available	Kernel Driver	No			
	Disabled	Stopped	OK	Normal	No	No	
cpqarray2	cpqarray2	Not Available	Kernel Driver	No			
	Disabled	Stopped	OK	Normal	No	No	
cpqcissm	cpqcissm	Not Available	Kernel Driver	No			
	Disabled	Stopped	OK	Normal	No	No	
cpqfcalm	cpqfcalm	Not Available	Kernel Driver	No			
	Disabled	Stopped	OK	Normal	No	No	
crcdisk	CRC Disk Filter Driver						
	c:\windows\system32\drivers\crcdisk.sys		Kernel Driver				Yes
	Boot	Running	OK	Normal	No	Yes	
dac960nt	dac960nt	Not Available	Kernel Driver	No			
	Disabled	Stopped	OK	Normal	No	No	
dcesmwdm	Instrumentation service device driver						
	c:\windows\system32\drivers\dcesmwdm.sys		Kernel Driver				No
	Manual	Stopped	OK	Normal	No	No	
dellcerc	dellcerc	Not Available	Kernel Driver	No			
	Disabled	Stopped	OK	Normal	No	No	
dfsdriver	DfsDriver	c:\windows\system32\drivers\dfs.sys	File System				
Driver	Yes	Boot	Running	OK	Normal	No	Yes
disk	Disk Driver	c:\windows\system32\drivers\disk.sys	Kernel				
Driver	Yes	Boot	Running	OK	Normal	No	Yes
dmboot	dmboot	c:\windows\system32\drivers\dmboot.sys					
	Kernel Driver	No	Disabled	Stopped	OK	Normal	
	No	No					
dmio	Logical Disk Manager Driver						
	c:\windows\system32\drivers\dmio.sys		Kernel Driver				Yes
	Boot	Running	OK	Normal	No	Yes	
dmload	dmload	c:\windows\system32\drivers\dmload.sys					
	Kernel Driver	Yes	Boot	Running	OK	Normal	No
	Yes						
dpti2o	dpti2o	Not Available	Kernel Driver	No			
	Disabled	Stopped	OK	Normal	No	No	
fastfat	Fastfat	c:\windows\system32\drivers\fastfat.sys	File				
System Driver	Yes	Disabled	Running	OK	Normal	No	No
	Yes						
fdc	Floppy Disk Controller Driver c:\windows\system32\drivers\fdc.sys						
	Kernel Driver	Yes	Manual	Running	OK	Normal	
	No	Yes					
fips	Fips	c:\windows\system32\drivers\fips.sys	Kernel Driver				
	Yes	System	Running	OK	Normal	No	Yes
flpydisk	Floppy Disk Driver						
	c:\windows\system32\drivers\flpydisk.sys		Kernel Driver				Yes
	Manual	Running	OK	Normal	No	Yes	
ftdisk	Volume Manager Driver						
	c:\windows\system32\drivers\ftdisk.sys		Kernel Driver				Yes
	Boot	Running	OK	Normal	No	Yes	
gpc	Generic Packet Classifier						
	c:\windows\system32\drivers\msgpc.sys		Kernel Driver				Yes
	Manual	Running	OK	Normal	No	Yes	
hpn	hpn	Not Available	Kernel Driver	No	Disabled		
	Stopped	OK	Normal	No	No		

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hpt3xx	hpt3xx	Not Available	Kernel Driver	No			
	Disabled	Stopped	OK	Normal	No	No	
http	HTTP	c:\windows\system32\drivers\http.sys	Kernel Driver				
	No	Manual	Stopped	OK	Normal	No	No
i2omgmt	i2omgmt	Not Available	Kernel Driver	No			
	System	Stopped	OK	Normal	No	No	
i2omp	i2omp	Not Available	Kernel Driver	No		Disabled	
	Stopped	OK	Normal	No	No		
i8042prt	i8042	Keyboard and PS/2 Mouse Port Driver					
		c:\windows\system32\drivers\i8042prt.sys	Kernel Driver				Yes
	System	Running	OK	Normal	No	Yes	
iirsp	iirsp	Not Available	Kernel Driver	No		Disabled	
	Stopped	OK	Normal	No	No		
imapi	CD-Burning Filter Driver						
		c:\windows\system32\drivers\imapi.sys	Kernel Driver				No
	System	Stopped	OK	Normal	No	No	
intelide	IntelIde	Not Available	Kernel Driver	No			
	Disabled	Stopped	OK	Normal	No	No	
ipfilterdriver	IP Traffic Filter Driver						
		c:\windows\system32\drivers\ipfltdrv.sys	Kernel Driver				No
	Manual	Stopped	OK	Normal	No	No	
ipinip	IP in IP Tunnel Driver						
		c:\windows\system32\drivers\ipinip.sys	Kernel Driver				No
	Manual	Stopped	OK	Normal	No	No	
ipnat	IP Network Address Translator						
		c:\windows\system32\drivers\ipnat.sys	Kernel Driver				No
	Manual	Stopped	OK	Normal	No	No	
ipsec	IPSEC driver	c:\windows\system32\drivers\ipsec.sys					
	Kernel Driver	Yes	System	Running	OK	Normal	
	No	Yes					
ipsraidn	ipsraidn	Not Available	Kernel Driver	No			
	Disabled	Stopped	OK	Normal	No	No	
irenum	IR Enumerator Service						
		c:\windows\system32\drivers\irenum.sys	Kernel Driver				No
	Manual	Stopped	OK	Normal	No	No	
isapnp	PnP ISA/EISA Bus Driver						
		c:\windows\system32\drivers\isapnp.sys	Kernel Driver				Yes
	Boot	Running	OK	Critical	No	Yes	
kbdclass	Keyboard Class Driver						
		c:\windows\system32\drivers\kbdclass.sys	Kernel Driver				Yes
	System	Running	OK	Normal	No	Yes	
ksecdd	KSecDD	c:\windows\system32\drivers\ksecdd.sys					
	Kernel Driver	Yes	Boot	Running	OK	Normal	No
	Yes						
lp6nds35	lp6nds35	Not Available	Kernel Driver	No			
	Disabled	Stopped	OK	Normal	No	No	
mnmdd	mnmdd	c:\windows\system32\drivers\mnmdd.sys	Kernel Driver				
	Yes	System	Running	OK	Ignore	No	Yes
modem	Modem	c:\windows\system32\drivers\modem.sys	Kernel Driver				
	No	Manual	Stopped	OK	Ignore	No	No
mouclass	Mouse Class Driver						
		c:\windows\system32\drivers\mouclass.sys	Kernel Driver				Yes
	System	Running	OK	Normal	No	Yes	

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mountmgr      Mount Point Manager
              c:\windows\system32\drivers\mountmgr.sys  Kernel Driver      Yes
              Boot Running      OK      Normal      No      Yes
mraid35x     mraid35x      c:\windows\system32\drivers\mraid35x.sys
              Kernel Driver      Yes      Boot Running      OK      Normal      No
              Yes
mrxdav       WebDav Client Redirector
              c:\windows\system32\drivers\mrxdav.sys      File System Driver
              No      Manual      Stopped      OK      Normal      No      No
mrxsmb       MRXSMB        c:\windows\system32\drivers\mrxsmb.sys      File
System Driver      Yes      System      Running      OK      Normal      No
              Yes
msfs         Msfs          c:\windows\system32\drivers\msfs.sys      File System
Driver            Yes      System      Running      OK      Normal      No      Yes
mup          Mup          c:\windows\system32\drivers\mup.sys      File System Driver
              Yes      Boot Running      OK      Normal      No      Yes
ndis         NDIS System Driver      c:\windows\system32\drivers\ndis.sys
              Kernel Driver      Yes      Boot Running      OK      Normal      No
              Yes
ndistapi     Remote Access NDIS TAPI Driver
              c:\windows\system32\drivers\ndistapi.sys  Kernel Driver      Yes
              Manual      Running      OK      Normal      No      Yes
ndisuio      NDIS Usermode I/O Protocol
              c:\windows\system32\drivers\ndisuio.sys  Kernel Driver      No
              Manual      Stopped      OK      Normal      No      No
ndiswan      Remote Access NDIS WAN Driver
              c:\windows\system32\drivers\ndiswan.sys  Kernel Driver      Yes
              Manual      Running      OK      Normal      No      Yes
ndproxy      NDIS Proxy    c:\windows\system32\drivers\ndproxy.sys
              Kernel Driver      Yes      Manual      Running      OK      Normal
              No      Yes
netbios      NetBIOS Interface c:\windows\system32\drivers\netbios.sys
              File System Driver      Yes      System      Running      OK
              Normal      No      Yes
netbt        NetBios over Tcpi      c:\windows\system32\drivers\netbt.sys
              Kernel Driver      Yes      System      Running      OK      Normal
              No      Yes
nfrd960      nfrd960      Not Available      Kernel Driver      No
              Disabled      Stopped      OK      Normal      No      No
npfs         Npfs         c:\windows\system32\drivers\npfs.sys      File System
Driver            Yes      System      Running      OK      Normal      No      Yes
ntfs         Ntfs         c:\windows\system32\drivers\ntfs.sys      File System
Driver            Yes      Disabled      Running      OK      Normal      No      Yes
null         Null         c:\windows\system32\drivers\null.sys      Kernel Driver
              Yes      System      Running      OK      Normal      No      Yes
parport      Parport      c:\windows\system32\drivers\parport.sys
              Kernel Driver      No      Manual      Stopped      OK      Ignore
              No      No
partmgr      Partition Manager c:\windows\system32\drivers\partmgr.sys
              Kernel Driver      Yes      Boot Running      OK      Normal      No
              Yes
pci          PCI Bus Driver      c:\windows\system32\drivers\pci.sys  Kernel
Driver            Yes      Boot Running      OK      Critical      No      Yes

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pciide	PCIIde	c:\windows\system32\drivers\pciide.sys						
	Kernel Driver	Yes	Boot	Running	OK	Normal		No
	Yes							
pcmcia	Pcmcia	c:\windows\system32\drivers\pcmcia.sys						
	Kernel Driver	No	Disabled	Stopped	OK	Normal		
	No	No						
pdcomp	PDCOMP	Not Available			Kernel Driver			No
	Manual	Stopped	OK	Ignore	No	No		
pdframe	PDFFRAME	Not Available			Kernel Driver			No
	Manual	Stopped	OK	Ignore	No	No		
pdreli	PDRELI	Not Available			Kernel Driver			No
	Manual	Stopped	OK	Ignore	No	No		
pdrframe	PDRFRAME	Not Available			Kernel Driver			No
	Manual	Stopped	OK	Ignore	No	No		
perc2	perc2	c:\windows\system32\drivers\perc2.sys			Kernel Driver			
	Yes	Boot	Running	OK	Normal	No	Yes	
perc2hib	perc2hib	c:\windows\system32\drivers\perc2hib.sys						
	Kernel Driver	Yes	Boot	Running	OK	Normal		No
	Yes							
pptpminiport	WAN Miniport (PPTP)							
		c:\windows\system32\drivers\rasppptp.sys			Kernel Driver			Yes
	Manual	Running	OK	Normal	No	Yes		
processor	Processor Driver	c:\windows\system32\drivers\processr.sys						
	Kernel Driver	Yes	Manual	Running	OK	Normal		
	No	Yes						
ptilink	Direct Parallel Link Driver							
		c:\windows\system32\drivers\ptilink.sys			Kernel Driver			Yes
	Manual	Running	OK	Normal	No	Yes		
ql1080	ql1080	Not Available			Kernel Driver			No
	Disabled	Stopped	OK	Normal	No	No		
ql10wnt	Ql10wnt	Not Available			Kernel Driver			No
	Disabled	Stopped	OK	Normal	No	No		
ql12160	ql12160	Not Available			Kernel Driver			No
	Disabled	Stopped	OK	Normal	No	No		
ql1240	ql1240	Not Available			Kernel Driver			No
	Disabled	Stopped	OK	Normal	No	No		
ql1280	ql1280	Not Available			Kernel Driver			No
	Disabled	Stopped	OK	Normal	No	No		
ql2100	ql2100	Not Available			Kernel Driver			No
	Disabled	Stopped	OK	Normal	No	No		
ql2200	ql2200	Not Available			Kernel Driver			No
	Disabled	Stopped	OK	Normal	No	No		
ql2300	ql2300	Not Available			Kernel Driver			No
	Disabled	Stopped	OK	Normal	No	No		
rasacd	Remote Access Auto Connection Driver							
		c:\windows\system32\drivers\rasacd.sys			Kernel Driver			Yes
	System	Running	OK	Normal	No	Yes		
rasl2tp	WAN Miniport (L2TP)							
		c:\windows\system32\drivers\rasl2tp.sys			Kernel Driver			Yes
	Manual	Running	OK	Normal	No	Yes		
rasppoe	Remote Access PPPOE Driver							
		c:\windows\system32\drivers\rasppoe.sys			Kernel Driver			Yes
	Manual	Running	OK	Normal	No	Yes		

## Appendix C – Tunable Parameters

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raspti      Direct Parallel  c:\windows\system32\drivers\raspti.sys
           Kernel Driver   Yes  Manual      Running    OK      Normal
           No      Yes

rdbss Rdbss c:\windows\system32\drivers\rdbss.sys      File System
Driver     Yes  System      Running    OK      Normal    No      Yes
rdpcdd     RDPCDD      c:\windows\system32\drivers\rdpcdd.sys
           Kernel Driver   Yes  System      Running    OK      Ignore
           No      Yes

rdpdr Terminal Server Device Redirector Driver
           c:\windows\system32\drivers\rdpdr.sys      Kernel Driver   Yes
           Manual      Running    OK      Normal    No      Yes
rdpwd RDPWD c:\windows\system32\drivers\rdpwd.sys      Kernel Driver
           No      Manual      Stopped   OK      Ignore    No      No
redbook    Digital CD Audio Playback Filter Driver
           c:\windows\system32\drivers\redbook.sys      Kernel Driver   Yes
           System      Running    OK      Normal    No      Yes
secdrv     Secdrv      c:\windows\system32\drivers\secdrv.sys
           Kernel Driver   No   Manual      Stopped   OK      Normal
           No      No

serenum    Serenum Filter Driver
           c:\windows\system32\drivers\serenum.sys      Kernel Driver   Yes
           Manual      Running    OK      Normal    No      Yes
serial     Serial port driver
           c:\windows\system32\drivers\serial.sys      Kernel Driver   Yes
           System      Running    OK      Ignore    No      Yes
sfloppy    Sfloppy     c:\windows\system32\drivers\sfloppy.sys
           Kernel Driver   No   System      Stopped   OK      Ignore
           No      No

simbad     Simbad      Not Available      Kernel Driver   No
           Disabled      Stopped   OK      Normal    No      No
sparrow    Sparrow     Not Available      Kernel Driver   No
           Disabled      Stopped   OK      Normal    No      No
srv        Srv        c:\windows\system32\drivers\srv.sys      File System Driver
           Yes  Manual      Running    OK      Normal    No      Yes
swenum     Software Bus Driver
           c:\windows\system32\drivers\swenum.sys      Kernel Driver   Yes
           Manual      Running    OK      Normal    No      Yes
symc810    symc810     Not Available      Kernel Driver   No
           Disabled      Stopped   OK      Normal    No      No
symc8xx    symc8xx     Not Available      Kernel Driver   No
           Disabled      Stopped   OK      Normal    No      No
symmpi     symmpi      Not Available      Kernel Driver   No
           Disabled      Stopped   OK      Normal    No      No
sym_hi     sym_hi      Not Available      Kernel Driver   No
           Disabled      Stopped   OK      Normal    No      No
sym_u3     sym_u3      Not Available      Kernel Driver   No
           Disabled      Stopped   OK      Normal    No      No
tcpip     TCP/IP Protocol Driver  c:\windows\system32\drivers\tcpip.sys
           Kernel Driver   Yes  System      Running    OK      Normal
           No      Yes

tdpipe     TDPIPE      c:\windows\system32\drivers\tdpipe.sys
           Kernel Driver   No   Manual      Stopped   OK      Ignore
           No      No

tdtcp     TDTCP      c:\windows\system32\drivers\tdtcp.sys      Kernel Driver
           No      Manual      Stopped   OK      Ignore    No      No

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termdd      Terminal Device Driver
            c:\windows\system32\drivers\termdd.sys      Kernel Driver      Yes
            System      Running      OK      Normal      No      Yes
toside      TosIde      Not Available      Kernel Driver      No
            Disabled      Stopped      OK      Normal      No      No
udfs       Udfs      c:\windows\system32\drivers\udfs.sys      File System
Driver      No      Disabled      Stopped      OK      Normal      No      No
ultra      ultra      Not Available      Kernel Driver      No      Disabled
            Stopped      OK      Normal      No      No
update     Microcode Update Driver
            c:\windows\system32\drivers\update.sys      Kernel Driver      Yes
            Manual      Running      OK      Normal      No      Yes
usbhub     USB2 Enabled Hub      c:\windows\system32\drivers\usbhub.sys
Kernel Driver      Yes      Manual      Running      OK      Normal
No      Yes
usbohci    Microsoft USB Open Host Controller Miniport Driver
            c:\windows\system32\drivers\usbohci.sys      Kernel Driver      Yes
            Manual      Running      OK      Normal      No      Yes
vgasave    VGA Display Controller. c:\windows\system32\drivers\vga.sys
Kernel Driver      Yes      System      Running      OK      Ignore
No      Yes
viaide     ViaIde      Not Available      Kernel Driver      No
            Disabled      Stopped      OK      Normal      No      No
volsnap    Storage volumes      c:\windows\system32\drivers\volsnap.sys
Kernel Driver      Yes      Boot      Running      OK      Normal      No
Yes
wanarp     Remote Access IP ARP Driver
            c:\windows\system32\drivers\wanarp.sys      Kernel Driver      Yes
            Manual      Running      OK      Normal      No      Yes
wdica      WDICA Not Available      Kernel Driver      No      Manual
            Stopped      OK      Ignore      No      No
wlbs       Network Load Balancing      c:\windows\system32\drivers\wlbs.sys
Kernel Driver      No      Manual      Stopped      OK      Normal
No      No

```

### [Signed Drivers]

```

Device Name Signed      Device Class      Driver Version      Driver Date
Manufacturer      INF Name      Driver Name Device ID
Not Available      Not Available      Not Available      Not Available
Not Available      Not Available      Not Available      Not
Available      HTREE\ROOT\0
ACPI Multiprocessor PC No      COMPUTER      5.2.3790.0 10/1/2002
(Standard computers) hal.inf      Not Available
ROOT\ACPI_HAL\0000
Microsoft ACPI-Compliant System      No      SYSTEM      5.2.3790.0
10/1/2002      Microsoft      acpi.inf      Not Available
ACPI_HAL\PNP0C08\0
Processor No      PROCESSOR      5.2.3790.0 10/1/2002 (Standard
processor types) cpu.inf      Not Available      ACPI\GENUINEINTEL_-
_X86_FAMILY_15_MODEL_2\0
Processor No      PROCESSOR      5.2.3790.0 10/1/2002 (Standard
processor types) cpu.inf      Not Available      ACPI\GENUINEINTEL_-
_X86_FAMILY_15_MODEL_2\2

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## Appendix C – Tunable Parameters

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PCI bus No SYSTEM 5.2.3790.0 10/1/2002 (Standard system devices) machine.inf Not Available ACPI\PNP0A03\1

ServerWorks (RCC) CMIC\_LE Processor to PCI Bridge(\*) No SYSTEM 5.2.3790.0 10/1/2002 ServerWorks (RCC) machine.inf Not Available

PCI\VEN\_1166&DEV\_0014&SUBSYS\_00000000&REV\_32\3&13C0B0C5&0&00

ServerWorks (RCC) CMIC\_LE Processor to PCI Bridge(\*) No SYSTEM 5.2.3790.0 10/1/2002 ServerWorks (RCC) machine.inf Not Available

PCI\VEN\_1166&DEV\_0014&SUBSYS\_00000000&REV\_00\3&13C0B0C5&0&01

ServerWorks (RCC) CMIC\_LE Processor to PCI Bridge(\*) No SYSTEM 5.2.3790.0 10/1/2002 ServerWorks (RCC) machine.inf Not Available

PCI\VEN\_1166&DEV\_0014&SUBSYS\_00000000&REV\_00\3&13C0B0C5&0&02

PCI Device Not Available UNKNOWN Not Available Not Available

Available Not Available Not Available Not Available

PCI\VEN\_1028&DEV\_000C&SUBSYS\_000C1028&REV\_00\3&13C0B0C5&0&20

PCI Device Not Available UNKNOWN Not Available Not Available

Available Not Available Not Available Not Available

PCI\VEN\_1028&DEV\_0008&SUBSYS\_00081028&REV\_00\3&13C0B0C5&0&21

PCI Device Not Available UNKNOWN Not Available Not Available

Available Not Available Not Available Not Available

PCI\VEN\_1028&DEV\_000D&SUBSYS\_000D1028&REV\_00\3&13C0B0C5&0&22

RAGE XL PCI Family (Microsoft Corporation) No DISPLAY 5.10.2600.6014 8/8/2001 ATI Technologies Inc. atiixpad.inf Not Available

PCI\VEN\_1002&DEV\_4752&SUBSYS\_01211028&REV\_27\3&13C0B0C5&0&70

Default Monitor No MONITOR 5.1.2001.0 6/6/2001 (Standard monitor types) monitor.inf Not Available

DISPLAY\DEFAULT\_MONITOR\4&2664298A&0&80000000&00&0E

ServerWorks Champion CSB5 - SouthBridge 5 No SYSTEM 5.2.3790.0 10/1/2002 ServerWorks (RCC) machine.inf Not Available

PCI\VEN\_1166&DEV\_0201&SUBSYS\_00000000&REV\_93\3&13C0B0C5&0&78

Direct memory access controller No SYSTEM 5.2.3790.0 10/1/2002 (Standard system devices) machine.inf Not Available

ACPI\PNP0200\4&25F73A82&0

Numeric data processor No SYSTEM 5.2.3790.0 10/1/2002 (Standard system devices) machine.inf Not Available

ACPI\PNP0C04\4&25F73A82&0

Programmable interrupt controller No SYSTEM 5.2.3790.0 10/1/2002 (Standard system devices) machine.inf Not Available

ACPI\PNP0000\4&25F73A82&0

System speaker No SYSTEM 5.2.3790.0 10/1/2002 (Standard system devices) machine.inf Not Available

ACPI\PNP0800\4&25F73A82&0

System timer No SYSTEM 5.2.3790.0 10/1/2002 (Standard system devices) machine.inf Not Available

ACPI\PNP0100\4&25F73A82&0

Standard floppy disk controller No FDC 5.2.3790.0 10/1/2002 (Standard floppy disk controllers) fdc.inf Not Available

ACPI\PNP0700\4&25F73A82&0

Floppy disk drive No FLOPPYDISK 5.2.3790.0 10/1/2002 (Standard floppy disk drives) flpydisk.inf Not Available

FDC\GENERIC\_FLOPPY\_DRIVE\5&1AE2F47D&0&0



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Standard 101/102-Key or Microsoft Natural PS/2 Keyboard No  
KEYBOARD 5.2.3790.0 10/1/2002 (Standard keyboards)  
keyboard.inf Not Available ACPI\PNP0303\4&25F73A82&0

PS/2 Compatible Mouse No MOUSE 5.2.3790.0 10/1/2002 Microsoft  
msmouse.inf Not Available ACPI\PNP0F13\4&25F73A82&0

Communications Port No PORTS 5.2.3790.0 10/1/2002 (Standard  
port types) mspports.inf Not Available ACPI\PNP0501\1

Communications Port No PORTS 5.2.3790.0 10/1/2002 (Standard  
port types) mspports.inf Not Available ACPI\PNP0501\2

System CMOS/real time clock No SYSTEM 5.2.3790.0 10/1/2002  
(Standard system devices) machine.inf Not Available  
ACPI\PNP0B00\4&25F73A82&0

System board No SYSTEM 5.2.3790.0 10/1/2002 (Standard  
system devices) machine.inf Not Available ACPI\PNP0C01\2

CSB5 IDE Controller No HDC 5.2.3790.0 10/1/2002 ServerWorks  
mshdc.inf Not Available  
PCI\VEN\_1166&DEV\_0212&SUBSYS\_02121166&REV\_93\3&13C0B0C5&0&79

Primary IDE Channel No HDC 5.2.3790.0 10/1/2002 (Standard  
IDE ATA/ATAPI controllers) mshdc.inf Not Available  
PCIIDE\IDECHANNEL\4&10A8249&0&0

CD-ROM Drive No CDROM 5.2.3790.0 10/1/2002 (Standard CD-ROM  
drives) cdrom.inf Not Available IDE\CDROMSAMSUNG\_CD-ROM\_SN-  
124\_Q009\5&3125DC91&0&0.0.0

Secondary IDE Channel No HDC 5.2.3790.0 10/1/2002 (Standard  
IDE ATA/ATAPI controllers) mshdc.inf Not Available  
PCIIDE\IDECHANNEL\4&10A8249&0&1

ServerWorks (RCC) PCI to USB Open Host Controller No USB  
5.2.3790.0 10/1/2002 ServerWorks (RCC) usbport.inf Not  
Available  
PCI\VEN\_1166&DEV\_0220&SUBSYS\_02201166&REV\_05\3&13C0B0C5&0&7A

USB Root Hub No USB 5.2.3790.0 10/1/2002 (Standard USB  
Host Controller) usbport.inf Not Available  
USB\ROOT\_HUB\4&1A0F8909&0

Serverworks Champion CSB5 - SouthBridge 5 LPC No SYSTEM  
5.2.3790.0 10/1/2002 ServerWorks (RCC) machine.inf Not  
Available  
PCI\VEN\_1166&DEV\_0225&SUBSYS\_00000000&REV\_00\3&13C0B0C5&0&7B

ISAPNP Read Data Port No SYSTEM 5.2.3790.0 10/1/2002  
(Standard system devices) machine.inf Not Available  
ISAPNP\READDATAPORT\0

ServerWorks Grand Champion CIOB\_X2 - I/O Bridge 133 Mhz No  
SYSTEM 5.2.3790.0 10/1/2002 ServerWorks (RCC) machine.inf  
Not Available  
PCI\VEN\_1166&DEV\_0101&SUBSYS\_00000000&REV\_05\3&13C0B0C5&0&80

ServerWorks Grand Champion CIOB\_X2 - I/O Bridge 133 Mhz No  
SYSTEM 5.2.3790.0 10/1/2002 ServerWorks (RCC) machine.inf  
Not Available  
PCI\VEN\_1166&DEV\_0101&SUBSYS\_00000000&REV\_05\3&13C0B0C5&0&82

ServerWorks Grand Champion CIOB\_X2 - I/O Bridge 133 Mhz No  
SYSTEM 5.2.3790.0 10/1/2002 ServerWorks (RCC) machine.inf  
Not Available  
PCI\VEN\_1166&DEV\_0101&SUBSYS\_00000000&REV\_03\3&13C0B0C5&0&88

ServerWorks Grand Champion CIOB\_X2 - I/O Bridge 133 Mhz No  
SYSTEM 5.2.3790.0 10/1/2002 ServerWorks (RCC) machine.inf

## Appendix C – Tunable Parameters

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Not Available  
PCI\VEN\_1166&DEV\_0101&SUBSYS\_00000000&REV\_03\3&13C0B0C5&0&8A  
PCI bus No SYSTEM 5.2.3790.0 10/1/2002 (Standard system devices) machine.inf Not Available ACPI\PNP0A03\5  
PCI standard PCI-to-PCI bridge No SYSTEM 5.2.3790.0  
10/1/2002 (Standard system devices) machine.inf Not Available  
Available PCI\VEN\_8086&DEV\_0309&SUBSYS\_00000000&REV\_01\3&474B838&0&40  
Dell PERC 3 RAID (SCSI chip) No SCSIADAPTER 5.2.3790.0 10/1/2002  
Dell pnpscsi.inf Not Available  
PCI\VEN\_9005&DEV\_00C5&SUBSYS\_00C51028&REV\_01\4&22300438&0&3040  
Dell PERC 3 RAID (SCSI chip) No SCSIADAPTER 5.2.3790.0 10/1/2002  
Dell pnpscsi.inf Not Available  
PCI\VEN\_9005&DEV\_00C5&SUBSYS\_00C51028&REV\_01\4&22300438&0&3140  
Dell PERC 3/Di RAID Controller No SCSIADAPTER 5.2.3790.0  
10/1/2002 Dell pnpscsi.inf Not Available  
PCI\VEN\_1028&DEV\_000A&SUBSYS\_01211028&REV\_01\3&474B838&0&41  
Disk drive No DISKDRIVE 5.2.3790.0 10/1/2002 (Standard disk drives) disk.inf Not Available  
SCSI\DISK&VEN\_DELL&PROD\_CONTAINER&REV\_V1.0\4&318925A3&0&400  
Dell PERC 2 Management Device No SYSTEM 5.2.3790.0 10/1/2002  
Adaptec scsidev.inf Not Available  
SCSI\PROCESSOR&VEN\_DELL&PROD\_MANAGEMENT&REV\_V1.0\4&318925A3&0&500  
PCI bus No SYSTEM 5.2.3790.0 10/1/2002 (Standard system devices) machine.inf Not Available ACPI\PNP0A03\4  
Broadcom NetXtreme Gigabit Ethernet No NET 2.91.0.0 10/1/2002  
Broadcom netb57xp.inf Not Available  
PCI\VEN\_14E4&DEV\_16A7&SUBSYS\_01211028&REV\_02\3&172E68DD&0&30  
Broadcom NetXtreme Gigabit Ethernet No NET 2.91.0.0 10/1/2002  
Broadcom netb57xp.inf Not Available  
PCI\VEN\_14E4&DEV\_16A7&SUBSYS\_01211028&REV\_02\3&172E68DD&0&40  
PCI bus No SYSTEM 5.2.3790.0 10/1/2002 (Standard system devices) machine.inf Not Available ACPI\PNP0A03\3  
Intel 21154 PCI to PCI bridge No SYSTEM 5.2.3790.0 10/1/2002  
Intel machine.inf Not Available  
PCI\VEN\_8086&DEV\_B154&SUBSYS\_00000000&REV\_00\3&29E81982&0&30  
Intel 21154 PCI to PCI bridge No SYSTEM 5.2.3790.0 10/1/2002  
Intel machine.inf Not Available  
PCI\VEN\_8086&DEV\_B154&SUBSYS\_00000000&REV\_00\4&20AFCB26&0&0030  
DELL PERC 3/DC Plus RAID Controller No SCSIADAPTER 5.2.22.4  
12/3/2002 DELL oem1.inf Not Available  
PCI\VEN\_101E&DEV\_1960&SUBSYS\_04931028&REV\_20\5&179BE7CD&0&000030  
DELL PV22XS Backplane No SYSTEM 5.2.3790.0 10/1/2002 Dell  
scsidev.inf Not Available  
SCSI\PROCESSOR&VEN\_DELL&PROD\_PV22XS&REV\_E.10\6&104EBF59&0&060  
DELL PV22XS Backplane No SYSTEM 5.2.3790.0 10/1/2002 Dell  
scsidev.inf Not Available  
SCSI\PROCESSOR&VEN\_DELL&PROD\_PV22XS&REV\_E.10\6&104EBF59&0&160  
RAID Virtual Device No SYSTEM 5.2.3790.0 10/1/2002  
American Megatrends, Inc. scsidev.inf Not Available  
SCSI\OTHER&VEN\_RAID&PROD\_DUMMYDEVICE&REV\_0000\6&104EBF59&0&2F0  
Disk drive No DISKDRIVE 5.2.3790.0 10/1/2002 (Standard disk drives) disk.inf Not Available  
SCSI\DISK&VEN\_PERC&PROD\_LD\_0 PERCRAID&REV\_\6&104EBF59&0&300  
RAID Controller Component Device No SYSTEM 5.2.3790.0  
10/1/2002 American Megatrends, Inc. scsidev.inf Not

## Appendix C – Tunable Parameters

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### Available

```

PCI\VEN_1077&DEV_1216&SUBSYS_8493101E&REV_06\4&20AFCB26&0&0830
PCI bus      No      SYSTEM      5.2.3790.0  10/1/2002  (Standard system
devices)    machine.inf Not Available  ACPI\PNP0A03\2
Intel 21154 PCI to PCI bridge No      SYSTEM      5.2.3790.0  10/1/2002
Intel machine.inf Not Available
PCI\VEN_8086&DEV_B154&SUBSYS_00000000&REV_00\3&1070020&0&40
Intel 21154 PCI to PCI bridge No      SYSTEM      5.2.3790.0  10/1/2002
Intel machine.inf Not Available
PCI\VEN_8086&DEV_B154&SUBSYS_00000000&REV_00\4&32BC6187&0&0040
DELL PERC 3/DC Plus RAID Controller No      SCSIADAPTER 5.2.22.4
12/3/2002  DELL oem1.inf Not Available
PCI\VEN_101E&DEV_1960&SUBSYS_04931028&REV_20\5&EF02CB5&0&000040
DELL PV22XS Backplane No      SYSTEM      5.2.3790.0  10/1/2002  Dell
scsidev.inf Not Available
SCSI\PROCESSOR&VEN_DELL&PROD_PV22XS&REV_E.10\6&14DB477F&0&060
DELL PV22XS Backplane No      SYSTEM      5.2.3790.0  10/1/2002  Dell
scsidev.inf Not Available
SCSI\PROCESSOR&VEN_DELL&PROD_PV22XS&REV_E.10\6&14DB477F&0&160
RAID Virtual Device No      SYSTEM      5.2.3790.0  10/1/2002
American Megatrends, Inc. scsidev.inf Not Available
SCSI\OTHER&VEN__RAID&PROD_DUMMYDEVICE&REV_0000\6&14DB477F&0&2F0
Disk drive No      DISKDRIVE  5.2.3790.0  10/1/2002  (Standard disk
drives)    disk.inf Not Available
SCSI\DISK&VEN_PERC&PROD_LD_0_PERCRAID&REV_\6&14DB477F&0&300
RAID Controller Component Device No      SYSTEM      5.2.3790.0
10/1/2002  American Megatrends, Inc. scsidev.inf Not

```

### Available

```

PCI\VEN_1077&DEV_1216&SUBSYS_8493101E&REV_06\4&32BC6187&0&0840
ACPI Fixed Feature Button No      SYSTEM      5.2.3790.0  10/1/2002
(Standard system devices) machine.inf Not Available
ACPI\FIXEDBUTTON\2&DABA3FF&0
Logical Disk Manager No      SYSTEM      5.2.3790.0  10/1/2002
(Standard system devices) machine.inf Not Available
ROOT\DMIO\0000
Volume Manager No      SYSTEM      5.2.3790.0  10/1/2002  (Standard
system devices) machine.inf Not Available  ROOT\FTDISK\0000
Generic volume No      VOLUME     5.2.3790.0  10/1/2002  Microsoft
volume.inf Not Available
STORAGE\VOLUME\1&30A96598&0&SIGNATURECF72CF72OFFSET7E00LENGTH2325
4F800
Generic volume No      VOLUME     5.2.3790.0  10/1/2002  Microsoft
volume.inf Not Available
STORAGE\VOLUME\1&30A96598&0&SIGNATURECF72CF72OFFSET232557600LENGT
HEC082AE00
Generic volume No      VOLUME     5.2.3790.0  10/1/2002  Microsoft
volume.inf Not Available
STORAGE\VOLUME\1&30A96598&0&SIGNATURE6268D265OFFSET7E00LENGT
HEA6094200
Generic volume No      VOLUME     5.2.3790.0  10/1/2002  Microsoft
volume.inf Not Available
STORAGE\VOLUME\1&30A96598&0&SIGNATURE6268D265OFFSETEA6094200LENGT
HEA6094200
Generic volume No      VOLUME     5.2.3790.0  10/1/2002  Microsoft
volume.inf Not Available

