

**TPC Benchmark™ C
Full Disclosure Report
for
Dell PowerEdge 2850
Using
Microsoft SQL Server 2000 Standard Edition
and
Microsoft Windows 2003 Server**

Second Edition
Submitted for Review
Updated to meet TPC-C Version 5.6 specification and updated pricing

April 14, 2006

Second Printing, April 14, 2006

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The pricing information given in this FDR is accurate as of the publication date, December 10, 2004 and is generally available.

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

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

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Abstract

Overview

This report documents the methodology and results of the TPC Benchmark™ C test conducted on Dell PowerEdge 2850. 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 5.6 of the Transaction Processing Council's TPC Benchmark™ C Standard Specification. Two standard TPC Benchmark™ C metrics, transactions per second (tpmC) and price per tpmC (\$/tpmC) are reported and referred to in this document. The results from the tests are summarized below.

| Hardware | Software | Total System Cost | tpmC | \$/tpmC | Availability Date |
|---------------------|---|-------------------|--------|---------|-------------------|
| Dell PowerEdge 2850 | Microsoft Windows 2003 Server with SQL Server 2000 Standard Edition | \$40,170 | 26,410 | \$1.53 | December 10, 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 5.6 specifications.

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

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Attention: Mike Molloy, Ph.D.



PowerEdge 2850

Client/Server w/1 PE1600SC Front End

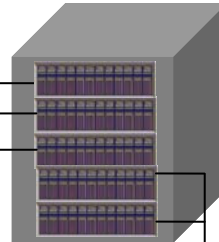
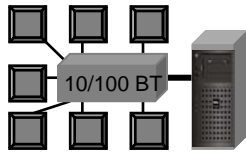
TPC-C Rev 5.6
 Report Date
December 10, 2004
 Revised Date
April 14, 2006

| | | | | |
|---|--|-------------------------------|--|-----------------|
| Total System Cost | TPC-C Throughput | Price/Performance | Availability Date | |
| \$40,170 | 26,410 tpmC | \$1.53 / tpmC | DEC 10, 2004 | |
| Processors | Database Manager | OS | Other Software | Number of Users |
| 1 x Intel Xeon™ Processors 1 Core, 2 Threads 3.4 GHz 1MB L2 Cache | Microsoft SQL Server 2000 Standard Edition | Microsoft Windows 2003 Server | Windows 2003 Server w/ COM+ Internet Information Server 5.0 Microsoft Visual C++ | 21,000 |

PE2850

w/ 1 3.4 GHz Intel Xeon 1 Core, 2 Threads CPUs
 w/ 1MB L2 cache,
 2.5GB RAM,
 3 LSI MegaRAID Elite 1650 DC Controllers
 6 36GB 10K RPM U320 SCSI disks
 2 Gigabit Ethernet adapters

5 PV220S Disk Pods
 70 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 1 Core, 2 Threads @ 3.4GHz 1MB cache | 2 | Intel Xeon 2 Core, 4 Threads w/ 512 KB L2 Client @ 2.4 GHz |
| Cache | | | | |
| Memory | | 2560 MB | | 1024 MB |
| Disk Controllers | 3 | LSI MegaRAID Elite 1650 DC Controller | 1 | Adaptec On-Board |
| Disk Drives | 70 | 18 GB SCSI | 1 | 36 GB |
| | 6 | 36 GB SCSI | | |
| Total Storage | | 1400 GB | | 36 GB |
| Other | 2 | 2GB NIC | 2 | 10/100MB BT NIC |
| | 1 | CD-ROM | | |

| Dell | | PowerEdge 2850 | | | TPC-C REV 5.6 PAGE 2 OF 3 | | |
|---|----------------|----------------|---------|--|------------------------------|---------------------------|--------------------|
| | | Client/Server | | Report Date: 10-December-04 Revised April 14, 2006 | | | |
| Description | Part Number | Third Party | | Unit Price | Qty | Extended Price | 3 yr. Maint. Price |
| | | Brand | Pricing | | | | |
| Server Hardware | | | | | | | |
| Dell PowerEdge 2800 3.6GHz XEON w/2MB L2 cache, 800MHz FSB, 2 onboard Gigabit NICs | 221-5965 | | | \$1,715.00 | 1 | \$1,715.00 | \$290.00 |
| 2GB DDR2 400MHz(4X512MB),1R | 311-3591 | | | \$849.00 | 1 | \$849.00 | |
| 512MB DDR2 400MHz(2X256MB),1R | 311-3585 | | | \$299.00 | 1 | \$299.00 | |
| Dell E773,17 in Gray (16.0 VIS) | 320-2907 | | | \$135.00 | 1 | \$135.00 | |
| | | | | | | Subtotal | \$2,998.00 |
| 3rd Party Raid Controllers | | | | | | | |
| LSI MegaRAID Elite 1650 2-ch SCSI | 4942510264A | LSI | 3 | \$999.00 | 5 | \$4,995.00 | |
| PowerVault Disk Subsystem | | | | | | | |
| PV220S, U3, PS, Tower | 220-4477, etc. | | | \$955.00 | 5 | \$4,775.00 | \$2,005.00 |
| ZEMM,U320,PV22XS,SINGLE | 340-9324 | | | \$399.00 | 5 | \$1,995.00 | |
| 600W,PWR SPLY,PV22XS | 310-0677 | | | \$0.00 | 5 | \$0.00 | |
| 600W,PWR SPLY,PV22XS | 310-0683 | | | \$89.00 | 5 | \$445.00 | |
| 36GB U320M SCSI 15K RPM Hard Drive | 340-9472 | | | \$249.00 | 70 | \$17,430.00 | |
| 36GB U320M SCSI 15K RPM Hard Drive (OS+LOG) | 340-9370 | | | \$249.00 | 6 | \$1,494.00 | |
| | | | | | | Subtotal | \$26,139.00 |
| Server Software | | | | | | | |
| SQL Workgroup, Per processor licensing ** | 228-01079 | Microsoft | 1 | \$4,999.00 | 1 | \$4,999.00 | |
| Windows 2003 Standard Server ** | P73-00295 | Microsoft | 1 | \$738.00 | 1 | \$738.00 | |
| Professional Support (1 Incident) | | Microsoft | 1 | \$245.00 | 1 | | \$245.00 |
| | | | | | | Subtotal | \$5,737.00 |
| Client Hardware | | | | | | | |
| Dell PowerEdge 1600SC, 2.4 GHz / 512KB L2/400 FSB | 221-2207 | | | \$227.00 | 1 | \$227.00 | \$290.00 |
| Additional processor , 2.4 GHz / 512KB | 311-2456 | | | \$599.00 | 1 | \$599.00 | |
| 1025MB RAM, 2 DIMMs | 311-1940 | | | \$548.00 | 1 | \$548.00 | |
| 36GB U160M SCSI 10K RPM Hard Drive | 340-7087 | | | \$249.00 | 1 | \$249.00 | |
| Non-Redundant Power | 310-1866 | | | \$199.00 | 1 | \$199.00 | |
| IntelPro 100S | 430-0369 | | | \$59.00 | 1 | \$59.00 | |
| Dell E773,17 in Gray (16.0 VIS) | 320-2907 | | | \$135.00 | 1 | \$135.00 | |
| | | | | | | Subtotal | \$2,016.00 |
| Client Software | | | | | | | |
| Windows 2003 Standard Server ** | P73-00295 | Microsoft | 1 | \$738.00 | 1 | \$738.00 | |
| Visual C++ **.NET | 254-00170 | Microsoft | 1 | \$109.00 | 1 | \$109.00 | |
| | | | | | | Subtotal | \$847.00 |
| User Connectivity | | | | | | | |
| 7ft Crossover cable | CBLC5C7 | LanAdapter | 2 | \$2.00 | 3 | \$6.00 | |
| | | | | | | Subtotal | \$6.00 |
| All hardware and maintenance components from Dell are discounted 16% based on total dollar volume of this configuration. Other Discounts | | | | | | | \$5,398.08 |
| | | | | | | Total USD | \$37,340 |
| | | | | | | | \$2,830 |
| Notes: * Maint. included in PowerVault 220S disk pod or PV650F/630F fibre channel disk pod | | | | Three-Year Cost of Ownership USD: | | \$40,170 | |
| ** 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 3 - LSI | | | | | | tpmC Rating: 26410 | |
| Pricing may be verified by calling 1-800-BUY-DELL and referencing quote # 190341430 as a complex quote. | | | | | | | |
| Audited by Lorna Livingtree, Performance Metrics Inc. | | | | | | USD\$ / tpmC: 1.53 | |
| Prices used in TPC benchmarks reflect the actual prices a customer would pay for a one-time purchase of the stated components. Individually negotiated discounts are not permitted. Special prices based on assumptions about past or future purchases are not permitted. All discounts reflect standard pricing policies for the listed components. For complete details, see the pricing sections of the TPC benchmark specifications. If you find that the stated prices are not available according to these items, please inform the TPC at pricing@tpc.org . | | | | | | | |

MQTh, computed Maximum Qualified Throughput

26,410 tpmC

Response Times (in seconds)

| | Average | 90 th | Max |
|----------------------------------|---------|------------------|------|
| - Neworder | 0.32 | 0.43 | 4.62 |
| - Payment | 0.15 | 0.19 | 1.85 |
| - Delivery (interactive portion) | 0.11 | 0.11 | 1.15 |
| - Stock-Level | 1.34 | 2.87 | 7.59 |
| - Order Status | 0.23 | 0.30 | 4.60 |
| - Delivery (deferred portion) | 0.70 | 0.96 | 2.84 |
| - Menu | 0.11 | 0.11 | 1.16 |

Response time delay added for emulated components

Menu 0.1

Resp 0.1

Transaction Mix, in percent of total transactions

| | |
|----------------|--------|
| - New-Order | 44.91% |
| - Payment | 43.02% |
| - Delivery | 4.04% |
| - Stock-Level | 4.02% |
| - Order-Status | 4.01% |

Keying/Think Times (in seconds),

| | Min | Average | Max |
|----------------|-----------|-------------|--------------|
| - New-Order | 18.02 0.0 | 18.03 12.05 | 18.91 120.41 |
| - Payment | 3.01 0.0 | 3.03 12.04 | 3.91 120.41 |
| - Delivery | 2.02 0.0 | 2.03 5.04 | 2.91 50.40 |
| - Stock-Level | 2.02 0.0 | 2.03 5.05 | 2.91 50.41 |
| - Order-Status | 2.02 0.0 | 2.03 10.03 | 2.91 100.40 |

Test Duration

| | |
|---|-------------|
| - Ramp-up time | 10 minutes |
| - Measurement interval | 120 minutes |
| - Number of checkpoints | 4 |
| - Checkpoint interval | 30 minutes |
| - Number of transactions (all types) completed in measurement interval | 7,341,150 |