```

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```

STORAGE\VOLUME\1&30A96598&0&SIGNATURE6268D265OFFSET1D4C128400LENG
TH58D008CE00
Generic volume      No      VOLUME      5.2.3790.0  10/1/2002  Microsoft
volume.inf         Not Available
STORAGE\VOLUME\1&30A96598&0&SIGNATUREC9AA667OFFSET7E00LENGT
HEA608
C400
Generic volume      No      VOLUME      5.2.3790.0  10/1/2002  Microsoft
volume.inf         Not Available
STORAGE\VOLUME\1&30A96598&0&SIGNATUREC9AA667OFFSETEA6094200LENGT
H
EA6094200
Generic volume      No      VOLUME      5.2.3790.0  10/1/2002  Microsoft
volume.inf         Not Available
STORAGE\VOLUME\1&30A96598&0&SIGNATUREC9AA667OFFSET1D4C128400LENGT
H58D008CE00
AFD Networking Support Environment  Not Available      LEGACYDRIVER
Not Available      Not Available      Not Available      Not
Available      Not Available      ROOT\LEGACY_AFD\0000
Beep  Not Available      LEGACYDRIVER      Not Available      Not
Available      Not Available      Not Available      Not Available
ROOT\LEGACY_BEEP\0000
CRC Disk Filter Driver  Not Available      LEGACYDRIVER      Not
Available      Not Available      Not Available      Not Available      Not
Available      ROOT\LEGACY_CRCDISK\0000
dmboot  Not Available      LEGACYDRIVER      Not Available      Not
Available      Not Available      Not Available      Not Available
ROOT\LEGACY_DMBOOT\0000
dmload  Not Available      LEGACYDRIVER      Not Available      Not
Available      Not Available      Not Available      Not Available
ROOT\LEGACY_DMLOAD\0000
Fips  Not Available      LEGACYDRIVER      Not Available      Not
Available      Not Available      Not Available      Not Available
ROOT\LEGACY_FIPS\0000
Generic Packet Classifier  Not Available      LEGACYDRIVER      Not
Available      Not Available      Not Available      Not Available      Not
Available      ROOT\LEGACY_GPC\0000
IPSEC driver  Not Available      LEGACYDRIVER      Not Available
Not Available      Not Available      Not Available      Not
Available      ROOT\LEGACY_IPSEC\0000
ksecdd  Not Available      LEGACYDRIVER      Not Available      Not
Available      Not Available      Not Available      Not Available
ROOT\LEGACY_KSECDD\0000
mmdd  Not Available      LEGACYDRIVER      Not Available      Not
Available      Not Available      Not Available      Not Available
ROOT\LEGACY_MMDD\0000
mountmgr  Not Available      LEGACYDRIVER      Not Available      Not
Available      Not Available      Not Available      Not Available
ROOT\LEGACY_MOUNTMGR\0000
NDIS System Driver  Not Available      LEGACYDRIVER      Not
Available      Not Available      Not Available      Not Available      Not
Available      ROOT\LEGACY_NDIS\0000
Remote Access NDIS TAPI Driver  Not Available      LEGACYDRIVER
Not Available      Not Available      Not Available      Not
Available      Not Available      ROOT\LEGACY_NDISTAPI\0000

```

## Appendix C – Tunable Parameters

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NDIS Usermode I/O Protocol	Not Available	LEGACYDRIVER	Not
Available	Not Available	Not Available	Not
Available	ROOT\LEGACY_NDISUIO\0000		
NDProxy	Not Available	LEGACYDRIVER	Not Available
Available	Not Available	Not Available	Not
	ROOT\LEGACY_NDPROXY\0000		
NetBios over Tcpip	Not Available	LEGACYDRIVER	Not
Available	Not Available	Not Available	Not
Available	ROOT\LEGACY_NETBT\0000		
Null	Not Available	LEGACYDRIVER	Not Available
Available	Not Available	Not Available	Not
	ROOT\LEGACY_NULL\0000		
Partition Manager	Not Available	LEGACYDRIVER	Not Available
Not Available	Not Available	Not Available	Not
Available	ROOT\LEGACY_PARTMGR\0000		
Remote Access Auto Connection Driver		Not Available	
LEGACYDRIVER	Not Available	Not Available	Not
Available	Not Available	Not Available	ROOT\LEGACY_RASACD\0000
RDPCDD	Not Available	LEGACYDRIVER	Not Available
Available	Not Available	Not Available	Not
	ROOT\LEGACY_RDPCDD\0000		
TCP/IP Protocol Driver	Not Available	LEGACYDRIVER	Not
Available	Not Available	Not Available	Not
Available	ROOT\LEGACY_TCPIP\0000		
VGA Display Controller.	Not Available	LEGACYDRIVER	Not
Available	Not Available	Not Available	Not
Available	ROOT\LEGACY_VGASAVE\0000		
volsnap	Not Available	LEGACYDRIVER	Not Available
Available	Not Available	Not Available	Not
	ROOT\LEGACY_VOLSNAP\0000		
Remote Access IP ARP Driver	Not Available	LEGACYDRIVER	Not
Available	Not Available	Not Available	Not
Available	ROOT\LEGACY_WANARP\0000		
Audio Codecs	No	MEDIA 5.2.3790.0	10/1/2002 (Standard system devices)
	wave.inf	Not Available	ROOT\MEDIA\MS_MMACM
Legacy Audio Drivers	No	MEDIA 5.2.3790.0	10/1/2002 (Standard system devices)
	wave.inf	Not Available	ROOT\MEDIA\MS_MMDRV
Media Control Devices	No	MEDIA 5.2.3790.0	10/1/2002 (Standard system devices)
	wave.inf	Not Available	ROOT\MEDIA\MS_MMMCI
Legacy Video Capture Devices	No	MEDIA 5.2.3790.0	10/1/2002 (Standard system devices)
	wave.inf	Not Available	ROOT\MEDIA\MS_MMVCD
Video Codecs	No	MEDIA 5.2.3790.0	10/1/2002 (Standard system devices)
	wave.inf	Not Available	ROOT\MEDIA\MS_MMVID
WAN Miniport (L2TP)	No	NET 5.2.3790.0	10/1/2002 Microsoft
	netrasa.inf	Not Available	ROOT\MS_L2TPMINIPORT\0000
WAN Miniport (IP)	No	NET 5.2.3790.0	10/1/2002 Microsoft
	netrasa.inf	Not Available	ROOT\MS_NDISWANIP\0000
WAN Miniport (PPPOE)	No	NET 5.2.3790.0	10/1/2002 Microsoft
	netrasa.inf	Not Available	ROOT\MS_PPPOEMINIPORT\0000
WAN Miniport (PPTP)	No	NET 5.2.3790.0	10/1/2002 Microsoft
	netrasa.inf	Not Available	ROOT\MS_PPTPMINIPORT\0000
Direct Parallel	No	NET 5.2.3790.0	10/1/2002 Microsoft
	netrasa.inf	Not Available	ROOT\MS_PTMINIPORT\0000

## Appendix C – Tunable Parameters

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```

Terminal Server Device Redirector  No    SYSTEM    5.2.3790.0
10/1/2002 (Standard system devices) machine.inf Not
Available ROOT\RDPDR\0000
Terminal Server Keyboard Driver    No    SYSTEM    5.2.3790.0
10/1/2002 (Standard system devices) machine.inf Not
Available ROOT\RDP_KBD\0000
Terminal Server Mouse Driver No    SYSTEM    5.2.3790.0 10/1/2002
(Standard system devices) machine.inf Not Available
ROOT\RDP_MOU\0000
Plug and Play Software Device Enumerator No    SYSTEM    5.2.3790.0
10/1/2002 (Standard system devices) machine.inf Not
Available ROOT\SYSTEM\0000
Microcode Update Device No    SYSTEM    5.2.3790.0 10/1/2002
(Standard system devices) machine.inf Not Available
ROOT\SYSTEM\0001

```

### [Environment Variables]

```

Variable      Value User Name
ComSpec       %SystemRoot%\system32\cmd.exe <SYSTEM>
Path
    C:\MKS\mksnt;C:\WINDOWS\system32;C:\WINDOWS;C:\WINDOWS\System32\W
bem;C:\PROGRA~1\MICROS~1\80\Tools\BINN; <SYSTEM>
windir        %SystemRoot% <SYSTEM>
OS            Windows_NT <SYSTEM>
PROCESSOR_ARCHITECTURE x86 <SYSTEM>
PROCESSOR_LEVEL 15 <SYSTEM>
PROCESSOR_IDENTIFIER x86 Family 15 Model 2 Stepping 5, GenuineIntel
<SYSTEM>
PROCESSOR_REVISION 0205 <SYSTEM>
NUMBER_OF_PROCESSORS 2 <SYSTEM>
ClusterLog    C:\WINDOWS\Cluster\cluster.log <SYSTEM>
PATHEXT       .COM;.EXE;.BAT;.CMD;.VBS;.VBE;.JS;.JSE;.WSF;.WSH
<SYSTEM>
TEMP          %SystemRoot%\TEMP <SYSTEM>
TMP           %SystemRoot%\TEMP <SYSTEM>
ROOTDIR       C:/MKS <SYSTEM>
SHELL         C:/MKS/mksnt/sh.exe <SYSTEM>
HOME          C:/Documents and Settings/Administrator <SYSTEM>
TMPDIR        C:/WINDOWS/TEMP <SYSTEM>
TEMP          %USERPROFILE%\Local Settings\Temp NT AUTHORITY\SYSTEM
TMP           %USERPROFILE%\Local Settings\Temp NT AUTHORITY\SYSTEM
TEMP          %USERPROFILE%\Local Settings\Temp PE2650\Administrator
TMP           %USERPROFILE%\Local Settings\Temp PE2650\Administrator

```

### [Print Jobs]

```

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

```

### [Network Connections]

```

Local Name  Remote Name Type  Status  User Name

```

## Appendix C – Tunable Parameters

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[Running Tasks]

Name	Path	Process ID	Priority	Min Working Set	Max Working Set
Start Time	Version	Size	File Date		
system idle process			Not Available	0	0
Not Available	Not Available	Not Available	Not Available	Not Available	Not Available
Available	Not Available				
system	Not Available	4	8	0	1413120
Available	Not Available	Not Available	Not Available	Not Available	Not Available
smss.exe	Not Available	344	11	204800	1413120
7/8/2003 5:05 PM	Not Available	Not Available	Not Available	Not Available	Not Available
Available					
csrss.exe	Not Available	540	13	Not Available	Not Available
Available	7/8/2003 5:05 PM	Not Available	Not Available	Not Available	Not Available
Available					
winlogon.exe	c:\windows\system32\winlogon.exe	564	13		
204800	1413120	7/8/2003 5:05 PM	5.2.3790.0		
(srv03_rtm.030324-2048)	536.50 KB (549,376 bytes)			3/29/2003 12:00 AM	
services.exe	c:\windows\system32\services.exe	608	9		
204800	1413120	7/8/2003 5:05 PM	5.2.3790.0		
(srv03_rtm.030324-2048)	102.00 KB (104,448 bytes)			3/29/2003 12:00 AM	
lsass.exe	c:\windows\system32\lsass.exe	620	9	204800	
1413120	7/8/2003 5:05 PM	5.2.3790.0	(srv03_rtm.030324-2048)		
13.00 KB (13,312 bytes)		3/29/2003 12:00 AM			
svchost.exe	c:\windows\system32\svchost.exe	772	8	204800	
1413120	7/8/2003 5:05 PM	5.2.3790.0	(srv03_rtm.030324-2048)		
13.00 KB (13,312 bytes)		3/29/2003 12:00 AM			
svchost.exe	c:\windows\system32\svchost.exe	836	8	204800	
1413120	7/8/2003 5:05 PM	5.2.3790.0	(srv03_rtm.030324-2048)		
13.00 KB (13,312 bytes)		3/29/2003 12:00 AM			
svchost.exe	c:\windows\system32\svchost.exe	972	8	204800	
1413120	7/8/2003 5:05 PM	5.2.3790.0	(srv03_rtm.030324-2048)		
13.00 KB (13,312 bytes)		3/29/2003 12:00 AM			
explorer.exe	c:\windows\explorer.exe	1284	8	204800	
1413120	7/8/2003 5:06 PM	6.00.3790.0	(srv03_rtm.030324-2048)		
1,008.50 KB (1,032,704 bytes)		3/29/2003 12:00 AM			
sqlmangr.exe	c:\program files\microsoft sql server\80\tools\bin\sqlmangr.exe	1364	8	204800	1413120
7/8/2003 5:06 PM	2000.080.0760.00	72.57 KB (74,308 bytes)			
6/1/2003 1:13 PM					
winvnc.exe	c:\program files\orl\vnc\winvnc.exe	1372	8	204800	
1413120	7/8/2003 5:06 PM	3, 3, 3, 7	204.00 KB (208,896 bytes)		
5/30/2003 4:28 PM					
wmioprse.exe	Not Available	1856	8	Not Available	Not Available
Available	7/8/2003 5:07 PM	Not Available	Not Available	Not Available	Not Available
Available					
mmc.exe	c:\windows\system32\mmc.exe	488	8	204800	
1413120	7/8/2003 6:14 PM	5.2.3790.0	(srv03_rtm.030324-2048)		
762.50 KB (780,800 bytes)		3/29/2003 12:00 AM			
mmc.exe	c:\windows\system32\mmc.exe	1612	8	204800	
1413120	7/9/2003 2:38 PM	5.2.3790.0	(srv03_rtm.030324-2048)		
762.50 KB (780,800 bytes)		3/29/2003 12:00 AM			

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```
vds.exe      c:\windows\system32\vds.exe  1604  8    204800
1413120     7/9/2003 2:38 PM  5.2.3790.0 (srv03_rtm.030324-2048)
157.00 KB (160,768 bytes)  3/29/2003 12:00 AM
dmadmin.exe c:\windows\system32\dmadmin.exe  1664  8    204800
1413120     7/9/2003 2:38 PM  5.2.3790.0 (srv03_rtm.030324-2048)
220.00 KB (225,280 bytes)  3/29/2003 12:00 AM
notepad.exe c:\windows\system32\notepad.exe  2028  8    204800
1413120     7/9/2003 2:40 PM  5.2.3790.0 (srv03_rtm.030324-2048)
66.50 KB (68,096 bytes) 3/29/2003 12:00 AM
sqlservr.exe c:\program files\microsoft sql
server\mssql\binn\sqlservr.exe  1100  13   204800    1413120
7/9/2003 2:53 PM  2000.080.0760.00  7.17 MB (7,520,337 bytes)
6/1/2003 1:13 PM
cmd.exe     c:\windows\system32\cmd.exe  1948  8    204800
1413120     7/9/2003 2:53 PM  5.2.3790.0 (srv03_rtm.030324-2048)
374.00 KB (382,976 bytes)  3/29/2003 12:00 AM
tpccldr.exe c:\tpcc\mstpcc.422\setup\loader\bin\tpccldr.exe 1464  8
204800     1413120 7/9/2003 2:57 PM  Not Available  84.00
KB (86,016 bytes) 5/30/2003 3:40 PM
helpctr.exe c:\windows\pchealth\helpctr\binaries\helpctr.exe  1692
8  204800  1413120 7/9/2003 3:09 PM  5.2.3790.0
(srv03_rtm.030324-2048) 764.00 KB (782,336 bytes)  5/30/2003 3:10 PM
wmiprvse.exe Not Available  1748  8    Not Available  Not
Available 7/9/2003 3:09 PM  Not Available  Not Available  Not
Available
helpsvc.exe c:\windows\pchealth\helpctr\binaries\helpsvc.exe  1796
8  204800  1413120 7/9/2003 3:09 PM  5.2.3790.0
(srv03_rtm.030324-2048) 720.00 KB (737,280 bytes)  5/30/2003 3:10 PM
```

### [Loaded Modules]

Name	Version	Size	File Date	Manufacturer	Path
winlogon	5.2.3790.0 (srv03_rtm.030324-2048)	536.50 KB (549,376 bytes)	3/29/2003 12:00 AM	Microsoft Corporation	c:\windows\system32\winlogon.exe
ntdll	5.2.3790.0 (srv03_rtm.030324-2048)	722.50 KB (739,840 bytes)	3/29/2003 12:00 AM	Microsoft Corporation	c:\windows\system32\ntdll.dll
kernel32	5.2.3790.0 (srv03_rtm.030324-2048)	965.00 KB (988,160 bytes)	3/29/2003 12:00 AM	Microsoft Corporation	c:\windows\system32\kernel32.dll
msvcrt	7.0.3790.0 (srv03_rtm.030324-2048)	319.50 KB (327,168 bytes)	3/29/2003 12:00 AM	Microsoft Corporation	c:\windows\system32\msvcrt.dll
advapi32	5.2.3790.0 (srv03_rtm.030324-2048)	559.50 KB (572,928 bytes)	3/29/2003 12:00 AM	Microsoft Corporation	c:\windows\system32\advapi32.dll
rpcrt4	5.2.3790.0 (srv03_rtm.030324-2048)	643.50 KB (658,944 bytes)	3/29/2003 12:00 AM	Microsoft Corporation	c:\windows\system32\rpcrt4.dll
user32	5.2.3790.0 (srv03_rtm.030324-2048)	562.00 KB (575,488 bytes)	3/29/2003 12:00 AM	Microsoft Corporation	c:\windows\system32\user32.dll



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gdi32 5.2.3790.0 (srv03\_rtm.030324-2048) 263.00 KB (269,312 bytes)  
3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\gdi32.dll

userenv 5.2.3790.0 (srv03\_rtm.030324-2048) 732.50 KB (750,080 bytes)  
3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\userenv.dll

nddeapi 5.2.3790.0 (srv03\_rtm.030324-2048) 16.00 KB (16,384 bytes)  
3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\nddeapi.dll

crypt32 5.131.3790.0 (srv03\_rtm.030324-2048) 598.00 KB (612,352 bytes)  
3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\crypt32.dll

msasn1 5.2.3790.0 (srv03\_rtm.030324-2048) 58.00 KB (59,392 bytes)  
3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\msasn1.dll

secur32 5.2.3790.0 (srv03\_rtm.030324-2048) 63.00 KB (64,512 bytes)  
3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\secur32.dll

winsta 5.2.3790.0 (srv03\_rtm.030324-2048) 51.00 KB (52,224 bytes)  
3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\winsta.dll

netapi32 5.2.3790.0 (srv03\_rtm.030324-2048) 317.00 KB (324,608 bytes)  
3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\netapi32.dll

profmap 5.2.3790.0 (srv03\_rtm.030324-2048) 22.00 KB (22,528 bytes)  
3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\profmap.dll

regapi 5.2.3790.0 (srv03\_rtm.030324-2048) 48.50 KB (49,664 bytes)  
3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\regapi.dll

ws2\_32 5.2.3790.0 (srv03\_rtm.030324-2048) 87.50 KB (89,600 bytes)  
3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\ws2\_32.dll

ws2help 5.2.3790.0 (srv03\_rtm.030324-2048) 19.50 KB (19,968 bytes)  
3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\ws2help.dll

psapi 5.2.3790.0 (srv03\_rtm.030324-2048) 21.50 KB (22,016 bytes)  
3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\psapi.dll

version 5.2.3790.0 (srv03\_rtm.030324-2048) 17.00 KB (17,408 bytes)  
3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\version.dll

setupapi 5.2.3790.0 (srv03\_rtm.030324-2048) 1,014.50 KB (1,038,848 bytes)  
3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\setupapi.dll

msgina 5.2.3790.0 (srv03\_rtm.030324-2048) 1.14 MB (1,191,936 bytes)  
3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\msgina.dll

shsvcs 6.00.3790.0 (srv03\_rtm.030324-2048) 121.50 KB (124,416 bytes)  
3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\shsvcs.dll

shlwapi 6.00.3790.0 (srv03\_rtm.030324-2048) 281.00 KB (287,744 bytes)  
3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\shlwapi.dll

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sfc 5.2.3790.0 (srv03\_rtm.030324-2048) 4.50 KB (4,608 bytes)  
3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\sfc.dll

sfc\_os 5.2.3790.0 (srv03\_rtm.030324-2048) 133.00 KB (136,192 bytes)  
3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\sfc\_os.dll

wintrust 5.131.3790.0 (srv03\_rtm.030324-2048) 161.50 KB (165,376 bytes)  
3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\wintrust.dll

ole32 5.2.3790.0 (srv03\_rtm.030324-2048) 1.13 MB (1,187,328 bytes)  
3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\ole32.dll

imagehlp 5.2.3790.0 (srv03\_rtm.030324-2048) 142.50 KB (145,920 bytes)  
3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\imagehlp.dll

comctl32 6.0 (srv03\_rtm.030324-2048) 907.00 KB (928,768 bytes)  
5/30/2003 9:53 AM Microsoft Corporation  
c:\windows\winsxs\x86\_microsoft.windows.common-controls\_6595b64144ccf1df\_6.0.100.0\_x-ww\_8417450b\comctl32.dll

winscard 5.2.3790.0 (srv03\_rtm.030324-2048) 98.50 KB (100,864 bytes)  
3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\winscard.dll

wtsapi32 5.2.3790.0 (srv03\_rtm.030324-2048) 17.50 KB (17,920 bytes)  
3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\wtsapi32.dll

sxs 5.2.3790.0 (srv03\_rtm.030324-2048) 733.00 KB (750,592 bytes)  
3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\sxs.dll

winmm 5.2.3790.0 (srv03\_rtm.030324-2048) 166.00 KB (169,984 bytes)  
3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\winmm.dll

wldap32 5.2.3790.0 (srv03\_rtm.030324-2048) 158.00 KB (161,792 bytes)  
3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\wldap32.dll

rsaenh 5.2.3790.0 (srv03\_rtm.030324-2048) 176.83 KB (181,072 bytes)  
3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\rsaenh.dll

cscdll 5.2.3790.0 (srv03\_rtm.030324-2048) 99.00 KB (101,376 bytes)  
3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\cscdll.dll

wlnotify 5.2.3790.0 (srv03\_rtm.030324-2048) 87.50 KB (89,600 bytes)  
3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\wlnotify.dll

winspool 5.2.3790.0 (srv03\_rtm.030324-2048) 140.00 KB (143,360 bytes)  
3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\winspool.drv

mpr 5.2.3790.0 (srv03\_rtm.030324-2048) 56.00 KB (57,344 bytes)  
3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\mpr.dll

shell32 6.00.3790.0 (srv03\_rtm.030324-2048) 7.79 MB (8,166,400 bytes)  
3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\shell32.dll

comctl32 5.82 (srv03\_rtm.030324-2048) 561.00 KB (574,464 bytes)  
5/30/2003 9:53 AM Microsoft Corporation

## Appendix C – Tunable Parameters

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```
c:\windows\winsxs\x86_microsoft.windows.common-
controls_6595b64144ccf1df_5.82.0.0_x-ww_8a69ba05\comctl32.dll
uxtheme 6.00.3790.0 (srv03_rtm.030324-2048) 196.00 KB (200,704
bytes) 3/29/2003 12:00 AM Microsoft Corporation
c:\windows\system32\uxtheme.dll
samlib 5.2.3790.0 (srv03_rtm.030324-2048) 49.00 KB (50,176 bytes)
3/29/2003 12:00 AM Microsoft Corporation
c:\windows\system32\samlib.dll
cscui 5.2.3790.0 (srv03_rtm.030324-2048) 305.00 KB (312,320 bytes)
3/29/2003 12:00 AM Microsoft Corporation
c:\windows\system32\cscui.dll
oleaut32 5.2.3790.0 486.00 KB (497,664 bytes) 3/29/2003 12:00
AM Microsoft Corporation c:\windows\system32\oleaut32.dll
clbcatq 2001.12.4720.0 (srv03_rtm.030324-2048) 481.00 KB
(492,544 bytes) 5/30/2003 3:07 PM Microsoft Corporation
c:\windows\system32\clbcatq.dll
comres 2001.12.4720.0 (srv03_rtm.030324-2048) 778.00 KB
(796,672 bytes) 3/29/2003 12:00 AM Microsoft Corporation
c:\windows\system32\comres.dll
ntmarta 5.2.3790.0 (srv03_rtm.030324-2048) 114.00 KB (116,736
bytes) 3/29/2003 12:00 AM Microsoft Corporation
c:\windows\system32\ntmarta.dll
wbemprox 5.2.3790.0 (srv03_rtm.030324-2048) 17.50 KB (17,920 bytes)
5/30/2003 3:07 PM Microsoft Corporation
c:\windows\system32\wbem\wbemprox.dll
wbemcomn 5.2.3790.0 (srv03_rtm.030324-2048) 211.50 KB (216,576
bytes) 3/29/2003 12:00 AM Microsoft Corporation
c:\windows\system32\wbem\wbemcomn.dll
wbemsvc 5.2.3790.0 (srv03_rtm.030324-2048) 42.50 KB (43,520 bytes)
5/30/2003 3:07 PM Microsoft Corporation
c:\windows\system32\wbem\wbemsvc.dll
fastprox 5.2.3790.0 (srv03_rtm.030324-2048) 443.00 KB (453,632
bytes) 5/30/2003 3:07 PM Microsoft Corporation
c:\windows\system32\wbem\fastprox.dll
msvcp60 6.05.2144.0 388.00 KB (397,312 bytes) 3/29/2003 12:00
AM Microsoft Corporation c:\windows\system32\msvcp60.dll
ntdsapi 5.2.3790.0 (srv03_rtm.030324-2048) 76.00 KB (77,824 bytes)
3/29/2003 12:00 AM Microsoft Corporation
c:\windows\system32\ntdsapi.dll
dnsapi 5.2.3790.0 (srv03_rtm.030324-2048) 147.50 KB (151,040
bytes) 3/29/2003 12:00 AM Microsoft Corporation
c:\windows\system32\dnsapi.dll
services 5.2.3790.0 (srv03_rtm.030324-2048) 102.00 KB (104,448
bytes) 3/29/2003 12:00 AM Microsoft Corporation
c:\windows\system32\services.exe
scesrv 5.2.3790.0 (srv03_rtm.030324-2048) 316.50 KB (324,096
bytes) 3/29/2003 12:00 AM Microsoft Corporation
c:\windows\system32\scesrv.dll
authz 5.2.3790.0 (srv03_rtm.030324-2048) 67.00 KB (68,608 bytes)
3/29/2003 12:00 AM Microsoft Corporation
c:\windows\system32\authz.dll
umpnpgmr 5.2.3790.0 (srv03_rtm.030324-2048) 121.50 KB (124,416
bytes) 3/29/2003 12:00 AM Microsoft Corporation
c:\windows\system32\umpnpgmr.dll
```