Table of Contents

| | |
|--|-----------|
| ABSTRACT | I |
| OVERVIEW | I |
| AUDITOR..... | I |
| TABLE OF CONTENTS | 1 |
| INTRODUCTION | 5 |
| DOCUMENT STRUCTURE | 5 |
| BENCHMARK OVERVIEW | 5 |
| SYSTEM OVERVIEW | 6 |
| GENERAL ITEMS | 7 |
| TEST SPONSOR..... | 7 |
| APPLICATION CODE AND DEFINITION STATEMENTS | 7 |
| PARAMETER SETTINGS | 7 |
| CONFIGURATION DIAGRAMS..... | 8 |
| CLAUSE 1 -- LOGICAL DATABASE DESIGN RELATED ITEMS | 10 |
| TABLE DEFINITIONS | 10 |
| PHYSICAL ORGANIZATION OF THE DATABASE | 10 |
| INSERT AND DELETE OPERATIONS..... | 10 |
| HORIZONTAL AND VERTICAL PARTITIONING..... | 10 |
| REPLICATION | 10 |
| TABLE ATTRIBUTES | 10 |
| CLAUSE 2 -- TRANSACTION AND TERMINAL PROFILES RELATED ITEMS | 11 |
| RANDOM NUMBER GENERATION | 11 |
| SCREEN LAYOUT | 11 |
| TERMINAL VERIFICATION..... | 11 |
| INTELLIGENT TERMINALS..... | 11 |
| TRANSACTION PROFILES | 11 |
| TRANSACTION MIX | 12 |
| DEFERRED DELIVERY MECHANISM | 12 |
| CLAUSE 3 -- TRANSACTION AND SYSTEM PROPERTIES RELATED ITEMS | 13 |
| ACID TESTS | 13 |
| <i>Atomicity</i> | 13 |
| <i>Consistency</i> | 13 |
| <i>Isolation</i> | 13 |
| <i>Durability</i> | 14 |
| CLAUSE 4 -- SCALING AND DATABASE POPULATION RELATED ITEMS | 16 |
| TABLE CARDINALITY | 16 |
| CONSTANT VALUES | 16 |
| DATA DISTRIBUTION | 17 |
| PARTITION MAPPING..... | 17 |
| 60 DAY SPACE CALCULATION..... | 20 |
| CLAUSE 5 -- PERFORMANCE METRICS AND RESPONSE TIME RELATED ITEMS | 21 |

| | |
|---|-----------|
| MEASURED TPMC | 21 |
| RESPONSE TIMES..... | 21 |
| THINK TIMES & KEY TIMES..... | 21 |
| RESPONSE TIME DISTRIBUTION CURVES | 21 |
| NEW-ORDER THINK TIME DISTRIBUTION GRAPH | 26 |
| STEADY-STATE GRAPH | 27 |
| STEADY-STATE METHODOLOGY..... | 27 |
| WORK PERFORMED DURING STEADY STATE | 27 |
| MEASUREMENT INTERVAL | 28 |
| MEASUREMENT PERIOD DURATION AND CHECKPOINT DURATION..... | 28 |
| TRANSACTION MIX | 28 |
| OTHER METRICS | 29 |
| RTE PARAMETERS..... | 30 |
| EMULATED COMPONENTS..... | 30 |
| BENCHMARKED AND TARGETED SYSTEM CONFIGURATION DIAGRAMS..... | 30 |
| NETWORK CONFIGURATION | 30 |
| NETWORK BANDWIDTH | 30 |
| OPERATOR INTERVENTION..... | 31 |
| CLAUSE 7 -- PRICING RELATED ITEMS | 32 |
| HARDWARE AND SOFTWARE LIST | 32 |
| AVAILABILITY DATE..... | 32 |
| MEASURED TPMC | 32 |
| COUNTRY SPECIFIC PRICING | 32 |
| USAGE PRICING | 32 |
| SYSTEM PRICING..... | 33 |
| CLAUSE 9 -- AUDIT RELATED ITEMS | 34 |
| AUDITOR..... | 34 |
| AVAILABILITY OF THE FULL DISCLOSURE REPORT | 35 |
| APPENDIX A - APPLICATION SOURCE CODE | 40 |
| TPCC.DLL ISAPI DLL SOURCE CODE | 40 |
| <i>isapi_dll/src/tpcc.def</i> | 40 |
| <i>isapi_dll/src/tpcc.h</i> | 40 |
| <i>isapi_dll/src/tpcc.rc</i> | 41 |
| <i>isapi_dll/src/tpcc.cpp</i> | 42 |
| <i>isapi_dll/src/resource.h</i> | 64 |
| <i>common/src/ReadRegistry.cpp</i> | 64 |
| <i>common/src/ReadRegistry.h</i> | 65 |
| <i>common/src/error.h</i> | 65 |
| <i>common/src/trans.h</i> | 67 |
| <i>common/src/txn_base.h</i> | 69 |
| <i>db_dblib_dll/src/tpcc_dblib.cpp</i> | 69 |
| <i>db_dblib_dll/src/tpcc_dblib.h</i> | 90 |
| <i>tm_com_dll/src/tpcc_com.cpp</i> | 92 |
| <i>tm_com_dll/src/tpcc_com.h</i> | 94 |
| <i>tpcc_com_all/src/methods.h</i> | 95 |
| <i>tpcc_com_all/src/resource.h</i> | 97 |
| <i>tpcc_com_all/src/tpcc_com_all.cpp</i> | 97 |
| <i>tpcc_com_all/src/tpcc_com_all.def</i> | 101 |
| <i>tpcc_com_all/src/tpcc_com_all.h</i> | 102 |
| <i>tpcc_com_all/src/tpcc_com_all.idl</i> | 103 |
| <i>tpcc_com_all/src/tpcc_com_all.rc</i> | 104 |

| | |
|---|------------|
| <i>tpcc_com_all/src/tpcc_com_all.rgs</i> | 105 |
| <i>tpcc_com_all/src/tpcc_com_all_i.c</i> | 105 |
| <i>tpcc_com_all/src/tpcc_com_no.rgs</i> | 107 |
| <i>tpcc_com_all/src/tpcc_com_os.rgs</i> | 107 |
| <i>tpcc_com_all/src/tpcc_com_pay.rgs</i> | 107 |
| <i>tpcc_com_all/src/tpcc_com_ps.h</i> | 108 |
| <i>tpcc_com_all/src/tpcc_com_sl.rgs</i> | 110 |
| <i>tpcc_com_ps/src/dlldata.c</i> | 110 |
| <i>tpcc_com_ps/src/tpcc_com_ps.def</i> | 111 |
| <i>tpcc_com_ps/src/tpcc_com_ps.h</i> | 111 |
| <i>tpcc_com_ps/src/tpcc_com_ps.idl</i> | 113 |
| <i>tpcc_com_ps/src/tpcc_com_ps_i.c</i> | 114 |
| <i>tpcc_com_ps/src/tpcc_com_ps_p.c</i> | 115 |
| <i>common/txnlog/include/rtetime.h</i> | 136 |
| <i>common/txnlog/include/spinlock.h</i> | 136 |
| <i>common/txnlog/include/txnlog.h</i> | 137 |
| APPENDIX B - DATABASE DESIGN | 141 |
| BUILD SCRIPTS | 141 |
| <i>setup.cmd</i> | 141 |
| <i>tables.sql</i> | 143 |
| <i>idxcuscl.sql</i> | 144 |
| <i>idxcusnc.sql</i> | 144 |
| <i>idxdiscl.sql</i> | 145 |
| <i>idxitmcl.sql</i> | 145 |
| <i>idxnodcl.sql</i> | 145 |
| <i>idxodlcl.sql</i> | 145 |
| <i>idxordcl.sql</i> | 146 |
| <i>idxstkcl.sql</i> | 146 |
| <i>idxwarcl.sql</i> | 146 |
| <i>dbopt1.sql</i> | 146 |
| <i>dbopt2.sql</i> | 147 |
| <i>dbopt3.sql</i> | 147 |
| <i>backup.sql</i> | 147 |
| -- File: BACKUP.SQL | 148 |
| -- Microsoft TPC-C Benchmark Kit Ver. 4.22 | 148 |
| -- Copyright Microsoft, 2001 | 148 |
| -- Purpose: Creates backup of tpcc database | 148 |
| <i>declare @startdate datetime</i> | 148 |
| <i>declare @enddate datetime</i> | 148 |
| <i>select @startdate = getdate()</i> | 148 |
| <i>select "Start date:", convert(varchar(30),@startdate,9)</i> | 148 |
| <i>backup database tpcc to tpccback1, tpccback2 with init, stats = 1</i> | 148 |
| <i>select @enddate = getdate()</i> | 148 |
| <i>select "End date: ", convert(varchar(30),@enddate,9)</i> | 148 |
| <i>select "Elapsed time (in seconds): ", datediff(second, @startdate,</i> <i>@enddate)</i> | 148 |
| <i>go</i> | 148 |
| <i>restore.sql</i> | 148 |
| STORED PROCEDURES | 149 |
| <i>neword.sql</i> | 149 |
| <i>payment.sql</i> | 151 |
| <i>ordstat.sql</i> | 153 |

| | |
|---|------------|
| <i>delivery.sql</i> | 154 |
| <i>stocklev.sql</i> | 155 |
| LOADER SOURCE CODE..... | 155 |
| <i>tpcc.h</i> | 155 |
| <i>tpccldr.c</i> | 157 |
| <i>getargs.c</i> | 177 |
| <i>random.c</i> | 178 |
| <i>strings.c</i> | 180 |
| <i>time.c</i> | 183 |
| APPENDIX C - TUNABLE PARAMETERS | 184 |
| SERVER CONFIGURATION PARAMETERS..... | 184 |
| <i>Microsoft Windows 2003 Server Parameters</i> | 184 |
| <i>Microsoft Windows 2003 Server Configuration</i> | 184 |
| <i>Microsoft SQL Server 2000 Startup Parameters</i> | 184 |
| <i>Microsoft SQL Server Stack Size</i> | 185 |
| <i>Microsoft SQL Server 2000 Configuration Parameters</i> | 185 |
| <i>TPCC Application Registry Parameters</i> | 285 |
| <i>Windows Registry Editor Version 5.00</i> | 285 |
| [HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft\TPCC]..... | 285 |
| "Path"="C:\Inetpub\wwwroot\"..... | 285 |
| "NumberOfDeliveryThreads"=dword:0000004b..... | 285 |
| "MaxConnections"=dword:000061a8..... | 285 |
| "MaxPendingDeliveries"=dword:0000012c..... | 285 |
| "DB_Protocol"="ODBC"..... | 285 |
| "TxnMonitor"="COM"..... | 285 |
| "DbServer"="pe2850"..... | 285 |
| "DbName"="tpcc"..... | 285 |
| "DbUser"="sa"..... | 285 |
| "DbPassword"=""..... | 285 |
| "COM_SinglePool"="YES"..... | 285 |
| <i>Microsoft Internet Information Server Registry Parameters</i> | 285 |
| [HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Services\InetInfo]..... | 285 |
| [HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Services\InetInfo\Parameters]..... | 285 |
| "ListenBackLog"=dword:00000019..... | 285 |
| "DispatchEntries"=hex(7):4c,00,44,00,41,00,50,00,53,00,56,00,43,00,00,00,00,00..... | 285 |
| "PoolThreadLimit"=dword:000000be..... | 285 |
| "ThreadTimeout"=dword:00015180..... | 285 |
| [HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Services\InetInfo\Performance]..... | 285 |
| "Library"="infoctrs.dll"..... | 285 |
| "Open"="OpenINFOPerformanceData"..... | 285 |
| "Close"="CloseINFOPerformanceData"..... | 285 |
| "Collect"="CollectINFOPerformanceData"..... | 285 |
| "Last Counter"=dword:00000842..... | 285 |
| "Last Help"=dword:00000843..... | 285 |
| "First Counter"=dword:00000802..... | 285 |
| "First Help"=dword:00000803..... | 285 |
| "Library Validation Code"=hex:de,fc,ed,18,0a,98,c0,01,10,25,00,00,00,00,00,00..... | 285 |