## Appendix C – Tunable Parameters

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```
ncobjapi    5.2.3790.0 (srv03_rtm.030324-2048)  34.50 KB (35,328 bytes)
             3/29/2003 12:00 AM      Microsoft Corporation
             c:\windows\system32\ncobjapi.dll
eventlog    5.2.3790.0 (srv03_rtm.030324-2048)  60.50 KB (61,952 bytes)
             3/29/2003 12:00 AM      Microsoft Corporation
             c:\windows\system32\eventlog.dll
lsass       5.2.3790.0 (srv03_rtm.030324-2048)  13.00 KB (13,312 bytes)
             3/29/2003 12:00 AM      Microsoft Corporation
             c:\windows\system32\lsass.exe
lsasrv      5.2.3790.0 (srv03_rtm.030324-2048)  780.50 KB (799,232
bytes)      3/29/2003 12:00 AM      Microsoft Corporation
             c:\windows\system32\lsasrv.dll
samsrv      5.2.3790.0 (srv03_rtm.030324-2048)  452.00 KB (462,848
bytes)      3/29/2003 12:00 AM      Microsoft Corporation
             c:\windows\system32\samsrv.dll
cryptdll    5.2.3790.0 (srv03_rtm.030324-2048)  34.00 KB (34,816 bytes)
             3/29/2003 12:00 AM      Microsoft Corporation
             c:\windows\system32\cryptdll.dll
msprivs     5.2.3790.0 (srv03_rtm.030324-2048)  46.50 KB (47,616 bytes)
             3/29/2003 12:00 AM      Microsoft Corporation
             c:\windows\system32\msprivs.dll
kerberos    5.2.3790.0 (srv03_rtm.030324-2048)  332.50 KB (340,480
bytes)      3/29/2003 12:00 AM      Microsoft Corporation
             c:\windows\system32\kerberos.dll
msv1_0      5.2.3790.0 (srv03_rtm.030324-2048)  127.00 KB (130,048
bytes)      3/29/2003 12:00 AM      Microsoft Corporation
             c:\windows\system32\msv1_0.dll
netlogon    5.2.3790.0 (srv03_rtm.030324-2048)  409.00 KB (418,816
bytes)      3/29/2003 12:00 AM      Microsoft Corporation
             c:\windows\system32\netlogon.dll
w32time     5.2.3790.0 (srv03_rtm.030324-2048)  216.00 KB (221,184
bytes)      3/29/2003 12:00 AM      Microsoft Corporation
             c:\windows\system32\w32time.dll
iphlpapi    5.2.3790.0 (srv03_rtm.030324-2048)  82.50 KB (84,480 bytes)
             3/29/2003 12:00 AM      Microsoft Corporation
             c:\windows\system32\iphlpapi.dll
schannel    5.2.3790.0 (srv03_rtm.030324-2048)  149.50 KB (153,088
bytes)      3/29/2003 12:00 AM      Microsoft Corporation
             c:\windows\system32\schannel.dll
wdigest     5.2.3790.0 (srv03_rtm.030324-2048)  61.00 KB (62,464 bytes)
             3/29/2003 12:00 AM      Microsoft Corporation
             c:\windows\system32\wdigest.dll
rassfm      5.2.3790.0 (srv03_rtm.030324-2048)  20.50 KB (20,992 bytes)
             3/29/2003 12:00 AM      Microsoft Corporation
             c:\windows\system32\rassfm.dll
kdcsvc      5.2.3790.0 (srv03_rtm.030324-2048)  221.00 KB (226,304
bytes)      3/29/2003 12:00 AM      Microsoft Corporation
             c:\windows\system32\kdcsvc.dll
ntdsa       5.2.3790.0 (srv03_rtm.030324-2048)  1.45 MB (1,520,640 bytes)
             3/29/2003 12:00 AM      Microsoft Corporation
             c:\windows\system32\ntdsa.dll
ntdsatq     5.2.3790.0 (srv03_rtm.030324-2048)  32.00 KB (32,768 bytes)
             3/29/2003 12:00 AM      Microsoft Corporation
             c:\windows\system32\ntdsatq.dll
```

## Appendix C – Tunable Parameters

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mswsock 5.2.3790.0 (srv03\_rtm.030324-2048) 254.00 KB (260,096 bytes) 3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\mswsock.dll

esent 5.2.3790.0 (srv03\_rtm.030324-2048) 1.01 MB (1,056,256 bytes) 3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\esent.dll

scecli 5.2.3790.0 (srv03\_rtm.030324-2048) 179.50 KB (183,808 bytes) 3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\scecli.dll

wshtcpip 5.2.3790.0 (srv03\_rtm.030324-2048) 18.00 KB (18,432 bytes) 3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\wshtcpip.dll

dssenh 5.2.3790.0 (srv03\_rtm.030324-2048) 131.33 KB (134,480 bytes) 3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\dssenh.dll

svchost 5.2.3790.0 (srv03\_rtm.030324-2048) 13.00 KB (13,312 bytes) 3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\svchost.exe

rpcss 5.2.3790.0 (srv03\_rtm.030324-2048) 276.50 KB (283,136 bytes) 3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\rpcss.dll

termsrv 5.2.3790.0 (srv03\_rtm.030324-2048) 216.50 KB (221,696 bytes) 5/30/2003 3:07 PM Microsoft Corporation  
c:\windows\system32\termsrv.dll

icaapi 5.2.3790.0 (srv03\_rtm.030324-2048) 10.50 KB (10,752 bytes) 5/30/2003 3:07 PM Microsoft Corporation  
c:\windows\system32\icaapi.dll

mstlsapi 5.2.3790.0 (srv03\_rtm.030324-2048) 104.50 KB (107,008 bytes) 3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\mstlsapi.dll

activeds 5.2.3790.0 (srv03\_rtm.030324-2048) 189.00 KB (193,536 bytes) 3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\activeds.dll

adslrpc 5.2.3790.0 (srv03\_rtm.030324-2048) 142.50 KB (145,920 bytes) 3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\adslrpc.dll

credui 5.2.3790.0 (srv03\_rtm.030324-2048) 159.00 KB (162,816 bytes) 3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\credui.dll

atl 3.05.2283 83.00 KB (84,992 bytes) 3/29/2003 12:00 AM Microsoft Corporation c:\windows\system32\atl.dll

wkssvc 5.2.3790.0 (srv03\_rtm.030324-2048) 125.00 KB (128,000 bytes) 3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\wkssvc.dll

wiarpc 5.2.3790.0 (srv03\_rtm.030324-2048) 30.00 KB (30,720 bytes) 3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\wiarpc.dll

srvsvc 5.2.3790.0 (srv03\_rtm.030324-2048) 89.00 KB (91,136 bytes) 3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\srvsvc.dll

wmisvc 5.2.3790.0 (srv03\_rtm.030324-2048) 131.00 KB (134,144 bytes) 5/30/2003 3:07 PM Microsoft Corporation  
c:\windows\system32\wbem\wmisvc.dll

## Appendix C – Tunable Parameters

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vssapi 5.2.3790.0 (srv03\_rtm.030324-2048) 528.00 KB (540,672 bytes) 3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\vssapi.dll

es 2001.12.4720.0 (srv03\_rtm.030324-2048) 221.50 KB (226,816 bytes) 3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\es.dll

comsvcs 2001.12.4720.0 (srv03\_rtm.030324-2048) 1.14 MB (1,199,616 bytes) 5/30/2003 3:07 PM Microsoft Corporation  
c:\windows\system32\comsvcs.dll

sens 5.2.3790.0 (srv03\_rtm.030324-2048) 35.50 KB (36,352 bytes) 3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\sens.dll

wbemcore 5.2.3790.0 (srv03\_rtm.030324-2048) 457.00 KB (467,968 bytes) 5/30/2003 3:07 PM Microsoft Corporation  
c:\windows\system32\wbem\wbemcore.dll

esscli 5.2.3790.0 (srv03\_rtm.030324-2048) 235.50 KB (241,152 bytes) 5/30/2003 3:07 PM Microsoft Corporation  
c:\windows\system32\wbem\esscli.dll

wmiutils 5.2.3790.0 (srv03\_rtm.030324-2048) 90.50 KB (92,672 bytes) 5/30/2003 3:07 PM Microsoft Corporation  
c:\windows\system32\wbem\wmiutils.dll

repdrvfs 5.2.3790.0 (srv03\_rtm.030324-2048) 165.00 KB (168,960 bytes) 5/30/2003 3:07 PM Microsoft Corporation  
c:\windows\system32\wbem\repdrvfs.dll

wmiprvsd 5.2.3790.0 (srv03\_rtm.030324-2048) 405.50 KB (415,232 bytes) 5/30/2003 3:07 PM Microsoft Corporation  
c:\windows\system32\wbem\wmiprvsd.dll

wbemess 5.2.3790.0 (srv03\_rtm.030324-2048) 256.50 KB (262,656 bytes) 5/30/2003 3:07 PM Microsoft Corporation  
c:\windows\system32\wbem\wbemess.dll

netman 5.2.3790.0 (srv03\_rtm.030324-2048) 209.00 KB (214,016 bytes) 3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\netman.dll

mprapi 5.2.3790.0 (srv03\_rtm.030324-2048) 81.00 KB (82,944 bytes) 3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\mprapi.dll

rtutils 5.2.3790.0 (srv03\_rtm.030324-2048) 32.00 KB (32,768 bytes) 3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\rtutils.dll

rasapi32 5.2.3790.0 (srv03\_rtm.030324-2048) 227.50 KB (232,960 bytes) 3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\rasapi32.dll

rasman 5.2.3790.0 (srv03\_rtm.030324-2048) 56.50 KB (57,856 bytes) 3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\rasman.dll

tapi32 5.2.3790.0 (srv03\_rtm.030324-2048) 175.00 KB (179,200 bytes) 3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\tapi32.dll

wzcsvc 5.2.3790.0 (srv03\_rtm.030324-2048) 272.50 KB (279,040 bytes) 3/25/2003 6:15 AM Microsoft Corporation  
c:\windows\system32\wzcsvc.dll

wmi 5.2.3790.0 (srv03\_rtm.030324-2048) 6.50 KB (6,656 bytes) 3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\wmi.dll

## Appendix C – Tunable Parameters

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```
dhcpcsvc      5.2.3790.0 (srv03_rtm.030324-2048) 101.50 KB (103,936
bytes)        3/29/2003 12:00 AM      Microsoft Corporation
              c:\windows\system32\dhcpcsvc.dll
wzcsapi       5.2.3790.0 (srv03_rtm.030324-2048) 24.50 KB (25,088 bytes)
              3/25/2003 6:15 AM      Microsoft Corporation
              c:\windows\system32\wzcsapi.dll
netshell      5.2.3790.0 (srv03_rtm.030324-2048) 1.67 MB (1,747,456
bytes)        3/29/2003 12:00 AM      Microsoft Corporation
              c:\windows\system32\netshell.dll
clusapi       5.2.3790.0 (srv03_rtm.030324-2048) 56.00 KB (57,344 bytes)
              3/29/2003 12:00 AM      Microsoft Corporation
              c:\windows\system32\clusapi.dll
hnetcfg       5.2.3790.0 (srv03_rtm.030324-2048) 243.50 KB (249,344
bytes)        3/29/2003 12:00 AM      Microsoft Corporation
              c:\windows\system32\hnetcfg.dll
wininet       6.00.3790.0 (srv03_rtm.030324-2048) 609.00 KB (623,616
bytes)        3/29/2003 12:00 AM      Microsoft Corporation
              c:\windows\system32\wininet.dll
rasdlg        5.2.3790.0 (srv03_rtm.030324-2048) 642.00 KB (657,408
bytes)        3/29/2003 12:00 AM      Microsoft Corporation
              c:\windows\system32\rasdlg.dll
rasadhlp      5.2.3790.0 (srv03_rtm.030324-2048) 6.50 KB (6,656 bytes)
              3/29/2003 12:00 AM      Microsoft Corporation
              c:\windows\system32\rasadhlp.dll
ncprov        5.2.3790.0 (srv03_rtm.030324-2048) 43.00 KB (44,032 bytes)
              5/30/2003 3:07 PM      Microsoft Corporation
              c:\windows\system32\wbem\ncprov.dll
dmserver      5.2.3790.0 (srv03_rtm.030324-2048) 24.00 KB (24,576 bytes)
              3/29/2003 12:00 AM      Microsoft Corporation
              c:\windows\system32\dmserver.dll
pchsvc        5.2.3790.0 (srv03_rtm.030324-2048) 31.50 KB (32,256 bytes)
              5/30/2003 3:10 PM      Microsoft Corporation
              c:\windows\pchealth\helpctr\binaries\pchsvc.dll
wbemcons      5.2.3790.0 (srv03_rtm.030324-2048) 69.00 KB (70,656 bytes)
              5/30/2003 3:07 PM      Microsoft Corporation
              c:\windows\system32\wbem\wbemcons.dll
explorer      6.00.3790.0 (srv03_rtm.030324-2048) 1,008.50 KB (1,032,704
bytes)        3/29/2003 12:00 AM      Microsoft Corporation
              c:\windows\explorer.exe
browseui      6.00.3790.0 (srv03_rtm.030324-2048) 1.01 MB (1,057,280
bytes)        3/29/2003 12:00 AM      Microsoft Corporation
              c:\windows\system32\browseui.dll
shdocvw       6.00.3790.0 (srv03_rtm.030324-2048) 1.33 MB (1,393,664
bytes)        3/29/2003 12:00 AM      Microsoft Corporation
              c:\windows\system32\shdocvw.dll
apphelp       5.2.3790.0 (srv03_rtm.030324-2048) 122.00 KB (124,928
bytes)        3/29/2003 12:00 AM      Microsoft Corporation
              c:\windows\system32\apphelp.dll
themeui       6.00.3790.0 (srv03_rtm.030324-2048) 360.50 KB (369,152
bytes)        3/29/2003 12:00 AM      Microsoft Corporation
              c:\windows\system32\themeui.dll
msimg32       5.2.3790.0 (srv03_rtm.030324-2048) 4.50 KB (4,608 bytes)
              3/29/2003 12:00 AM      Microsoft Corporation
              c:\windows\system32\msimg32.dll
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## Appendix C – Tunable Parameters

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linkinfo 5.2.3790.0 (srv03\_rtm.030324-2048) 16.50 KB (16,896 bytes)  
3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\linkinfo.dll

ntshrui 6.00.3790.0 (srv03\_rtm.030324-2048) 136.00 KB (139,264 bytes)  
3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\ntshrui.dll

urlmon 6.00.3790.0 (srv03\_rtm.030324-2048) 501.50 KB (513,536 bytes)  
3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\urlmon.dll

webcheck 6.00.3790.0 (srv03\_rtm.030324-2048) 261.50 KB (267,776 bytes)  
3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\webcheck.dll

wsock32 5.2.3790.0 (srv03\_rtm.030324-2048) 22.00 KB (22,528 bytes)  
3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\wsock32.dll

stobject 5.2.3790.0 (srv03\_rtm.030324-2048) 117.50 KB (120,320 bytes)  
3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\stobject.dll

batmeter 6.00.3790.0 (srv03\_rtm.030324-2048) 28.50 KB (29,184 bytes)  
3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\batmeter.dll

powrprof 6.00.3790.0 (srv03\_rtm.030324-2048) 14.50 KB (14,848 bytes)  
3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\powrprof.dll

printui 5.2.3790.0 (srv03\_rtm.030324-2048) 536.50 KB (549,376 bytes)  
3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\printui.dll

cfgmgr32 5.2.3790.0 (srv03\_rtm.030324-2048) 17.50 KB (17,920 bytes)  
3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\cfgmgr32.dll

drprov 5.2.3790.0 (srv03\_rtm.030324-2048) 12.50 KB (12,800 bytes)  
3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\drprov.dll

ntlanman 5.2.3790.0 (srv03\_rtm.030324-2048) 41.00 KB (41,984 bytes)  
3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\ntlanman.dll

netui0 5.2.3790.0 (srv03\_rtm.030324-2048) 75.50 KB (77,312 bytes)  
3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\netui0.dll

netui1 5.2.3790.0 (srv03\_rtm.030324-2048) 184.00 KB (188,416 bytes)  
3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\netui1.dll

davclnt 5.2.3790.0 (srv03\_rtm.030324-2048) 23.50 KB (24,064 bytes)  
3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\davclnt.dll

browseic 6.00.3790.0 (srv03\_rtm.030324-2048) 62.00 KB (63,488 bytes)  
3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\browseic.dll

shdoclc 6.00.3790.0 (srv03\_rtm.030324-2048) 588.50 KB (602,624 bytes)  
3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\shdoclc.dll

zipfldr 6.00.3790.0 (srv03\_rtm.030324-2048) 316.00 KB (323,584 bytes)  
3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\zipfldr.dll



## Appendix C – Tunable Parameters

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wzshlstb 3.0 (32-bit) 24.07 KB (24,644 bytes) 4/19/2000 8:00 AM  
WinZip Computing, Inc. c:\progra~1\winzip\wzshlstb.dll

sendmail 6.00.3790.0 (srv03\_rtm.030324-2048) 52.00 KB (53,248 bytes)  
3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\sendmail.dll

mydocs 6.00.3790.0 (srv03\_rtm.030324-2048) 88.00 KB (90,112 bytes)  
3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\mydocs.dll

actxprxy 6.00.3790.0 (srv03\_rtm.030324-2048) 95.00 KB (97,280 bytes)  
3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\actxprxy.dll

sqlmangr 2000.080.0760.00 72.57 KB (74,308 bytes) 6/1/2003 1:13 PM  
Microsoft Corporation c:\program files\microsoft sql  
server\80\tools\bin\sqlmangr.exe

sqlunirl 2000.080.0728.00 176.56 KB (180,800 bytes) 3/29/2003  
12:00 AM Microsoft Corporation c:\windows\system32\sqlunirl.dll

comdlg32 6.00.3790.0 (srv03\_rtm.030324-2048) 261.00 KB (267,264  
bytes) 3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\comdlg32.dll

w95scm 2000.080.0760.00 48.56 KB (49,728 bytes) 6/1/2003 1:13 PM  
Microsoft Corporation c:\program files\microsoft sql  
server\80\tools\bin\w95scm.dll

odbc32 3.525.1022.0 (srv03\_rtm.030324-2048) 232.00 KB  
(237,568 bytes) 3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\odbc32.dll

sqlsvc 2000.080.0760.00 92.56 KB (94,784 bytes) 6/1/2003 1:13 PM  
Microsoft Corporation c:\program files\microsoft sql  
server\80\tools\bin\sqlsvc.dll

odbcbcpl 2000.085.1022.0 (srv03\_rtm.030324-2048) 24.00 KB (24,576  
bytes) 3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\odbcbcpl.dll

sqlresld 2000.080.0382.00 28.56 KB (29,248 bytes) 6/1/2003 1:13 PM  
Microsoft Corporation c:\program files\microsoft sql  
server\80\tools\bin\sqlresld.dll

odbcint 3.525.1022.0 (srv03\_rtm.030324-2048) 92.00 KB (94,208  
bytes) 3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\odbcint.dll

resutils 5.2.3790.0 (srv03\_rtm.030324-2048) 59.00 KB (60,416 bytes)  
3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\resutils.dll

mfc42u 6.05.3014.0 960.00 KB (983,040 bytes) 3/29/2003 12:00  
AM Microsoft Corporation c:\windows\system32\mfc42u.dll

sqlsvc 2000.080.0194.00 24.00 KB (24,576 bytes) 6/1/2003 1:13 PM  
Microsoft Corporation c:\program files\microsoft sql  
server\80\tools\bin\resources\1033\sqlsvc.rll

sqlmangr 2000.080.0194.00 96.00 KB (98,304 bytes) 6/1/2003 1:13 PM  
Microsoft Corporation c:\program files\microsoft sql  
server\80\tools\bin\resources\1033\sqlmangr.rll

winvnc 3, 3, 3, 7 204.00 KB (208,896 bytes) 5/30/2003 4:28 PM  
AT&T Research Labs Cambridge c:\program files\orl\vnc\winvnc.exe

vnchooks 3, 3, 3, 6 32.00 KB (32,768 bytes) 5/30/2003 4:28 PM AT&T  
Research Labs Cambridge c:\program files\orl\vnc\vnchooks.dll

omnithread\_rt Not Available 44.00 KB (45,056 bytes) 5/30/2003  
4:28 PM Not Available c:\windows\system32\omnithread\_rt.dll

## Appendix C – Tunable Parameters

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```
winrnr      5.2.3790.0 (srv03_rtm.030324-2048) 15.00 KB (15,360 bytes)
            3/29/2003 12:00 AM Microsoft Corporation
            c:\windows\system32\winrnr.dll
mmc         5.2.3790.0 (srv03_rtm.030324-2048) 762.50 KB (780,800 bytes)
            3/29/2003 12:00 AM Microsoft Corporation
            c:\windows\system32\mmc.exe
oleacc     4.2.5406.0 (srv03_rtm.030324-2048) 171.00 KB (175,104
bytes)     3/29/2003 12:00 AM Microsoft Corporation
            c:\windows\system32\oleacc.dll
mmcbase    5.2.3790.0 (srv03_rtm.030324-2048) 70.50 KB (72,192 bytes)
            3/29/2003 12:00 AM Microsoft Corporation
            c:\windows\system32\mmcbase.dll
mmcndmgr   5.2.3790.0 (srv03_rtm.030324-2048) 1.13 MB (1,182,720
bytes)     3/29/2003 12:00 AM Microsoft Corporation
            c:\windows\system32\mmcndmgr.dll
msxml3     8.40.9419.0 1.28 MB (1,337,344 bytes)      3/29/2003 12:00
AM Microsoft Corporation c:\windows\system32\msxml3.dll
els        5.2.3790.0 (srv03_rtm.030324-2048) 178.00 KB (182,272 bytes)
            3/29/2003 12:00 AM Microsoft Corporation
            c:\windows\system32\els.dll
riched32   5.2.3790.0 (srv03_rtm.030324-2048) 3.50 KB (3,584 bytes)
            3/29/2003 12:00 AM Microsoft Corporation
            c:\windows\system32\riched32.dll
riched20   5.31.23.1218 406.00 KB (415,744 bytes)      3/29/2003
12:00 AM Microsoft Corporation c:\windows\system32\riched20.dll
mlang      6.00.3790.0 (srv03_rtm.030324-2048) 570.00 KB (583,680 bytes)
            3/29/2003 12:00 AM Microsoft Corporation
            c:\windows\system32\mlang.dll
mycomput   5.2.3790.0 (srv03_rtm.030324-2048) 96.50 KB (98,816 bytes)
            3/29/2003 12:00 AM Microsoft Corporation
            c:\windows\system32\mycomput.dll
ntmsmgr    5.2.3790.0 (srv03_rtm.030324-2048) 495.50 KB (507,392
bytes)     3/29/2003 12:00 AM Microsoft Corporation
            c:\windows\system32\ntmsmgr.dll
ntmsapi    5.2.3790.0 (srv03_rtm.030324-2048) 42.50 KB (43,520 bytes)
            3/29/2003 12:00 AM Microsoft Corporation
            c:\windows\system32\ntmsapi.dll
dfrgsnap   5.2.3790.0 (srv03_rtm.030324-2048) 36.00 KB (36,864 bytes)
            3/29/2003 12:00 AM Microsoft Corp. and Executive Software
International, Inc. c:\windows\system32\dfrgsnap.dll
dfrgres    5.2.3790.0 (srv03_rtm.030324-2048) 50.50 KB (51,712 bytes)
            3/29/2003 12:00 AM Microsoft Corp. and Executive Software
International, Inc. c:\windows\system32\dfrgres.dll
dmdskmgr   5.2.3790.0 (srv03_rtm.030324-2048) 164.00 KB (167,936
bytes)     3/29/2003 12:00 AM Microsoft Corporation
            c:\windows\system32\dmdskmgr.dll
dmutil     5.2.3790.0 (srv03_rtm.030324-2048) 51.50 KB (52,736 bytes)
            3/24/2003 7:48 PM Microsoft Corporation
            c:\windows\system32\dmutil.dll
dmdskres   5.2.3790.0 (srv03_rtm.030324-2048) 115.50 KB (118,272
bytes)     3/29/2003 12:00 AM Microsoft Corporation
            c:\windows\system32\dmdskres.dll
filemgmt   5.2.3790.0 (srv03_rtm.030324-2048) 327.50 KB (335,360
bytes)     3/29/2003 12:00 AM Microsoft Corporation
            c:\windows\system32\filemgmt.dll
```

## Appendix C – Tunable Parameters

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localsec 5.2.3790.0 (srv03\_rtm.030324-2048) 223.50 KB (228,864 bytes) 3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\localsec.dll

adsnt 5.2.3790.0 (srv03\_rtm.030324-2048) 260.00 KB (266,240 bytes) 3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\adsnt.dll

smlogcfg 5.2.3790.0 (srv03\_rtm.030324-2048) 360.50 KB (369,152 bytes) 3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\smlogcfg.dll

pdh 5.2.3790.0 (srv03\_rtm.030324-2048) 274.50 KB (281,088 bytes) 3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\pdh.dll

devmgr 5.2.3790.0 (srv03\_rtm.030324-2048) 276.50 KB (283,136 bytes) 3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\devmgr.dll

dmdlgs 5.2.3790.0 (srv03\_rtm.030324-2048) 272.50 KB (279,040 bytes) 3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\dmdlgs.dll

dmview 5.2.3790.0 (srv03\_rtm.030324-2048) 61.50 KB (62,976 bytes) 3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\dmview.ocx

vds\_ps 5.2.3790.0 (srv03\_rtm.030324-2048) 21.50 KB (22,016 bytes) 3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\vds\_ps.dll

dmvdsitf 5.2.3790.0 (srv03\_rtm.030324-2048) 92.50 KB (94,720 bytes) 3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\dmvdsitf.dll

vds 5.2.3790.0 (srv03\_rtm.030324-2048) 157.00 KB (160,768 bytes) 3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\vds.exe

osuninst 5.2.3790.0 (srv03\_rtm.030324-2048) 115.50 KB (118,272 bytes) 3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\osuninst.dll

cabinet 5.2.3790.0 (srv03\_rtm.030324-2048) 61.00 KB (62,464 bytes) 3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\cabinet.dll

vdsutil 5.2.3790.0 (srv03\_rtm.030324-2048) 38.50 KB (39,424 bytes) 3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\vdsutil.dll

vdsbas 5.2.3790.0 (srv03\_rtm.030324-2048) 103.50 KB (105,984 bytes) 3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\vdsbas.dll

fmifs 5.2.3790.0 (srv03\_rtm.030324-2048) 17.00 KB (17,408 bytes) 3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\fmifs.dll

ulib 5.2.3790.0 (srv03\_rtm.030324-2048) 265.50 KB (271,872 bytes) 3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\ulib.dll

ifsutil 5.2.3790.0 (srv03\_rtm.030324-2048) 72.00 KB (73,728 bytes) 3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\ifsutil.dll

vdsdyndr 5.2.3790.0 (srv03\_rtm.030324-2048) 307.50 KB (314,880 bytes) 3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\vdsdyndr.dll

## Appendix C – Tunable Parameters

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dmintf 5.2.3790.0 (srv03\_rtm.030324-2048) 20.00 KB (20,480 bytes)  
3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\dmintf.dll

dmadmin 5.2.3790.0 (srv03\_rtm.030324-2048) 220.00 KB (225,280  
bytes) 3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\dmadmin.exe

notepad 5.2.3790.0 (srv03\_rtm.030324-2048) 66.50 KB (68,096 bytes)  
3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\notepad.exe

sqlservr 2000.080.0760.00 7.17 MB (7,520,337 bytes) 6/1/2003  
1:13 PM Microsoft Corporation c:\program files\microsoft sql  
server\mssql\binn\sqlservr.exe

opends60 2000.080.0194.00 24.06 KB (24,639 bytes) 6/1/2003 1:13 PM  
Microsoft Corporation c:\program files\microsoft sql  
server\mssql\binn\opends60.dll

ums 2000.080.0760.00 52.55 KB (53,808 bytes) 6/1/2003 1:13 PM  
Microsoft Corporation c:\program files\microsoft sql  
server\mssql\binn\ums.dll

sqlsort 2000.080.0760.00 576.56 KB (590,396 bytes) 6/1/2003  
1:13 PM Microsoft Corporation c:\program files\microsoft sql  
server\mssql\binn\sqlsort.dll

msvcirt 7.0.3790.0 (srv03\_rtm.030324-2048) 50.00 KB (51,200 bytes)  
3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\msvcirt.dll

sqllevn70 2000.080.0760.00 28.00 KB (28,672 bytes) 6/1/2003 1:13 PM  
Microsoft Corporation c:\program files\microsoft sql  
server\mssql\binn\resources\1033\sqllevn70.rll

xolehlp 2001.12.4720.0 (srv03\_rtm.030324-2048) 8.50 KB (8,704  
bytes) 5/30/2003 3:07 PM Microsoft Corporation  
c:\windows\system32\xolehlp.dll

msdtcprx 2001.12.4720.0 (srv03\_rtm.030324-2048) 427.50 KB  
(437,760 bytes) 5/30/2003 3:07 PM Microsoft Corporation  
c:\windows\system32\msdtcprx.dll

mtxclu 2001.12.4720.0 (srv03\_rtm.030324-2048) 74.50 KB (76,288  
bytes) 3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\mtxclu.dll

ssnetlib 2000.080.0760.00 80.56 KB (82,492 bytes) 6/1/2003 1:13 PM  
Microsoft Corporation c:\program files\microsoft sql  
server\mssql\binn\ssnetlib.dll

ssnmpn70 2000.080.0534.00 24.56 KB (25,148 bytes) 6/1/2003 1:13 PM  
Microsoft Corporation c:\program files\microsoft sql  
server\mssql\binn\ssnmpn70.dll

security 5.2.3790.0 (srv03\_rtm.030324-2048) 5.50 KB (5,632 bytes)  
3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\security.dll

ssmslpcn 2000.080.0760.00 28.56 KB (29,244 bytes) 6/1/2003 1:13 PM  
Microsoft Corporation c:\program files\microsoft sql  
server\mssql\binn\ssmslpcn.dll

sqlftqry 2000.080.0760.00 192.57 KB (197,196 bytes) 6/1/2003  
1:13 PM Microsoft Corporation c:\program files\microsoft sql  
server\mssql\binn\sqlftqry.dll

sqloledb 2000.085.1022.00 (srv03\_rtm.030324-2048) 536.00 KB  
(548,864 bytes) 5/30/2003 3:10 PM Microsoft Corporation c:\program  
files\common files\system\ole db\sqloledb.dll

## Appendix C – Tunable Parameters

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msdart 2.80.1022.0 (srv03\_rtm.030324-2048) 164.00 KB (167,936 bytes) 3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\msdart.dll

msdatl3 2.80.1022.0 (srv03\_rtm.030324-2048) 96.00 KB (98,304 bytes) 5/30/2003 3:10 PM Microsoft Corporation c:\program files\common files\system\ole db\msdatl3.dll

oledb32 2.80.1022.0 (srv03\_rtm.030324-2048) 500.00 KB (512,000 bytes) 5/30/2003 3:10 PM Microsoft Corporation c:\program files\common files\system\ole db\oledb32.dll

oledb32r 2.80.1022.0 (srv03\_rtm.030324-2048) 68.00 KB (69,632 bytes) 5/30/2003 3:10 PM Microsoft Corporation c:\program files\common files\system\ole db\oledb32r.dll

xplog70 2000.080.0760.00 68.56 KB (70,208 bytes) 6/1/2003 1:13 PM Microsoft Corporation c:\program files\microsoft sql server\mssql\binn\xplog70.dll

xplog70 2000.080.0194.00 16.07 KB (16,453 bytes) 6/1/2003 1:13 PM Microsoft Corporation c:\program files\microsoft sql server\mssql\binn\resources\1033\xplog70.rll

cmd 5.2.3790.0 (srv03\_rtm.030324-2048) 374.00 KB (382,976 bytes) 3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\cmd.exe

tpccldr Not Available 84.00 KB (86,016 bytes) 5/30/2003 3:40 PM Not Available c:\tpcc\mstpcc.422\setup\loader\bin\tpccldr.exe

sqlsrv32 2000.085.1022.00 (srv03\_rtm.030324-2048) 404.00 KB (413,696 bytes) 3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\sqlsrv32.dll

sqlsrv32 2000.085.1022.00 (srv03\_rtm.030324-2048) 88.00 KB (90,112 bytes) 3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\sqlsrv32.rll

odbccp32 3.525.1022.0 (srv03\_rtm.030324-2048) 100.00 KB (102,400 bytes) 3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\odbccp32.dll

dbnetlib 2000.085.1022 (srv03\_rtm.030324-2048) 76.00 KB (77,824 bytes) 3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\dbnetlib.dll

dbmslpcn 2000.080.0760.00 28.56 KB (29,244 bytes) 6/1/2003 1:13 PM Microsoft Corporation c:\windows\system32\dbmslpcn.dll

helpctr 5.2.3790.0 (srv03\_rtm.030324-2048) 764.00 KB (782,336 bytes) 5/30/2003 3:10 PM Microsoft Corporation  
c:\windows\pchealth\helpctr\binaries\helpctr.exe

hcappres 5.2.3790.0 (srv03\_rtm.030324-2048) 6.50 KB (6,656 bytes) 5/30/2003 3:10 PM Microsoft Corporation  
c:\windows\pchealth\helpctr\binaries\hcappres.dll

itss 5.2.3790.0 (srv03\_rtm.030324-2048) 119.50 KB (122,368 bytes) 3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\itss.dll

pchshell 5.2.3790.0 (srv03\_rtm.030324-2048) 100.50 KB (102,912 bytes) 5/30/2003 3:10 PM Microsoft Corporation  
c:\windows\pchealth\helpctr\binaries\pchshell.dll

mshtml 6.00.3790.0 (srv03\_rtm.030324-2048) 2.78 MB (2,916,352 bytes) 3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\mshtml.dll

msimtf 5.2.3790.0 (srv03\_rtm.030324-2048) 149.00 KB (152,576 bytes) 3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\msimtf.dll

## Appendix C – Tunable Parameters

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msctf 5.2.3790.0 (srv03_rtm.030324-2048) 287.00 KB (293,888 bytes)
      3/29/2003 12:00 AM Microsoft Corporation
      c:\windows\system32\msctf.dll
jscript 5.6.0.8515 436.00 KB (446,464 bytes) 3/29/2003 12:00
AM Microsoft Corporation c:\windows\system32\jscript.dll
msls31 3.10.349.0 147.00 KB (150,528 bytes) 3/29/2003 12:00
AM Microsoft Corporation c:\windows\system32\msls31.dll
imm32 5.2.3790.0 (srv03_rtm.030324-2048) 105.50 KB (108,032 bytes)
      3/29/2003 12:00 AM Microsoft Corporation
      c:\windows\system32\imm32.dll
mshtml 6.00.3790.0 (srv03_rtm.030324-2048) 443.50 KB (454,144
bytes) 3/29/2003 12:00 AM Microsoft Corporation
      c:\windows\system32\mshtml.dll
vbscript 5.6.0.8515 404.00 KB (413,696 bytes) 3/29/2003 12:00
AM Microsoft Corporation c:\windows\system32\vbscript.dll
mfc42 6.05.3014.0 960.00 KB (983,040 bytes) 3/29/2003 12:00 AM
Microsoft Corporation c:\windows\system32\mfc42.dll
msinfo 5.2.3790.0 (srv03_rtm.030324-2048) 358.50 KB (367,104
bytes) 5/30/2003 3:10 PM Microsoft Corporation
      c:\windows\pchealth\helpctr\binaries\msinfo.dll
helpsvc 5.2.3790.0 (srv03_rtm.030324-2048) 720.00 KB (737,280
bytes) 5/30/2003 3:10 PM Microsoft Corporation
      c:\windows\pchealth\helpctr\binaries\helpsvc.exe

```

### [Services]

Display Name	Name	State	Start Mode	Service Type	Path	Error
Control	Start Name	Tag ID				
Alerter	Alerter	Stopped	Disabled	Share Process	c:\windows\system32\svchost.exe -k localservice	NT
AUTHORITY\LocalService	0					
Application Layer Gateway Service	ALG	Stopped	Manual	Own	c:\windows\system32\alg.exe	NT
Process	Normal					
AUTHORITY\LocalService	0					
Application Management	AppMgmt	Stopped	Manual	Share	c:\windows\system32\svchost.exe -k netsvcs	Normal
Process	LocalSystem	0				
Windows Audio	AudioSrv	Stopped	Manual	Share Process	c:\windows\system32\svchost.exe -k netsvcs	Normal
Process	LocalSystem	0				
Background Intelligent Transfer Service	BITS	Stopped	Manual	Share Process	c:\windows\system32\svchost.exe -k netsvcs	Normal
Process	LocalSystem	0				
Computer Browser	Browser	Stopped	Disabled	Share Process	c:\windows\system32\svchost.exe -k netsvcs	Normal
Process	LocalSystem	0				
Indexing Service	CiSvc	Stopped	Disabled	Share Process	c:\windows\system32\cisvc.exe	Normal
Process	LocalSystem	0				
ClipBook	ClipSrv	Stopped	Disabled	Own Process	c:\windows\system32\clipsrv.exe	Normal
Process	LocalSystem	0				
COM+ System Application	COMSysApp	Stopped	Manual	Own Process	c:\windows\system32\dllhost.exe /processid:{02d4b3f1-fd88-11d1-960d-00805fc79235}	Normal
Process	LocalSystem	0				

## Appendix C – Tunable Parameters

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```

Cryptographic Services CryptSvc Stopped Manual Share
Process c:\windows\system32\svchost.exe -k netsvcs Normal
LocalSystem 0
Distributed File System Dfs Stopped Manual Own Process
c:\windows\system32\dfssvc.exe Normal LocalSystem 0
DHCP Client Dhcp Stopped Manual Share Process
c:\windows\system32\svchost.exe -k networkservice Normal
NT AUTHORITY\NetworkService 0
Logical Disk Manager Administrative Service dmadmin Running
Manual Share Process c:\windows\system32\dmadmin.exe
/com Normal LocalSystem 0
Logical Disk Manager dmserver Running Manual Share
Process c:\windows\system32\svchost.exe -k netsvcs Normal
LocalSystem 0
DNS Client Dnscache Stopped Manual Share Process
c:\windows\system32\svchost.exe -k networkservice Normal
NT AUTHORITY\NetworkService 0
Error Reporting Service ERSvc Stopped Manual Share Process
c:\windows\system32\svchost.exe -k winerr Ignore LocalSystem
0
Event Log Eventlog Running Auto Share Process
c:\windows\system32\services.exe Normal LocalSystem 0
COM+ Event System EventSystem Running Manual Share Process
c:\windows\system32\svchost.exe -k netsvcs Normal
LocalSystem 0
Help and Support helpsvc Running Manual Share Process
c:\windows\system32\svchost.exe -k netsvcs Normal
LocalSystem 0
Human Interface Device Access HidServ Stopped Disabled Share
Process c:\windows\system32\svchost.exe -k netsvcs Normal
LocalSystem 0
HTTP SSL HTTPFilter Stopped Manual Share Process
c:\windows\system32\lsass.exe Normal LocalSystem 0
IMAPI CD-Burning COM Service ImapiService Stopped Disabled
Own Process c:\windows\system32\imapi.exe Normal LocalSystem
0
Intersite Messaging IsmServ Stopped Disabled Own Process
c:\windows\system32\ismserv.exe Normal LocalSystem 0
Kerberos Key Distribution Center kdc Stopped Disabled Share
Process c:\windows\system32\lsass.exe Normal LocalSystem 0
Server lanmanserver Running Auto Share Process
c:\windows\system32\svchost.exe -k netsvcs Normal
LocalSystem 0
Workstation lanmanworkstation Running Auto Share Process
c:\windows\system32\svchost.exe -k netsvcs Normal
LocalSystem 0
License Logging LicenseService Stopped Disabled Own Process
c:\windows\system32\llssrv.exe Normal NT
AUTHORITY\NetworkService 0
TCP/IP NetBIOS Helper LmHosts Stopped Manual Share
Process c:\windows\system32\svchost.exe -k localservice Normal
NT AUTHORITY\LocalService 0
Messenger Messenger Stopped Disabled Share Process
c:\windows\system32\svchost.exe -k netsvcs Normal
LocalSystem 0

```

## Appendix C – Tunable Parameters

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```

NetMeeting Remote Desktop Sharing mnmsrvc Stopped Disabled
Own Process c:\windows\system32\mnmsrvc.exe Normal
LocalSystem 0
Distributed Transaction Coordinator MSDTC Stopped Manual Own
Process c:\windows\system32\msdtc.exe Normal NT
AUTHORITY\NetworkService 0
Windows Installer MSIServer Stopped Manual Share Process
c:\windows\system32\msiexec.exe /v Normal LocalSystem 0
Microsoft Search MSSEARCH Stopped Manual Share Process
"c:\program files\common files\system\mssearch\bin\mssearch.exe"
Normal LocalSystem 0
MSSQLSERVER MSSQLSERVER Stopped Manual Own Process
c:\progra~1\microso~1\mssql\bin\sqlservr.exe Normal
LocalSystem 0
MSSQLServerADHelper MSSQLServerADHelper Stopped Manual
Own Process c:\program files\microsoft sql
server\80\tools\bin\sqladhlp.exe Normal LocalSystem 0
Network DDE NetDDE Stopped Disabled Share Process
c:\windows\system32\netdde.exe Normal LocalSystem 0
Network DDE DSDM NetDDEdsdm Stopped Disabled Share Process
c:\windows\system32\netdde.exe Normal LocalSystem 0
Net Logon Netlogon Stopped Manual Share Process
c:\windows\system32\lsass.exe Normal LocalSystem 0
Network Connections Netman Running Manual Share
Process c:\windows\system32\svchost.exe -k netsvcs Normal
LocalSystem 0
Network Location Awareness (NLA) Nla Running Manual Share
Process c:\windows\system32\svchost.exe -k netsvcs Normal
LocalSystem 0
File Replication NtFrs Stopped Manual Own Process
c:\windows\system32\ntfrs.exe Ignore LocalSystem 0
NT LM Security Support Provider NtLmSsp Stopped Manual
Share Process c:\windows\system32\lsass.exe Normal
LocalSystem 0
Removable Storage NtmsSvc Stopped Manual Share Process
c:\windows\system32\svchost.exe -k netsvcs Normal
LocalSystem 0
Plug and Play PlugPlay Running Auto Share Process
c:\windows\system32\services.exe Normal LocalSystem 0
IPSEC Services PolicyAgent Stopped Manual Share Process
c:\windows\system32\lsass.exe Normal LocalSystem 0
Protected Storage ProtectedStorage Stopped Manual Share
Process c:\windows\system32\lsass.exe Normal LocalSystem 0
Remote Access Auto Connection Manager RasAuto Stopped
Manual Share Process c:\windows\system32\svchost.exe -k
netsvcs Normal LocalSystem 0
Remote Access Connection Manager RasMan Stopped Manual
Share Process c:\windows\system32\svchost.exe -k netsvcs
Normal LocalSystem 0
Remote Desktop Help Session Manager RDSessMgr Stopped Manual
Own Process c:\windows\system32\sessmgr.exe Normal
LocalSystem 0
Routing and Remote Access RemoteAccess Stopped Disabled
Share Process c:\windows\system32\svchost.exe -k netsvcs
Normal LocalSystem 0

```



## Appendix C – Tunable Parameters

---

```

Remote Registry RemoteRegistry Stopped Manual Share
Process c:\windows\system32\svchost.exe -k regsvc Normal NT
AUTHORITY\LocalService 0
Remote Procedure Call (RPC) Locator RpcLocator Stopped Manual
Own Process c:\windows\system32\locator.exe Normal NT
AUTHORITY\NetworkService 0
Remote Procedure Call (RPC) RpcSs Running Auto Share Process
c:\windows\system32\svchost -k rpcss Normal LocalSystem
0
Resultant Set of Policy Provider RSoPProv Stopped Manual
Share Process c:\windows\system32\rsopprov.exe Normal
LocalSystem 0
Special Administration Console Helper sacsvr Stopped
Manual Share Process c:\windows\system32\svchost.exe -k
netsvcs Normal LocalSystem 0
Security Accounts Manager SamSs Stopped Manual Share
Process c:\windows\system32\lsass.exe Normal LocalSystem 0
Smart Card SCardSvr Stopped Manual Share Process
c:\windows\system32\scardsvr.exe Ignore NT
AUTHORITY\LocalService 0
Task Scheduler Schedule Stopped Manual Share Process
c:\windows\system32\svchost.exe -k netsvcs Normal
LocalSystem 0
Secondary Logon seclogon Stopped Manual Share Process
c:\windows\system32\svchost.exe -k netsvcs Ignore
LocalSystem 0
System Event Notification SENS Running Manual Share
Process c:\windows\system32\svchost.exe -k netsvcs Normal
LocalSystem 0
Internet Connection Firewall (ICF) / Internet Connection Sharing (ICS)
SharedAccess Stopped Disabled Share Process
c:\windows\system32\svchost.exe -k netsvcs Normal
LocalSystem 0
Shell Hardware Detection ShellHWDetection Running Auto Share
Process c:\windows\system32\svchost.exe -k netsvcs Ignore
LocalSystem 0
Print Spooler Spooler Stopped Manual Own Process
c:\windows\system32\spoolsv.exe Normal LocalSystem 0
SQLSERVERAGENT SQLSERVERAGENT Stopped Manual Own Process
c:\progra~1\microso~1\mssql\bin\sqlagent.exe Normal
LocalSystem 0
Windows Image Acquisition (WIA) stisvc Stopped Disabled
Share Process c:\windows\system32\svchost.exe -k imgsvc
Normal NT AUTHORITY\LocalService 0
Microsoft Software Shadow Copy Provider swprv Stopped Manual
Own Process c:\windows\system32\svchost.exe -k swprv Normal
LocalSystem 0
Performance Logs and Alerts SysmonLog Stopped Manual Own
Process c:\windows\system32\smlogsvc.exe Normal NT
Authority\NetworkService 0
Telephony TapiSrv Stopped Manual Share Process
c:\windows\system32\svchost.exe -k tapisrv Normal
LocalSystem 0

```

## Appendix C – Tunable Parameters

---

```

Terminal Services TermService Running Manual Share Process
c:\windows\system32\svchost.exe -k termsvcs Normal
LocalSystem 0
Themes Themes Stopped Disabled Share Process
c:\windows\system32\svchost.exe -k netsvcs Normal
LocalSystem 0
Telnet TlntSvr Stopped Disabled Own Process
c:\windows\system32\tlntsvr.exe Normal NT
AUTHORITY\LocalService 0
Distributed Link Tracking Server TrkSvr Stopped Disabled
Share Process c:\windows\system32\svchost.exe -k netsvcs
Normal LocalSystem 0
Distributed Link Tracking Client TrkWks Stopped Manual
Share Process c:\windows\system32\svchost.exe -k netsvcs
Normal LocalSystem 0
Terminal Services Session Directory Tssdis Stopped Disabled
Own Process c:\windows\system32\tssdis.exe Normal
LocalSystem 0
Upload Manager uploadmgr Stopped Manual Share Process
c:\windows\system32\svchost.exe -k netsvcs Normal
LocalSystem 0
Uninterruptible Power Supply UPS Stopped Manual Own Process
c:\windows\system32\ups.exe Normal NT
AUTHORITY\LocalService 0
Virtual Disk Service vds Running Manual Own Process
c:\windows\system32\vds.exe Normal LocalSystem 0
Volume Shadow Copy VSS Stopped Manual Own Process
c:\windows\system32\vssvc.exe Normal LocalSystem 0
Windows Time W32Time Stopped Manual Share Process
c:\windows\system32\svchost.exe -k netsvcs Normal
LocalSystem 0
WebClient WebClient Stopped Disabled Share Process
c:\windows\system32\svchost.exe -k localservice Normal NT
AUTHORITY\LocalService 0
WinHTTP Web Proxy Auto-Discovery Service WinHttpAutoProxySvc
Stopped Manual Share Process
c:\windows\system32\svchost.exe -k localservice Normal NT
AUTHORITY\LocalService 0
Windows Management Instrumentation winmgmt Running Auto Share
Process c:\windows\system32\svchost.exe -k netsvcs Ignore
LocalSystem 0
Portable Media Serial Number Service WmdmPmSN Stopped
Manual Share Process c:\windows\system32\svchost.exe -k
netsvcs Normal LocalSystem 0
Windows Management Instrumentation Driver Extensions Wmi Stopped
Manual Share Process c:\windows\system32\svchost.exe -k
netsvcs Normal LocalSystem 0
WMI Performance Adapter WmiApSrv Stopped Manual Own Process
c:\windows\system32\wbem\wmiaprv.exe Normal LocalSystem
0
Automatic Updates wuauerv Stopped Manual Share Process
c:\windows\system32\svchost.exe -k netsvcs Normal
LocalSystem 0

```

## Appendix C – Tunable Parameters

---

```
Wireless Configuration WZCSVC Stopped Manual Share
Process c:\windows\system32\svchost.exe -k netsvcs Normal
LocalSystem 0
```

[Program Groups]

```
Group Name Name User Name
Accessories Default User:Accessories Default User
Accessories\Accessibility Default User:Accessories\Accessibility
Default User
Accessories\Entertainment Default User:Accessories\Entertainment
Default User
Startup Default User:Startup Default User
Accessories All Users:Accessories All Users
Accessories\Accessibility All Users:Accessories\Accessibility All
Users
Accessories\Communications All Users:Accessories\Communications
All Users
Accessories\Entertainment All Users:Accessories\Entertainment All
Users
Accessories\System Tools All Users:Accessories\System Tools All
Users
Administrative Tools All Users:Administrative Tools All Users
Microsoft SQL Server All Users:Microsoft SQL Server All Users
Microsoft SQL Server - Switch All Users:Microsoft SQL Server - Switch
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
WinZip All Users:WinZip All Users
Accessories NT AUTHORITY\SYSTEM:Accessories NT AUTHORITY\SYSTEM
Accessories\Accessibility NT
AUTHORITY\SYSTEM:Accessories\Accessibility NT AUTHORITY\SYSTEM
Accessories\Entertainment NT
AUTHORITY\SYSTEM:Accessories\Entertainment NT AUTHORITY\SYSTEM
Startup NT AUTHORITY\SYSTEM:Startup NT AUTHORITY\SYSTEM
Accessories PE2650\Administrator:Accessories PE2650\Administrator
Accessories\Accessibility
PE2650\Administrator:Accessories\Accessibility
PE2650\Administrator
Accessories\Entertainment
PE2650\Administrator:Accessories\Entertainment
PE2650\Administrator
Administrative Tools PE2650\Administrator:Administrative Tools
PE2650\Administrator
Startup PE2650\Administrator:Startup PE2650\Administrator
```

[Startup Programs]

```
Program Command User Name Location
desktop desktop.ini NT AUTHORITY\SYSTEM Startup
desktop desktop.ini PE2650\Administrator Startup
```

## Appendix C – Tunable Parameters

---

```
Run WinVNC (App Mode)    run winvnc (app mode).lnk
                        PE2650\Administrator    Startup
desktop                 desktop.ini .DEFAULT    Startup
desktop                 desktop.ini All Users    Common Startup
Service Manager        c:\progra~1\microso~1\80\tools\bin\sqlmangr.exe /n
                        All Users    Common Startup
```

[OLE Registration]

```
Object      Local Server
Sound (OLE2)      sndrec32.exe
Media Clip      mplay32.exe
Video Clip      mplay32.exe /avi
MIDI Sequence    mplay32.exe /mid
Sound Not Available
Media Clip      Not Available
WordPad Document "%programfiles%\windows nt\accessories\wordpad.exe"
Windows Media Services DRM Storage object Not Available
Bitmap Image     mspaint.exe
```

[Windows Error Reporting]

Time Type Details

[Internet Settings]

[Internet Explorer]

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

```
Item Value
Version      6.0.3790.0
Build 63790
Application Path C:\Program Files\Internet Explorer
Language      English (United States)
Active Printer    Not Available
```

```
Cipher Strength  128-bit
Content Advisor  Disabled
IEAK Install     No
```

[File Versions]