| | |
|---|------------|
| "WbemAdapFileTime"=hex:00,60,4e,96,aa,40,bf,01..... | 285 |
| "WbemAdapFileSize"=dword:00002510..... | 285 |
| "WbemAdapStatus"=dword:00000000..... | 285 |
| World Wide Web Service Registry Parameters..... | 285 |
| RTE INPUT PARAMETERS..... | 315 |
| <i>BenchCraft Configuration File</i> | 315 |
| APPENDIX D – DISK STORAGE..... | 319 |
| APPENDIX E - PRICE QUOTATIONS..... | 320 |

Introduction

Document Structure

The TPC Benchmark C Standard Specification Revision 5.6, written and approved by the Transaction Processing Performance Council (TPC), determines the contents of this report. The format of this report is based on this specification. Most sections of this report begin with the specification requirements printed in italic type, immediately followed by the detail in plain type of how Dell complied with the specification. Where extensive listings are required (such as listing of code), a note is included which references an appendix containing the listing.

Benchmark Overview

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

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

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

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

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

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

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

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

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

System Overview

The hardware configuration used in this TPC-C test is a Dell PowerEdge 2850 server driven by one Dell PowerEdge 1600 client. The PE2850 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. One remote terminal emulator (RTE) system (PowerEdge 2200's) emulate 21,000 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 2850 motherboard uses the Intel E7520 (Lindenhurst) chipset and can hold up to two Pentium® 4 Xeon processors (3.6 GHz with 1 MB L2 cache each) and 64-bit Extensions. The system has 3 PCI-X 64-bit/100MHz I/O slots. The measured configuration used 2.50 Gbytes of DDR2 RAM, which was achieved by using four 512 Mbyte DIMMs and two 256Mbyte DIMMs.

The PowerEdge 2850 has an integrated LSI Perc4 DCI-E SCSI controller to which was attached 6 36GB hard disks in RAID 10 configuration containing the database log and OS. In addition, three LSI PERC3 DC RAID controllers were installed in PCI-X slots. The three PERC3 controllers were connected to five PV220 disk pods enclosing a total of 70 18GB 15K RPM SCSI disks, containing database data.

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 machine through a 10/100 BaseT switch and the Intel Pro NIC was connected to the Database Server through a cross-over cable. The client was driven through three network segments to run a total of 21,000 emulated users. The network segments between the switches and RTEs were fixed at 10 Mbit/sec, half duplex.

General Items

Test Sponsor

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

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

Application Code and Definition Statements

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

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

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

The web Client code is listed in Appendix A.

Parameter Settings

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

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

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

Appendix C contains all the database, Windows 2003 Server, and Internet Information Service parameters used in this benchmark.

Appendix D contains the 60 day space calculations.

Configuration Diagrams

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

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

Figure 1: Measured Configuration

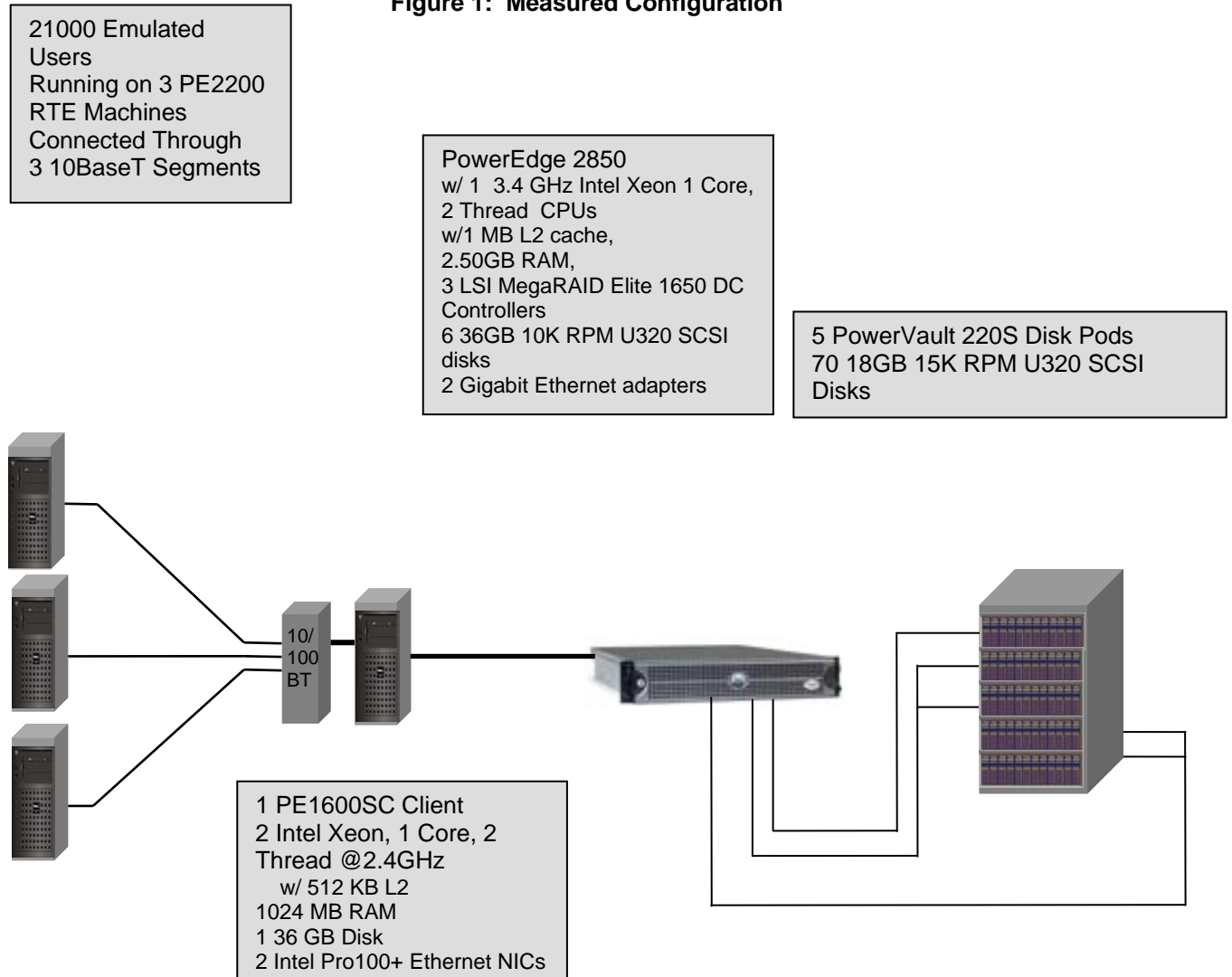
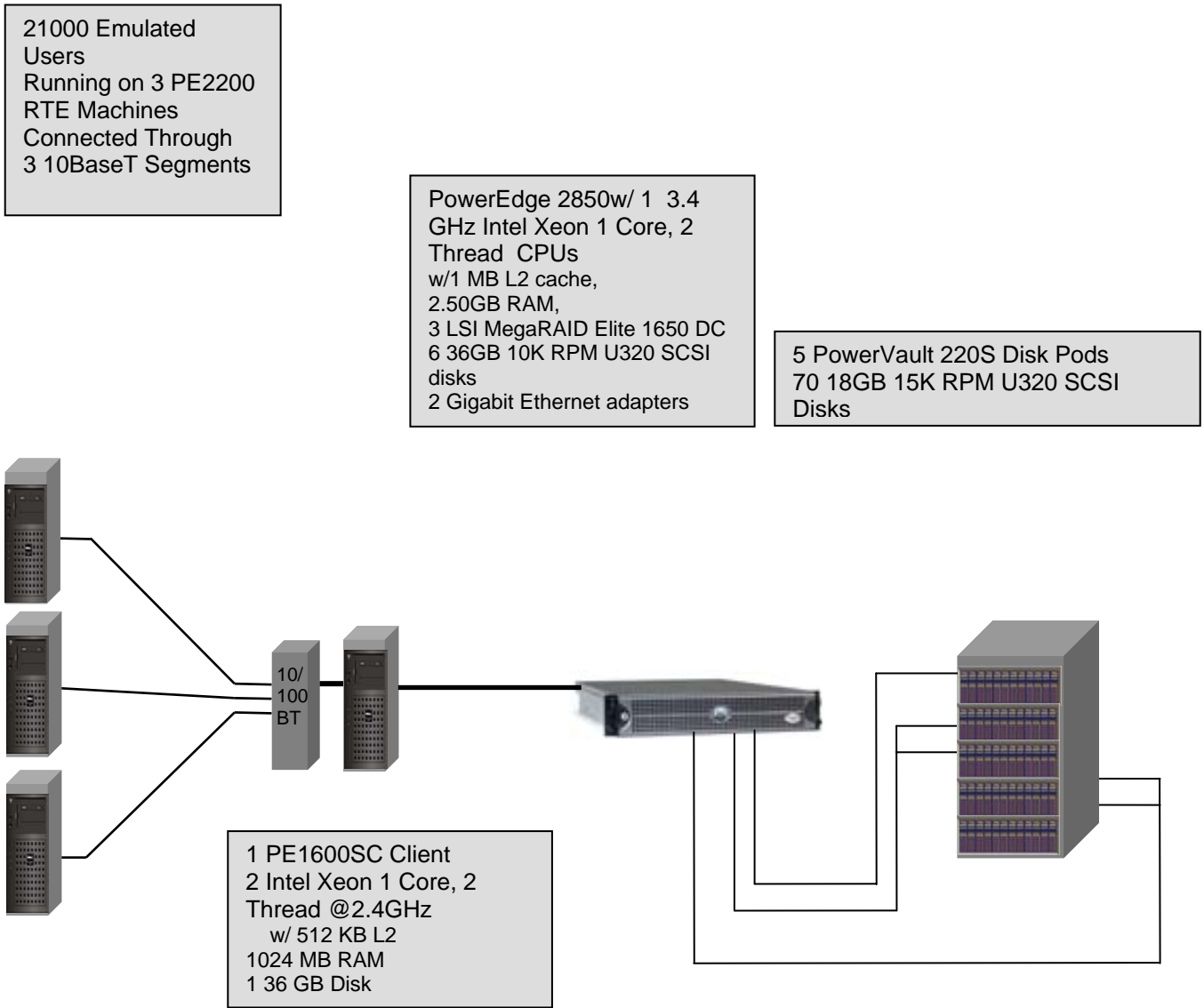


Figure 2: Priced Configuration



Clause 1 -- Logical Database Design Related Items

Table Definitions

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

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

Physical Organization of the Database

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

The measured configuration used 76 disk drives. The organization is shown in Table 5: Data Distribution.