```
File Version      Size Date Path Company
actxprxy.dll      6.0.3790.0 95 KB 3/29/2003 1:00:00 AM
                  C:\WINDOWS\system32 Microsoft Corporation
advpack.dll       6.0.3790.0 94 KB 3/29/2003 1:00:00 AM
                  C:\WINDOWS\system32 Microsoft Corporation
asctrls.ocx       6.0.3790.0 90 KB 3/29/2003 1:00:00 AM
                  C:\WINDOWS\system32 Microsoft Corporation
browselc.dll      6.0.3790.0 62 KB 3/29/2003 1:00:00 AM
                  C:\WINDOWS\system32 Microsoft Corporation
```

## Appendix C – Tunable Parameters

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browseui.dll	6.0.3790.0	1,033 KB	3/29/2003 1:00:00 AM	
C:\WINDOWS\system32		Microsoft Corporation		
cdfview.dll	6.0.3790.0	144 KB	3/29/2003 1:00:00 AM	
C:\WINDOWS\system32		Microsoft Corporation		
comctl32.dll	5.82.3790.0	561 KB	3/29/2003 1:00:00 AM	
C:\WINDOWS\system32		Microsoft Corporation		
dxtrans.dll	6.3.3790.0	198 KB	3/29/2003 1:00:00 AM	
C:\WINDOWS\system32		Microsoft Corporation		
dxtmsft.dll	6.3.3790.0	344 KB	3/29/2003 1:00:00 AM	
C:\WINDOWS\system32		Microsoft Corporation		
iecont.dll	<File Missing>	Not Available	Not Available	Not Available
Available Not Available				
iecontlc.dll	<File Missing>	Not Available	Not Available	Not Available
Not Available Not Available				
iedkcs32.dll	16.0.3790.0	300 KB	3/29/2003 1:00:00 AM	
C:\WINDOWS\system32		Microsoft Corporation		
iepeers.dll	6.0.3790.0	230 KB	3/29/2003 1:00:00 AM	
C:\WINDOWS\system32		Microsoft Corporation		
iesetup.dll	6.0.3790.0	59 KB	3/29/2003 1:00:00 AM	
C:\WINDOWS\system32		Microsoft Corporation		
ieuinit.inf	Not Available	20 KB	3/29/2003 1:00:00 AM	
C:\WINDOWS\system32		Not Available		
ieexplore.exe	6.0.3790.0	90 KB	3/29/2003 1:00:00 AM	C:\Program
Files\Internet Explorer Microsoft Corporation				
imgutil.dll	5.2.3790.0	35 KB	3/29/2003 1:00:00 AM	
C:\WINDOWS\system32		Microsoft Corporation		
inetcpl.cpl	6.0.3790.0	303 KB	3/29/2003 1:00:00 AM	
C:\WINDOWS\system32		Microsoft Corporation		
inetcplc.dll	6.0.3790.0	109 KB	3/29/2003 1:00:00 AM	
C:\WINDOWS\system32		Microsoft Corporation		
inseng.dll	6.0.3790.0	72 KB	3/29/2003 1:00:00 AM	
C:\WINDOWS\system32		Microsoft Corporation		
mlang.dll	6.0.3790.0	570 KB	3/29/2003 1:00:00 AM	
C:\WINDOWS\system32		Microsoft Corporation		
msencode.dll	2002.10.4.0	112 KB	3/29/2003 1:00:00 AM	
C:\WINDOWS\system32		Not Available		
mshta.exe	6.0.3790.0	26 KB	3/29/2003 1:00:00 AM	
C:\WINDOWS\system32		Microsoft Corporation		
mshtml.dll	6.0.3790.0	2,848 KB	3/29/2003 1:00:00 AM	
C:\WINDOWS\system32		Microsoft Corporation		
mshtml.tlb	6.0.3790.0	1,319 KB	3/29/2003 1:00:00 AM	
C:\WINDOWS\system32		Microsoft Corporation		
mshtml.ed.dll	6.0.3790.0	444 KB	3/29/2003 1:00:00 AM	
C:\WINDOWS\system32		Microsoft Corporation		
mshtmlr.dll	6.0.3790.0	55 KB	3/29/2003 1:00:00 AM	
C:\WINDOWS\system32		Microsoft Corporation		
msident.dll	6.0.3790.0	47 KB	3/29/2003 1:00:00 AM	
C:\WINDOWS\system32		Microsoft Corporation		
msidntld.dll	6.0.3790.0	15 KB	3/29/2003 1:00:00 AM	
C:\WINDOWS\system32		Microsoft Corporation		
msieftp.dll	6.0.3790.0	230 KB	3/29/2003 1:00:00 AM	
C:\WINDOWS\system32		Microsoft Corporation		
msrating.dll	6.0.3790.0	132 KB	3/29/2003 1:00:00 AM	
C:\WINDOWS\system32		Microsoft Corporation		

## Appendix C – Tunable Parameters

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mstime.dll 6.0.3790.0 491 KB 3/29/2003 1:00:00 AM  
C:\WINDOWS\system32 Microsoft Corporation  
occache.dll 6.0.3790.0 89 KB 3/29/2003 1:00:00 AM  
C:\WINDOWS\system32 Microsoft Corporation  
proctexe.ocx 6.3.3790.0 78 KB 3/29/2003 1:00:00 AM  
C:\WINDOWS\system32 Intel Corporation  
sendmail.dll 6.0.3790.0 52 KB 3/29/2003 1:00:00 AM  
C:\WINDOWS\system32 Microsoft Corporation  
shdoclc.dll 6.0.3790.0 589 KB 3/29/2003 1:00:00 AM  
C:\WINDOWS\system32 Microsoft Corporation  
shdocvw.dll 6.0.3790.0 1,361 KB 3/29/2003 1:00:00 AM  
C:\WINDOWS\system32 Microsoft Corporation  
shfolder.dll 6.0.3790.0 23 KB 3/29/2003 1:00:00 AM  
C:\WINDOWS\system32 Microsoft Corporation  
shlwapi.dll 6.0.3790.0 281 KB 3/29/2003 1:00:00 AM  
C:\WINDOWS\system32 Microsoft Corporation  
tdc.ocx 1.3.0.3130 58 KB 3/29/2003 1:00:00 AM  
C:\WINDOWS\system32 Microsoft Corporation  
url.dll 6.0.3790.0 36 KB 3/29/2003 1:00:00 AM  
C:\WINDOWS\system32 Microsoft Corporation  
urlmon.dll 6.0.3790.0 502 KB 3/29/2003 1:00:00 AM  
C:\WINDOWS\system32 Microsoft Corporation  
webcheck.dll 6.0.3790.0 262 KB 3/29/2003 1:00:00 AM  
C:\WINDOWS\system32 Microsoft Corporation  
wininet.dll 6.0.3790.0 609 KB 3/29/2003 1:00:00 AM  
C:\WINDOWS\system32 Microsoft Corporation

[Connectivity]

Item Value  
Connection Preference Never dial

LAN Settings

AutoConfigProxy Not Available  
AutoProxyDetectMode Disabled  
AutoConfigURL  
Proxy Disabled  
ProxyServer  
ProxyOverride

[Cache]

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

Item Value  
Page Refresh Type Automatic  
Temporary Internet Files Folder  
C:\WINDOWS\system32\config\systemprofile\Local Settings\Temporary  
Internet Files  
Total Disk Space Not Available  
Available Disk Space Not Available  
Maximum Cache Size Not Available  
Available Cache Size Not Available

## Appendix C – Tunable Parameters

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[List of Objects]

Program File	Status	CodeBase
No cached object information available		

[Content]

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

Item	Value
Content Advisor	Disabled

[Personal Certificates]

Issued To	Issued By	Validity	Signature Algorithm
No personal certificate information available			

[Other People Certificates]

Issued To	Issued By	Validity	Signature Algorithm
No other people certificate information available			

[Publishers]

Name
No publisher information available

[Security]

Zone	Security Level
My Computer	Custom
Local intranet	Medium-low
Trusted sites	Medium
Internet	High
Restricted sites	High

# Appendix C – Tunable Parameters

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## Microsoft Windows 2000 Server System Information Report for PE1600SC

### Client Configuration Parameters

System Information report written at: 07/08/03 18:24:31

System Name: CLIENT7

[System Summary]

Item Value

OS Name Microsoft(R) Windows(R) Server 2003, Standard Edition  
Version 5.2.3790 Build 3790  
OS Manufacturer Microsoft Corporation  
System Name CLIENT7  
System Manufacturer Dell Computer Corporation  
System Model PowerEdge 1600SC  
System Type X86-based PC  
Processor x86 Family 15 Model 2 Stepping 7 GenuineIntel ~2392 Mhz  
Processor x86 Family 15 Model 2 Stepping 7 GenuineIntel ~2392 Mhz  
Processor x86 Family 15 Model 2 Stepping 7 GenuineIntel ~2392 Mhz  
Processor x86 Family 15 Model 2 Stepping 7 GenuineIntel ~2392 Mhz  
BIOS Version/Date Dell Computer Corporation X22, 1/14/2003  
SMBIOS Version 2.3  
Windows Directory C:\WINDOWS  
System Directory C:\WINDOWS\system32  
Boot Device \Device\HarddiskVolume1  
Locale United States  
Hardware Abstraction Layer Version = "5.2.3790.0 (srv03\_rtm.030324-2048)"  
User Name CLIENT7\Administrator  
Time Zone Central Daylight Time  
Total Physical Memory 1,024.00 MB  
Available Physical Memory 701.55 MB  
Total Virtual Memory 3.41 GB  
Available Virtual Memory 2.88 GB  
Page File Space 2.41 GB  
Page File C:\pagefile.sys

[Hardware Resources]

[Conflicts/Sharing]

Resource Device

I/O Port 0x00000000-0x0000003AF PCI bus  
I/O Port 0x00000000-0x0000003AF Direct memory access controller  
  
Memory Address 0xFD000000-0xFE1FFFFFF PCI bus  
Memory Address 0xFD000000-0xFE1FFFFFF RAGE XL PCI Family (Microsoft Corporation)  
  
Memory Address 0xA0000-0xBFFFFF PCI bus  
Memory Address 0xA0000-0xBFFFFF RAGE XL PCI Family (Microsoft Corporation)



## Appendix C – Tunable Parameters

---

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

Memory Address 0xFCB00000-0xFCDFFFFF PCI bus  
Memory Address 0xFCB00000-0xFCDFFFFF Intel(R) PRO/100+ Server Adapter (PILA8470B)

[DMA]

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

[Forced Hardware]

Device	PNP Device ID
--------	---------------

[I/O]

Resource	Device	Status
0x00000000-0x000003AF	PCI bus	OK
0x00000000-0x000003AF	Direct memory access controller	OK
0x000003B0-0x000003DF	PCI bus	OK
0x000003B0-0x000003DF	RAGE XL PCI Family (Microsoft Corporation)	OK
0x000003E0-0x00000FFF	PCI bus	OK
0x0000E000-0x0000EFFF	PCI bus	OK
0x0000ECC0-0x0000ECFF	Intel(R) PRO/1000 MT Network Connection	OK
0x0000E800-0x0000E8FF	RAGE XL PCI Family (Microsoft Corporation)	OK
0x000003C0-0x000003DF	RAGE XL PCI Family (Microsoft Corporation)	OK
0x00000080-0x0000009F	Direct memory access controller	OK
0x000000C0-0x000000DF	Direct memory access controller	OK
0x000000F0-0x000000FF	Numeric data processor	OK
0x00000020-0x0000003F	Programmable interrupt controller	OK
0x000000A0-0x000000BF	Programmable interrupt controller	OK
0x000004D0-0x000004D1	Programmable interrupt controller	OK
0x00000061-0x00000061	System speaker	OK
0x00000040-0x0000005F	System timer	OK
0x000003F0-0x000003F5	Standard floppy disk controller	OK
0x000003F7-0x000003F7	Standard floppy disk controller	OK
0x00000060-0x00000060	Standard 101/102-Key or Microsoft Natural PS/2 Keyboard	OK
0x00000064-0x00000064	Standard 101/102-Key or Microsoft Natural PS/2 Keyboard	OK
0x000003F8-0x000003FF	Communications Port (COM1)	OK
0x00000378-0x0000037F	ECP Printer Port (LPT1)	OK
0x00000778-0x0000077F	ECP Printer Port (LPT1)	OK
0x00000070-0x0000007F	System CMOS/real time clock	OK
0x00000814-0x0000085B	System board	OK
0x00000820-0x0000083F	System board	OK
0x000008A0-0x000008AF	System board	OK

## Appendix C – Tunable Parameters

---

0x00000C00-0x00000CD7	System board	OK
0x00000F50-0x00000F58	System board	OK
0x000008B0-0x000008BF	Standard Dual Channel PCI IDE Controller	OK
0x000001F0-0x000001F7	Primary IDE Channel	OK
0x000003F6-0x000003F6	Primary IDE Channel	OK
0x00000170-0x00000177	Secondary IDE Channel	OK
0x00000376-0x00000376	Secondary IDE Channel	OK
0x00000A79-0x00000A79	ISAPNP Read Data Port	OK
0x00000279-0x00000279	ISAPNP Read Data Port	OK
0x00000274-0x00000277	ISAPNP Read Data Port	OK
0x0000D000-0x0000DFFF	PCI bus	OK
0x0000DC00-0x0000DCFF	LSI Logic PCI-X Ultra320 SCSI Host Adapter	OK
0x0000C000-0x0000CFFF	PCI bus	OK
0x0000CCC0-0x0000CCFF	Intel(R) PRO/100+ Server Adapter (PILA8470B)	OK

### [IRQs]

Resource	Device	Status
IRQ 9	Microsoft ACPI-Compliant System	OK
IRQ 16	Intel(R) PRO/1000 MT Network Connection	OK
IRQ 13	Numeric data processor	OK
IRQ 0	System timer	OK
IRQ 6	Standard floppy disk controller	OK
IRQ 1	Standard 101/102-Key or Microsoft Natural PS/2 Keyboard	OK
IRQ 12	PS/2 Compatible Mouse	OK
IRQ 4	Communications Port (COM1)	OK
IRQ 8	System CMOS/real time clock	OK
IRQ 15	Secondary IDE Channel	OK
IRQ 10	ServerWorks (RCC) PCI to USB Open Host Controller	OK
IRQ 29	LSI Logic PCI-X Ultra320 SCSI Host Adapter	OK
IRQ 24	Intel(R) PRO/100+ Server Adapter (PILA8470B)	OK

### [Memory]

Resource	Device	Status
0xA0000-0xBFFFF	PCI bus	OK
0xA0000-0xBFFFF	RAGE XL PCI Family (Microsoft Corporation)	OK
0xD0000-0xE7FFF	PCI bus	OK
0xFD000000-0xFE1FFFFF	PCI bus	OK
0xFD000000-0xFE1FFFFF	RAGE XL PCI Family (Microsoft Corporation)	OK
0xFE100000-0xFE11FFFF	Intel(R) PRO/1000 MT Network Connection	OK
0xFE121000-0xFE121FFF	RAGE XL PCI Family (Microsoft Corporation)	OK
0xFE120000-0xFE120FFF	ServerWorks (RCC) PCI to USB Open Host Controller	OK
0x0000-0x9FFFF	System board	OK
0x100000-0x3FFFFFFF	System board	OK
0xF0000-0xFFFFF	System board	OK
0xFEC00000-0xFEC0FFFF	System board	OK
0xFEE00000-0xFEE0FFFF	System board	OK
0xFFE00000-0xFFFFFFF	System board	OK
0xFCE00000-0xFCFFFFFF	PCI bus	OK

## Appendix C – Tunable Parameters

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0xFCF10000-0xFCF1FFFF LSI Logic PCI-X Ultra320 SCSI Host Adapter  
OK  
0xFCF00000-0xFCF0FFFF LSI Logic PCI-X Ultra320 SCSI Host Adapter  
OK  
0xFCB00000-0xFCDFFFFFF PCI bus OK  
0xFCB00000-0xFCDFFFFFF Intel(R) PRO/100+ Server Adapter (PILA8470B)  
OK  
0xFCD00000-0xFCD00FFF Intel(R) PRO/100+ Server Adapter (PILA8470B)  
OK

[Components]

[Multimedia]

[Audio Codecs]

CODEC	Manufacturer	Description	Status	File	Version	Size
		Creation Date				
c:\windows\system32\msaud32.acm	Microsoft Corporation	Windows Media Audio Codec	OK	C:\WINDOWS\system32\MSAUD32.ACM		
	8.00.00.4487	288.00 KB (294,912 bytes)			3/29/2003 12:00 AM	
c:\windows\system32\msg711.acm	Microsoft Corporation		OK	C:\WINDOWS\system32\MSG711.ACM	5.2.3790.0 (srv03_rtm.030324-2048)	10.00 KB (10,240 bytes)
		3/29/2003 12:00 AM				
c:\windows\system32\imaadp32.acm	Microsoft Corporation		OK	C:\WINDOWS\system32\IMAADP32.ACM	5.2.3790.0 (srv03_rtm.030324-2048)	15.50 KB (15,872 bytes)
		3/29/2003 12:00 AM				
c:\windows\system32\tssoft32.acm	DSP GROUP, INC.		OK	C:\WINDOWS\system32\TSSOFT32.ACM	1.01	9.50 KB (9,728 bytes)
		3/29/2003 12:00 AM				
c:\windows\system32\sl_anet.acm	Sipro Lab Telecom Inc.	Sipro Lab Telecom Audio Codec	OK	C:\WINDOWS\system32\SL_ANET.ACM		3.02
		84.00 KB (86,016 bytes)			3/29/2003 12:00 AM	
c:\windows\system32\msg723.acm	Microsoft Corporation		OK	C:\WINDOWS\system32\MSG723.ACM	4.4.4000	116.00 KB (118,784 bytes)
		6/9/2003 9:37 AM				
c:\windows\system32\msadp32.acm	Microsoft Corporation		OK	C:\WINDOWS\system32\MSADP32.ACM	5.2.3790.0 (srv03_rtm.030324-2048)	14.50 KB (14,848 bytes)
		3/29/2003 12:00 AM				
c:\windows\system32\l3codeca.acm	Fraunhofer Institut Integrierte Schaltungen IIS	Fraunhofer IIS MPEG Layer-3 Codec	OK	C:\WINDOWS\system32\L3CODECA.ACM	1, 9, 0, 0305	284.00 KB (290,816 bytes)
		3/29/2003 12:00 AM				
c:\windows\system32\msgsm32.acm	Microsoft Corporation		OK	C:\WINDOWS\system32\MSGSM32.ACM	5.2.3790.0 (srv03_rtm.030324-2048)	20.50 KB (20,992 bytes)
		3/29/2003 12:00 AM				

[Video Codecs]

## Appendix C – Tunable Parameters

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CODEC	Manufacturer	Description	Status	File	Version	Size
		Creation Date				
c:\windows\system32\msh263.drv	Microsoft Corporation		OK			
	C:\WINDOWS\system32\MSH263.DRV		4.4.4000	284.00 KB		
	(290,816 bytes)	3/24/2003 7:46 PM				
c:\windows\system32\msvidc32.dll	Microsoft Corporation		OK			
	C:\WINDOWS\system32\MSVIDC32.DLL		5.2.3790.0 (srv03_rtm.030324-			
	2048)	26.50 KB (27,136 bytes)	3/29/2003 12:00 AM			
c:\windows\system32\msh261.drv	Microsoft Corporation		OK			
	C:\WINDOWS\system32\MSH261.DRV		4.4.4000	180.00 KB		
	(184,320 bytes)	6/9/2003 9:37 AM				
c:\windows\system32\tsbyuv.dll	Microsoft Corporation		OK			
	C:\WINDOWS\system32\TSBYUV.DLL		5.2.3790.0 (srv03_rtm.030324-			
	2048)	8.00 KB (8,192 bytes)	3/24/2003 7:50 PM			
c:\windows\system32\msrle32.dll	Microsoft Corporation		OK			
	C:\WINDOWS\system32\MSRLE32.DLL		5.2.3790.0 (srv03_rtm.030324-			
	2048)	10.50 KB (10,752 bytes)	3/29/2003 12:00 AM			
c:\windows\system32\iyuv_32.dll	Microsoft Corporation		OK			
	C:\WINDOWS\system32\IYUV_32.DLL		5.2.3790.0 (srv03_rtm.030324-			
	2048)	45.00 KB (46,080 bytes)	3/24/2003 7:49 PM			
c:\windows\system32\msyuv.dll	Microsoft Corporation		OK			
	C:\WINDOWS\system32\MSYUV.DLL		5.2.3790.0 (srv03_rtm.030324-2048)			
	16.50 KB (16,896 bytes)	3/24/2003 7:49 PM				

[CD-ROM]

Item	Value
Drive D:	
Description	CD-ROM Drive
Media Loaded	No
Media Type	CD-ROM
Name	LITEON DVD-ROM LTD163
Manufacturer	(Standard CD-ROM drives)
Status	OK
Transfer Rate	Not Available
SCSI Target ID	0
PNP Device ID	IDE\CDROMLITEON_DVD- ROM_LTD163_____GDHB____\5&1A6C219A&0&0.0.0
Driver	c:\windows\system32\drivers\cdrom.sys (5.2.3790.0 (srv03_rtm.030324-2048), 49.50 KB (50,688 bytes), 3/29/2003 12:00 AM)

[Sound Device]

Item	Value
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[Display]

Item	Value
Name	RAGE XL PCI Family (Microsoft Corporation)
PNP Device ID	PCI\VEN_1002&DEV_4752&SUBSYS_01351028&REV_27\3&13C0B0C5&0&70
Adapter Type	ATI RAGE XL PCI (B41), ATI Technologies Inc. compatible
Adapter Description	RAGE XL PCI Family (Microsoft Corporation)
Adapter RAM	8.00 MB (8,388,608 bytes)

## Appendix C – Tunable Parameters

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Installed Drivers ati2drad.dll  
Driver Version 5.10.3663.6013  
INF File atiixpad.inf (ati2mpad section)  
Color Planes 1  
Color Table Entries 65536  
Resolution 1024 x 768 x 60 hertz  
Bits/Pixel 16  
Memory Address 0xFD000000-0xFE1FFFFFFF  
I/O Port 0x0000E800-0x0000E8FF  
Memory Address 0xFE121000-0xFE121FFF  
I/O Port 0x000003B0-0x000003DF  
I/O Port 0x000003C0-0x000003DF  
Memory Address 0xA0000-0xBFFFFF  
Driver c:\windows\system32\drivers\ati2mpad.sys (5.10.3663.6013,  
335.38 KB (343,424 bytes), 6/9/2003 4:29 AM)

[Infrared]

Item Value

[Input]

[Keyboard]

Item Value  
Description Standard 101/102-Key or Microsoft Natural PS/2 Keyboard  
Name Enhanced (101- or 102-key)  
Layout 00000409  
PNP Device ID ACPI\PNP0303\4&25F73A82&0  
Number of Function Keys 12  
I/O Port 0x00000060-0x00000060  
I/O Port 0x00000064-0x00000064  
IRQ Channel IRQ 1  
Driver c:\windows\system32\drivers\i8042prt.sys (5.2.3790.0  
(srv03\_rtm.030324-2048), 68.50 KB (70,144 bytes), 3/29/2003 12:00 AM)

[Pointing Device]

Item Value  
Hardware Type PS/2 Compatible Mouse  
Number of Buttons 3  
Status OK  
PNP Device ID ACPI\PNP0F13\4&25F73A82&0  
Power Management Supported No  
Double Click Threshold 6  
Handedness Right Handed Operation  
IRQ Channel IRQ 12  
Driver c:\windows\system32\drivers\i8042prt.sys (5.2.3790.0  
(srv03\_rtm.030324-2048), 68.50 KB (70,144 bytes), 3/29/2003 12:00 AM)

[Modem]

Item Value

## Appendix C – Tunable Parameters

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[Network]

[Adapter]

Item Value

Name [00000001] Intel(R) PRO/1000 MT Network Connection  
Adapter Type Ethernet 802.3  
Product Type Intel(R) PRO/1000 MT Network Connection  
Installed Yes  
PNP Device ID  
PCI\VEN\_8086&DEV\_100E&SUBSYS\_01351028&REV\_02\3&13C0B0C5&0&10  
Last Reset 7/8/2003 3:42 PM  
Index 1  
Service Name E1000  
IP Address 192.1.100.7  
IP Subnet 255.255.255.0  
Default IP Gateway Not Available  
DHCP Enabled No  
DHCP Server Not Available  
DHCP Lease Expires Not Available  
DHCP Lease Obtained Not Available  
MAC Address 00:C0:9F:1D:77:0D  
Memory Address 0xFE100000-0xFE11FFFF  
I/O Port 0x0000ECC0-0x0000ECFF  
IRQ Channel IRQ 16  
Driver c:\windows\system32\drivers\e1000325.sys (6.3.6.31 built by: WinDDK, 99.00 KB (101,376 bytes), 6/9/2003 4:29 AM)

Name [00000002] Intel(R) PRO/100+ Server Adapter (PILA8470B)  
Adapter Type Ethernet 802.3  
Product Type Intel(R) PRO/100+ Server Adapter (PILA8470B)  
Installed Yes  
PNP Device ID  
PCI\VEN\_8086&DEV\_1229&SUBSYS\_100C8086&REV\_08\3&29E81982&0&20  
Last Reset 7/8/2003 3:42 PM  
Index 2  
Service Name E100B  
IP Address 192.1.1.7  
IP Subnet 255.255.255.0  
Default IP Gateway Not Available  
DHCP Enabled No  
DHCP Server Not Available  
DHCP Lease Expires Not Available  
DHCP Lease Obtained Not Available  
MAC Address 00:D0:B7:9E:A8:B9  
Memory Address 0xFCD00000-0xFCD00FFF  
I/O Port 0x0000CCC0-0x0000CCFF  
Memory Address 0xFCB00000-0xFCDFEFFF  
IRQ Channel IRQ 24  
Driver c:\windows\system32\drivers\e100b325.sys (6.6.8.1 built by: WinDDK, 138.50 KB (141,824 bytes), 6/9/2003 4:30 AM)

## Appendix C – Tunable Parameters

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Name [00000003] RAS Async Adapter  
Adapter Type Not Available  
Product Type RAS Async Adapter  
Installed Yes  
PNP Device ID Not Available  
Last Reset 7/8/2003 3:42 PM  
Index 3  
Service Name AsyncMac  
IP Address Not Available  
IP Subnet Not Available  
Default IP Gateway Not Available  
DHCP Enabled No  
DHCP Server Not Available  
DHCP Lease Expires Not Available  
DHCP Lease Obtained Not Available  
MAC Address Not Available

Name [00000004] WAN Miniport (L2TP)  
Adapter Type Not Available  
Product Type WAN Miniport (L2TP)  
Installed Yes  
PNP Device ID ROOT\MS\_L2TPMINIPOINT\0000  
Last Reset 7/8/2003 3:42 PM  
Index 4  
Service Name Rasl2tp  
IP Address Not Available  
IP Subnet Not Available  
Default IP Gateway Not Available  
DHCP Enabled No  
DHCP Server Not Available  
DHCP Lease Expires Not Available  
DHCP Lease Obtained Not Available  
MAC Address Not Available  
Driver c:\windows\system32\drivers\rasl2tp.sys (5.2.3790.0  
(srv03\_rtm.030324-2048), 77.00 KB (78,848 bytes), 3/29/2003 12:00 AM)

Name [00000005] WAN Miniport (PPTP)  
Adapter Type Wide Area Network (WAN)  
Product Type WAN Miniport (PPTP)  
Installed Yes  
PNP Device ID ROOT\MS\_PPTPMINIPOINT\0000  
Last Reset 7/8/2003 3:42 PM  
Index 5  
Service Name PptpMiniport  
IP Address Not Available  
IP Subnet Not Available  
Default IP Gateway Not Available  
DHCP Enabled No  
DHCP Server Not Available  
DHCP Lease Expires Not Available  
DHCP Lease Obtained Not Available  
MAC Address 50:50:54:50:30:30  
Driver c:\windows\system32\drivers\raspptp.sys (5.2.3790.0  
(srv03\_rtm.030324-2048), 70.50 KB (72,192 bytes), 3/29/2003 12:00 AM)

## Appendix C – Tunable Parameters

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Name [00000006] WAN Miniport (PPPOE)  
Adapter Type Wide Area Network (WAN)  
Product Type WAN Miniport (PPPOE)  
Installed Yes  
PNP Device ID ROOT\MS\_PPPOEMINIPOINT\0000  
Last Reset 7/8/2003 3:42 PM  
Index 6  
Service Name RasPppoe  
IP Address Not Available  
IP Subnet Not Available  
Default IP Gateway Not Available  
DHCP Enabled No  
DHCP Server Not Available  
DHCP Lease Expires Not Available  
DHCP Lease Obtained Not Available  
MAC Address 33:50:6F:45:30:30  
Driver c:\windows\system32\drivers\rasppoe.sys (5.2.3790.0  
(srv03\_rtm.030324-2048), 38.00 KB (38,912 bytes), 3/29/2003 12:00 AM)

Name [00000007] Direct Parallel  
Adapter Type Not Available  
Product Type Direct Parallel  
Installed Yes  
PNP Device ID ROOT\MS\_PTIMINIPOINT\0000  
Last Reset 7/8/2003 3:42 PM  
Index 7  
Service Name Raspti  
IP Address Not Available  
IP Subnet Not Available  
Default IP Gateway Not Available  
DHCP Enabled No  
DHCP Server Not Available  
DHCP Lease Expires Not Available  
DHCP Lease Obtained Not Available  
MAC Address Not Available  
Driver c:\windows\system32\drivers\raspti.sys (5.2.3790.0  
(srv03\_rtm.030324-2048), 18.50 KB (18,944 bytes), 3/29/2003 12:00 AM)

Name [00000008] WAN Miniport (IP)  
Adapter Type Not Available  
Product Type WAN Miniport (IP)  
Installed Yes  
PNP Device ID ROOT\MS\_NDISWANIP\0000  
Last Reset 7/8/2003 3:42 PM  
Index 8  
Service Name NdisWan  
IP Address Not Available  
IP Subnet Not Available  
Default IP Gateway Not Available  
DHCP Enabled No  
DHCP Server Not Available  
DHCP Lease Expires Not Available  
DHCP Lease Obtained Not Available  
MAC Address Not Available



## Appendix C – Tunable Parameters

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Driver c:\windows\system32\drivers\ndiswan.sys (5.2.3790.0  
(srv03\_rtm.030324-2048), 96.50 KB (98,816 bytes), 3/29/2003 12:00 AM)

[Protocol]

Item Value

Name MSAFD Tcpiip [TCP/IP]  
Connectionless Service No  
Guarantees Delivery Yes  
Guarantees Sequencing Yes  
Maximum Address Size 16 bytes  
Maximum Message Size 0 bytes  
Message Oriented No  
Minimum Address Size 16 bytes  
Pseudo Stream Oriented No  
Supports Broadcasting No  
Supports Connect Data No  
Supports Disconnect Data No  
Supports Encryption No  
Supports Expedited Data Yes  
Supports Graceful Closing Yes  
Supports Guaranteed Bandwidth No  
Supports Multicasting No

Name MSAFD Tcpiip [UDP/IP]  
Connectionless Service Yes  
Guarantees Delivery No  
Guarantees Sequencing No  
Maximum Address Size 16 bytes  
Maximum Message Size 63.93 KB (65,467 bytes)  
Message Oriented Yes  
Minimum Address Size 16 bytes  
Pseudo Stream Oriented No  
Supports Broadcasting Yes  
Supports Connect Data No  
Supports Disconnect Data No  
Supports Encryption No  
Supports Expedited Data No  
Supports Graceful Closing No  
Supports Guaranteed Bandwidth No  
Supports Multicasting Yes

Name RSVP UDP Service Provider  
Connectionless Service Yes  
Guarantees Delivery No  
Guarantees Sequencing No  
Maximum Address Size 16 bytes  
Maximum Message Size 63.93 KB (65,467 bytes)  
Message Oriented Yes  
Minimum Address Size 16 bytes  
Pseudo Stream Oriented No  
Supports Broadcasting Yes  
Supports Connect Data No  
Supports Disconnect Data No  
Supports Encryption Yes

## Appendix C – Tunable Parameters

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Supports Expedited Data No  
Supports Graceful Closing No  
Supports Guaranteed Bandwidth No  
Supports Multicasting Yes

Name RSVP TCP Service Provider  
Connectionless Service No  
Guarantees Delivery Yes  
Guarantees Sequencing Yes  
Maximum Address Size 16 bytes  
Maximum Message Size 0 bytes  
Message Oriented No  
Minimum Address Size 16 bytes  
Pseudo Stream Oriented No  
Supports Broadcasting No  
Supports Connect Data No  
Supports Disconnect Data No  
Supports Encryption Yes  
Supports Expedited Data Yes  
Supports Graceful Closing Yes  
Supports Guaranteed Bandwidth No  
Supports Multicasting No

Name MSAFD NetBIOS [\\Device\\NetBT\_Tcpip\_{C6159487-ADE2-4268-BD91-923EC4BF802A}] SEQPACKET 0  
Connectionless Service No  
Guarantees Delivery Yes  
Guarantees Sequencing Yes  
Maximum Address Size 20 bytes  
Maximum Message Size 62.50 KB (64,000 bytes)  
Message Oriented Yes  
Minimum Address Size 20 bytes  
Pseudo Stream Oriented No  
Supports Broadcasting No  
Supports Connect Data No  
Supports Disconnect Data No  
Supports Encryption No  
Supports Expedited Data No  
Supports Graceful Closing No  
Supports Guaranteed Bandwidth No  
Supports Multicasting No

Name MSAFD NetBIOS [\\Device\\NetBT\_Tcpip\_{C6159487-ADE2-4268-BD91-923EC4BF802A}] DATAGRAM 0  
Connectionless Service Yes  
Guarantees Delivery No  
Guarantees Sequencing No  
Maximum Address Size 20 bytes  
Maximum Message Size 62.50 KB (64,000 bytes)  
Message Oriented Yes  
Minimum Address Size 20 bytes  
Pseudo Stream Oriented No  
Supports Broadcasting Yes  
Supports Connect Data No  
Supports Disconnect Data No

## Appendix C – Tunable Parameters

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Supports Encryption No  
Supports Expedited Data No  
Supports Graceful Closing No  
Supports Guaranteed Bandwidth No  
Supports Multicasting No

Name MSAFD NetBIOS [\Device\NetBT\_Tcpip\_{06DA0E24-5E78-4724-94EB-F23A4C3220C5}] SEQPACKET 1  
Connectionless Service No  
Guarantees Delivery Yes  
Guarantees Sequencing Yes  
Maximum Address Size 20 bytes  
Maximum Message Size 62.50 KB (64,000 bytes)  
Message Oriented Yes  
Minimum Address Size 20 bytes  
Pseudo Stream Oriented No  
Supports Broadcasting No  
Supports Connect Data No  
Supports Disconnect Data No  
Supports Encryption No  
Supports Expedited Data No  
Supports Graceful Closing No  
Supports Guaranteed Bandwidth No  
Supports Multicasting No

Name MSAFD NetBIOS [\Device\NetBT\_Tcpip\_{06DA0E24-5E78-4724-94EB-F23A4C3220C5}] DATAGRAM 1  
Connectionless Service Yes  
Guarantees Delivery No  
Guarantees Sequencing No  
Maximum Address Size 20 bytes  
Maximum Message Size 62.50 KB (64,000 bytes)  
Message Oriented Yes  
Minimum Address Size 20 bytes  
Pseudo Stream Oriented No  
Supports Broadcasting Yes  
Supports Connect Data No  
Supports Disconnect Data No  
Supports Encryption No  
Supports Expedited Data No  
Supports Graceful Closing No  
Supports Guaranteed Bandwidth No  
Supports Multicasting No

Name MSAFD NetBIOS [\Device\NetBT\_Tcpip\_{0EE8E2AC-02A2-460D-A615-8C43D7F8F664}] SEQPACKET 2  
Connectionless Service No  
Guarantees Delivery Yes  
Guarantees Sequencing Yes  
Maximum Address Size 20 bytes  
Maximum Message Size 62.50 KB (64,000 bytes)  
Message Oriented Yes  
Minimum Address Size 20 bytes  
Pseudo Stream Oriented No  
Supports Broadcasting No

## Appendix C – Tunable Parameters

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Supports Connect Data No  
Supports Disconnect Data No  
Supports Encryption No  
Supports Expedited Data No  
Supports Graceful Closing No  
Supports Guaranteed Bandwidth No  
Supports Multicasting No

Name MSAFD NetBIOS [\Device\NetBT\_Tcpip\_{0EE8E2AC-02A2-460D-A615-8C43D7F8F664}] DATAGRAM 2  
Connectionless Service Yes  
Guarantees Delivery No  
Guarantees Sequencing No  
Maximum Address Size 20 bytes  
Maximum Message Size 62.50 KB (64,000 bytes)  
Message Oriented Yes  
Minimum Address Size 20 bytes  
Pseudo Stream Oriented No  
Supports Broadcasting Yes  
Supports Connect Data No  
Supports Disconnect Data No  
Supports Encryption No  
Supports Expedited Data No  
Supports Graceful Closing No  
Supports Guaranteed Bandwidth No  
Supports Multicasting No

Name MSAFD NetBIOS [\Device\NetBT\_Tcpip\_{306A4226-0F33-4520-9E2D-9C814B3125D0}] SEQPACKET 3  
Connectionless Service No  
Guarantees Delivery Yes  
Guarantees Sequencing Yes  
Maximum Address Size 20 bytes  
Maximum Message Size 62.50 KB (64,000 bytes)  
Message Oriented Yes  
Minimum Address Size 20 bytes  
Pseudo Stream Oriented No  
Supports Broadcasting No  
Supports Connect Data No  
Supports Disconnect Data No  
Supports Encryption No  
Supports Expedited Data No  
Supports Graceful Closing No  
Supports Guaranteed Bandwidth No  
Supports Multicasting No

Name MSAFD NetBIOS [\Device\NetBT\_Tcpip\_{306A4226-0F33-4520-9E2D-9C814B3125D0}] DATAGRAM 3  
Connectionless Service Yes  
Guarantees Delivery No  
Guarantees Sequencing No  
Maximum Address Size 20 bytes  
Maximum Message Size 62.50 KB (64,000 bytes)  
Message Oriented Yes  
Minimum Address Size 20 bytes

## Appendix C – Tunable Parameters

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Pseudo Stream Oriented No  
Supports Broadcasting Yes  
Supports Connect Data No  
Supports Disconnect Data No  
Supports Encryption No  
Supports Expedited Data No  
Supports Graceful Closing No  
Supports Guaranteed Bandwidth No  
Supports Multicasting No

### [WinSock]

Item Value

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

File c:\windows\system32\wsock32.dll  
Size 22.00 KB (22,528 bytes)  
Version 5.2.3790.0 (srv03\_rtm.030324-2048)

### [Ports]

### [Serial]

Item Value

Name Communications Port (COM1)  
Status OK  
PNP Device ID ACPI\PNP0501\1  
Maximum Input Buffer Size 0  
Maximum Output Buffer Size No  
Settable Baud Rate Yes  
Settable Data Bits Yes  
Settable Flow Control Yes  
Settable Parity Yes  
Settable Parity Check Yes  
Settable Stop Bits Yes  
Settable RLSD Yes  
Supports RLSD Yes  
Supports 16 Bit Mode No  
Supports Special Characters No  
Baud Rate 9600  
Bits/Byte 8  
Stop Bits 1  
Parity None  
Busy No  
Abort Read/Write on Error No  
Binary Mode Enabled Yes  
Continue XMit on XOff No  
CTS Outflow Control No  
Discard NULL Bytes No  
DSR Outflow Control 0  
DSR Sensitivity 0

## Appendix C – Tunable Parameters

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DTR Flow Control Type    Enable  
EOF Character            0  
Error Replace Character 0  
Error Replacement Enabled    No  
Event Character        0  
Parity Check Enabled      No  
RTS Flow Control Type    Enable  
XOff Character          19  
XOffXmit Threshold      512  
XOn Character          17  
XOnXmit Threshold 2048  
XOnXOff InFlow Control 0  
XOnXOff OutFlow Control 0  
I/O Port            0x000003F8-0x000003FF  
IRQ Channel        IRQ 4  
Driver            c:\windows\system32\drivers\serial.sys (5.2.3790.0  
(srv03\_rtm.030324-2048), 76.00 KB (77,824 bytes), 3/29/2003 12:00 AM)

[Parallel]

Item    Value  
Name    LPT1  
PNP Device ID        ACPI\PNP0401\4&25F73A82&0  
I/O Port        0x00000378-0x0000037F  
I/O Port        0x00000778-0x0000077F  
Driver            c:\windows\system32\drivers\parport.sys (5.2.3790.0  
(srv03\_rtm.030324-2048), 76.50 KB (78,336 bytes), 3/24/2003 5:04 PM)

[Storage]

[Drives]

Item    Value  
Drive A:  
Description 3 1/2 Inch Floppy Drive  
  
Drive C:  
Description Local Fixed Disk  
Compressed    No  
File System NTFS  
Size    8.79 GB (9,434,361,856 bytes)  
Free Space 4.93 GB (5,289,955,328 bytes)  
Volume Name  
Volume Serial Number        A09C3FCB

Drive D:  
Description CD-ROM Disc

[Disks]

Item    Value  
Description Disk drive  
Manufacturer        (Standard disk drives)

## Appendix C – Tunable Parameters

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Model SEAGATE ST336752LW SCSI Disk Device  
Bytes/Sector 512  
Media Loaded Yes  
Media Type Fixed hard disk  
Partitions 1  
SCSI Bus 0  
SCSI Logical Unit 0  
SCSI Port 2  
SCSI Target ID 0  
Sectors/Track 63  
Size 33.91 GB (36,413,314,560 bytes)  
Total Cylinders 4,427  
Total Sectors 71,119,755  
Total Tracks 1,128,885  
Tracks/Cylinder 255  
Partition Disk #0, Partition #0  
Partition Size 8.79 GB (9,434,363,904 bytes)  
Partition Starting Offset 32,256 bytes

[SCSI]

Item Value  
Name LSI Logic PCI-X Ultra320 SCSI Host Adapter  
Manufacturer LSI Logic Inc.  
Status OK  
PNP Device ID  
PCI\VEN\_1000&DEV\_0030&SUBSYS\_01351028&REV\_07\3&1070020&0&20  
I/O Port 0x0000DC00-0x0000DCFF  
Memory Address 0xFCF10000-0xFCF1FFFF  
Memory Address 0xFCF00000-0xFCF0FFFF  
IRQ Channel IRQ 29  
Driver c:\windows\system32\drivers\symmpi.sys (1.08.18.00  
(NT.021001-2000), 25.88 KB (26,496 bytes), 3/29/2003 12:00 AM)

[IDE]

Item Value  
Name Standard Dual Channel PCI IDE Controller  
Manufacturer (Standard IDE ATA/ATAPI controllers)  
Status OK  
PNP Device ID  
PCI\VEN\_1166&DEV\_0212&SUBSYS\_41351028&REV\_93\3&13C0B0C5&0&79  
I/O Port 0x000008B0-0x000008BF  
Driver c:\windows\system32\drivers\pciide.sys (5.2.3790.0  
(srv03\_rtm.030324-2048), 5.50 KB (5,632 bytes), 3/29/2003 12:00 AM)

Name Primary IDE Channel  
Manufacturer (Standard IDE ATA/ATAPI controllers)  
Status OK  
PNP Device ID PCIIDE\IDECHANNEL\4&68D74DF&0&0  
I/O Port 0x000001F0-0x000001F7  
I/O Port 0x000003F6-0x000003F6  
Driver c:\windows\system32\drivers\atapi.sys (5.2.3790.0  
(srv03\_rtm.030324-2048), 89.00 KB (91,136 bytes), 3/29/2003 12:00 AM)

## Appendix C – Tunable Parameters

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Name Secondary IDE Channel  
Manufacturer (Standard IDE ATA/ATAPI controllers)  
Status OK  
PNP Device ID PCIIDE\IDECHANNEL\4&68D74DF&0&1  
I/O Port 0x00000170-0x00000177  
I/O Port 0x00000376-0x00000376  
IRQ Channel IRQ 15  
Driver c:\windows\system32\drivers\atapi.sys (5.2.3790.0  
(srv03\_rtm.030324-2048), 89.00 KB (91,136 bytes), 3/29/2003 12:00 AM)

[Printing]

Name Driver Port Name Server Name

[Problem Devices]

Device PNP Device ID Error Code

[USB]

Device PNP Device ID  
ServerWorks (RCC) PCI to USB Open Host Controller  
PCI\VEN\_1166&DEV\_0220&SUBSYS\_02201166&REV\_05\3&13C0B0C5&0&7A  
USB Root Hub USB\ROOT\_HUB\4&1A0F8909&0

[Software Environment]

[System Drivers]

Name	Description	File	Type	Started	Start Mode	State	Status
	Error Control		Accept	Pause	Accept	Stop	
abiosdsk	Abiosdsk		Not Available		Kernel Driver		No
	Disabled	Stopped	OK	Ignore	No	No	
acpi	Microsoft ACPI Driver		c:\windows\system32\drivers\acpi.sys				
	Kernel Driver	Yes	Boot	Running	OK	Normal	No
	Yes						
acpiec	ACPIEC		c:\windows\system32\drivers\acpiec.sys				
	Kernel Driver	No	Disabled	Stopped	OK	Normal	
	No	No					
adpu160m	adpu160m		Not Available		Kernel Driver		No
	Disabled	Stopped	OK	Normal	No	No	
adpu320	adpu320		Not Available		Kernel Driver		No
	Disabled	Stopped	OK	Normal	No	No	
afcnc	afcnc	Not Available	Kernel Driver		No	Disabled	
	Stopped	OK	Normal	No	No		
afd	AFD Networking Support Environment		c:\windows\system32\drivers\afd.sys		Kernel Driver		Yes Auto
	Running	OK	Normal	No	Yes		
aha154x	Aha154x		Not Available		Kernel Driver		No
	Disabled	Stopped	OK	Normal	No	No	
aic78u2	aic78u2		Not Available		Kernel Driver		No
	Disabled	Stopped	OK	Normal	No	No	



## Appendix C – Tunable Parameters

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aic78xx	aic78xx	Not Available	Kernel Driver	No
Disabled	Stopped	OK	Normal	No No
aliide	AliIde	Not Available	Kernel Driver	No
Disabled	Stopped	OK	Normal	No No
asynmac	RAS Asynchronous Media Driver			
	c:\windows\system32\drivers\asynmac.sys	Kernel Driver	No	
Manual	Stopped	OK	Normal	No No
atapi	Standard IDE/ESDI Hard Disk Controller			
	c:\windows\system32\drivers\atapi.sys	Kernel Driver	Yes	
Boot	Running	OK	Normal	No Yes
atdisk	Atdisk	Not Available	Kernel Driver	No
Disabled	Stopped	OK	Ignore	No No
ati2mpad	ati2mpad	c:\windows\system32\drivers\ati2mpad.sys		
Kernel Driver	Yes	Manual	Running	OK Ignore
No	Yes			
atmarpc	ATM ARP Client Protocol			
	c:\windows\system32\drivers\atmarpc.sys	Kernel Driver	No	
Manual	Stopped	OK	Normal	No No
audstub	Audio Stub Driver c:\windows\system32\drivers\audstub.sys			
Kernel Driver	Yes	Manual	Running	OK Normal
No	Yes			
beep	Beep	c:\windows\system32\drivers\beep.sys		Kernel Driver
Yes	System	Running	OK	Normal No Yes
cbidf2k	cbidf2k	c:\windows\system32\drivers\cbidf2k.sys		
Kernel Driver	No	Disabled	Stopped	OK Normal
No	No			
cd20xrnt	cd20xrnt	Not Available	Kernel Driver	No
Disabled	Stopped	OK	Normal	No No
cdfs	Cdfs	c:\windows\system32\drivers\cdfs.sys		File System
Driver	Yes	Disabled	Running	OK Normal No Yes
cdrom	CD-ROM Driver c:\windows\system32\drivers\cdrom.sys			
Kernel Driver	Yes	System	Running	OK Normal
No	Yes			
changer	Changer	Not Available	Kernel Driver	No
System	Stopped	OK	Ignore	No No
clusdisk	Cluster Disk Driver			
	c:\windows\system32\drivers\clusdisk.sys	Kernel Driver	No	
Disabled	Stopped	OK	Normal	No No
cmdide	CmdIde	Not Available	Kernel Driver	No
Disabled	Stopped	OK	Normal	No No
cpqarray	Cpqarray	Not Available	Kernel Driver	No
Disabled	Stopped	OK	Normal	No No
cpqarray2	cpqarray2	Not Available	Kernel Driver	No
Disabled	Stopped	OK	Normal	No No
cpqcissm	cpqcissm	Not Available	Kernel Driver	No
Disabled	Stopped	OK	Normal	No No
cpqfcalm	cpqfcalm	Not Available	Kernel Driver	No
Disabled	Stopped	OK	Normal	No No
crcdisk	CRC Disk Filter Driver			
	c:\windows\system32\drivers\crcdisk.sys	Kernel Driver	Yes	
Boot	Running	OK	Normal	No Yes
dac960nt	dac960nt	Not Available	Kernel Driver	No
Disabled	Stopped	OK	Normal	No No
dellcerc	dellcerc	Not Available	Kernel Driver	No
Disabled	Stopped	OK	Normal	No No

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dfsdriver  DfsDriver  c:\windows\system32\drivers\dfs.sys File System
Driver      Yes  Boot  Running  OK  Normal  No  Yes
disk  Disk Driver  c:\windows\system32\drivers\disk.sys  Kernel
Driver      Yes  Boot  Running  OK  Normal  No  Yes
dmboot  dmboot  c:\windows\system32\drivers\dmboot.sys
Kernel Driver  No  Disabled  Stopped  OK  Normal
No  No
dmio  Logical Disk Manager Driver
c:\windows\system32\drivers\dmio.sys  Kernel Driver  Yes
Boot  Running  OK  Normal  No  Yes
dmload  dmload  c:\windows\system32\drivers\dmload.sys
Kernel Driver  Yes  Boot  Running  OK  Normal  No
Yes
dpti2o  dpti2o  Not Available  Kernel Driver  No
Disabled  Stopped  OK  Normal  No  No
e1000  Intel(R) PRO/1000 Device Driver
c:\windows\system32\drivers\e1000325.sys  Kernel Driver  Yes
Manual  Running  OK  Normal  No  Yes
e100b  Intel(R) PRO Adapter Driver
c:\windows\system32\drivers\e100b325.sys  Kernel Driver  Yes
Manual  Running  OK  Normal  No  Yes
fastfat  Fastfat  c:\windows\system32\drivers\fastfat.sys  File
System Driver  No  Disabled  Stopped  OK  Normal  No
No
fdc  Floppy Disk Controller Driver  c:\windows\system32\drivers\fdc.sys
Kernel Driver  Yes  Manual  Running  OK  Normal
No  Yes
fips  Fips  c:\windows\system32\drivers\fips.sys  Kernel Driver
Yes  System  Running  OK  Normal  No  Yes
flpydisk  Floppy Disk Driver
c:\windows\system32\drivers\flpydisk.sys  Kernel Driver  Yes
Manual  Running  OK  Normal  No  Yes
ftdisk  Volume Manager Driver
c:\windows\system32\drivers\ftdisk.sys  Kernel Driver  Yes
Boot  Running  OK  Normal  No  Yes
gpc  Generic Packet Classifier
c:\windows\system32\drivers\msgpc.sys  Kernel Driver  Yes
Manual  Running  OK  Normal  No  Yes
hpn  hpn  Not Available  Kernel Driver  No  Disabled
Stopped  OK  Normal  No  No
hpt3xx  hpt3xx  Not Available  Kernel Driver  No
Disabled  Stopped  OK  Normal  No  No
http  HTTP  c:\windows\system32\drivers\http.sys  Kernel Driver
Yes  Manual  Running  OK  Normal  No  Yes
i2omgmt  i2omgmt  Not Available  Kernel Driver  No
System  Stopped  OK  Normal  No  No
i2omp  i2omp  Not Available  Kernel Driver  No  Disabled
Stopped  OK  Normal  No  No
i8042prt  i8042 Keyboard and PS/2 Mouse Port Driver
c:\windows\system32\drivers\i8042prt.sys  Kernel Driver  Yes
System  Running  OK  Normal  No  Yes
iirsp  iirsp  Not Available  Kernel Driver  No  Disabled
Stopped  OK  Normal  No  No

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imapi CD-Burning Filter Driver
      c:\windows\system32\drivers\imapi.sys      Kernel Driver      No
      System      Stopped      OK      Normal      No      No
intelide IntelIde      Not Available      Kernel Driver      No
      Disabled      Stopped      OK      Normal      No      No
ipfilterdriver IP Traffic Filter Driver
      c:\windows\system32\drivers\ipfltdrv.sys  Kernel Driver      No
      Manual      Stopped      OK      Normal      No      No
ipinip IP in IP Tunnel Driver
      c:\windows\system32\drivers\ipinip.sys    Kernel Driver      No
      Manual      Stopped      OK      Normal      No      No
ipnat IP Network Address Translator
      c:\windows\system32\drivers\ipnat.sys     Kernel Driver      No
      Manual      Stopped      OK      Normal      No      No
ipsec IPSEC driver      c:\windows\system32\drivers\ipsec.sys
      Kernel Driver      Yes      System      Running      OK      Normal
      No      Yes
ipsraidn ipsraidn      Not Available      Kernel Driver      No
      Disabled      Stopped      OK      Normal      No      No
irenum IR Enumerator Service
      c:\windows\system32\drivers\irenum.sys    Kernel Driver      No
      Manual      Stopped      OK      Normal      No      No
isapnp PnP ISA/EISA Bus Driver
      c:\windows\system32\drivers\isapnp.sys    Kernel Driver      Yes
      Boot      Running      OK      Critical      No      Yes
kbdclass Keyboard Class Driver
      c:\windows\system32\drivers\kbdclass.sys  Kernel Driver      Yes
      System      Running      OK      Normal      No      Yes
ksecdd KSecDD      c:\windows\system32\drivers\ksecdd.sys
      Kernel Driver      Yes      Boot      Running      OK      Normal      No
      Yes
lp6nds35 lp6nds35      Not Available      Kernel Driver      No
      Disabled      Stopped      OK      Normal      No      No
mnmdd mnmdd c:\windows\system32\drivers\mnmdd.sys
      Yes      System      Running      OK      Ignore      No      Yes
modem Modem c:\windows\system32\drivers\modem.sys
      No      Manual      Stopped      OK      Ignore      No      No
mouclass Mouse Class Driver
      c:\windows\system32\drivers\mouclass.sys  Kernel Driver      Yes
      System      Running      OK      Normal      No      Yes
mountmgr Mount Point Manager
      c:\windows\system32\drivers\mountmgr.sys  Kernel Driver      Yes
      Boot      Running      OK      Normal      No      Yes
mraid35x mraid35x      Not Available      Kernel Driver      No
      Disabled      Stopped      OK      Normal      No      No
mrxdav WebDav Client Redirector
      c:\windows\system32\drivers\mrxdav.sys    File System Driver
      No      Manual      Stopped      OK      Normal      No      No
mrxsmb MRXSMB      c:\windows\system32\drivers\mrxsmb.sys
      System Driver      Yes      System      Running      OK      Normal      No
      Yes
msfs Msfs c:\windows\system32\drivers\msfs.sys
      Driver      Yes      System      Running      OK      Normal      No      Yes
mup Mup c:\windows\system32\drivers\mup.sys
      Yes      Boot      Running      OK      Normal      No      Yes

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ndis  NDIS System Driver      c:\windows\system32\drivers\ndis.sys
      Kernel Driver      Yes  Boot  Running      OK      Normal      No
      Yes

ndistapi  Remote Access NDIS TAPI Driver
          c:\windows\system32\drivers\ndistapi.sys  Kernel Driver      Yes
          Manual      Running      OK      Normal      No      Yes

ndisuio  NDIS Usermode I/O Protocol
          c:\windows\system32\drivers\ndisuio.sys  Kernel Driver      Yes
          Manual      Running      OK      Normal      No      Yes

ndiswan  Remote Access NDIS WAN Driver
          c:\windows\system32\drivers\ndiswan.sys  Kernel Driver      Yes
          Manual      Running      OK      Normal      No      Yes

ndproxy  NDIS Proxy c:\windows\system32\drivers\ndproxy.sys
          Kernel Driver      Yes  Manual      Running      OK      Normal
          No      Yes

netbios  NetBIOS Interface c:\windows\system32\drivers\netbios.sys
          File System Driver      Yes  System      Running      OK
          Normal      No      Yes

netbt  NetBios over Tcpip      c:\windows\system32\drivers\netbt.sys
          Kernel Driver      Yes  System      Running      OK      Normal
          No      Yes

nfrd960  nfrd960      Not Available      Kernel Driver      No
          Disabled      Stopped      OK      Normal      No      No

npfs  Npfs c:\windows\system32\drivers\npfs.sys      File System
          Driver      Yes  System      Running      OK      Normal      No      Yes

ntfs  Ntfs c:\windows\system32\drivers\ntfs.sys      File System
          Driver      Yes  Disabled      Running      OK      Normal      No      Yes

null  Null c:\windows\system32\drivers\null.sys      Kernel Driver
          Yes  System      Running      OK      Normal      No      Yes

parport  Parallel port driver
          c:\windows\system32\drivers\parport.sys  Kernel Driver      Yes
          Manual      Running      OK      Normal      No      Yes

partmgr  Partition Manager c:\windows\system32\drivers\partmgr.sys
          Kernel Driver      Yes  Boot  Running      OK      Normal      No
          Yes

parvdm  Parvdm      c:\windows\system32\drivers\parvdm.sys
          Kernel Driver      Yes  Auto  Running      OK      Ignore      No
          Yes

pci  PCI Bus Driver      c:\windows\system32\drivers\pci.sys  Kernel
          Driver      Yes  Boot  Running      OK      Critical      No      Yes

pciide  PCIIde      c:\windows\system32\drivers\pciide.sys
          Kernel Driver      Yes  Boot  Running      OK      Normal      No
          Yes

pcmcia  Pcmcia      c:\windows\system32\drivers\pcmcia.sys
          Kernel Driver      No  Disabled      Stopped      OK      Normal
          No      No

pdcomp  PDCOMP      Not Available      Kernel Driver      No
          Manual      Stopped      OK      Ignore      No      No

pdframe  PDFRAME      Not Available      Kernel Driver      No
          Manual      Stopped      OK      Ignore      No      No

pdreli  PDRELI      Not Available      Kernel Driver      No
          Manual      Stopped      OK      Ignore      No      No

pdrframe  PDRFRAME      Not Available      Kernel Driver      No
          Manual      Stopped      OK      Ignore      No      No

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perc2 perc2 Not Available Kernel Driver No Disabled
      Stopped OK Normal No No
perc2hib perc2hib Not Available Kernel Driver No
      Disabled Stopped OK Normal No No
pptpminiport WAN Miniport (PPTP)
      c:\windows\system32\drivers\rasppptp.sys Kernel Driver Yes
      Manual Running OK Normal No Yes
processor Processor Driver c:\windows\system32\drivers\processr.sys
      Kernel Driver Yes Manual Running OK Normal
      No Yes
ptilink Direct Parallel Link Driver
      c:\windows\system32\drivers\ptilink.sys Kernel Driver Yes
      Manual Running OK Normal No Yes
ql1080 ql1080 Not Available Kernel Driver No
      Disabled Stopped OK Normal No No
ql10wnt Ql10wnt Not Available Kernel Driver No
      Disabled Stopped OK Normal No No
ql12160 ql12160 Not Available Kernel Driver No
      Disabled Stopped OK Normal No No
ql1240 ql1240 Not Available Kernel Driver No
      Disabled Stopped OK Normal No No
ql1280 ql1280 Not Available Kernel Driver No
      Disabled Stopped OK Normal No No
ql2100 ql2100 Not Available Kernel Driver No
      Disabled Stopped OK Normal No No
ql2200 ql2200 Not Available Kernel Driver No
      Disabled Stopped OK Normal No No
ql2300 ql2300 Not Available Kernel Driver No
      Disabled Stopped OK Normal No No
rasacd Remote Access Auto Connection Driver
      c:\windows\system32\drivers\rasacd.sys Kernel Driver Yes
      System Running OK Normal No Yes
rasl2tp WAN Miniport (L2TP)
      c:\windows\system32\drivers\rasl2tp.sys Kernel Driver Yes
      Manual Running OK Normal No Yes
rasppoe Remote Access PPPOE Driver
      c:\windows\system32\drivers\rasppoe.sys Kernel Driver Yes
      Manual Running OK Normal No Yes
raspti Direct Parallel c:\windows\system32\drivers\raspti.sys
      Kernel Driver Yes Manual Running OK Normal
      No Yes
rdbss Rdbss c:\windows\system32\drivers\rdbss.sys File System
      Driver Yes System Running OK Normal No Yes
rdpcdd RDPCCDD c:\windows\system32\drivers\rdpcdd.sys
      Kernel Driver Yes System Running OK Ignore
      No Yes
rdpdr Terminal Server Device Redirector Driver
      c:\windows\system32\drivers\rdpdr.sys Kernel Driver Yes
      Manual Running OK Normal No Yes
rdpwd RDPWD c:\windows\system32\drivers\rdpwd.sys Kernel Driver
      No Manual Stopped OK Ignore No No
redbook Digital CD Audio Playback Filter Driver
      c:\windows\system32\drivers\redbook.sys Kernel Driver Yes
      System Running OK Normal No Yes

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secdrv      Secdrv      c:\windows\system32\drivers\secdrv.sys
            Kernel Driver  No    Manual    Stopped    OK    Normal
            No    No
serenum     Serenum Filter Driver
            c:\windows\system32\drivers\serenum.sys  Kernel Driver    Yes
            Manual    Running    OK    Normal    No    Yes
serial      Serial port driver
            c:\windows\system32\drivers\serial.sys  Kernel Driver    Yes
            System    Running    OK    Ignore    No    Yes
sfloppy     Sfloppy      c:\windows\system32\drivers\sfloppy.sys
            Kernel Driver  No    System    Stopped    OK    Ignore
            No    No
simbad      Simbad      Not Available    Kernel Driver    No
            Disabled    Stopped    OK    Normal    No    No
sparrow     Sparrow     Not Available    Kernel Driver    No
            Disabled    Stopped    OK    Normal    No    No
srv         Srv         c:\windows\system32\drivers\srv.sys  File System Driver
            Yes    Manual    Running    OK    Normal    No    Yes
swenum     Software Bus Driver
            c:\windows\system32\drivers\swenum.sys  Kernel Driver    Yes
            Manual    Running    OK    Normal    No    Yes
symc810     symc810     Not Available    Kernel Driver    No
            Disabled    Stopped    OK    Normal    No    No
symc8xx     symc8xx     Not Available    Kernel Driver    No
            Disabled    Stopped    OK    Normal    No    No
symmpi     symmpi     c:\windows\system32\drivers\symmpi.sys
            Kernel Driver  Yes    Boot    Running    OK    Normal    No
            Yes
sym_hi     sym_hi     Not Available    Kernel Driver    No
            Disabled    Stopped    OK    Normal    No    No
sym_u3     sym_u3     Not Available    Kernel Driver    No
            Disabled    Stopped    OK    Normal    No    No
tcpip      TCP/IP Protocol Driver  c:\windows\system32\drivers\tcpip.sys
            Kernel Driver  Yes    System    Running    OK    Normal
            No    Yes
tdpipe     TDPIPE     c:\windows\system32\drivers\tdpipe.sys
            Kernel Driver  No    Manual    Stopped    OK    Ignore
            No    No
tdtcp     TDTCP     c:\windows\system32\drivers\tdtcp.sys  Kernel Driver
            No    Manual    Stopped    OK    Ignore    No    No
termdd     Terminal Device Driver
            c:\windows\system32\drivers\termdd.sys  Kernel Driver    Yes
            System    Running    OK    Normal    No    Yes
toside     TosIde     Not Available    Kernel Driver    No
            Disabled    Stopped    OK    Normal    No    No
udfs       Udfs      c:\windows\system32\drivers\udfs.sys  File System
Driver      No    Disabled    Stopped    OK    Normal    No    No
ultra     ultra     Not Available    Kernel Driver    No    Disabled
            Stopped    OK    Normal    No    No
update     Microcode Update Driver
            c:\windows\system32\drivers\update.sys  Kernel Driver    Yes
            Manual    Running    OK    Normal    No    Yes
usbhub     USB2 Enabled Hub  c:\windows\system32\drivers\usbhub.sys
            Kernel Driver  Yes    Manual    Running    OK    Normal
            No    Yes

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usbohci      Microsoft USB Open Host Controller Miniport Driver
             c:\windows\system32\drivers\usbhohci.sys  Kernel Driver      Yes
             Manual      Running      OK      Normal      No      Yes
vgasave      VGA Display Controller. c:\windows\system32\drivers\vga.sys
             Kernel Driver      Yes      System      Running      OK      Ignore
             No      Yes
viaide       ViaIde      Not Available      Kernel Driver      No
             Disabled      Stopped      OK      Normal      No      No
volsnap      Storage volumes c:\windows\system32\drivers\volsnap.sys
             Kernel Driver      Yes      Boot      Running      OK      Normal      No
             Yes
wanarp       Remote Access IP ARP Driver
             c:\windows\system32\drivers\wanarp.sys  Kernel Driver      Yes
             Manual      Running      OK      Normal      No      Yes
wdica       WDICA Not Available      Kernel Driver      No      Manual
             Stopped      OK      Ignore      No      No
wlbs       Network Load Balancing c:\windows\system32\drivers\wlbs.sys
             Kernel Driver      No      Manual      Stopped      OK      Normal
             No      No