Insert and Delete Operations

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

Insert and delete functionality was fully operational during the benchmark.

Horizontal and Vertical Partitioning

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

Partitioning was not used in this benchmark.

Replication

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

Replication was not used in this benchmark.

Table Attributes

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

No additional attributes were used in this benchmark.

Clause 2 -- Transaction and Terminal Profiles Related Items

Random Number Generation

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

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

Screen Layout

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

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

Terminal Verification

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

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

Intelligent Terminals

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

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

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

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

Transaction Profiles

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

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

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

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

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

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

Table 1: Transaction Statistics

| Transaction | Function | Value |
|--------------------|--------------------------|--------------|
| New Order | Home Warehouse Items | 99.00% |
| | Remote Warehouse Items | 1.00% |
| | Rolled Back Transactions | 1.00% |
| | Average Lines Per Order | 10.00 |
| Payment | Home Warehouse | 84.98% |
| | Remote Warehouse | 15.02% |
| | Non-Primary Key Access | 60.00% |
| Order Status | Non-Primary Key Access | 60.15% |
| Delivery | Skipped Transactions | 0 |

Transaction Mix

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

Table 2: Transaction mix

| Transaction | Percentage |
|--------------------|-------------------|
| New Order | 44.91% |
| Payment | 43.02% |
| Order Status | 4.04% |
| Delivery | 4.02% |
| Stock Level | 4.01% |

Deferred Delivery Mechanism

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

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

The source code is listed in Appendix A.

Clause 3 -- Transaction and System Properties Related Items

ACID Tests

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

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

Atomicity

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

Completed Transactions

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

Aborted Transactions

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

Consistency

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

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

Isolation

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

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

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

For Isolation test seven, case A was followed.

Durability

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

Durable Media Failure

Durability from media failure was demonstrated on the 210 warehouse database. The standard driving mechanism was used to generate the transaction load of 2100 users for the Loss of Data.

Loss of Data/Loss of Log

Loss of data and loss of log were demonstrated on the 210 Warehouse database. The standard driving mechanism was used to generate the transaction load of 210 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 210 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. 2100 users were logged in to the database and ran transactions.
5. The system was run at steady state for 5 minutes.
6. One disk drive in the transaction log array was removed with no effect on Windows 2003 or SQL Server.
7. The system ran for an additional 5 minutes.
8. One disk drive in the data array was removed causing SQL Server errors.
9. The RTE was allowed to continue running. Completed transactions enroute from the clients were recorded. Error messages began appearing on the RTE screen.
10. The RTE was stopped.
11. SQL Server was stopped and restarted and a dump of the transaction log was taken.
12. SQL Server was stopped, Windows 2003 was shutdown and the machine powered off.
13. The failed disk was replaced.
14. The machine was powered up, Windows 2003 and SQL Server were started.
15. The TPC-C database was dropped and restored from backup.
16. The transaction log was restored and transactions rolled forward.
17. A new count of D_NEXT_O_ID was taken.
15. This number was compared with the number of new orders reported by the RTE. The difference was valid per the spec.

Instantaneous Interruption and Loss of Memory

Instantaneous Interruption and Loss of Memory were demonstrated on the full database with 2100 warehouses in a single test. The standard driving mechanism was used to generate the transaction load of 21000 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. 21000 users were logged in to the database and ran transactions.
4. The system was run is steady state for 5 minutes
5. A checkpoint was executed and allowed to finish.
6. The system ran for an additional 30 seconds.

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. The difference was valid per the spec.

Clause 4 -- Scaling and Database Population Related Items

Table Cardinality

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

The database was originally built with 2100 warehouses.

Table 3: Table Cardinality

| Table | Cardinality as Benchmarked |
|--------------------|-----------------------------------|
| Warehouse | 2,100 |
| District | 21,000 |
| Customer | 63,000,000 |
| History | 63,000,000 |
| NewOrder | 18,900,000 |
| Orders | 63,000,000 |
| OrderLine | 630,001,483 |
| Item | 100,000 |
| Stock | 210,000,000 |
| Deleted Warehouses | 0 |

Constant Values

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

Table 4: Constant Values

| Function | Constant C Value |
|-----------------|-------------------------|
| C_LAST (Build) | 123 |
| C_LAST (Run) | 208 |

Data Distribution

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

The Database was built using a total of 76 disks: 70 18GB for data, 6 36GB for log and OS and application software. The data drives were configured as hardware RAID 0. Logs and OS were configured as hardware RAID 10. LSI MEGARAID ELITE 1650 DC RAID Controllers 2 and 3 were configured with 1 logical drive each. Each logical drive spanned 28 disk drives. PERC3/Di intergrated controller 1 was configured with 1 logical drive spanning 6 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 | | | LSI MEGARAID ELITE 1650 DCConfiguration | | | | | |
|-------------------------|----------------------------|---|---|---------|----------|---|---|---|
| Disk 0 104028MB | | | Controller # 1 | | | | | |
| Partition | | | Slot# 1 | | Channels | | | |
| 1 | 2 | 3 | | SCSI ID | A | B | C | D |
| C: OS NTFS 8GB | E: MS1 RAW 48.5GB | | | 0 | A1-1 | | | |
| | | | | 1 | A1-2 | | | |
| | | | | 2 | A1-3 | | | |
| | | | | 3 | A1-4 | | | |
| | | | | 4 | A1-5 | | | |
| | | | | 5 | A1-6 | | | |
| | | | | 8 | | | | |
| | | | | 9 | | | | |
| | | | | 10 | | | | |
| | | | | 11 | | | | |
| | | | | 12 | | | | |
| | | | | 13 | | | | |
| | | | | 14 | | | | |
| | | | | 15 | | | | |

| W2K Disk Administration | | | LSI MEGARAID ELITE 1650 DC Configuration | | | | | |
|----------------------------|----------------------------|-----------------------------------|--|---------|----------|-------|---|---|
| Disk 1 241879MB | | | Controller # 1 | | | | | |
| Partition | | | Slot# 1 | | Channels | | | |
| 1 | 2 | 3 | | SCSI ID | A | B | C | D |
| F: MS1 RAW 12.7GB | M: CS1 RAW 24.9GB | T: Backup1 NTFS 198.61GB | | 0 | | A2-1 | | |
| | | | | 1 | | A2-2 | | |
| | | | | 2 | | A2-3 | | |
| | | | | 3 | | A2-4 | | |
| | | | | 4 | | A2-5 | | |
| | | | | 5 | | A2-6 | | |
| | | | | 8 | | A2-7 | | |
| | | | | 9 | | A2-8 | | |
| | | | | 10 | | A2-9 | | |
| | | | | 11 | | A2-10 | | |
| | | | | 12 | | A2-11 | | |
| | | | | 13 | | A2-12 | | |
| | | | | 14 | | A2-13 | | |
| | | | | 15 | | A2-14 | | |

| W2K Disk Administration | | | LSI MEGARAID ELITE 1650 DC Configuration | | | | | |
|----------------------------|----------------------------|-----------------------------------|--|---------|----------|-------|---|---|
| Disk 2 & 3 483758MB | | | Controller # 2 | | | | | |
| Partition | | | Slot# 2 | | Channels | | | |
| 1 | 2 | 3 | | SCSI ID | A | B | C | D |
| Channel A: | | | | 0 | A1-1 | A2-1 | | |
| G: MS2 RAW 12.7GB | N: CS2 RAW 24.9GB | U: Backup2 NTFS 198.61GB | | 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 | | |
| Channel B: | | | | 8 | A1-7 | A2-7 | | |
| H: MS3 RAW 12.7GB | O: CS3 RAW 24.9GB | V: Backup3 NTFS 198.61GB | | 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 | | | LSI MEGARAID ELITE 1650 DC Configuration | | | | | |
|-------------------------|-----------|-----------|--|---------|----------|-------|---|---|
| Disk 4 & 5 483758MB | | | Controller # 3 | | | | | |
| Partition | | | Slot# 3 | | Channels | | | |
| 1 | 2 | 3 | | SCSI ID | A | B | C | D |
| Channel A: | | | | 0 | A1-1 | A2-1 | | |
| I: | P: | W: | | 1 | A1-2 | A2-2 | | |
| MS4 | CS4 | Backup4 | | 2 | A1-3 | A2-3 | | |
| RAW | RAW | NTFS | | 3 | A1-4 | A2-4 | | |
| 12.7GB | 24.9GB | 198.61GB | | 4 | A1-5 | A2-5 | | |
| | | | | 5 | A1-6 | A2-6 | | |
| Channel B: | | | | 8 | A1-7 | A2-7 | | |
| J: | Q: | | | 9 | A1-8 | A2-8 | | |
| MS5 | CS5 | | | 10 | A1-9 | A2-9 | | |
| RAW | RAW | | | 11 | A1-10 | A2-10 | | |
| 12.7GB | 24.9GB | | | 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 Standard 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 space used 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 100.2906 GB (including mirror) to sustain the log for 8 hours. Space available on the transaction log volume was 134.98GB (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 | 26,410 |
| Price per TpmC | \$1.53 |

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 | 0.32 | 0.43 | 4.62 |
| Payment | 0.15 | 0.19 | 1.85 |
| Interactive Delivery | 0.11 | 0.11 | 1.15 |
| Stock Level | 1.34 | 2.87 | 7.59 |
| Order Status | 0.23 | 0.30 | 4.60 |
| Deferred Delivery | 0.70 | 0.96 | 2.84 |
| Menu | 0.11 | 0.11 | 1.16 |

Think Times & Key Times

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

Table 7: Transaction Key Times

| Transaction | Minimum | Average | Maximum |
|--------------|---------|---------|---------|
| New Order | 18.02 | 18.03 | 18.91 |
| Payment | 3.01 | 3.03 | 3.91 |
| Delivery | 2.02 | 2.03 | 2.91 |
| Stock Level | 2.02 | 2.03 | 2.91 |
| Order Status | 2.02 | 2.03 | 2.91 |

Table 8: Transaction Think Times

| Transaction | Minimum | Average | Maximum |
|--------------|---------|---------|---------|
| New Order | 0.00 | 12.05 | 120.41 |
| Payment | 0.00 | 12.04 | 120.41 |
| Delivery | 0.00 | 5.04 | 50.40 |
| Stock Level | 0.00 | 5.05 | 50.41 |
| Order Status | 0.00 | 10.03 | 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

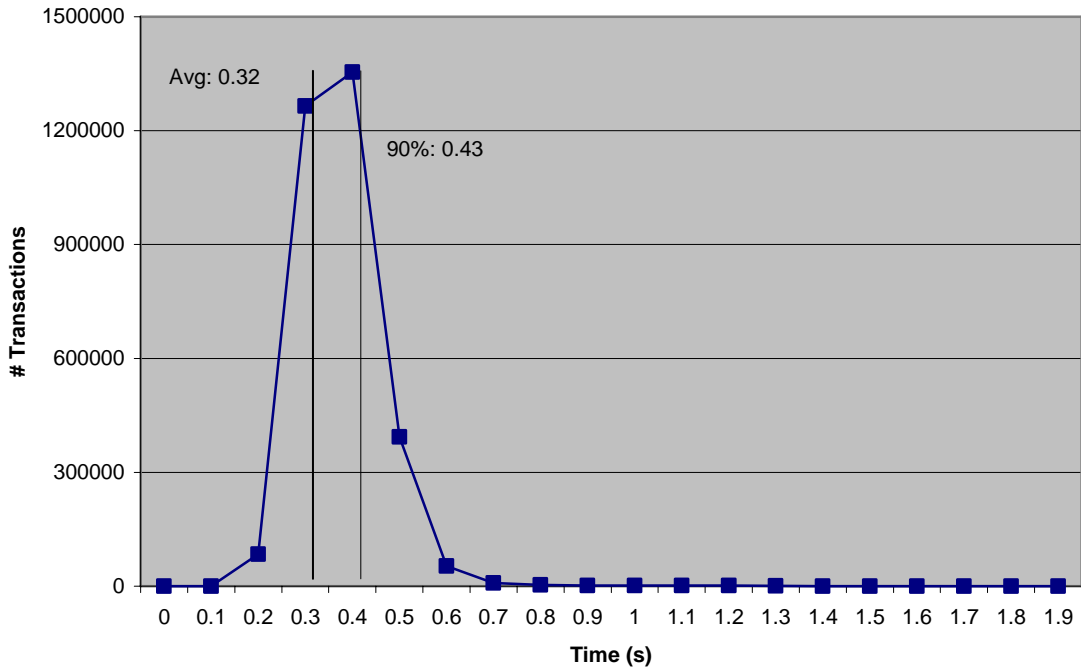


Figure 4: Payment Response Time Distribution

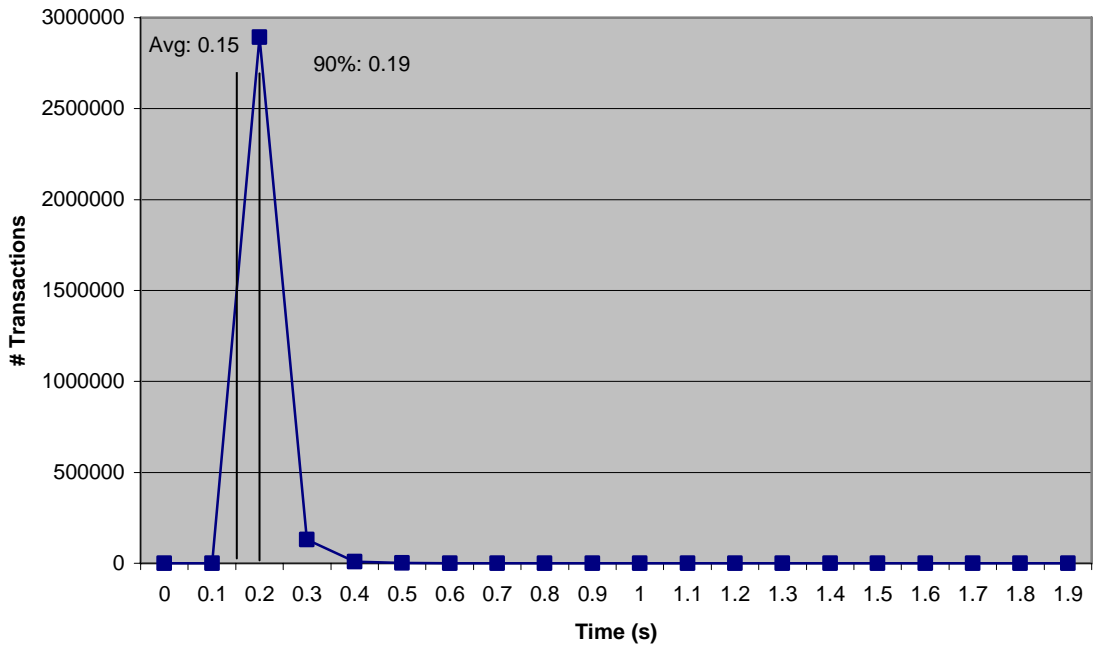


Figure 5: Order Status Response Time Distribution

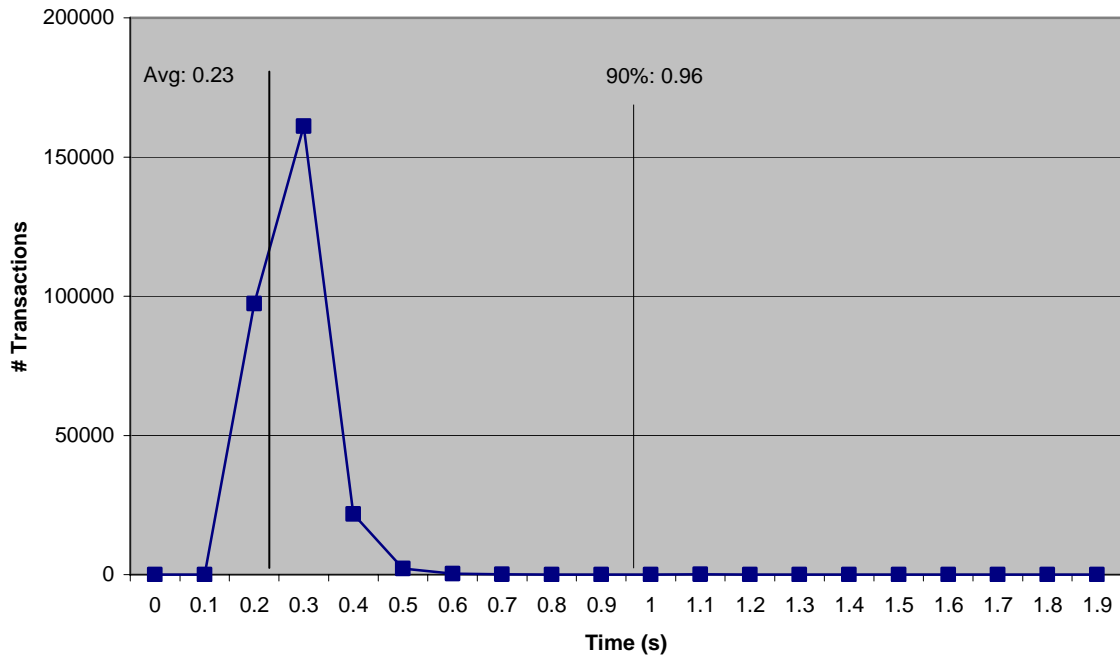


Figure 6: Delivery Response Time Distribution

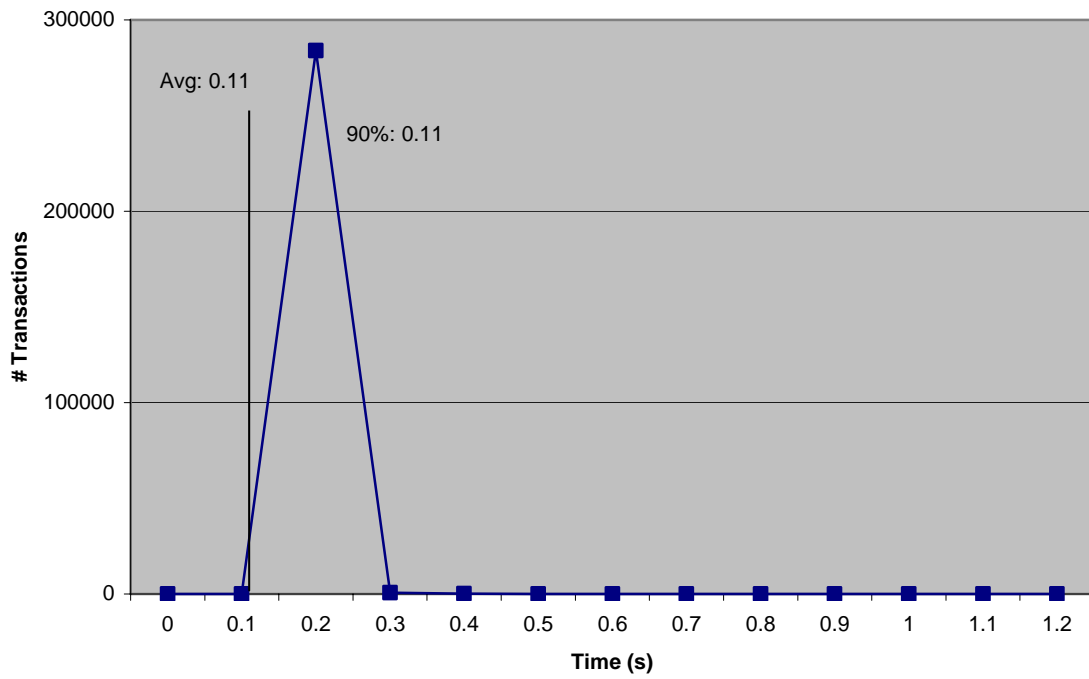
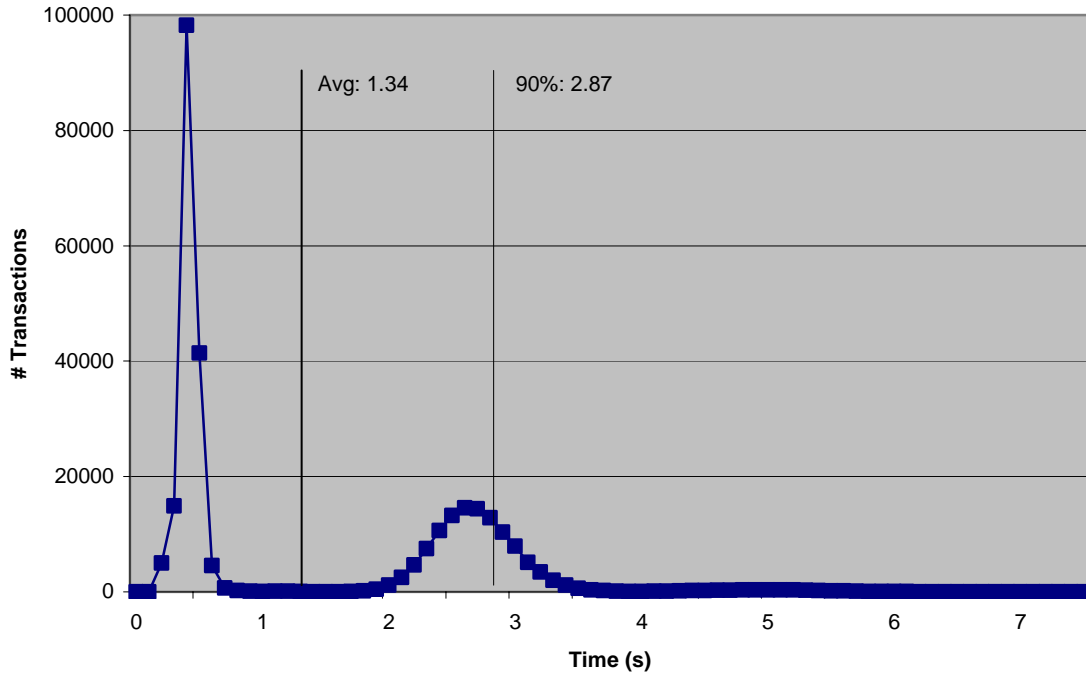