```

[Signed Drivers]

```

Device Name Signed      Device Class      Driver Version      Driver Date
Manufacturer      INF Name      Driver Name Device ID
Not Available      Not Available      Not Available      Not Available
Not Available      Not Available      Not Available      Not
Available      HTREE\ROOT\0
ACPI Multiprocessor PC Yes      COMPUTER      5.2.3790.0  10/1/2002
(Standard computers) hal.inf      Not Available
ROOT\ACPI_HAL\0000
Microsoft ACPI-Compliant System      Yes      SYSTEM      5.2.3790.0
10/1/2002      Microsoft      acpi.inf      Not Available
ACPI_HAL\PNP0C08\0
Processor      Yes      PROCESSOR      5.2.3790.0  10/1/2002      (Standard
processor types) cpu.inf      Not Available      ACPI\GENUINEINTEL_-
_X86_FAMILY_15_MODEL_2\0
Processor      Yes      PROCESSOR      5.2.3790.0  10/1/2002      (Standard
processor types) cpu.inf      Not Available      ACPI\GENUINEINTEL_-
_X86_FAMILY_15_MODEL_2\1
Processor      Yes      PROCESSOR      5.2.3790.0  10/1/2002      (Standard
processor types) cpu.inf      Not Available      ACPI\GENUINEINTEL_-
_X86_FAMILY_15_MODEL_2\2
Processor      Yes      PROCESSOR      5.2.3790.0  10/1/2002      (Standard
processor types) cpu.inf      Not Available      ACPI\GENUINEINTEL_-
_X86_FAMILY_15_MODEL_2\3
PCI bus      Yes      SYSTEM      5.2.3790.0  10/1/2002      (Standard system
devices) machine.inf Not Available      ACPI\PNP0A03\1
ServerWorks Grand Champion CMIC_SL - NorthBridge Super Lite Yes
SYSTEM      5.2.3790.0  10/1/2002      ServerWorks (RCC) machine.inf
Not Available
PCI\VEN_1166&DEV_0017&SUBSYS_00000000&REV_32\3&13C0B0C5&0&00
ServerWorks Grand Champion CMIC_SL - NorthBridge Super Lite Yes
SYSTEM      5.2.3790.0  10/1/2002      ServerWorks (RCC) machine.inf
Not Available
PCI\VEN_1166&DEV_0017&SUBSYS_00000000&REV_00\3&13C0B0C5&0&01

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Intel(R) PRO/1000 MT Network Connection Yes NET 6.3.6.31  
 10/1/2002 Intel netel1000.inf Not Available  
 PCI\VEN\_8086&DEV\_100E&SUBSYS\_01351028&REV\_02\3&13C0B0C5&0&10

RAGE XL PCI Family (Microsoft Corporation) Yes DISPLAY  
 5.10.2600.6014 8/8/2001 ATI Technologies Inc.  
 atiixpad.inf Not Available  
 PCI\VEN\_1002&DEV\_4752&SUBSYS\_01351028&REV\_27\3&13C0B0C5&0&70

Default Monitor Yes MONITOR 5.1.2001.0 6/6/2001 (Standard  
 monitor types) monitor.inf Not Available  
 DISPLAY\DEFAULT\_MONITOR\4&38274D1&0&80000000&00&0E

ServerWorks Champion CSB5 - SouthBridge 5 Yes SYSTEM 5.2.3790.0  
 10/1/2002 ServerWorks (RCC) machine.inf Not Available  
 PCI\VEN\_1166&DEV\_0201&SUBSYS\_00000000&REV\_93\3&13C0B0C5&0&78

Direct memory access controller Yes SYSTEM 5.2.3790.0  
 10/1/2002 (Standard system devices) machine.inf Not  
 Available ACPI\PNP0200\4&25F73A82&0

Numeric data processor Yes SYSTEM 5.2.3790.0 10/1/2002  
 (Standard system devices) machine.inf Not Available  
 ACPI\PNP0C04\4&25F73A82&0

Programmable interrupt controller Yes SYSTEM 5.2.3790.0  
 10/1/2002 (Standard system devices) machine.inf Not  
 Available ACPI\PNP0000\4&25F73A82&0

System speaker Yes SYSTEM 5.2.3790.0 10/1/2002 (Standard  
 system devices) machine.inf Not Available  
 ACPI\PNP0800\4&25F73A82&0

System timer Yes SYSTEM 5.2.3790.0 10/1/2002 (Standard  
 system devices) machine.inf Not Available  
 ACPI\PNP0100\4&25F73A82&0

Standard floppy disk controller Yes FDC 5.2.3790.0 10/1/2002  
 (Standard floppy disk controllers) fdc.inf Not Available  
 ACPI\PNP0700\4&25F73A82&0

Floppy disk drive Yes FLOPPYDISK 5.2.3790.0 10/1/2002 (Standard  
 floppy disk drives) flpydisk.inf Not Available  
 FDC\GENERIC\_FLOPPY\_DRIVE\5&1AE2F47D&0&0

Standard 101/102-Key or Microsoft Natural PS/2 Keyboard Yes  
 KEYBOARD 5.2.3790.0 10/1/2002 (Standard keyboards)  
 keyboard.inf Not Available ACPI\PNP0303\4&25F73A82&0

PS/2 Compatible Mouse Yes MOUSE 5.2.3790.0 10/1/2002 Microsoft  
 msmouse.inf Not Available ACPI\PNP0F13\4&25F73A82&0

Communications Port Yes PORTS 5.2.3790.0 10/1/2002 (Standard  
 port types) msports.inf Not Available ACPI\PNP0501\1

ECP Printer Port Yes PORTS 5.2.3790.0 10/1/2002 (Standard port  
 types) msports.inf Not Available ACPI\PNP0401\4&25F73A82&0

Printer Port Logical Interface Yes SYSTEM 5.2.3790.0  
 10/1/2002 (Standard system devices) machine.inf Not  
 Available LPTENUM\MICROSOFTRAWPORT\5&39F3CAEA&0&LPT1

System CMOS/real time clock Yes SYSTEM 5.2.3790.0 10/1/2002  
 (Standard system devices) machine.inf Not Available  
 ACPI\PNP0B00\4&25F73A82&0

System board Yes SYSTEM 5.2.3790.0 10/1/2002 (Standard  
 system devices) machine.inf Not Available ACPI\PNP0C01\2

Standard Dual Channel PCI IDE Controller Yes HDC 5.2.3790.0  
 10/1/2002 (Standard IDE ATA/ATAPI controllers) mshdc.inf  
 Not Available  
 PCI\VEN\_1166&DEV\_0212&SUBSYS\_41351028&REV\_93\3&13C0B0C5&0&79



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Primary IDE Channel Yes HDC 5.2.3790.0 10/1/2002 (Standard IDE ATA/ATAPI controllers) mshdc.inf Not Available  
 PCI\IDE\IDECHANNEL\4&68D74DF&0&0

Secondary IDE Channel Yes HDC 5.2.3790.0 10/1/2002 (Standard IDE ATA/ATAPI controllers) mshdc.inf Not Available  
 PCI\IDE\IDECHANNEL\4&68D74DF&0&1

CD-ROM Drive Yes CDROM 5.2.3790.0 10/1/2002 (Standard CD-ROM drives) cdrom.inf Not Available IDE\CDROMLITEON\_DVD-ROM\_LTD163\_GDHB\5&1A6C219A&0&0.0.0

ServerWorks (RCC) PCI to USB Open Host Controller Yes USB 5.2.3790.0 10/1/2002 ServerWorks (RCC) usbport.inf Not Available

USB Root Hub Yes USB 5.2.3790.0 10/1/2002 (Standard USB Host Controller) usbport.inf Not Available  
 USB\ROOT\_HUB\4&1A0F8909&0

Serverworks Champion CSB5 - SouthBridge 5 LPC Yes SYSTEM 5.2.3790.0 10/1/2002 ServerWorks (RCC) machine.inf Not Available  
 PCI\VEN\_1166&DEV\_0220&SUBSYS\_02201166&REV\_05\3&13C0B0C5&0&7A

ISAPNP Read Data Port Yes SYSTEM 5.2.3790.0 10/1/2002 (Standard system devices) machine.inf Not Available  
 ISAPNP\READDATAPORT\0

ServerWorks Grand Champion CIOB\_X2 - I/O Bridge 133 Mhz Yes SYSTEM 5.2.3790.0 10/1/2002 ServerWorks (RCC) machine.inf Not Available  
 PCI\VEN\_1166&DEV\_0101&SUBSYS\_00000000&REV\_03\3&13C0B0C5&0&80

ServerWorks Grand Champion CIOB\_X2 - I/O Bridge 133 Mhz Yes SYSTEM 5.2.3790.0 10/1/2002 ServerWorks (RCC) machine.inf Not Available  
 PCI\VEN\_1166&DEV\_0101&SUBSYS\_00000000&REV\_03\3&13C0B0C5&0&82

System board Yes SYSTEM 5.2.3790.0 10/1/2002 (Standard system devices) machine.inf Not Available ACPI\PNP0C01\1

PCI bus Yes SYSTEM 5.2.3790.0 10/1/2002 (Standard system devices) machine.inf Not Available ACPI\PNP0A03\2

LSI Logic PCI-X Ultra320 SCSI Host Adapter Yes SCSIADAPTER 5.2.3790.0 10/1/2002 LSI Logic Inc. pnpscscsi.inf Not Available  
 PCI\VEN\_1000&DEV\_0030&SUBSYS\_01351028&REV\_07\3&1070020&0&20

Disk drive Yes DISKDRIVE 5.2.3790.0 10/1/2002 (Standard disk drives) disk.inf Not Available  
 SCSI\DISK&VEN\_SEAGATE&PROD\_ST336752LW&REV\_2212\4&1E63B2AC&0&000

PCI bus Yes SYSTEM 5.2.3790.0 10/1/2002 (Standard system devices) machine.inf Not Available ACPI\PNP0A03\3

Intel(R) PRO/100+ Server Adapter (PILA8470B) Yes NET 6.6.8.1 10/1/2002 Intel net557.inf Not Available  
 PCI\VEN\_8086&DEV\_1229&SUBSYS\_100C8086&REV\_08\3&29E81982&0&20

ACPI Fixed Feature Button Yes SYSTEM 5.2.3790.0 10/1/2002 (Standard system devices) machine.inf Not Available  
 ACPI\FIXEDBUTTON\2&DABA3FF&0

Logical Disk Manager Yes SYSTEM 5.2.3790.0 10/1/2002 (Standard system devices) machine.inf Not Available  
 ROOT\DMIO\0000

Volume Manager Yes SYSTEM 5.2.3790.0 10/1/2002 (Standard system devices) machine.inf Not Available  
 ROOT\FTDISK\0000

## Appendix C – Tunable Parameters

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Generic volume	Yes	VOLUME	5.2.3790.0	10/1/2002	Microsoft
volume.inf	Not Available				
		STORAGE\VOLUME\1&30A96598&0&SIGNATUREB66CB66COFFSET7E00LENGTH2325			
		4F800			
AFD Networking Support Environment	Not Available		LEGACYDRIVER		
	Not Available	Not Available	Not Available	Not	
Available	Not Available	ROOT\LEGACY_AFD\0000			
Beep	Not Available	LEGACYDRIVER	Not Available	Not	
Available	Not Available	Not Available	Not Available		
		ROOT\LEGACY_BEEP\0000			
CRC Disk Filter Driver	Not Available		LEGACYDRIVER	Not	
Available	Not Available	Not Available	Not Available	Not	
Available		ROOT\LEGACY_CRCDISK\0000			
dmboot	Not Available	LEGACYDRIVER	Not Available	Not	
Available	Not Available	Not Available	Not Available		
		ROOT\LEGACY_DMBOOT\0000			
dmload	Not Available	LEGACYDRIVER	Not Available	Not	
Available	Not Available	Not Available	Not Available		
		ROOT\LEGACY_DMLOAD\0000			
Fips	Not Available	LEGACYDRIVER	Not Available	Not	
Available	Not Available	Not Available	Not Available		
		ROOT\LEGACY_FIPS\0000			
Generic Packet Classifier		Not Available	LEGACYDRIVER	Not	
Available	Not Available	Not Available	Not Available	Not	
Available		ROOT\LEGACY_GPC\0000			
HTTP	Not Available	LEGACYDRIVER	Not Available	Not	
Available	Not Available	Not Available	Not Available		
		ROOT\LEGACY_HTTP\0000			
IPSEC driver	Not Available	LEGACYDRIVER	Not Available	Not	
	Not Available	Not Available	Not Available	Not	
Available		ROOT\LEGACY_IPSEC\0000			
ksecdd	Not Available	LEGACYDRIVER	Not Available	Not	
Available	Not Available	Not Available	Not Available		
		ROOT\LEGACY_KSECDD\0000			
mmdd	Not Available	LEGACYDRIVER	Not Available	Not	
Available	Not Available	Not Available	Not Available		
		ROOT\LEGACY_MNMDD\0000			
mountmgr	Not Available	LEGACYDRIVER	Not Available	Not	
Available	Not Available	Not Available	Not Available		
		ROOT\LEGACY_MOUNTMGR\0000			
NDIS System Driver		Not Available	LEGACYDRIVER	Not	
Available	Not Available	Not Available	Not Available	Not	
Available		ROOT\LEGACY_NDIS\0000			
Remote Access NDIS TAPI Driver		Not Available	LEGACYDRIVER		
	Not Available	Not Available	Not Available	Not	
Available	Not Available	ROOT\LEGACY_NDISTAPI\0000			
NDIS Usermode I/O Protocol		Not Available	LEGACYDRIVER	Not	
Available	Not Available	Not Available	Not Available	Not	
Available		ROOT\LEGACY_NDISUIO\0000			
NDProxy	Not Available	LEGACYDRIVER	Not Available	Not	
Available	Not Available	Not Available	Not Available		
		ROOT\LEGACY_NDPROXY\0000			
NetBios over Tcpip		Not Available	LEGACYDRIVER	Not	
Available	Not Available	Not Available	Not Available	Not	
Available		ROOT\LEGACY_NETBT\0000			

## Appendix C – Tunable Parameters

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Null Available	Not Available	LEGACYDRIVER	Not Available	Not Available	Not Available
ROOT\LEGACY_NULL\0000					
Partition Manager	Not Available	LEGACYDRIVER	Not Available	Not Available	Not Available
ROOT\LEGACY_PARTMGR\0000					
Parvdm	Not Available	LEGACYDRIVER	Not Available	Not Available	Not Available
ROOT\LEGACY_PARVDM\0000					
Remote Access Auto Connection Driver	LEGACYDRIVER	Not Available	Not Available	Not Available	Not Available
ROOT\LEGACY_RASACD\0000					
RDPCCD	Not Available	LEGACYDRIVER	Not Available	Not Available	Not Available
ROOT\LEGACY_RDPCCD\0000					
TCP/IP Protocol Driver	Not Available	LEGACYDRIVER	Not Available	Not Available	Not Available
ROOT\LEGACY_TCPIP\0000					
VGA Display Controller.	Not Available	LEGACYDRIVER	Not Available	Not Available	Not Available
ROOT\LEGACY_VGASAVE\0000					
volsnap	Not Available	LEGACYDRIVER	Not Available	Not Available	Not Available
ROOT\LEGACY_VOLSNAP\0000					
Remote Access IP ARP Driver	Not Available	LEGACYDRIVER	Not Available	Not Available	Not Available
ROOT\LEGACY_WANARP\0000					
Audio Codecs (devices)	Yes	MEDIA 5.2.3790.0	10/1/2002	Standard system devices)	Not Available
wave.inf					
Legacy Audio Drivers	Yes	MEDIA 5.2.3790.0	10/1/2002	Standard system devices)	Not Available
wave.inf					
Media Control Devices (devices)	Yes	MEDIA 5.2.3790.0	10/1/2002	Standard system devices)	Not Available
wave.inf					
Legacy Video Capture Devices (Standard system devices)	Yes	MEDIA 5.2.3790.0	10/1/2002	Standard system devices)	Not Available
wave.inf					
ROOT\MEDIA\MS_MMVCD					
Video Codecs (devices)	Yes	MEDIA 5.2.3790.0	10/1/2002	Standard system devices)	Not Available
wave.inf					
WAN Miniport (L2TP)	Yes	NET 5.2.3790.0	10/1/2002	Microsoft	Not Available
netrasa.inf					
WAN Miniport (IP)	Yes	NET 5.2.3790.0	10/1/2002	Microsoft	Not Available
netrasa.inf					
WAN Miniport (PPPOE)	Yes	NET 5.2.3790.0	10/1/2002	Microsoft	Not Available
netrasa.inf					
WAN Miniport (PPTP)	Yes	NET 5.2.3790.0	10/1/2002	Microsoft	Not Available
netrasa.inf					
Direct Parallel	Yes	NET 5.2.3790.0	10/1/2002	Microsoft	Not Available
netrasa.inf					
Terminal Server Device Redirector	Yes	SYSTEM 5.2.3790.0	10/1/2002	Standard system devices)	Not Available
machine.inf					
ROOT\RDPDR\0000					
Terminal Server Keyboard Driver	Yes	SYSTEM 5.2.3790.0	10/1/2002	Standard system devices)	Not Available
machine.inf					
ROOT\RDP_KBD\0000					

## Appendix C – Tunable Parameters

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```
Terminal Server Mouse Driver Yes SYSTEM 5.2.3790.0 10/1/2002
(Standard system devices) machine.inf Not Available
ROOT\RDP_MOU\0000
Plug and Play Software Device Enumerator Yes SYSTEM 5.2.3790.0
10/1/2002 (Standard system devices) machine.inf Not
Available ROOT\SYSTEM\0000
Microcode Update Device Yes SYSTEM 5.2.3790.0 10/1/2002
(Standard system devices) machine.inf Not Available
ROOT\SYSTEM\0001
```

### [Environment Variables]

```
Variable Value User Name
ComSpec %SystemRoot%\system32\cmd.exe <SYSTEM>
Path
C:\mksnt;C:\WINDOWS\system32;C:\WINDOWS;C:\WINDOWS\System32\Wbem;
C:\PROGRA~1\MICROS~1\80\Tools\BINN; <SYSTEM>
windir %SystemRoot% <SYSTEM>
OS Windows_NT <SYSTEM>
PROCESSOR_ARCHITECTURE x86 <SYSTEM>
PROCESSOR_LEVEL 15 <SYSTEM>
PROCESSOR_IDENTIFIER x86 Family 15 Model 2 Stepping 7, GenuineIntel
<SYSTEM>
PROCESSOR_REVISION 0207 <SYSTEM>
NUMBER_OF_PROCESSORS 4 <SYSTEM>
ClusterLog C:\WINDOWS\Cluster\cluster.log <SYSTEM>
PATHEXT .COM;.EXE;.BAT;.CMD;.VBS;.VBE;.JS;.JSE;.WSF;.WSH;.VBS
<SYSTEM>
TEMP %SystemRoot%\TEMP <SYSTEM>
TMP %SystemRoot%\TEMP <SYSTEM>
ROOTDIR C:/ <SYSTEM>
SHELL C:/mksnt/sh.exe <SYSTEM>
HOME C:/Documents and Settings/Administrator <SYSTEM>
TMPDIR C:/WINDOWS/TEMP <SYSTEM>
TEMP %USERPROFILE%\Local Settings\Temp NT AUTHORITY\SYSTEM
TMP %USERPROFILE%\Local Settings\Temp NT AUTHORITY\SYSTEM
TEMP %USERPROFILE%\Local Settings\Temp NT AUTHORITY\NETWORK SERVICE
TMP %USERPROFILE%\Local Settings\Temp NT AUTHORITY\NETWORK SERVICE
TEMP %USERPROFILE%\Local Settings\Temp CLIENT7\Administrator
TMP %USERPROFILE%\Local Settings\Temp CLIENT7\Administrator
```

### [Print Jobs]

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

### [Network Connections]

```
Local Name Remote Name Type Status User Name
```

### [Running Tasks]

## Appendix C – Tunable Parameters

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Name	Path	Process ID	Priority	Min Working Set	Max Working Set
	Start Time	Version	Size	File Date	
system idle process			Not Available	0	0
	Not Available		Not Available	Not Available	Not Available
Available	Not Available				
system			4	8	0
Available	Not Available		Not Available	Not Available	Not Available
smss.exe			492	11	204800
	7/8/2003 3:43 PM		Not Available	Not Available	1413120
Available					Not Available
csrss.exe			548	13	Not Available
Available	7/8/2003 3:43 PM		Not Available	Not Available	Not Available
Available					Not Available
winlogon.exe		c:\windows\system32\winlogon.exe		576	13
		204800	1413120	7/8/2003 3:43 PM	5.2.3790.0
(srv03_rtm.030324-2048)			536.50 KB (549,376 bytes)		3/29/2003 12:00 AM
services.exe		c:\windows\system32\services.exe		620	9
		204800	1413120	7/8/2003 3:43 PM	5.2.3790.0
(srv03_rtm.030324-2048)			102.00 KB (104,448 bytes)		3/29/2003 12:00 AM
lsass.exe		c:\windows\system32\lsass.exe	632	9	204800
		1413120	7/8/2003 3:43 PM	5.2.3790.0	(srv03_rtm.030324-2048)
			13.00 KB (13,312 bytes)		3/29/2003 12:00 AM
svchost.exe		c:\windows\system32\svchost.exe	800	8	204800
		1413120	7/8/2003 3:43 PM	5.2.3790.0	(srv03_rtm.030324-2048)
			13.00 KB (13,312 bytes)		3/29/2003 12:00 AM
svchost.exe		c:\windows\system32\svchost.exe	848	8	204800
		1413120	7/8/2003 3:43 PM	5.2.3790.0	(srv03_rtm.030324-2048)
			13.00 KB (13,312 bytes)		3/29/2003 12:00 AM
svchost.exe		c:\windows\system32\svchost.exe	992	8	204800
		1413120	7/8/2003 3:43 PM	5.2.3790.0	(srv03_rtm.030324-2048)
			13.00 KB (13,312 bytes)		3/29/2003 12:00 AM
explorer.exe		c:\windows\explorer.exe	1284	8	204800
		1413120	7/8/2003 3:43 PM	6.00.3790.0	(srv03_rtm.030324-2048)
			1,008.50 KB (1,032,704 bytes)		3/29/2003 12:00 AM
msdtc.exe			Not Available	1360	8
Available	7/8/2003 3:43 PM		Not Available	Not Available	Not Available
Available					Not Available
svchost.exe		c:\windows\system32\svchost.exe	1496	8	204800
		1413120	7/8/2003 3:43 PM	5.2.3790.0	(srv03_rtm.030324-2048)
			13.00 KB (13,312 bytes)		3/29/2003 12:00 AM
inetinfo.exe		c:\windows\system32\inetsrv\inetinfo.exe	1560	8	
		204800	1413120	7/8/2003 3:43 PM	6.0.3790.0
(srv03_rtm.030324-2048)			13.00 KB (13,312 bytes)		6/23/2003 1:54 PM
winvnc.exe		c:\documents and settings\administrator\start			
menu\programs\startup\winvnc.exe			1688	8	204800
			7/8/2003 3:43 PM	3, 3, 3, 7	204.00 KB (208,896 bytes)
			6/20/2003 3:40 PM		
svchost.exe		c:\windows\system32\svchost.exe	1856	8	204800
		1413120	7/8/2003 3:43 PM	5.2.3790.0	(srv03_rtm.030324-2048)
			13.00 KB (13,312 bytes)		3/29/2003 12:00 AM
w3wp.exe		c:\windows\system32\inetsrv\w3wp.exe	1024	8	
		204800	1413120	7/8/2003 3:44 PM	6.0.3790.0
(srv03_rtm.030324-2048)			6.50 KB (6,656 bytes)		6/23/2003 1:54 PM