Figure 7: Stock Level Response Time Distribution

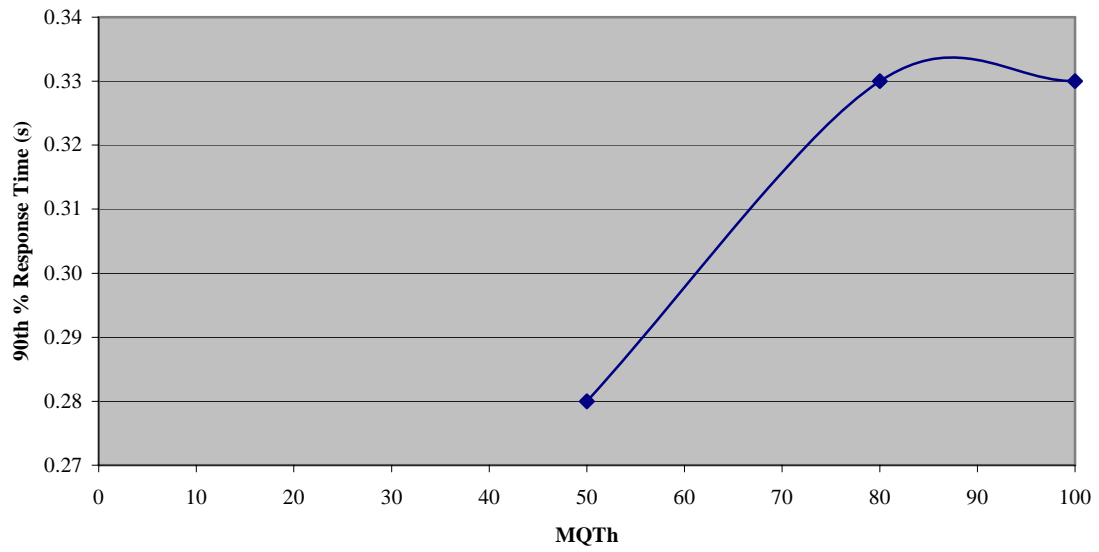


New-Order Response Time vs. Throughput Graph

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

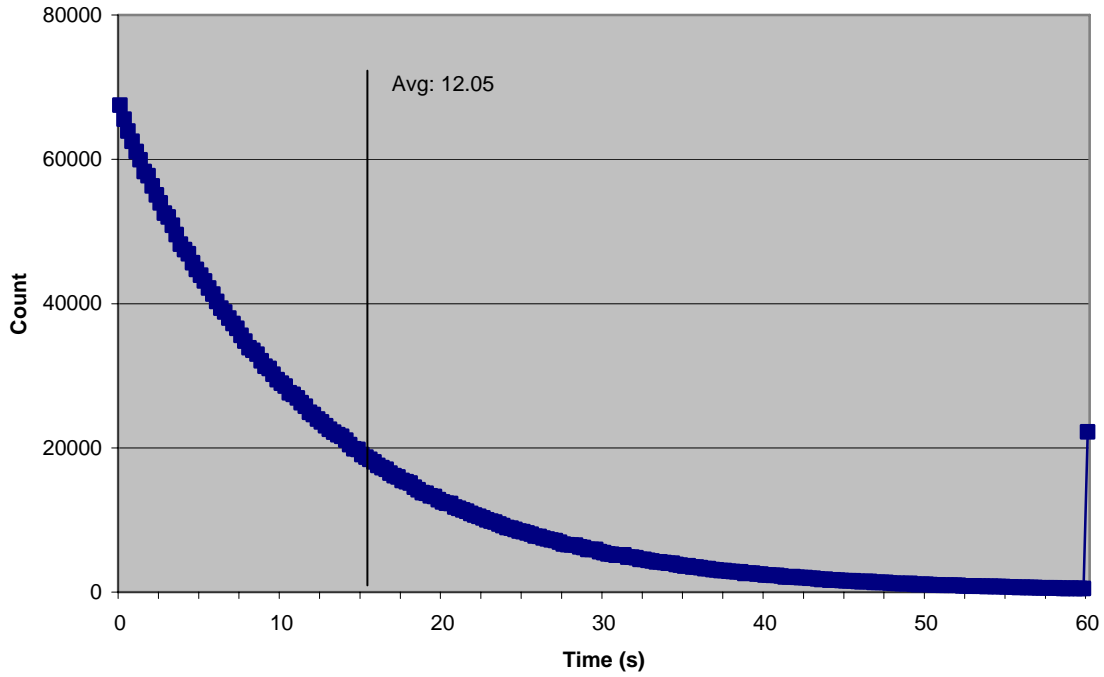
Report MQTh versus 90th % Response Time



New-Order Think Time Distribution Graph

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

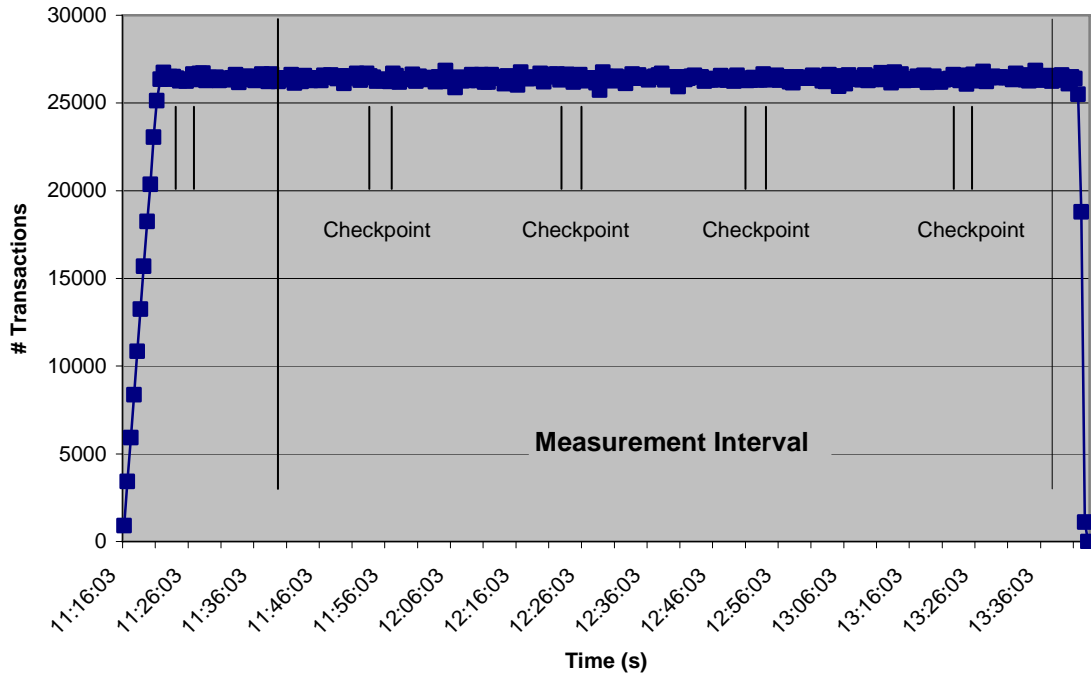
Figure 9: New Order Think Time Distribution



Steady-State Graph

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

Figure 10: New Order Throughput vs. Time



Steady-State Methodology

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

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

Work Performed During Steady State

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

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

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

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

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

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

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

Measurement Interval

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

The measurement interval was 7200 minutes.

Measurement Period Duration and Checkpoint Duration

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

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

| | Start | End | Duration |
|----------------------------|--------------|------------|-----------------|
| Measurement Interval | 11:37:58 | 13:57:58 | 7,200 |
| 1 st Checkpoint | 11:52:53 | 11:54:41 | 108 |
| 2 nd Checkpoint | 12:22:48 | 12:24:40 | 112 |
| 3 rd Checkpoint | 12:52:43 | 12:54:51 | 128 |
| 4 th Checkpoint | 13:22:38 | 13:24:57 | 139 |

Transaction Mix

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

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

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

Table 9: Transaction Mix

| Transaction | Percentage |
|--------------|------------|
| New Order | 44.91% |
| Payment | 43.02% |
| Delivery | 4.04% |
| Stock Level | 4.02% |
| Order Status | 4.01% |

Other Metrics

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

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

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

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

The percentage of customer selections by customer last name in the Payment and Order-Status transactions must be disclosed. (8.1.6.19)

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

Table 10: Transaction Statistics

| Transaction | Function | Value |
|--------------|--------------------------|--------|
| New Order | Home Warehouse Items | 99.00% |
| | Remote Warehouse Items | 1.00% |
| | Rolled Back Transactions | 1.00% |
| | Average Lines Per Order | 10.00 |
| Payment | Home Warehouse | 84.98% |
| | Remote Warehouse | 15.02% |
| | Non-Primary Key Access | 60.00% |
| Order Status | Non-Primary Key Access | 60.15% |
| 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: December 10, 2004

Software Availability Date: December 10, 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: 26,410 tpmC

Price Performance Metric: \$1.53

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 Standard 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 Ruger St.
San Francisco, CA 94129-0920
Phone: (415) 561-6272, fax 415-561 6120
www.tpc.org

or:

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



December 10, 2004

Mr. Eugene Purdy
Dell Computer Corporation
One Dell Way
Round Rock, TX 78682

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

Platform: Dell PowerEdge 2850
Database Manager: Microsoft SQL Server 2000 Standard Edition
Operating System: Microsoft Windows 2003 Standard Server
Transaction Monitor: COM+

| System Under Test: Dell PowerEdge 2850 with: | | | | |
|--|--------------|-------------------------|--------------|--------|
| CPU's | Memory | Disks (total) | 90% Response | TpmC |
| 1 Intel Xeon @ 3.4 Ghz | Main: 2.5 GB | 70 @ 18.2GB 6 @ 36GB | 0.43 | 26,410 |

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

- The transactions were correctly implemented.
- The database files were properly sized.
- The database was properly scaled with 2,100 warehouses, all of which were active during the measured interval.
- The ACID properties were successfully demonstrated.
- Data loss durability was demonstrated on a subset of the SUT configured with a database properly populated for 210 warehouses.
- Input data was generated according to the specified percentages.
- Eight hours of mirrored log space was present on the tested system.
- Eight hours of growth space for the dynamic tables was present on the tested system.
- The data for the 60 days space calculation was verified.
- The controller cache for the log disks was disabled.
- The steady state portion of the test was 120 minutes.
- More than one checkpoint was taken before the measured interval opened.
- Four checkpoints were completed inside the measured interval.
- The system pricing was checked for major components and maintenance.
- Third party quotes were verified for compliance.