## Appendix C – Tunable Parameters

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```
dllhost.exe c:\windows\system32\dllhost.exe      1828  8    204800
             1413120      7/8/2003 3:44 PM  5.2.3790.0 (srv03_rtm.030324-2048)
             5.50 KB (5,632 bytes)    3/29/2003 12:00 AM
sh.exe      c:\mksnt\sh.exe      364   8    204800      1413120
             7/8/2003 3:44 PM  5.2 build 64      271.50 KB (278,016 bytes)
             6/24/2003 3:44 PM
wmiprvse.exe      Not Available      512   8    Not Available      Not
Available 7/8/2003 3:44 PM  Not Available      Not Available      Not
Available
helpctr.exe c:\windows\pchealth\helpctr\binaries\helpctr.exe      4556
             8    204800      1413120      7/8/2003 6:22 PM  5.2.3790.0
(srv03_rtm.030324-2048) 764.00 KB (782,336 bytes)    6/9/2003 9:37 AM
wmiprvse.exe      Not Available      2200  8    Not Available      Not
Available 7/8/2003 6:22 PM  Not Available      Not Available      Not
Available
helpsvc.exe c:\windows\pchealth\helpctr\binaries\helpsvc.exe      4272
             8    204800      1413120      7/8/2003 6:22 PM  5.2.3790.0
(srv03_rtm.030324-2048) 720.00 KB (737,280 bytes)    6/9/2003 9:37 AM
```

[Loaded Modules]

Name	Version	Size	File Date	Manufacturer	Path
winlogon	5.2.3790.0 (srv03_rtm.030324-2048)	536.50 KB (549,376 bytes)	3/29/2003 12:00 AM	Microsoft Corporation	c:\windows\system32\winlogon.exe
ntdll	5.2.3790.0 (srv03_rtm.030324-2048)	722.50 KB (739,840 bytes)	3/29/2003 12:00 AM	Microsoft Corporation	c:\windows\system32\ntdll.dll
kernel32	5.2.3790.0 (srv03_rtm.030324-2048)	965.00 KB (988,160 bytes)	3/29/2003 12:00 AM	Microsoft Corporation	c:\windows\system32\kernel32.dll
msvcrt	7.0.3790.0 (srv03_rtm.030324-2048)	319.50 KB (327,168 bytes)	3/29/2003 12:00 AM	Microsoft Corporation	c:\windows\system32\msvcrt.dll
advapi32	5.2.3790.0 (srv03_rtm.030324-2048)	559.50 KB (572,928 bytes)	3/29/2003 12:00 AM	Microsoft Corporation	c:\windows\system32\advapi32.dll
rpcrt4	5.2.3790.0 (srv03_rtm.030324-2048)	643.50 KB (658,944 bytes)	3/29/2003 12:00 AM	Microsoft Corporation	c:\windows\system32\rpcrt4.dll
user32	5.2.3790.0 (srv03_rtm.030324-2048)	562.00 KB (575,488 bytes)	3/29/2003 12:00 AM	Microsoft Corporation	c:\windows\system32\user32.dll
gdi32	5.2.3790.0 (srv03_rtm.030324-2048)	263.00 KB (269,312 bytes)	3/29/2003 12:00 AM	Microsoft Corporation	c:\windows\system32\gdi32.dll
userenv	5.2.3790.0 (srv03_rtm.030324-2048)	732.50 KB (750,080 bytes)	3/29/2003 12:00 AM	Microsoft Corporation	c:\windows\system32\userenv.dll
nddeapi	5.2.3790.0 (srv03_rtm.030324-2048)	16.00 KB (16,384 bytes)	3/29/2003 12:00 AM	Microsoft Corporation	c:\windows\system32\nddeapi.dll
crypt32	5.131.3790.0 (srv03_rtm.030324-2048)	598.00 KB (612,352 bytes)	3/29/2003 12:00 AM	Microsoft Corporation	c:\windows\system32\crypt32.dll

## Appendix C – Tunable Parameters

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msasn1 5.2.3790.0 (srv03\_rtm.030324-2048) 58.00 KB (59,392 bytes)  
3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\msasn1.dll

secur32 5.2.3790.0 (srv03\_rtm.030324-2048) 63.00 KB (64,512 bytes)  
3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\secur32.dll

winsta 5.2.3790.0 (srv03\_rtm.030324-2048) 51.00 KB (52,224 bytes)  
3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\winsta.dll

netapi32 5.2.3790.0 (srv03\_rtm.030324-2048) 317.00 KB (324,608 bytes)  
3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\netapi32.dll

profmap 5.2.3790.0 (srv03\_rtm.030324-2048) 22.00 KB (22,528 bytes)  
3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\profmap.dll

regapi 5.2.3790.0 (srv03\_rtm.030324-2048) 48.50 KB (49,664 bytes)  
3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\regapi.dll

ws2\_32 5.2.3790.0 (srv03\_rtm.030324-2048) 87.50 KB (89,600 bytes)  
3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\ws2\_32.dll

ws2help 5.2.3790.0 (srv03\_rtm.030324-2048) 19.50 KB (19,968 bytes)  
3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\ws2help.dll

psapi 5.2.3790.0 (srv03\_rtm.030324-2048) 21.50 KB (22,016 bytes)  
3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\psapi.dll

version 5.2.3790.0 (srv03\_rtm.030324-2048) 17.00 KB (17,408 bytes)  
3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\version.dll

setupapi 5.2.3790.0 (srv03\_rtm.030324-2048) 1,014.50 KB (1,038,848 bytes)  
3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\setupapi.dll

msgina 5.2.3790.0 (srv03\_rtm.030324-2048) 1.14 MB (1,191,936 bytes)  
3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\msgina.dll

shsvcs 6.00.3790.0 (srv03\_rtm.030324-2048) 121.50 KB (124,416 bytes)  
3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\shsvcs.dll

shlwapi 6.00.3790.0 (srv03\_rtm.030324-2048) 281.00 KB (287,744 bytes)  
3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\shlwapi.dll

sfc 5.2.3790.0 (srv03\_rtm.030324-2048) 4.50 KB (4,608 bytes)  
3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\sfc.dll

sfc\_os 5.2.3790.0 (srv03\_rtm.030324-2048) 133.00 KB (136,192 bytes)  
3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\sfc\_os.dll

wintrust 5.131.3790.0 (srv03\_rtm.030324-2048) 161.50 KB (165,376 bytes)  
3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\wintrust.dll

ole32 5.2.3790.0 (srv03\_rtm.030324-2048) 1.13 MB (1,187,328 bytes)  
3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\ole32.dll

## Appendix C – Tunable Parameters

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imagehlp 5.2.3790.0 (srv03\_rtm.030324-2048) 142.50 KB (145,920 bytes) 3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\imagehlp.dll

comctl32 6.0 (srv03\_rtm.030324-2048) 907.00 KB (928,768 bytes) 6/6/2003 11:32 AM Microsoft Corporation  
c:\windows\winsxs\x86\_microsoft.windows.common-controls\_6595b64144ccf1df\_6.0.100.0\_x-ww\_8417450b\comctl32.dll

winscard 5.2.3790.0 (srv03\_rtm.030324-2048) 98.50 KB (100,864 bytes) 3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\winscard.dll

wtsapi32 5.2.3790.0 (srv03\_rtm.030324-2048) 17.50 KB (17,920 bytes) 3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\wtsapi32.dll

sxs 5.2.3790.0 (srv03\_rtm.030324-2048) 733.00 KB (750,592 bytes) 3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\sxs.dll

winmm 5.2.3790.0 (srv03\_rtm.030324-2048) 166.00 KB (169,984 bytes) 3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\winmm.dll

wldap32 5.2.3790.0 (srv03\_rtm.030324-2048) 158.00 KB (161,792 bytes) 3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\wldap32.dll

rsaenh 5.2.3790.0 (srv03\_rtm.030324-2048) 176.83 KB (181,072 bytes) 3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\rsaenh.dll

cscdll 5.2.3790.0 (srv03\_rtm.030324-2048) 99.00 KB (101,376 bytes) 3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\cscdll.dll

wlnotify 5.2.3790.0 (srv03\_rtm.030324-2048) 87.50 KB (89,600 bytes) 3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\wlnotify.dll

winspool 5.2.3790.0 (srv03\_rtm.030324-2048) 140.00 KB (143,360 bytes) 3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\winspool.drv

mpr 5.2.3790.0 (srv03\_rtm.030324-2048) 56.00 KB (57,344 bytes) 3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\mpr.dll

shell32 6.00.3790.0 (srv03\_rtm.030324-2048) 7.79 MB (8,166,400 bytes) 3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\shell32.dll

comctl32 5.82 (srv03\_rtm.030324-2048) 561.00 KB (574,464 bytes) 6/6/2003 11:32 AM Microsoft Corporation  
c:\windows\winsxs\x86\_microsoft.windows.common-controls\_6595b64144ccf1df\_5.82.0.0\_x-ww\_8a69ba05\comctl32.dll

uxtheme 6.00.3790.0 (srv03\_rtm.030324-2048) 196.00 KB (200,704 bytes) 3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\uxtheme.dll

samlib 5.2.3790.0 (srv03\_rtm.030324-2048) 49.00 KB (50,176 bytes) 3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\samlib.dll

cscui 5.2.3790.0 (srv03\_rtm.030324-2048) 305.00 KB (312,320 bytes) 3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\cscui.dll



## Appendix C – Tunable Parameters

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ntmarta 5.2.3790.0 (srv03\_rtm.030324-2048) 114.00 KB (116,736 bytes) 3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\ntmarta.dll

oleaut32 5.2.3790.0 486.00 KB (497,664 bytes) 3/29/2003 12:00 AM Microsoft Corporation c:\windows\system32\oleaut32.dll

clbcatq 2001.12.4720.0 (srv03\_rtm.030324-2048) 481.00 KB (492,544 bytes) 6/9/2003 9:34 AM Microsoft Corporation  
c:\windows\system32\clbcatq.dll

comres 2001.12.4720.0 (srv03\_rtm.030324-2048) 778.00 KB (796,672 bytes) 3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\comres.dll

wbemprox 5.2.3790.0 (srv03\_rtm.030324-2048) 17.50 KB (17,920 bytes) 6/9/2003 9:34 AM Microsoft Corporation  
c:\windows\system32\wbem\wbemprox.dll

wbemcomn 5.2.3790.0 (srv03\_rtm.030324-2048) 211.50 KB (216,576 bytes) 3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\wbem\wbemcomn.dll

wbemsvc 5.2.3790.0 (srv03\_rtm.030324-2048) 42.50 KB (43,520 bytes) 6/9/2003 9:34 AM Microsoft Corporation  
c:\windows\system32\wbem\wbemsvc.dll

fastprox 5.2.3790.0 (srv03\_rtm.030324-2048) 443.00 KB (453,632 bytes) 6/9/2003 9:34 AM Microsoft Corporation  
c:\windows\system32\wbem\fastprox.dll

msvcp60 6.05.2144.0 388.00 KB (397,312 bytes) 3/29/2003 12:00 AM Microsoft Corporation c:\windows\system32\msvcp60.dll

ntdsapi 5.2.3790.0 (srv03\_rtm.030324-2048) 76.00 KB (77,824 bytes) 3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\ntdsapi.dll

dnsapi 5.2.3790.0 (srv03\_rtm.030324-2048) 147.50 KB (151,040 bytes) 3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\dnsapi.dll

services 5.2.3790.0 (srv03\_rtm.030324-2048) 102.00 KB (104,448 bytes) 3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\services.exe

scesrv 5.2.3790.0 (srv03\_rtm.030324-2048) 316.50 KB (324,096 bytes) 3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\scesrv.dll

authz 5.2.3790.0 (srv03\_rtm.030324-2048) 67.00 KB (68,608 bytes) 3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\authz.dll

umpnpgmr 5.2.3790.0 (srv03\_rtm.030324-2048) 121.50 KB (124,416 bytes) 3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\umpnpgmr.dll

ncobjapi 5.2.3790.0 (srv03\_rtm.030324-2048) 34.50 KB (35,328 bytes) 3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\ncobjapi.dll

eventlog 5.2.3790.0 (srv03\_rtm.030324-2048) 60.50 KB (61,952 bytes) 3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\eventlog.dll

lsass 5.2.3790.0 (srv03\_rtm.030324-2048) 13.00 KB (13,312 bytes) 3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\lsass.exe

lsasrv 5.2.3790.0 (srv03\_rtm.030324-2048) 780.50 KB (799,232 bytes) 3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\lsasrv.dll

## Appendix C – Tunable Parameters

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samsrv 5.2.3790.0 (srv03\_rtm.030324-2048) 452.00 KB (462,848 bytes) 3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\samsrv.dll

cryptdll 5.2.3790.0 (srv03\_rtm.030324-2048) 34.00 KB (34,816 bytes) 3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\cryptdll.dll

msprivs 5.2.3790.0 (srv03\_rtm.030324-2048) 46.50 KB (47,616 bytes) 3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\msprivs.dll

kerberos 5.2.3790.0 (srv03\_rtm.030324-2048) 332.50 KB (340,480 bytes) 3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\kerberos.dll

msv1\_0 5.2.3790.0 (srv03\_rtm.030324-2048) 127.00 KB (130,048 bytes) 3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\msv1\_0.dll

netlogon 5.2.3790.0 (srv03\_rtm.030324-2048) 409.00 KB (418,816 bytes) 3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\netlogon.dll

w32time 5.2.3790.0 (srv03\_rtm.030324-2048) 216.00 KB (221,184 bytes) 3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\w32time.dll

iphlpapi 5.2.3790.0 (srv03\_rtm.030324-2048) 82.50 KB (84,480 bytes) 3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\iphlpapi.dll

schannel 5.2.3790.0 (srv03\_rtm.030324-2048) 149.50 KB (153,088 bytes) 3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\schannel.dll

wdigest 5.2.3790.0 (srv03\_rtm.030324-2048) 61.00 KB (62,464 bytes) 3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\wdigest.dll

rassfm 5.2.3790.0 (srv03\_rtm.030324-2048) 20.50 KB (20,992 bytes) 3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\rassfm.dll

kdcsvc 5.2.3790.0 (srv03\_rtm.030324-2048) 221.00 KB (226,304 bytes) 3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\kdcsvc.dll

ntdsa 5.2.3790.0 (srv03\_rtm.030324-2048) 1.45 MB (1,520,640 bytes) 3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\ntdsa.dll

ntdsatq 5.2.3790.0 (srv03\_rtm.030324-2048) 32.00 KB (32,768 bytes) 3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\ntdsatq.dll

msswsock 5.2.3790.0 (srv03\_rtm.030324-2048) 254.00 KB (260,096 bytes) 3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\msswsock.dll

esent 5.2.3790.0 (srv03\_rtm.030324-2048) 1.01 MB (1,056,256 bytes) 3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\esent.dll

scecli 5.2.3790.0 (srv03\_rtm.030324-2048) 179.50 KB (183,808 bytes) 3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\scecli.dll

wshtcpip 5.2.3790.0 (srv03\_rtm.030324-2048) 18.00 KB (18,432 bytes) 3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\wshtcpip.dll

## Appendix C – Tunable Parameters

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pstorsvc 5.2.3790.0 (srv03\_rtm.030324-2048) 24.00 KB (24,576 bytes)  
3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\pstorsvc.dll

psbase 5.2.3790.0 (srv03\_rtm.030324-2048) 81.00 KB (82,944 bytes)  
3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\psbase.dll

w3ssl 6.0.3790.0 (srv03\_rtm.030324-2048) 15.00 KB (15,360 bytes)  
3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\w3ssl.dll

strmfilt 6.0.3790.0 (srv03\_rtm.030324-2048) 70.50 KB (72,192 bytes)  
3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\strmfilt.dll

httpapi 5.2.3790.0 (srv03\_rtm.030324-2048) 26.50 KB (27,136 bytes)  
3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\httpapi.dll

iissuba 6.0.3790.0 (srv03\_rtm.030324-2048) 8.00 KB (8,192 bytes)  
3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\iissuba.dll

dssenh 5.2.3790.0 (srv03\_rtm.030324-2048) 131.33 KB (134,480 bytes)  
3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\dssenh.dll

svchost 5.2.3790.0 (srv03\_rtm.030324-2048) 13.00 KB (13,312 bytes)  
3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\svchost.exe

rpcss 5.2.3790.0 (srv03\_rtm.030324-2048) 276.50 KB (283,136 bytes)  
3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\rpcss.dll

termsrv 5.2.3790.0 (srv03\_rtm.030324-2048) 216.50 KB (221,696 bytes)  
6/9/2003 9:34 AM Microsoft Corporation  
c:\windows\system32\termsrv.dll

icaapi 5.2.3790.0 (srv03\_rtm.030324-2048) 10.50 KB (10,752 bytes)  
6/9/2003 9:34 AM Microsoft Corporation  
c:\windows\system32\icaapi.dll

mstlsapi 5.2.3790.0 (srv03\_rtm.030324-2048) 104.50 KB (107,008 bytes)  
3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\mstlsapi.dll

activeds 5.2.3790.0 (srv03\_rtm.030324-2048) 189.00 KB (193,536 bytes)  
3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\activeds.dll

adslrpc 5.2.3790.0 (srv03\_rtm.030324-2048) 142.50 KB (145,920 bytes)  
3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\adslrpc.dll

credui 5.2.3790.0 (srv03\_rtm.030324-2048) 159.00 KB (162,816 bytes)  
3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\credui.dll

atl 3.05.2283 83.00 KB (84,992 bytes) 3/29/2003 12:00 AM  
Microsoft Corporation c:\windows\system32\atl.dll

wzcsvc 5.2.3790.0 (srv03\_rtm.030324-2048) 272.50 KB (279,040 bytes)  
3/25/2003 6:15 AM Microsoft Corporation  
c:\windows\system32\wzcsvc.dll

rtutils 5.2.3790.0 (srv03\_rtm.030324-2048) 32.00 KB (32,768 bytes)  
3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\rtutils.dll

## Appendix C – Tunable Parameters

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```
wmi 5.2.3790.0 (srv03_rtm.030324-2048) 6.50 KB (6,656 bytes)
    3/29/2003 12:00 AM Microsoft Corporation
    c:\windows\system32\wmi.dll
dhcpcsvc 5.2.3790.0 (srv03_rtm.030324-2048) 101.50 KB (103,936
bytes) 3/29/2003 12:00 AM Microsoft Corporation
    c:\windows\system32\dhcpcsvc.dll
rastls 5.2.3790.0 (srv03_rtm.030324-2048) 155.00 KB (158,720
bytes) 3/29/2003 12:00 AM Microsoft Corporation
    c:\windows\system32\rastls.dll
cryptui 5.131.3790.0 (srv03_rtm.030324-2048) 473.50 KB
(484,864 bytes) 3/29/2003 12:00 AM Microsoft Corporation
    c:\windows\system32\cryptui.dll
mprapi 5.2.3790.0 (srv03_rtm.030324-2048) 81.00 KB (82,944 bytes)
3/29/2003 12:00 AM Microsoft Corporation
    c:\windows\system32\mprapi.dll
rasapi32 5.2.3790.0 (srv03_rtm.030324-2048) 227.50 KB (232,960
bytes) 3/29/2003 12:00 AM Microsoft Corporation
    c:\windows\system32\rasapi32.dll
rasman 5.2.3790.0 (srv03_rtm.030324-2048) 56.50 KB (57,856 bytes)
3/29/2003 12:00 AM Microsoft Corporation
    c:\windows\system32\rasman.dll
tapi32 5.2.3790.0 (srv03_rtm.030324-2048) 175.00 KB (179,200
bytes) 3/29/2003 12:00 AM Microsoft Corporation
    c:\windows\system32\tapi32.dll
raschap 5.2.3790.0 (srv03_rtm.030324-2048) 106.00 KB (108,544
bytes) 3/29/2003 12:00 AM Microsoft Corporation
    c:\windows\system32\raschap.dll
audiosrv 5.2.3790.0 (srv03_rtm.030324-2048) 38.00 KB (38,912 bytes)
3/29/2003 12:00 AM Microsoft Corporation
    c:\windows\system32\audiosrv.dll
wkssvc 5.2.3790.0 (srv03_rtm.030324-2048) 125.00 KB (128,000
bytes) 3/29/2003 12:00 AM Microsoft Corporation
    c:\windows\system32\wkssvc.dll
wiarpc 5.2.3790.0 (srv03_rtm.030324-2048) 30.00 KB (30,720 bytes)
3/29/2003 12:00 AM Microsoft Corporation
    c:\windows\system32\wiarpc.dll
cryptsvc 5.2.3790.0 (srv03_rtm.030324-2048) 51.00 KB (52,224 bytes)
3/29/2003 12:00 AM Microsoft Corporation
    c:\windows\system32\cryptsvc.dll
certcli 5.2.3790.0 (srv03_rtm.030324-2048) 228.00 KB (233,472
bytes) 3/29/2003 12:00 AM Microsoft Corporation
    c:\windows\system32\certcli.dll
vssapi 5.2.3790.0 (srv03_rtm.030324-2048) 528.00 KB (540,672
bytes) 3/29/2003 12:00 AM Microsoft Corporation
    c:\windows\system32\vssapi.dll
pchsvc 5.2.3790.0 (srv03_rtm.030324-2048) 31.50 KB (32,256 bytes)
6/9/2003 9:37 AM Microsoft Corporation
    c:\windows\pchealth\helpctr\binaries\pchsvc.dll
srvsvc 5.2.3790.0 (srv03_rtm.030324-2048) 89.00 KB (91,136 bytes)
3/29/2003 12:00 AM Microsoft Corporation
    c:\windows\system32\srvsvc.dll
seclogon 5.2.3790.0 (srv03_rtm.030324-2048) 16.50 KB (16,896 bytes)
3/29/2003 12:00 AM Microsoft Corporation
    c:\windows\system32\seclogon.dll
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## Appendix C – Tunable Parameters

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wmisvc      5.2.3790.0 (srv03_rtm.030324-2048) 131.00 KB (134,144
bytes)      6/9/2003 9:34 AM Microsoft Corporation
           c:\windows\system32\wbem\wmisvc.dll
wuauserv    5.4.3790.0 (srv03_rtm.030324-2048) 10.50 KB (10,752 bytes)
           6/9/2003 9:34 AM Microsoft Corporation
           c:\windows\system32\wuauserv.dll
wuauieng    5.4.3790.0 (srv03_rtm.030324-2048) 188.50 KB (193,024
bytes)      6/9/2003 9:34 AM Microsoft Corporation
           c:\windows\system32\wuauieng.dll
advpack     6.00.3790.0 (srv03_rtm.030324-2048) 93.50 KB (95,744 bytes)
           3/29/2003 12:00 AM Microsoft Corporation
           c:\windows\system32\advpack.dll
wininet     6.00.3790.0 (srv03_rtm.030324-2048) 609.00 KB (623,616
bytes)      3/29/2003 12:00 AM Microsoft Corporation
           c:\windows\system32\wininet.dll
winrnr      5.2.3790.0 (srv03_rtm.030324-2048) 15.00 KB (15,360 bytes)
           3/29/2003 12:00 AM Microsoft Corporation
           c:\windows\system32\winrnr.dll
netman      5.2.3790.0 (srv03_rtm.030324-2048) 209.00 KB (214,016
bytes)      3/29/2003 12:00 AM Microsoft Corporation
           c:\windows\system32\netman.dll
wzcsapi     5.2.3790.0 (srv03_rtm.030324-2048) 24.50 KB (25,088 bytes)
           3/25/2003 6:15 AM Microsoft Corporation
           c:\windows\system32\wzcsapi.dll
es          2001.12.4720.0 (srv03_rtm.030324-2048) 221.50 KB (226,816
bytes)      3/29/2003 12:00 AM Microsoft Corporation
           c:\windows\system32\es.dll
comsvcs     2001.12.4720.0 (srv03_rtm.030324-2048) 1.14 MB
(1,199,616 bytes) 6/9/2003 9:34 AM Microsoft Corporation
           c:\windows\system32\comsvcs.dll
sens        5.2.3790.0 (srv03_rtm.030324-2048) 35.50 KB (36,352 bytes)
           3/29/2003 12:00 AM Microsoft Corporation
           c:\windows\system32\sens.dll
netshell    5.2.3790.0 (srv03_rtm.030324-2048) 1.67 MB (1,747,456
bytes)      3/29/2003 12:00 AM Microsoft Corporation
           c:\windows\system32\netshell.dll
clusapi     5.2.3790.0 (srv03_rtm.030324-2048) 56.00 KB (57,344 bytes)
           3/29/2003 12:00 AM Microsoft Corporation
           c:\windows\system32\clusapi.dll
hnetcfg     5.2.3790.0 (srv03_rtm.030324-2048) 243.50 KB (249,344
bytes)      3/29/2003 12:00 AM Microsoft Corporation
           c:\windows\system32\hnetcfg.dll
wbemcore    5.2.3790.0 (srv03_rtm.030324-2048) 457.00 KB (467,968
bytes)      6/9/2003 9:34 AM Microsoft Corporation
           c:\windows\system32\wbem\wbemcore.dll
esscli      5.2.3790.0 (srv03_rtm.030324-2048) 235.50 KB (241,152
bytes)      6/9/2003 9:34 AM Microsoft Corporation
           c:\windows\system32\wbem\esscli.dll
wmiutils    5.2.3790.0 (srv03_rtm.030324-2048) 90.50 KB (92,672 bytes)
           6/9/2003 9:34 AM Microsoft Corporation
           c:\windows\system32\wbem\wmiutils.dll
repdrvfs    5.2.3790.0 (srv03_rtm.030324-2048) 165.00 KB (168,960
bytes)      6/9/2003 9:34 AM Microsoft Corporation
           c:\windows\system32\wbem\repdrvfs.dll
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## Appendix C – Tunable Parameters

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wmiprvsd 5.2.3790.0 (srv03\_rtm.030324-2048) 405.50 KB (415,232 bytes) 6/9/2003 9:34 AM Microsoft Corporation  
c:\windows\system32\wbem\wmiprvsd.dll

wbemess 5.2.3790.0 (srv03\_rtm.030324-2048) 256.50 KB (262,656 bytes) 6/9/2003 9:34 AM Microsoft Corporation  
c:\windows\system32\wbem\wbemess.dll

rasdlg 5.2.3790.0 (srv03\_rtm.030324-2048) 642.00 KB (657,408 bytes) 3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\rasdlg.dll

rasadhlp 5.2.3790.0 (srv03\_rtm.030324-2048) 6.50 KB (6,656 bytes) 3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\rasadhlp.dll

winhttp 5.2.3790.0 (srv03\_rtm.030324-2048) 327.50 KB (335,360 bytes) 6/6/2003 11:32 AM Microsoft Corporation  
c:\windows\winsxs\x86\_microsoft.windows.winhttp\_6595b64144ccf1df\_5.1.0.0\_x-ww\_e0651936\winhttp.dll

sensapi 5.2.3790.0 (srv03\_rtm.030324-2048) 6.00 KB (6,144 bytes) 3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\sensapi.dll

ncprov 5.2.3790.0 (srv03\_rtm.030324-2048) 43.00 KB (44,032 bytes) 6/9/2003 9:34 AM Microsoft Corporation  
c:\windows\system32\wbem\ncprov.dll

explorer 6.00.3790.0 (srv03\_rtm.030324-2048) 1,008.50 KB (1,032,704 bytes) 3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\explorer.exe

browseui 6.00.3790.0 (srv03\_rtm.030324-2048) 1.01 MB (1,057,280 bytes) 3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\browseui.dll

shdocvw 6.00.3790.0 (srv03\_rtm.030324-2048) 1.33 MB (1,393,664 bytes) 3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\shdocvw.dll

apphelp 5.2.3790.0 (srv03\_rtm.030324-2048) 122.00 KB (124,928 bytes) 3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\apphelp.dll

themeui 6.00.3790.0 (srv03\_rtm.030324-2048) 360.50 KB (369,152 bytes) 3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\themeui.dll

msimg32 5.2.3790.0 (srv03\_rtm.030324-2048) 4.50 KB (4,608 bytes) 3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\msimg32.dll

actxprxy 6.00.3790.0 (srv03\_rtm.030324-2048) 95.00 KB (97,280 bytes) 3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\actxprxy.dll

linkinfo 5.2.3790.0 (srv03\_rtm.030324-2048) 16.50 KB (16,896 bytes) 3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\linkinfo.dll

ntshrui 6.00.3790.0 (srv03\_rtm.030324-2048) 136.00 KB (139,264 bytes) 3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\ntshrui.dll

urlmon 6.00.3790.0 (srv03\_rtm.030324-2048) 501.50 KB (513,536 bytes) 3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\urlmon.dll

webcheck 6.00.3790.0 (srv03\_rtm.030324-2048) 261.50 KB (267,776 bytes) 3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\webcheck.dll

## Appendix C – Tunable Parameters

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wsock32 5.2.3790.0 (srv03\_rtm.030324-2048) 22.00 KB (22,528 bytes)  
3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\wsock32.dll

stobject 5.2.3790.0 (srv03\_rtm.030324-2048) 117.50 KB (120,320 bytes)  
3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\stobject.dll

batmeter 6.00.3790.0 (srv03\_rtm.030324-2048) 28.50 KB (29,184 bytes)  
3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\batmeter.dll

powrprof 6.00.3790.0 (srv03\_rtm.030324-2048) 14.50 KB (14,848 bytes)  
3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\powrprof.dll

printui 5.2.3790.0 (srv03\_rtm.030324-2048) 536.50 KB (549,376 bytes)  
3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\printui.dll

cfgmgr32 5.2.3790.0 (srv03\_rtm.030324-2048) 17.50 KB (17,920 bytes)  
3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\cfgmgr32.dll

drprov 5.2.3790.0 (srv03\_rtm.030324-2048) 12.50 KB (12,800 bytes)  
3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\drprov.dll

ntlanman 5.2.3790.0 (srv03\_rtm.030324-2048) 41.00 KB (41,984 bytes)  
3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\ntlanman.dll

netui0 5.2.3790.0 (srv03\_rtm.030324-2048) 75.50 KB (77,312 bytes)  
3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\netui0.dll

netui1 5.2.3790.0 (srv03\_rtm.030324-2048) 184.00 KB (188,416 bytes)  
3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\netui1.dll

davclnt 5.2.3790.0 (srv03\_rtm.030324-2048) 23.50 KB (24,064 bytes)  
3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\davclnt.dll

browseic 6.00.3790.0 (srv03\_rtm.030324-2048) 62.00 KB (63,488 bytes)  
3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\browseic.dll

shdoclc 6.00.3790.0 (srv03\_rtm.030324-2048) 588.50 KB (602,624 bytes)  
3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\shdoclc.dll

ersvc 5.2.3790.0 (srv03\_rtm.030324-2048) 22.00 KB (22,528 bytes)  
3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\ersvc.dll

inetinfo 6.0.3790.0 (srv03\_rtm.030324-2048) 13.00 KB (13,312 bytes)  
6/23/2003 1:54 PM Microsoft Corporation  
c:\windows\system32\inetsrv\inetinfo.exe

iisutil 6.0.3790.0 (srv03\_rtm.030324-2048) 177.00 KB (181,248 bytes)  
6/23/2003 1:54 PM Microsoft Corporation  
c:\windows\system32\inetsrv\iisutil.dll

rpcref 6.0.3790.0 (srv03\_rtm.030324-2048) 4.00 KB (4,096 bytes)  
6/23/2003 1:54 PM Microsoft Corporation  
c:\windows\system32\inetsrv\rpcref.dll

iisrtl 6.0.3790.0 (srv03\_rtm.030324-2048) 129.00 KB (132,096 bytes)  
6/23/2003 1:54 PM Microsoft Corporation  
c:\windows\system32\iisrtl.dll

## Appendix C – Tunable Parameters

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iisadmin 6.0.3790.0 (srv03\_rtm.030324-2048) 18.50 KB (18,944 bytes)  
6/23/2003 1:54 PM Microsoft Corporation  
c:\windows\system32\inetsrv\iisadmin.dll

coadmin 6.0.3790.0 (srv03\_rtm.030324-2048) 48.50 KB (49,664 bytes)  
6/23/2003 1:54 PM Microsoft Corporation  
c:\windows\system32\inetsrv\coadmin.dll

admwprox 6.0.3790.0 (srv03\_rtm.030324-2048) 44.00 KB (45,056 bytes)  
6/23/2003 1:54 PM Microsoft Corporation  
c:\windows\system32\admwprox.dll

iiscfg 6.0.3790.0 (srv03\_rtm.030324-2048) 1.06 MB (1,116,160 bytes)  
6/23/2003 1:54 PM Microsoft Corporation  
c:\windows\system32\inetsrv\iiscfg.dll

metadata 6.0.3790.0 (srv03\_rtm.030324-2048) 218.50 KB (223,744 bytes)  
6/23/2003 1:54 PM Microsoft Corporation  
c:\windows\system32\inetsrv\metadata.dll

msxml3 8.40.9419.0 1.28 MB (1,337,344 bytes) 3/29/2003 12:00 AM  
Microsoft Corporation c:\windows\system32\msxml3.dll

svcxext 6.0.3790.0 (srv03\_rtm.030324-2048) 41.50 KB (42,496 bytes)  
6/23/2003 1:54 PM Microsoft Corporation  
c:\windows\system32\inetsrv\svcxext.dll

security 5.2.3790.0 (srv03\_rtm.030324-2048) 5.50 KB (5,632 bytes)  
3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\security.dll

iismap 6.0.3790.0 (srv03\_rtm.030324-2048) 55.00 KB (56,320 bytes)  
6/23/2003 1:54 PM Microsoft Corporation  
c:\windows\system32\iismap.dll

wamreg 6.0.3790.0 (srv03\_rtm.030324-2048) 52.00 KB (53,248 bytes)  
6/23/2003 1:54 PM Microsoft Corporation  
c:\windows\system32\inetsrv\wamreg.dll

winvnc 3, 3, 3, 7 204.00 KB (208,896 bytes) 6/20/2003 3:40 PM  
AT&T Research Labs Cambridge c:\documents and settings\administrator\start menu\programs\startup\winvnc.exe

vnchooks 3, 3, 3, 6 32.00 KB (32,768 bytes) 6/20/2003 3:40 PM AT&T  
Research Labs Cambridge c:\program files\orl\vnc\vnchooks.dll

omnithread\_rt Not Available 44.00 KB (45,056 bytes) 6/20/2003  
3:40 PM Not Available c:\windows\system32\omnithread\_rt.dll

iisw3adm 6.0.3790.0 (srv03\_rtm.030324-2048) 199.50 KB (204,288 bytes)  
6/23/2003 1:54 PM Microsoft Corporation  
c:\windows\system32\inetsrv\iisw3adm.dll

w3cache 6.0.3790.0 (srv03\_rtm.030324-2048) 21.00 KB (21,504 bytes)  
6/23/2003 1:54 PM Microsoft Corporation  
c:\windows\system32\inetsrv\w3cache.dll

w3tp 6.0.3790.0 (srv03\_rtm.030324-2048) 12.50 KB (12,800 bytes)  
6/23/2003 1:54 PM Microsoft Corporation  
c:\windows\system32\inetsrv\w3tp.dll

lonsint 6.0.3790.0 (srv03\_rtm.030324-2048) 11.50 KB (11,776 bytes)  
6/23/2003 1:54 PM Microsoft Corporation  
c:\windows\system32\inetsrv\lonsint.dll

w3wp 6.0.3790.0 (srv03\_rtm.030324-2048) 6.50 KB (6,656 bytes)  
6/23/2003 1:54 PM Microsoft Corporation  
c:\windows\system32\inetsrv\w3wp.exe

w3core 6.0.3790.0 (srv03\_rtm.030324-2048) 329.50 KB (337,408 bytes)  
6/23/2003 1:54 PM Microsoft Corporation  
c:\windows\system32\inetsrv\w3core.dll



## Appendix C – Tunable Parameters

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w3dt 6.0.3790.0 (srv03\_rtm.030324-2048) 36.00 KB (36,864 bytes)  
6/23/2003 1:54 PM Microsoft Corporation  
c:\windows\system32\inetsrv\w3dt.dll

w3comlog 6.0.3790.0 (srv03\_rtm.030324-2048) 9.50 KB (9,728 bytes)  
6/23/2003 1:54 PM Microsoft Corporation  
c:\windows\system32\inetsrv\w3comlog.dll

iisres 6.0.3790.0 (srv03\_rtm.030324-2048) 119.50 KB (122,368 bytes)  
6/23/2003 1:54 PM Microsoft Corporation  
c:\windows\system32\inetsrv\iisres.dll

w3isapi 6.0.3790.0 (srv03\_rtm.030324-2048) 61.50 KB (62,976 bytes)  
6/23/2003 1:54 PM Microsoft Corporation  
c:\windows\system32\inetsrv\w3isapi.dll

gzip 6.0.3790.0 (srv03\_rtm.030324-2048) 23.00 KB (23,552 bytes)  
6/23/2003 1:54 PM Microsoft Corporation  
c:\windows\system32\inetsrv\gzip.dll

"\?\c:\inetpub\wwwroot\tpcc.dll"  
"\?\c:\inetpub\wwwroot\tpcc.dll"

tpcc\_com Not Available 24.00 KB (24,576 bytes) 6/23/2003 2:03 PM  
Not Available c:\inetpub\wwwroot\tpcc\_com.dll

tpcc\_odbc Not Available 28.00 KB (28,672 bytes) 6/23/2003 2:03 PM  
Not Available c:\inetpub\wwwroot\tpcc\_odbc.dll

odbc32 3.525.1022.0 (srv03\_rtm.030324-2048) 232.00 KB  
(237,568 bytes) 3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\odbc32.dll

comdlg32 6.00.3790.0 (srv03\_rtm.030324-2048) 261.00 KB (267,264 bytes)  
3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\comdlg32.dll

odbcint 3.525.1022.0 (srv03\_rtm.030324-2048) 92.00 KB (94,208 bytes)  
3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\odbcint.dll

sqlsrv32 2000.085.1022.00 (srv03\_rtm.030324-2048) 404.00 KB  
(413,696 bytes) 3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\sqlsrv32.dll

sqlunirl 2000.080.0728.00 176.56 KB (180,800 bytes) 3/29/2003  
12:00 AM Microsoft Corporation c:\windows\system32\sqlunirl.dll

sqlsrv32 2000.085.1022.00 (srv03\_rtm.030324-2048) 88.00 KB (90,112 bytes)  
3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\sqlsrv32.rll

odbccp32 3.525.1022.0 (srv03\_rtm.030324-2048) 100.00 KB  
(102,400 bytes) 3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\odbccp32.dll

dbnetlib 2000.085.1022 (srv03\_rtm.030324-2048) 76.00 KB (77,824 bytes)  
3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\dbnetlib.dll

mtxoci 2001.12.4720.0 (srv03\_rtm.030324-2048) 101.00 KB  
(103,424 bytes) 6/9/2003 9:34 AM Microsoft Corporation  
c:\windows\system32\mtxoci.dll

tpcc\_com\_all 1, 0, 0, 1 80.00 KB (81,920 bytes) 6/23/2003 2:03 PM  
c:\inetpub\wwwroot\tpcc\_c~2.dll

dllhost 5.2.3790.0 (srv03\_rtm.030324-2048) 5.50 KB (5,632 bytes)  
3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\dllhost.exe

txflog 2001.12.4720.0 (srv03\_rtm.030324-2048) 92.50 KB (94,720 bytes)  
3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\txflog.dll

## Appendix C – Tunable Parameters

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xolehlp 2001.12.4720.0 (srv03\_rtm.030324-2048) 8.50 KB (8,704 bytes) 6/9/2003 9:34 AM Microsoft Corporation  
c:\windows\system32\xolehlp.dll

msdtcprx 2001.12.4720.0 (srv03\_rtm.030324-2048) 427.50 KB (437,760 bytes) 6/9/2003 9:34 AM Microsoft Corporation  
c:\windows\system32\msdtcprx.dll

mtxclu 2001.12.4720.0 (srv03\_rtm.030324-2048) 74.50 KB (76,288 bytes) 3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\mtxclu.dll

resutils 5.2.3790.0 (srv03\_rtm.030324-2048) 59.00 KB (60,416 bytes) 3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\resutils.dll

mfc42u 6.05.3014.0 960.00 KB (983,040 bytes) 3/29/2003 12:00 AM Microsoft Corporation c:\windows\system32\mfc42u.dll

catsrv 2001.12.4720.0 (srv03\_rtm.030324-2048) 256.00 KB (262,144 bytes) 6/9/2003 9:34 AM Microsoft Corporation  
c:\windows\system32\catsrv.dll

clbcatex 2001.12.4720.0 (srv03\_rtm.030324-2048) 96.00 KB (98,304 bytes) 6/9/2003 9:34 AM Microsoft Corporation  
c:\windows\system32\clbcatex.dll

sh 5.2 build 64 271.50 KB (278,016 bytes) 6/24/2003 3:44 PM Mortice Kern Systems Inc. c:\mksnt\sh.exe

helpctr 5.2.3790.0 (srv03\_rtm.030324-2048) 764.00 KB (782,336 bytes) 6/9/2003 9:37 AM Microsoft Corporation  
c:\windows\pchealth\helpctr\binaries\helpctr.exe

hcappres 5.2.3790.0 (srv03\_rtm.030324-2048) 6.50 KB (6,656 bytes) 6/9/2003 9:37 AM Microsoft Corporation  
c:\windows\pchealth\helpctr\binaries\hcappres.dll

itss 5.2.3790.0 (srv03\_rtm.030324-2048) 119.50 KB (122,368 bytes) 3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\itss.dll

pchshell 5.2.3790.0 (srv03\_rtm.030324-2048) 100.50 KB (102,912 bytes) 6/9/2003 9:37 AM Microsoft Corporation  
c:\windows\pchealth\helpctr\binaries\pchshell.dll

mlang 6.00.3790.0 (srv03\_rtm.030324-2048) 570.00 KB (583,680 bytes) 3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\mlang.dll

mshtml 6.00.3790.0 (srv03\_rtm.030324-2048) 2.78 MB (2,916,352 bytes) 3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\mshtml.dll

msimtf 5.2.3790.0 (srv03\_rtm.030324-2048) 149.00 KB (152,576 bytes) 3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\msimtf.dll

msctf 5.2.3790.0 (srv03\_rtm.030324-2048) 287.00 KB (293,888 bytes) 3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\msctf.dll

jscript 5.6.0.8515 436.00 KB (446,464 bytes) 3/29/2003 12:00 AM Microsoft Corporation c:\windows\system32\jscript.dll

msls31 3.10.349.0 147.00 KB (150,528 bytes) 3/29/2003 12:00 AM Microsoft Corporation c:\windows\system32\msls31.dll

imm32 5.2.3790.0 (srv03\_rtm.030324-2048) 105.50 KB (108,032 bytes) 3/29/2003 12:00 AM Microsoft Corporation  
c:\windows\system32\imm32.dll

## Appendix C – Tunable Parameters

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```
mshtml 6.00.3790.0 (srv03_rtm.030324-2048) 443.50 KB (454,144
bytes) 3/29/2003 12:00 AM Microsoft Corporation
c:\windows\system32\mshtml.dll
vbscript 5.6.0.8515 404.00 KB (413,696 bytes) 3/29/2003 12:00
AM Microsoft Corporation c:\windows\system32\vbscript.dll
mfc42 6.05.3014.0 960.00 KB (983,040 bytes) 3/29/2003 12:00 AM
Microsoft Corporation c:\windows\system32\mfc42.dll
msinfo 5.2.3790.0 (srv03_rtm.030324-2048) 358.50 KB (367,104
bytes) 6/9/2003 9:37 AM Microsoft Corporation
c:\windows\pchealth\helpctr\binaries\msinfo.dll
riched32 5.2.3790.0 (srv03_rtm.030324-2048) 3.50 KB (3,584 bytes)
3/29/2003 12:00 AM Microsoft Corporation
c:\windows\system32\riched32.dll
riched20 5.31.23.1218 406.00 KB (415,744 bytes) 3/29/2003
12:00 AM Microsoft Corporation c:\windows\system32\riched20.dll
helpsvc 5.2.3790.0 (srv03_rtm.030324-2048) 720.00 KB (737,280
bytes) 6/9/2003 9:37 AM Microsoft Corporation
c:\windows\pchealth\helpctr\binaries\helpsvc.exe
```

[Services]

Display Name	Name	State	Start Mode	Service Type	Path	Error
Control	Start Name	Tag ID				
Alerter	Alerter	Stopped	Disabled	Share Process	c:\windows\system32\svchost.exe -k localservice	NT
AUTHORITY\LocalService		0				
Application Layer Gateway Process	Service	ALG	Stopped	Manual	c:\windows\system32\alg.exe	Own
AUTHORITY\LocalService		0				
Application Management Process	AppMgmt	Stopped	Manual	Share	c:\windows\system32\svchost.exe -k netsvcs	Normal
LocalSystem		0				
Windows Audio	AudioSrv	Running	Auto	Share Process	c:\windows\system32\svchost.exe -k netsvcs	Normal
LocalSystem		0				
Background Intelligent Transfer Service		BITS	Stopped	Manual	c:\windows\system32\svchost.exe -k netsvcs	Normal
LocalSystem		0				
Computer Browser	Browser	Stopped	Manual	Share Process	c:\windows\system32\svchost.exe -k netsvcs	Normal
LocalSystem		0				
Indexing Service	CiSvc	Stopped	Disabled	Share Process	c:\windows\system32\cisvc.exe	Normal
LocalSystem		0				
ClipBook	ClipSrv	Stopped	Disabled	Own Process	c:\windows\system32\clipsrv.exe	Normal
LocalSystem		0				
COM+ System Application	COMSysApp	Running	Manual	Own Process	c:\windows\system32\dllhost.exe /processid:{02d4b3f1-fd88-11d1-960d-00805fc79235}	Normal
LocalSystem		0				
Cryptographic Services	CryptSvc	Running	Auto	Share Process	c:\windows\system32\svchost.exe -k netsvcs	Normal
LocalSystem		0				
Distributed File System	Dfs	Stopped	Manual	Own Process	c:\windows\system32\dfssvc.exe	Normal
LocalSystem		0				

## Appendix C – Tunable Parameters

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```

DHCP Client Dhcp Stopped Manual Share Process
      c:\windows\system32\svchost.exe -k networkservice Normal
      NT AUTHORITY\NetworkService 0
Logical Disk Manager Administrative Service dmadmin Stopped
      Manual Share Process c:\windows\system32\dmadmin.exe
/com Normal LocalSystem 0
Logical Disk Manager dmservice Stopped Manual Share
Process c:\windows\system32\svchost.exe -k netsvcs Normal
      LocalSystem 0
DNS Client Dnscache Stopped Manual Share Process
      c:\windows\system32\svchost.exe -k networkservice Normal
      NT AUTHORITY\NetworkService 0
Error Reporting Service ERSvc Running Auto Share Process
      c:\windows\system32\svchost.exe -k winerr Ignore LocalSystem
      0
Event Log Eventlog Running Auto Share Process
      c:\windows\system32\services.exe Normal LocalSystem 0
COM+ Event System EventSystem Running Manual Share Process
      c:\windows\system32\svchost.exe -k netsvcs Normal
      LocalSystem 0
Help and Support helpsvc Running Auto Share Process
      c:\windows\system32\svchost.exe -k netsvcs Normal
      LocalSystem 0
Human Interface Device Access HidServ Stopped Disabled Share
Process c:\windows\system32\svchost.exe -k netsvcs Normal
      LocalSystem 0
HTTP SSL HTTPFilter Running Manual Share Process
      c:\windows\system32\lsass.exe Normal LocalSystem 0
IIS Admin Service IISADMIN Running Auto Share Process
      c:\windows\system32\inetresv\inetinfo.exe Normal LocalSystem
      0
IMAPI CD-Burning COM Service ImapiService Stopped Disabled
Own Process c:\windows\system32\imapi.exe Normal LocalSystem
      0
Intersite Messaging IsmServ Stopped Disabled Own Process
      c:\windows\system32\ismserv.exe Normal LocalSystem 0
Kerberos Key Distribution Center kdc Stopped Disabled Share
Process c:\windows\system32\lsass.exe Normal LocalSystem 0
Server lanmanserver Running Auto Share Process
      c:\windows\system32\svchost.exe -k netsvcs Normal
      LocalSystem 0
Workstation lanmanworkstation Running Auto Share Process
      c:\windows\system32\svchost.exe -k netsvcs Normal
      LocalSystem 0
License Logging LicenseService Stopped Disabled Own Process
      c:\windows\system32\llssrv.exe Normal NT
AUTHORITY\NetworkService 0
TCP/IP NetBIOS Helper LmHosts Stopped Manual Share
Process c:\windows\system32\svchost.exe -k localservice Normal
      NT AUTHORITY\LocalService 0
Messenger Messenger Stopped Disabled Share Process
      c:\windows\system32\svchost.exe -k netsvcs Normal
      LocalSystem 0

```

## Appendix C – Tunable Parameters

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```

NetMeeting Remote Desktop Sharing mnmsrvc Stopped Disabled
Own Process c:\windows\system32\mnmsrvc.exe Normal
LocalSystem 0
Distributed Transaction Coordinator MSDTC Running Auto Own Process
c:\windows\system32\msdtc.exe Normal NT
AUTHORITY\NetworkService 0
Windows Installer MSIServer Stopped Manual Share Process
c:\windows\system32\msiexec.exe /v Normal LocalSystem 0
Network DDE NetDDE Stopped Disabled Share Process
c:\windows\system32\netdde.exe Normal LocalSystem 0
Network DDE DSDM NetDDEdsdm Stopped Disabled Share Process
c:\windows\system32\netdde.exe Normal LocalSystem 0
Net Logon Netlogon Stopped Manual Share Process
c:\windows\system32\lsass.exe Normal LocalSystem 0
Network Connections Netman Running Manual Share
Process c:\windows\system32\svchost.exe -k netsvcs Normal
LocalSystem 0
Network Location Awareness (NLA) Nla Running Manual Share
Process c:\windows\system32\svchost.exe -k netsvcs Normal
LocalSystem 0
File Replication NtFrs Stopped Manual Own Process
c:\windows\system32\ntfrs.exe Ignore LocalSystem 0
NT LM Security Support Provider NtLmSsp Stopped Manual
Share Process c:\windows\system32\lsass.exe Normal
LocalSystem 0
Removable Storage NtmsSvc Stopped Manual Share Process
c:\windows\system32\svchost.exe -k netsvcs Normal
LocalSystem 0
Plug and Play PlugPlay Running Auto Share Process
c:\windows\system32\services.exe Normal LocalSystem 0
IPSEC Services PolicyAgent Stopped Manual Share Process
c:\windows\system32\lsass.exe Normal LocalSystem 0
Protected Storage ProtectedStorage Running Auto Share Process
c:\windows\system32\lsass.exe Normal LocalSystem 0
Remote Access Auto Connection Manager RasAuto Stopped
Manual Share Process c:\windows\system32\svchost.exe -k
netsvcs Normal LocalSystem 0
Remote Access Connection Manager RasMan Stopped Manual
Share Process c:\windows\system32\svchost.exe -k netsvcs
Normal LocalSystem 0
Remote Desktop Help Session Manager RDSessMgr Stopped Manual
Own Process c:\windows\system32\sessmgr.exe Normal
LocalSystem 0
Routing and Remote Access RemoteAccess Stopped Disabled
Share Process c:\windows\system32\svchost.exe -k netsvcs
Normal LocalSystem 0
Remote Registry RemoteRegistry Stopped Manual Share
Process c:\windows\system32\svchost.exe -k regsvc Normal NT
AUTHORITY\LocalService 0
Remote Procedure Call (RPC) Locator RpcLocator Stopped Manual
Own Process c:\windows\system32\locator.exe Normal NT
AUTHORITY\NetworkService 0
Remote Procedure Call (RPC) RpcSs Running Auto Share Process
c:\windows\system32\svchost -k rpcss Normal LocalSystem
0