Auditor Notes: None

Sincerely,

Lorna Livingtree

Lorna Livingtree
Auditor

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      4001
#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,
    ERR_DELIVERY_THREAD_FAILED,
    ERR_GETPROCADDR_FAILED,
```

Appendix A - Application Source Code

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

class CWEBCLNT_ERR : public CBaseErr
{
public:
    CWEBCLNT_ERR(WEBERROR Err)
    {
        m_Error = Err;
        m_szTextDetail = NULL;
        m_SystemErr = 0;
    }
};

m_szErrorText = NULL;
};

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

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

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

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

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

//function prototypes

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

Appendix A - Application Source Code

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

isapi_dll/src/tpcc.rc

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

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

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

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

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

#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
STYLE DS_MODALFRAME | WS_POPUP | WS_CAPTION | WS_SYSMENU
CAPTION "Dialog"
```

Appendix A - Application Source Code

```
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

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

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

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

isapi_dll/src/tpcc.cpp

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

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

#include <sqltypes.h>

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

#include "..\..\common\src\trans.h" //tpckit transaction header contains
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\txnolog\include\rtetime.h"
#include "..\..\common\txnolog\include\spinlock.h"
#include "..\..\common\txnolog\include\txnolog.h"

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

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

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

#define LEN_ERR_STRING 256

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

char szMyComputerName[MAX_COMPUTERNAME_LENGTH+1];

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

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


Appendix A - Application Source Code

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

HANDLE INVALID_HANDLE_VALUE;
HANDLE = INVALID_HANDLE_VALUE;
HANDLE *pDeliHandles = NULL;

// configuration settings from registry
TPCCREGISTRYDATA Reg;

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

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

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

```
*/
BOOL 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
                pCTPCC_TUXEDO_new =
(TYPE_CTPCC_TUXEDO*) GetProcAddress(hLibInstanceTm, "CTPCC_TUXEDO_new");
                if (pCTPCC_TUXEDO_new == NULL)
                    throw new CWEBCLNT_ERR(
ERR_GETPROCADDR_FAILED, szDllName, GetLastError() );
                else if (Reg.eTxnMon == ENCINA)
                {
                    strcpy( szDllName, Reg.szPath );
                    strcat( szDllName, "tpcc_encina.dll");
                }
            }
        }
    }
}
```

Appendix A - Application Source Code

```
);
        hLibInstanceTm = LoadLibrary( szDllName
ERR_LOADDLL_FAILED, szDllName, GetLastError() );
        if (hLibInstanceTm == NULL)
            throw new CWEBCLNT_ERR(
// get function pointer to wrapper for
class constructor
        pCTPCC_ENCINA_new =
(TYPE_CTPCC_ENCINA*) GetProcAddress(hLibInstanceTm,"CTPCC_ENCINA_new");
        pCTPCC_ENCINA_post_init =
(TYPE_CTPCC_ENCINA*) GetProcAddress(hLibInstanceTm,"CTPCC_ENCINA_post_init");
        if (pCTPCC_ENCINA_new == NULL)
            throw new CWEBCLNT_ERR(
ERR_GETPROCADDR_FAILED, szDllName, GetLastError() );
        }
        else if (Reg.eTxnMon == COM)
        {
            strcpy( szDllName, Reg.szPath );
            strcat( szDllName, "tpcc_com.dll");
            hLibInstanceTm = LoadLibrary( szDllName
);
        if (hLibInstanceTm == NULL)
            throw new CWEBCLNT_ERR(
ERR_LOADDLL_FAILED, szDllName, GetLastError() );
// get function pointer to wrapper for
class constructor
        pCTPCC_COM_new = (TYPE_CTPCC_COM*)
GetProcAddress(hLibInstanceTm,"CTPCC_COM_new");
        if (pCTPCC_COM_new == NULL)
            throw new CWEBCLNT_ERR(
ERR_GETPROCADDR_FAILED, szDllName, GetLastError() );
        }
// load DLL for database connection
if ((Reg.eTxnMon == None) ||
(dwNumDeliveryThreads > 0))
    {
        if (Reg.eDB_Protocol == DBLIB)
        {
            strcpy( szDllName, Reg.szPath
);
            strcat( szDllName,
"tpcc_dblib.dll");
            hLibInstanceDb = LoadLibrary(
szDllName );
            if (hLibInstanceDb == NULL)
                throw new
CWEBCLNT_ERR( ERR_LOADDLL_FAILED, szDllName, GetLastError() );
// get function pointer to
wrapper for class constructor
        pCTPCC_DBLIB_new =
(TYPE_CTPCC_DBLIB*) GetProcAddress(hLibInstanceDb,"CTPCC_DBLIB_new");
        if (pCTPCC_DBLIB_new == NULL)
            throw new
CWEBCLNT_ERR( ERR_GETPROCADDR_FAILED, szDllName, GetLastError() );
        }
        else if (Reg.eDB_Protocol == ODBC)
        {
            strcpy( szDllName, Reg.szPath
```

```

            strcat( szDllName,
"tpcc_odbc.dll");
            hLibInstanceDb = LoadLibrary(
szDllName );
            if (hLibInstanceDb == NULL)
                throw new
CWEBCLNT_ERR( ERR_LOADDLL_FAILED, szDllName, GetLastError() );
// get function pointer to
wrapper for class constructor
        pCTPCC_ODBC_new =
(TYPE_CTPCC_ODBC*) GetProcAddress(hLibInstanceDb,"CTPCC_ODBC_new");
        if (pCTPCC_ODBC_new == NULL)
            throw new
CWEBCLNT_ERR( ERR_GETPROCADDR_FAILED, szDllName, GetLastError() );
        }
    }
    if (dwNumDeliveryThreads)
    {
        // for deferred delivery txns:
        hDoneEvent = CreateEvent( NULL, TRUE /*
manual reset */, FALSE /* initially not signalled */, NULL );
        InitializeCriticalSection(&DelBuffCriticalSection);
        hWorkerSemaphore = CreateSemaphore(
NULL, 0, dwDelBuffSize, NULL );
        dwDelBuffFreeCount = dwDelBuffSize;
        InitJulianTime(NULL);
// create unique log file name based on
        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)
            if (pDeliHandles[i] ==
                throw new
CWEBCLNT_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.
*
* ARGUMENTS: 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;
            }
        }
    }
}
```

```
szBuffer);

szBuffer);

szBuffer);

szBuffer);

szBuffer);

}
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();
}
```

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

```

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(long w_id, short o_carrier_id)
{
    BOOL bError;

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

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

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

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

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

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

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

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

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

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

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

/* FUNCTION: void WelcomeForm
 *
 */

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

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

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

Appendix A - Application Source Code

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

if (Reg.eTxnMon == None)
// connection options may be specified when not using a txn monitor
    sprintf( szTmp, "Please enter your database options for this
connection:<BR>"

            "<font face=\"Courier New\"
color=\"blue\"><PRE>"
            "DB Server = <INPUT
NAME=\"db_server\" SIZE=20 VALUE=\"%s\"><BR>"
            "DB User ID = <INPUT
NAME=\"db_user\" SIZE=20 VALUE=\"%s\"><BR>"
            "DB Password = <INPUT
NAME=\"db_passwd\" SIZE=20 VALUE=\"%s\"><BR>"
            "DB Name = <INPUT
NAME=\"db_name\" SIZE=20 VALUE=\"%s\"><BR>"
            "</PRE></font>"
            , Reg.szDbServer, Reg.szDbUser,
            Reg.szDbPassword, Reg.szDbName );
    else
// if using a txn monitor, connection options are determined from
registry; can't
// set per user. show options fyi
    sprintf( szTmp, "Database options which will be used by the
transaction monitor:<BR>"

            "<font face=\"Courier New\"
color=\"blue\"><PRE>"
            "DB Server =
<B>%s</B><BR>"
            "DB User ID =
<B>%s</B><BR>"
            "DB Password =
<B>%s</B><BR>"
            "DB Name =
<B>%s</B><BR>"
            "</PRE></font>"
            , Reg.szDbServer, Reg.szDbUser,
            Reg.szDbPassword, Reg.szDbName );
    strcat( szBuffer, szTmp);

    sprintf( szTmp, "Please enter your Warehouse and District for this
session:<BR>"

            "<font face=\"Courier New\"
color=\"blue\"><PRE>" );
    strcat( szBuffer, szTmp);
    strcat( szBuffer, "Warehouse ID = <INPUT NAME=\"w_id\" SIZE=6><BR>"
            "District ID = <INPUT
NAME=\"d_id\" SIZE=2><BR>"

            "</PRE></font><HR>"
            "<INPUT TYPE=\"submit\">"
            "</FORM></BODY></HTML>");
}