```

## Appendix C – Tunable Parameters

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Resultant Set of Policy Provider      RSoPProv      Stopped      Manual
    Share Process      c:\windows\system32\rsopprov.exe      Normal
    LocalSystem 0
Special Administration Console Helper      sacsvr      Stopped
    Manual      Share Process      c:\windows\system32\svchost.exe -k
netsvcs      Normal      LocalSystem 0
Security Accounts Manager      SamSs      Running      Manual      Share
Process      c:\windows\system32\lsass.exe      Normal      LocalSystem 0
Smart Card      SCardSvr      Stopped      Manual      Share Process
    c:\windows\system32\scardsvr.exe      Ignore      NT
AUTHORITY\LocalService 0
Task Scheduler      Schedule      Stopped      Manual      Share Process
    c:\windows\system32\svchost.exe -k netsvcs      Normal
    LocalSystem 0
Secondary Logon      seclogon      Running      Auto      Share Process
    c:\windows\system32\svchost.exe -k netsvcs      Ignore
    LocalSystem 0
System Event Notification      SENS      Running      Manual      Share
Process      c:\windows\system32\svchost.exe -k netsvcs      Normal
    LocalSystem 0
Internet Connection Firewall (ICF) / Internet Connection Sharing (ICS)
    SharedAccess      Stopped      Disabled      Share Process
    c:\windows\system32\svchost.exe -k netsvcs      Normal
    LocalSystem 0
Shell Hardware Detection      ShellHWDetection      Running      Auto      Share
Process      c:\windows\system32\svchost.exe -k netsvcs      Ignore
    LocalSystem 0
Print Spooler      Spooler      Stopped      Manual      Own Process
    c:\windows\system32\spoolsv.exe      Normal      LocalSystem 0
Windows Image Acquisition (WIA)      stisvc      Stopped      Disabled
Share Process      c:\windows\system32\svchost.exe -k imgsvc
Normal      NT AUTHORITY\LocalService      0
Microsoft Software Shadow Copy Provider      swprv      Stopped      Manual
Own Process      c:\windows\system32\svchost.exe -k swprv      Normal
    LocalSystem 0
Performance Logs and Alerts      SysmonLog      Stopped      Manual      Own
Process      c:\windows\system32\smlogsvc.exe      Normal      NT
Authority\NetworkService      0
Telephony      TapiSrv      Stopped      Manual      Share Process
    c:\windows\system32\svchost.exe -k tapisrv      Normal
    LocalSystem 0
Terminal Services      TermService      Running      Manual      Share Process
    c:\windows\system32\svchost.exe -k termsvcs      Normal
    LocalSystem 0
Themes      Themes      Stopped      Disabled      Share Process
    c:\windows\system32\svchost.exe -k netsvcs      Normal
    LocalSystem 0
Telnet      TlntSvr      Stopped      Disabled      Own Process
    c:\windows\system32\tlntsvr.exe      Normal      NT
AUTHORITY\LocalService 0
Distributed Link Tracking Server      TrkSvr      Stopped      Disabled
Share Process      c:\windows\system32\svchost.exe -k netsvcs
Normal      LocalSystem 0

```

## Appendix C – Tunable Parameters

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```

Distributed Link Tracking Client    TrkWks        Stopped      Manual
    Share Process    c:\windows\system32\svchost.exe -k netsvcs
    Normal          LocalSystem 0
Terminal Services Session Directory Tssdis        Stopped      Disabled
    Own Process    c:\windows\system32\tssdis.exe      Normal
    LocalSystem 0
Upload Manager    uploadmgr    Stopped      Manual      Share Process
    c:\windows\system32\svchost.exe -k netsvcs      Normal
    LocalSystem 0
Uninterruptible Power Supply UPS    Stopped      Manual      Own Process
    c:\windows\system32\ups.exe      Normal      NT
AUTHORITY\LocalService 0
Virtual Disk Service vds    Stopped      Manual      Own Process
    c:\windows\system32\vds.exe      Normal      LocalSystem 0
Volume Shadow Copy    VSS    Stopped      Manual      Own Process
    c:\windows\system32\vssvc.exe      Normal      LocalSystem 0
Windows Time        W32Time    Running      Auto      Share Process
    c:\windows\system32\svchost.exe -k netsvcs      Normal
    LocalSystem 0
World Wide Web Publishing Service W3SVC    Running      Auto      Share
Process    c:\windows\system32\svchost.exe -k iissvcs      Normal
    LocalSystem 0
WebClient    WebClient    Stopped      Disabled    Share Process
    c:\windows\system32\svchost.exe -k localservice      Normal      NT
AUTHORITY\LocalService 0
WinHTTP Web Proxy Auto-Discovery Service WinHttpAutoProxySvc
    Stopped      Manual      Share Process
    c:\windows\system32\svchost.exe -k localservice      Normal      NT
AUTHORITY\LocalService 0
Windows Management Instrumentation winmgmt      Running      Auto      Share
Process    c:\windows\system32\svchost.exe -k netsvcs      Ignore
    LocalSystem 0
Portable Media Serial Number Service WmdmPmSN    Stopped
    Manual      Share Process    c:\windows\system32\svchost.exe -k
netsvcs      Normal      LocalSystem 0
Windows Management Instrumentation Driver Extensions Wmi    Stopped
    Manual      Share Process    c:\windows\system32\svchost.exe -k
netsvcs      Normal      LocalSystem 0
WMI Performance Adapter WmiApSrv    Stopped      Manual      Own Process
    c:\windows\system32\wbem\wmiapshr.exe      Normal      LocalSystem
0
Automatic Updates wuauerv    Running      Auto      Share Process
    c:\windows\system32\svchost.exe -k netsvcs      Normal
    LocalSystem 0
Wireless Configuration WZCSVC      Running      Auto      Share Process
    c:\windows\system32\svchost.exe -k netsvcs      Normal
    LocalSystem 0

```

[Program Groups]

```

Group Name  Name  User Name
Accessories Default User:Accessories      Default User
Accessories\Accessibility      Default User:Accessories\Accessibility
    Default User

```

## Appendix C – Tunable Parameters

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```

Accessories\Entertainment      Default User:Accessories\Entertainment
    Default User
Startup      Default User:Startup      Default User
Accessories All Users:Accessories      All Users
Accessories\Accessibility      All Users:Accessories\Accessibility All
Users
Accessories\Communications      All Users:Accessories\Communications
    All Users
Accessories\Entertainment      All Users:Accessories\Entertainment All
Users
Accessories\System Tools      All Users:Accessories\System Tools  All
Users
Administrative Tools      All Users:Administrative Tools      All Users
Microsoft SQL Server      All Users:Microsoft SQL Server      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 NT AUTHORITY\SYSTEM:Accessories      NT AUTHORITY\SYSTEM
Accessories\Accessibility      NT
AUTHORITY\SYSTEM:Accessories\Accessibility      NT AUTHORITY\SYSTEM
Accessories\Entertainment      NT
AUTHORITY\SYSTEM:Accessories\Entertainment      NT AUTHORITY\SYSTEM
Startup      NT AUTHORITY\SYSTEM:Startup      NT AUTHORITY\SYSTEM
Accessories CLIENT7\Administrator:Accessories      CLIENT7\Administrator
Accessories\Accessibility
    CLIENT7\Administrator:Accessories\Accessibility
    CLIENT7\Administrator
Accessories\Entertainment
    CLIENT7\Administrator:Accessories\Entertainment
    CLIENT7\Administrator
Administrative Tools      CLIENT7\Administrator:Administrative Tools
    CLIENT7\Administrator
Startup      CLIENT7\Administrator:Startup CLIENT7\Administrator

```

### [Startup Programs]

Program	Command	User Name	Location
desktop	desktop.ini	NT AUTHORITY\SYSTEM	Startup
desktop	desktop.ini	CLIENT7\Administrator	Startup
WinVNC	winvnc.exe	CLIENT7\Administrator	Startup
desktop	desktop.ini	.DEFAULT	Startup
desktop	desktop.ini	All Users	Common Startup

### [OLE Registration]

```

Object      Local Server
Sound (OLE2)      sndrec32.exe
Media Clip      mplay32.exe
Video Clip      mplay32.exe /avi
MIDI Sequence      mplay32.exe /mid
Sound Not Available
Media Clip      Not Available
WordPad Document      "%programfiles%\windows nt\accessories\wordpad.exe"

```



## Appendix C – Tunable Parameters

---

Windows Media Services DRM Storage object Not Available  
Bitmap Image mspaint.exe

[Windows Error Reporting]

Time Type Details

6/30/2003 1:55 PM Application Error Faulting application rte.exe,  
version 0.3.0.0, faulting module rte.exe, version 0.3.0.0, fault  
address 0x000397e8.&#x000d;&#x000a;  
6/30/2003 8:06 PM Application Hang Hanging application notepad.exe,  
version 5.2.3790.0, hang module hungapp, version 0.0.0.0, hang address  
0x00000000.&#x000d;&#x000a;

[Internet Settings]

[Internet Explorer]

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

Item Value

Version 6.0.3790.0  
Build 63790  
Application Path C:\Program Files\Internet Explorer  
Language English (United States)  
Active Printer Not Available

Cipher Strength 128-bit  
Content Advisor Disabled  
IEAK Install No

[File Versions]

File	Version	Size	Date	Path	Company
actxprxy.dll	6.0.3790.0	95 KB	3/29/2003 1:00:00 AM	C:\WINDOWS\system32	Microsoft Corporation
advpack.dll	6.0.3790.0	94 KB	3/29/2003 1:00:00 AM	C:\WINDOWS\system32	Microsoft Corporation
asctrls.ocx	6.0.3790.0	90 KB	3/29/2003 1:00:00 AM	C:\WINDOWS\system32	Microsoft Corporation
browseic.dll	6.0.3790.0	62 KB	3/29/2003 1:00:00 AM	C:\WINDOWS\system32	Microsoft Corporation
browseui.dll	6.0.3790.0	1,033 KB	3/29/2003 1:00:00 AM	C:\WINDOWS\system32	Microsoft Corporation
cdfview.dll	6.0.3790.0	144 KB	3/29/2003 1:00:00 AM	C:\WINDOWS\system32	Microsoft Corporation
comctl32.dll	5.82.3790.0	561 KB	3/29/2003 1:00:00 AM	C:\WINDOWS\system32	Microsoft Corporation
dxtrans.dll	6.3.3790.0	198 KB	3/29/2003 1:00:00 AM	C:\WINDOWS\system32	Microsoft Corporation
dxtmsft.dll	6.3.3790.0	344 KB	3/29/2003 1:00:00 AM	C:\WINDOWS\system32	Microsoft Corporation

## Appendix C – Tunable Parameters

---

iecont.dll	<File Missing>	Not Available	Not Available	Not Available
iecontlc.dll	<File Missing>	Not Available	Not Available	Not Available
iedkcs32.dll	16.0.3790.0	300 KB	3/29/2003 1:00:00 AM	
	C:\WINDOWS\system32	Microsoft Corporation		
iepeers.dll	6.0.3790.0	230 KB	3/29/2003 1:00:00 AM	
	C:\WINDOWS\system32	Microsoft Corporation		
iesetup.dll	6.0.3790.0	59 KB	3/29/2003 1:00:00 AM	
	C:\WINDOWS\system32	Microsoft Corporation		
ieuinit.inf	Not Available	20 KB	3/29/2003 1:00:00 AM	
	C:\WINDOWS\system32	Not Available		
iexplore.exe	6.0.3790.0	90 KB	3/29/2003 1:00:00 AM	C:\Program Files\Internet Explorer
	Microsoft Corporation			
imgutil.dll	5.2.3790.0	35 KB	3/29/2003 1:00:00 AM	
	C:\WINDOWS\system32	Microsoft Corporation		
inetcpl.cpl	6.0.3790.0	303 KB	3/29/2003 1:00:00 AM	
	C:\WINDOWS\system32	Microsoft Corporation		
inetcplc.dll	6.0.3790.0	109 KB	3/29/2003 1:00:00 AM	
	C:\WINDOWS\system32	Microsoft Corporation		
inseng.dll	6.0.3790.0	72 KB	3/29/2003 1:00:00 AM	
	C:\WINDOWS\system32	Microsoft Corporation		
mlang.dll	6.0.3790.0	570 KB	3/29/2003 1:00:00 AM	
	C:\WINDOWS\system32	Microsoft Corporation		
msencode.dll	2002.10.4.0	112 KB	3/29/2003 1:00:00 AM	
	C:\WINDOWS\system32	Not Available		
mshta.exe	6.0.3790.0	26 KB	3/29/2003 1:00:00 AM	
	C:\WINDOWS\system32	Microsoft Corporation		
mshtml.dll	6.0.3790.0	2,848 KB	3/29/2003 1:00:00 AM	
	C:\WINDOWS\system32	Microsoft Corporation		
mshtml.tlb	6.0.3790.0	1,319 KB	3/29/2003 1:00:00 AM	
	C:\WINDOWS\system32	Microsoft Corporation		
mshtml.ed.dll	6.0.3790.0	444 KB	3/29/2003 1:00:00 AM	
	C:\WINDOWS\system32	Microsoft Corporation		
mshtmlr.dll	6.0.3790.0	55 KB	3/29/2003 1:00:00 AM	
	C:\WINDOWS\system32	Microsoft Corporation		
msident.dll	6.0.3790.0	47 KB	3/29/2003 1:00:00 AM	
	C:\WINDOWS\system32	Microsoft Corporation		
msidntld.dll	6.0.3790.0	15 KB	3/29/2003 1:00:00 AM	
	C:\WINDOWS\system32	Microsoft Corporation		
msieftp.dll	6.0.3790.0	230 KB	3/29/2003 1:00:00 AM	
	C:\WINDOWS\system32	Microsoft Corporation		
msrating.dll	6.0.3790.0	132 KB	3/29/2003 1:00:00 AM	
	C:\WINDOWS\system32	Microsoft Corporation		
mstime.dll	6.0.3790.0	491 KB	3/29/2003 1:00:00 AM	
	C:\WINDOWS\system32	Microsoft Corporation		
occache.dll	6.0.3790.0	89 KB	3/29/2003 1:00:00 AM	
	C:\WINDOWS\system32	Microsoft Corporation		
proctexe.ocx	6.3.3790.0	78 KB	3/29/2003 1:00:00 AM	
	C:\WINDOWS\system32	Intel Corporation		
sendmail.dll	6.0.3790.0	52 KB	3/29/2003 1:00:00 AM	
	C:\WINDOWS\system32	Microsoft Corporation		
shdoclc.dll	6.0.3790.0	589 KB	3/29/2003 1:00:00 AM	
	C:\WINDOWS\system32	Microsoft Corporation		

## Appendix C – Tunable Parameters

---

shdocvw.dll	6.0.3790.0	1,361 KB	3/29/2003 1:00:00 AM
C:\WINDOWS\system32		Microsoft Corporation	
shfolder.dll	6.0.3790.0	23 KB	3/29/2003 1:00:00 AM
C:\WINDOWS\system32		Microsoft Corporation	
shlwapi.dll	6.0.3790.0	281 KB	3/29/2003 1:00:00 AM
C:\WINDOWS\system32		Microsoft Corporation	
tdc.ocx	1.3.0.3130	58 KB	3/29/2003 1:00:00 AM
C:\WINDOWS\system32		Microsoft Corporation	
url.dll	6.0.3790.0	36 KB	3/29/2003 1:00:00 AM
C:\WINDOWS\system32		Microsoft Corporation	
urlmon.dll	6.0.3790.0	502 KB	3/29/2003 1:00:00 AM
C:\WINDOWS\system32		Microsoft Corporation	
webcheck.dll	6.0.3790.0	262 KB	3/29/2003 1:00:00 AM
C:\WINDOWS\system32		Microsoft Corporation	
wininet.dll	6.0.3790.0	609 KB	3/29/2003 1:00:00 AM
C:\WINDOWS\system32		Microsoft Corporation	

[Connectivity]

Item	Value
Connection Preference	Never dial

LAN Settings

AutoConfigProxy	Not Available
AutoProxyDetectMode	Disabled
AutoConfigURL	
Proxy Disabled	
ProxyServer	
ProxyOverride	

[Cache]

[ Following are sub-categories of this main category ]

[Summary]

Item	Value
Page Refresh Type	Automatic
Temporary Internet Files Folder	C:\Documents and Settings\NetworkService\Local Settings\Temporary Internet Files
Total Disk Space	Not Available
Available Disk Space	Not Available
Maximum Cache Size	Not Available
Available Cache Size	Not Available

[List of Objects]

Program File	Status	CodeBase
No cached object information available		

[Content]

[ Following are sub-categories of this main category ]

[Summary]

## Appendix C – Tunable Parameters

---

Item Value  
Content Advisor Disabled

[Personal Certificates]

Issued To Issued By Validity Signature Algorithm  
No personal certificate information available

[Other People Certificates]

Issued To Issued By Validity Signature Algorithm  
No other people certificate information available

[Publishers]

Name  
No publisher information available

[Security]

Zone Security Level  
My Computer Custom  
Local intranet Medium-low  
Trusted sites Medium  
Internet High  
Restricted sites High

### COM+ Settings

TPCC.AllTxns:

Activation:

Enable Object Pooling selected  
Minimum Pool Size: 302  
Maximum Pool Size: 302  
Creation Timeout: 60,000  
Enable Object Construction  
Enable Just in Time Activation

Concurrency:

Concurrency Required

### TPCC Application Registry Parameters

Windows Registry Editor Version 5.00

## Appendix C – Tunable Parameters

---

```
[HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft\TPCC]
"Path"="c:\inetpub\wwwroot\"
"NumberOfDeliveryThreads"=dword:0000002d
"MaxConnections"=dword:00002ee0
"MaxPendingDeliveries"=dword:000005dc
"DB_Protocol"="DBLIB"
"TxnMonitor"="COM"
"DbServer"="pe2650"
"DbName"="tpcc"
"DbUser"="sa"
"DbPassword"=""
"COM_SinglePool"="YES"
```

### Microsoft Internet Information Server Registry Parameters

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

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

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

### World Wide Web Service Registry Parameters

Windows Registry Editor Version 5.00

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

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

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

## Appendix C – Tunable Parameters

---

[HKEY\_LOCAL\_MACHINE\SYSTEM\CurrentControlSet\Services\W3SVC\Parameters]

"MajorVersion"=dword:00000005  
"MinorVersion"=dword:00000000  
"InstallPath"="C:\\WINNT\\System32\\inetrv"  
"CertMapList"="C:\\WINNT\\System32\\inetrv\\iisrmap.dll"  
"AccessDeniedMessage"="Error: Access is Denied."  
"Filter DLLs"=""  
"LogFileDirectory"="C:\\WINNT\\System32\\LogFiles"  
"AcceptExOutstanding"=dword:00000028

[HKEY\_LOCAL\_MACHINE\SYSTEM\CurrentControlSet\Services\W3SVC\Parameters\ADCLaunch]

[HKEY\_LOCAL\_MACHINE\SYSTEM\CurrentControlSet\Services\W3SVC\Parameters\ADCLaunch\AdvancedDataFactory]

[HKEY\_LOCAL\_MACHINE\SYSTEM\CurrentControlSet\Services\W3SVC\Parameters\ADCLaunch\RDSDataFactory]

[HKEY\_LOCAL\_MACHINE\SYSTEM\CurrentControlSet\Services\W3SVC\Parameters\ScriptMap]

[HKEY\_LOCAL\_MACHINE\SYSTEM\CurrentControlSet\Services\W3SVC\Parameters\VirtualRoots]

"/"="c:\\inetpub\\wwwroot,,205"  
"/Scripts"="c:\\inetpub\\scripts,,204"  
"/IISHelp"="c:\\winnt\\help\\iishelp,,201"  
"/IISAdmin"="C:\\WINNT\\System32\\inetrv\\iisadmin,,201"  
"/IISSamples"="c:\\inetpub\\iissamples,,201"  
"/MSADC"="c:\\program files\\common files\\system\\msadc,,205"  
"/\_vti\_bin"="C:\\Program Files\\Common Files\\Microsoft Shared\\Web Server Extensions\\40\\isapi,,205"  
"/Rpc"="C:\\WINNT\\System32\\RpcProxy,,4"  
"/Printers"="C:\\WINNT\\web\\printers,,201"

[HKEY\_LOCAL\_MACHINE\SYSTEM\CurrentControlSet\Services\W3SVC\Performance]

"Library"="w3ctrs.dll"  
"Open"="OpenW3PerformanceData"  
"Close"="CloseW3PerformanceData"  
"Collect"="CollectW3PerformanceData"  
"Last Counter"=dword:000008e6  
"Last Help"=dword:000008e7  
"First Counter"=dword:00000844  
"First Help"=dword:00000845  
"Library Validation Code"=hex:86,2b,a6,1b,0a,98,c0,01,10,3d,00,00,00,00,02,\\  
00,1c,00,01,00,00,02,80,14,00,ff,01,0f,00,01,01,00,00,00,00,00,01,00,00,\\  
00,00,02,00,70,00,04,00,00,00,00,18,00,fd,01,02,00,01,01,00,00,00,00,\\  
05,12,00,00,00,74,00,6f,00,00,00,1c,00,ff,01,0f,00,01,02,00,00,00,00,00,05,\\

[HKEY\_LOCAL\_MACHINE\SYSTEM\CurrentControlSet\Services\W3SVC\Security]

"Security"=hex:01,00,14,80,a0,00,00,00,ac,00,00,00,14,00,00,00,30,00,00,00,02,\\  
00,1c,00,01,00,00,02,80,14,00,ff,01,0f,00,01,01,00,00,00,00,00,01,00,00,\\  
00,00,02,00,70,00,04,00,00,00,00,18,00,fd,01,02,00,01,01,00,00,00,00,\\  
05,12,00,00,00,74,00,6f,00,00,00,1c,00,ff,01,0f,00,01,02,00,00,00,00,00,05,\\

## Appendix C – Tunable Parameters

---

20,00,00,00,20,02,00,00,72,00,73,00,00,00,18,00,8d,01,02,00,01,01,00,00,00,\  
00,00,05,0b,00,00,00,20,02,00,00,00,00,1c,00,fd,01,02,00,01,02,00,00,00,00,\  
00,05,20,00,00,00,23,02,00,00,72,00,73,00,01,01,00,00,00,00,00,05,12,00,00,\  
00,01,01,00,00,00,00,00,05,12,00,00,00

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

### *RTE Input Parameters*

#### BenchCraft Configuration File

Profile: 1620\_6\_1\_01  
File Path: C:\benchcrf\1620\_6\_1\_01.pro  
Version: 4

Number of Engines: 5

Name: DRIVER1  
Description: rte1  
Directory: c:\tpcclog\rte1.log  
Machine: rte1  
Parameter Set: PARAM2  
Index: 0  
Seed: 59915  
Configured Users: 3400  
Pipe Name: DRIVER1958504807  
Connect Rate: 1500  
Start Rate: 1000  
Max. Concurrency: -1  
Concurrency Rate: 10  
CLIENT\_NURAND: 233  
CPU: 0  
Additional Options:

Name: DRIVER2  
Description: rte2  
Directory: c:\tpcclog\rte2.log  
Machine: rte2  
Parameter Set: PARAM2  
Index: 100000000  
Seed: 59915  
Configured Users: 3400  
Pipe Name: DRIVER2958566445  
Connect Rate: 1500  
Start Rate: 1000  
Max. Concurrency: -1  
Concurrency Rate: 10  
CLIENT\_NURAND: 233  
CPU: 0  
Additional Options:

## Appendix C – Tunable Parameters

---

Name: DRIVER3  
Description: rte3  
Directory: c:\tpcclog\rte3.log  
Machine: rte3  
Parameter Set: PARAM2  
Index: 200000000  
Seed: 59915  
Configured Users: 3400  
Pipe Name: DRIVER3958590900  
Connect Rate: 1500  
Start Rate: 1000  
Max. Concurrency: -1  
Concurrency Rate: 10  
CLIENT\_NURAND: 233  
CPU: 0  
Additional Options:

Name: DRIVER4  
Description: rte4  
Directory: c:\tpcclog\rte4.log  
Machine: rte4  
Parameter Set: PARAM2  
Index: 300000000  
Seed: 59915  
Configured Users: 3400  
Pipe Name: DRIVER41824367832  
Connect Rate: 1500  
Start Rate: 1000  
Max. Concurrency: -1  
Concurrency Rate: 10  
CLIENT\_NURAND: 233  
CPU: 0  
Additional Options:

Name: DRIVER5  
Description: rte5  
Directory: c:\tpcclog\rte5.log  
Machine: rte5  
Parameter Set: PARAM2  
Index: 400000000  
Seed: 59915  
Configured Users: 2600  
Pipe Name: DRIVER52001196187  
Connect Rate: 1500  
Start Rate: 1000  
Max. Concurrency: -1  
Concurrency Rate: 10  
CLIENT\_NURAND: 233  
CPU: 0  
Additional Options:

Number of User groups: 10

Driver Engine: DRIVER1

---



## Appendix C – Tunable Parameters

---

IIS Server: client7  
SQL Server: pe2650  
Database: tpcc  
User: sa  
Protocol: HTML  
w\_id Range: 1 - 170  
w\_id Min Warehouse: 1  
w\_id Max Warehouse: 1620  
Scale: Normal  
User Count: 1700  
District id: 1  
Scale Down: No

Driver Engine: DRIVER1  
IIS Server: client7  
SQL Server: pe2650  
Database: tpcc  
User: sa  
Protocol: HTML  
w\_id Range: 171 - 340  
w\_id Min Warehouse: 1  
w\_id Max Warehouse: 1620  
Scale: Normal  
User Count: 1700  
District id: 1  
Scale Down: No

Driver Engine: DRIVER2  
IIS Server: client7  
SQL Server: pe2650  
Database: tpcc  
User: sa  
Protocol: HTML  
w\_id Range: 341 - 510  
w\_id Min Warehouse: 1  
w\_id Max Warehouse: 1620  
Scale: Normal  
User Count: 1700  
District id: 1  
Scale Down: No

Driver Engine: DRIVER2  
IIS Server: client7  
SQL Server: pe2650  
Database: tpcc  
User: sa  
Protocol: HTML  
w\_id Range: 511 - 680  
w\_id Min Warehouse: 1  
w\_id Max Warehouse: 1620  
Scale: Normal  
User Count: 1700  
District id: 1  
Scale Down: No

## Appendix C – Tunable Parameters

---

Driver Engine: DRIVER3  
IIS Server: client7  
SQL Server: pe2650  
Database: tpcc  
User: sa  
Protocol: HTML  
w\_id Range: 681 - 850  
w\_id Min Warehouse: 1  
w\_id Max Warehouse: 1620  
Scale: Normal  
User Count: 1700  
District id: 1  
Scale Down: No

Driver Engine: DRIVER3  
IIS Server: client7  
SQL Server: pe2650  
Database: tpcc  
User: sa  
Protocol: HTML  
w\_id Range: 851 - 1020  
w\_id Min Warehouse: 1  
w\_id Max Warehouse: 1620  
Scale: Normal  
User Count: 1700  
District id: 1  
Scale Down: No

Driver Engine: DRIVER4  
IIS Server: client7  
SQL Server: pe2650  
Database: tpcc  
User: sa  
Protocol: HTML  
w\_id Range: 1021 - 1190  
w\_id Min Warehouse: 1  
w\_id Max Warehouse: 1620  
Scale: Normal  
User Count: 1700  
District id: 1  
Scale Down: No

Driver Engine: DRIVER4  
IIS Server: client7  
SQL Server: pe2650  
Database: tpcc  
User: sa  
Protocol: HTML  
w\_id Range: 1191 - 1360  
w\_id Min Warehouse: 1  
w\_id Max Warehouse: 1620  
Scale: Normal  
User Count: 1700  
District id: 1  
Scale Down: No

## Appendix C – Tunable Parameters

---

Driver Engine: DRIVER5  
 IIS Server: client7  
 SQL Server: pe2650  
 Database: tpcc  
 User: sa  
 Protocol: HTML  
 w\_id Range: 1361 - 1530  
 w\_id Min Warehouse: 1  
 w\_id Max Warehouse: 1620  
 Scale: Normal  
 User Count: 1700  
 District id: 1  
 Scale Down: No

Driver Engine: DRIVER5  
 IIS Server: client7  
 SQL Server: pe2650  
 Database: tpcc  
 User: sa  
 Protocol: HTML  
 w\_id Range: 1531 - 1620  
 w\_id Min Warehouse: 1  
 w\_id Max Warehouse: 1620  
 Scale: Normal  
 User Count: 900  
 District id: 1  
 Scale Down: No

Number of Parameter Sets: 2

~Default

Default Parameter Set

	Txn Weight	Think Time	Key Time	RT Delay	RT Fence	Menu Delay	
New Order	10.00	10.00	12.05	18.01	0.10	5.00	0.10
Payment	10.00	10.00	12.05	3.01	0.10	5.00	0.10
Delivery	1.00	1.00	5.05	2.01	0.10	5.00	0.10
Stock Level	1.00	1.00	5.05	2.01	0.10	20.00	0.10
Order Status	1.00	1.00	10.05	2.01	0.10	5.00	0.10

PARAM2

	Txn Weight	Think Time	Key Time	RT Delay	RT Fence	Menu Delay	
New Order	44.84	44.84	12.04	18.02	0.10	5.00	0.10
Payment	43.04	43.04	12.04	3.02	0.10	5.00	0.10
Delivery	4.05	4.05	5.04	2.02	0.10	5.00	0.10
Stock Level	4.05	4.05	5.04	2.02	0.10	20.00	0.10
Order Status	4.05	4.05	10.04	2.02	0.10	5.00	0.10

# Appendix E – Price Quotations

## Appendix D – Disk Storage

TPC-C 60 Day Space Requirements						
Warehouses	1700				TpmC	20,108.79
Table	Rows	Data KB	Index KB	Extra 5% KB	8hr Space	Total Space KB
Warehouse	1,700	184	24	10		218
District	17,000	1,896	24	96		2016
Customer	51,000,000	37,090,912	2,211,688	1,965,130		41267730
History	51,000,000	2,833,344	16		536,236	2833360
NewOrder	15,300,000	241,904	568			242472
Orders	51,000,000	1,563,224	710,856		295,855	2274080
OrderLine	510,007,366	31,875,464	67,480		6,032,725	31942944
Item	100,000	9,528	40	478		10046
Stock	170,000,000	54,400,008	101,632	2,725,082		57226722
<b>Total</b>		128,016,464	3,092,328	4,690,797	6,864,816	135,799,589
MB						
Dynamic Space	35,422	Sum of Data for Order, Orderline and History				
Static Space	97,195	Sum of Data+Index+5%-Dynamic Space				
Free Space	na	Total Allocated Spac - ( Dynamic + Static Space)				
Daily Growth	6,704	(Dynamic Space/(W*62.5))*tpmc				
Daily Spread	-	(Free Space -1.5*Daily Growth) Zero Assumed				
60 Day Space MB	499,430					
<b>60 Day Space GB</b>	<b>487.72</b>	<b>GB</b>				
Log Size	54,000	MB				
KB Per New Order	5.4338	KB				
8 hr log MB	51,219	MB				
<b>8 hr log GB</b>	<b>50.0184</b>	<b>GB</b>				
Space Usage	GB Needed	Disks Measured	GB Priced	Disk Size	Formatted Size	
60 Day Space DB	487.72	56	960.96	18GB	17.160	960.96
		0	0.00	9GB	8.195	
		0	0.00	4GB	3.999	
Total DB		<b>56.00</b>	<b>960.96</b>	<b>9GB</b>		
8-hr log + mirror	100.0368	4	135.58	36GB	33.895	135.58
OS, Swap	3	1	3.999	4GB		
<b>Total Storage</b>	<b>590.76</b>	<b>GB</b>	<b>1,100.54</b>	<b>GB</b>		

## Appendix E – Price Quotations

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### Appendix E - Price Quotations

# Appendix E – Price Quotations

The screenshot shows a shopping cart page for LanAdapters.com. The browser is Microsoft Internet Explorer. The address bar shows the URL: <http://order.store.yahoo.com/cgi-bin/wg-order?unique=10d95&catalog=lanadapters&set=4021149&basket=5Ccf188d800f1a740210d9513bf280e188d811ffa68fac1c33d5915f01a3e>

The page features a navigation menu on the left with the following items: Home, old page, WE ARE ANTI SPAM, Blacklisted Brands, Printing Supplies and Cables, SCSI, Software, Storage, Miscellaneous Items, Barcode, Cables, Network Cables & Parts, Cat5 Cat6, Networking, Power, Print servers, Show Order, Privacy Policy, Info & Shipping Notes & Ways to delay Processing of order, Search, Index, and Y! SHOPPING.

The main content area displays the LanAdapters.com logo and a "NEW!" notification: "Send to more than one address. What's This?". Below this is a table with the following columns: Item, Options, Unit Price, Quantity, and Subtotal.

Item	Options	Unit Price	Quantity	Subtotal
 <a href="#">7ft Category 5e cross over Cable RJ45/RJ45 PC To PC Cat5 LIFETIME WARRANTY Sit available also Crossover Cable with molded ends (backwards compatible with cat5)</a>	Select_color: gray	1.00	<input type="text" value="3"/>	3.00 <a href="#">Remove</a>
<b>Subtotal for LanAdapters.com</b>				<b>3.00</b>

Below the table are buttons for "Update Quantities", "Check Out" (with a "Express checkout with YAHOO! WALLET" logo), and "Keep Shopping".

## Appendix E – Price Quotations

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Microsoft Corporation  
One Microsoft Way  
Redmond, WA 98052-6399

Tel 425 882 8080  
Fax 425 936 7329  
<http://www.microsoft.com/>

**Microsoft**

March 5, 2004

Dell Computer  
Corporation  
Kong Yang  
RR5  
One Dell Way  
Round Rock, TX 78682

Mr. Yang:

Here is the information you requested regarding pricing for several Microsoft products to be used in conjunction with your TPC-C benchmark testing.

All pricing shown is in US Dollars (\$).

<b>Part Number</b>	<b>Description</b>	<b>Unit Price</b>	<b>Quantity</b>	<b>Price</b>
228-01079	<b>SQL Server 2000 Standard Edition</b> <i>Per processor licensing No discounts applied</i>	\$4,999	1	\$4,999
P73-00295	<b>Windows Server 2003, Standard Edition</b> <i>Server license only - No CALs Discount Schedule: Open Program - No Level Unit Price reflects a 26% discount from the retail unit price of \$999.</i>	\$738	2	\$1,476
254-00170	<b>Visual C++ Standard</b> <i>No discounts applied</i>	\$109	1	\$109
PRO-PRORS-16U-01	<b>Database Server Support Package</b> <i>1 Year Term</i>	\$1,950	3	\$5,850

All products are currently orderable through Microsoft's normal distribution channels.

This quote is valid for the next 90 days.

If we can be of any further assistance, please contact Jamie Reding at (425) 703-0510 or [jamiere@microsoft.com](mailto:jamiere@microsoft.com).

Reference ID: PCKoya0405036456

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