/* FUNCTION: SubmitCmd
*
```

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

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

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

    // validate version field; the version field ensures that the RTE is
synchronized with the web client
    GetKeyValue(&ptr, "VERSION", szVersion, sizeof(szVersion),
ERR_VERSION_MISMATCH);
    if ( strcmp( szVersion, WEBCLIENT_VERSION ) )
        throw new 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, Reg.szSPPrefix );
        else if (Reg.eDB_Protocol == DBLIB)
            Term.pClientData[iNewTerm].pTxn = pCTPCC_DBLIB_new(
szServer, szUser, szPassword, szMyComputerName, szDatabase );
    }
    catch (...)
    {
        TermDelete(iNewTerm);
        throw; // pass exception upward
    }

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

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

void StatsCmd(EXTENSION_CONTROL_BLOCK *pECB, char *szBuffer)
{
    int i;
    int 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. GetProcAddress 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_TO_LONG,
            "Payment Customer last name longer than 16 characters."
        },
        {
            ERR_PAYMENT_MISSING_CDI_KEY,
            "Payment missing Customer district key \"CDI*\"."
        },
        {
            ERR_PAYMENT_MISSING_CID_CLT,
            "Payment Either Customer ID or Last Name must be entered."
        },
        {
            ERR_PAYMENT_MISSING_CID_KEY,
            "Payment missing Customer Key \"CID*\"."
        },
        {
            ERR_PAYMENT_MISSING_CLT_KEY,
            "Payment missing Customer Last Name key \"CLT*\"."
        },
        {
            ERR_PAYMENT_MISSING_CWI_KEY,
            "Payment missing Customer Warehouse key \"CWI*\"."
        },
        {
            ERR_PAYMENT_MISSING_DID_KEY,
            "Payment missing District Key \"DID*\"."
        },
        {
            ERR_PAYMENT_MISSING_HAM_KEY,
            "Payment missing Amount key \"HAM*\"."
        },
        {
            ERR_STOCKLEVEL_MISSING_THRESHOLD_KEY,
            "Stock Level; missing Threshold key \"TT*\"."
        },
        {
            ERR_STOCKLEVEL_THRESHOLD_INVALID,
            "Stock Level; Threshold value must be in the range = 1 - 99."
        },
        {
            ERR_STOCKLEVEL_THRESHOLD_RANGE,
            "Stock Level Threshold out of range, range must be 1 - 99."
        },
        {
            ERR_VERSION_MISMATCH,
            "Invalid version field. RTE and Web Client are probably out of sync."
        },
        {
            ERR_W_ID_INVALID,
            "Invalid Warehouse ID."
        },
        {
            0,
            ""
        }
    };

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

    if (m_szTextDetail)
        strcat( szTmp, m_szTextDetail );
    if (m_SystemErr)
        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
*   maximum length of key value array.      int      iMax
*   error value to throw      WEBERROR      err
* RETURNS:      nothing.
* ERROR:      if (the pKey value is not found) then
*             if (err == 0)
*             return (empty string)
*             else
*             throw CWEBCLNT_ERR(err)
* COMMENTS:      http keys are formatted either KEY=value& or KEY=value\0. This DLL
formats
*               TPC-C input fields in such a manner that the keys
can be extracted in the
*               above manner.
*/

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

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

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

    *pQueryString = ptr;
    return;

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

/* FUNCTION: GetIntKeyValue
*
* PURPOSE:      This function parses a http formatted string for a specific key
value.
*
* ARGUMENTS:      char      *pQueryString      http string from
client browser
*
*               char      *pKey
*
*               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\">                                Stock-
Level<BR>"
"Warehouse: %6.6d District: %2.2d<BR><BR>",
STOCK_LEVEL_FORM, iTermId, Term.pClientData[iTermId].iSyncId,
Term.pClientData[iTermId].w_id, Term.pClientData[iTermId].d_id);

    if ( bInput )
    {
        strcpy(szForm+c,
"Stock Level Threshold: <INPUT NAME=\"TT\" SIZE=2><BR>"
"low stock:      </font><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></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, "%6.6d %6.6d %24s
%2.2d %3.3d %1.1s  $%6.2f  $%7.2f <BR>",
                pNewOrderData->OL[i].ol_supply_w_id,
                pNewOrderData->OL[i].ol_i_id,
                pNewOrderData->OL[i].ol_i_name,
                pNewOrderData->OL[i].ol_quantity,
                pNewOrderData->OL[i].ol_stock,
                pNewOrderData->OL[i].ol_brand_generic,
                pNewOrderData->OL[i].ol_i_price,
                pNewOrderData->OL[i].ol_amount );
            }
        }
        else
        {
            c += wsprintf(szForm+c,
                "%Disc:<BR>"
                "Order Number: %8.8d Number of Lines:
                " 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\"
                VALUE=\"..NewOrder..\">"
                "<INPUT TYPE=\"submit\" NAME=\"CMD\"
                VALUE=\"..Payment..\">"
                "<INPUT TYPE=\"submit\" NAME=\"CMD\"
                VALUE=\"..Delivery..\">"
                "<INPUT TYPE=\"submit\" NAME=\"CMD\" VALUE=\"..Order-
                Status..\">"

```

```

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

        Payment<BR>"

        "Date: "
        , PAYMENT_FORM, iTermId, Term.pClientData[iTermId].iSyncId);

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

    if ( bInput )
    {
        c += wsprintf(szForm+c,
            "<BR> <BR>Warehouse: %6.6d"
            " District: <INPUT NAME=\"DID\"
            SIZE=1><BR> <BR> <BR> <BR> <BR>"
            "Customer: <INPUT NAME=\"CID\" SIZE=4>"
            "Cust-Warehouse: <INPUT NAME=\"CWI\" SIZE=4> "
            "Cust-District: <INPUT NAME=\"CDI\" SIZE=1><BR>"
            "Name: <INPUT NAME=\"CLT\" SIZE=16>"

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

            New Cust-Balance:<BR>"

```

Appendix A - Application Source Code

```

                "Credit Limit:<BR> <BR>Cust-Data: <BR> <BR> <BR> <BR>
<BR></font></PRE><HR>"
                " <INPUT TYPE=\\"submit\\" NAME=\\"CMD\\"
VALUE=\\"Process\\"><INPUT TYPE=\\"submit\\" NAME=\\"CMD\\" VALUE=\\"Menu\\">"
                "</BODY></FORM></HTML>"
                , Term.pClientData[iTermId].w_id);
        }
        else
        {
                c += wsprintf(szForm+c,
                "<BR> <BR>Warehouse: %6.6d                 District:
%2.2d<BR>"
                "%-20s                 %-20s<BR>"
                "%-20s                 %-20s<BR>"
                "%-20s %-2s %5.5s-%4.4s                 %-20s %-2s %5.5s-%4.4s<BR>"
                <BR>"
                "Customer: %4.4d Cust-Warehouse: %6.6d Cust-District:
%2.2d<BR>"
                "Name:  %-16s %-2s %-16s                 Since: %2.2d-%2.2d-
%4.4d<BR>"
                "
                %-20s                 Credit: %-2s<BR>"
                , Term.pClientData[iTermId].w_id, pPaymentData->d_id
                , pPaymentData->w_street_1, pPaymentData->d_street_1
                , pPaymentData->w_street_2, pPaymentData->d_street_2
                , pPaymentData->w_city, pPaymentData->w_state,
                pPaymentData->w_zip, pPaymentData->w_zip+5
                , pPaymentData->d_city, pPaymentData->d_state,
                pPaymentData->d_zip, pPaymentData->d_zip+5
                , pPaymentData->c_id, pPaymentData->c_w_id,
                pPaymentData->c_d_id
                , pPaymentData->c_first, pPaymentData->c_middle,
                pPaymentData->c_last
                , pPaymentData->c_since.day, pPaymentData->c_since.month,
                pPaymentData->c_since.year
                , pPaymentData->c_street_1, pPaymentData->c_credit
                );
                c += sprintf(szForm+c,
                "
                %-20s                 %%Disc:  %5.2f<BR>",
                pPaymentData->c_street_2, 100.0*pPaymentData->c_discount);
                c += wsprintf(szForm+c,
                "
                %-20s %-2s %5.5s-%4.4s                 Phone: %6.6s-%3.3s-
%3.3s-%4.4s<BR> <BR>",
                pPaymentData->c_city, pPaymentData->c_state, pPaymentData-
>c_zip, pPaymentData->c_zip+5,
                pPaymentData->c_phone, pPaymentData->c_phone+6,
                pPaymentData->c_phone+9, pPaymentData->c_phone+12 );
                c += sprintf(szForm+c,
                "Amount Paid:          $$7.2f                 New Cust-Balance:
$%14.2f<BR>"
                "Credit Limit:  $$%13.2f<BR> <BR>"
                , pPaymentData->h_amount, pPaymentData->c_balance
                , pPaymentData->c_credit_lim
                );
                if ( pPaymentData->c_credit[0] == 'B' && pPaymentData->c_credit[1] ==
'C' )
                c += wsprintf(szForm+c,
                "Cust-Data: %50.50s<BR>                 %-
50.50s<BR>
                %-50.50s<BR>                 %-50.50s<BR>";

                pPaymentData->c_data, pPaymentData->
c_data+50, pPaymentData->c_data+100, pPaymentData->c_data+150 );
                else
                strcpy(szForm+c, "Cust-Data: <BR> <BR> <BR> <BR>");

                strcat(szForm,
                " <BR></font></PRE><HR>"
                " <INPUT TYPE=\\"submit\\"
NAME=\\"CMD\\" VALUE=\\"..NewOrder..\\">"
                " <INPUT TYPE=\\"submit\\"
NAME=\\"CMD\\" VALUE=\\"..Payment..\\">"
                " <INPUT TYPE=\\"submit\\"
NAME=\\"CMD\\" VALUE=\\"..Delivery..\\">"
                " <INPUT TYPE=\\"submit\\"
NAME=\\"CMD\\" VALUE=\\"..Order-Status..\\">"
                " <INPUT TYPE=\\"submit\\"
NAME=\\"CMD\\" VALUE=\\"..Stock-Level..\\">"
                " <INPUT TYPE=\\"submit\\"
NAME=\\"CMD\\" VALUE=\\"..Exit..\\">"
                "</BODY></FORM></HTML>");
        }
}
/* FUNCTION: MakeOrderStatusForm
 *
 * COMMENTS:         The internal client buffer is created when the terminal id is
                    assigned and should not
                    longer needed.
                    be freed except when the client terminal id is no
                    longer needed.
 */
void MakeOrderStatusForm(int iTermId, ORDER_STATUS_DATA *pOrderStatusData, BOOL bInput,
char *szForm)
{
        int i, c;
        static char szBR[] = " <BR> <BR> <BR> <BR> <BR> <BR> <BR> <BR> <BR> <BR> <BR> <BR>
<BR> <BR> <BR> <BR>";
        c = wsprintf(szForm,
        "<HTML><HEAD><TITLE>TPC-C Order-Status</TITLE></HEAD><BODY>"
        "<FORM ACTION=\\"tpcc.dll\\" METHOD=\\"GET\\">"
        "<INPUT TYPE=\\"hidden\\" NAME=\\"STATUSID\\" VALUE=\\"0\\">"
        "<INPUT TYPE=\\"hidden\\" NAME=\\"ERROR\\" VALUE=\\"0\\">"
        "<INPUT TYPE=\\"hidden\\" NAME=\\"FORMID\\" VALUE=\\"%d\\">"
        "<INPUT TYPE=\\"hidden\\" NAME=\\"TERMINID\\" VALUE=\\"%d\\">"
        "<INPUT TYPE=\\"hidden\\" NAME=\\"SYNCRID\\" VALUE=\\"%d\\">"
        "<PRE><font face=\\"Courier\\">"
        Status<BR>"
        "Warehouse: %6.6d ",
        ORDER_STATUS_FORM, iTermId, Term.pClientData[iTermId].iSyncId,
        Term.pClientData[iTermId].w_id);
        if ( bInput )
        {
                strcpy(szForm+c,
                "District: <INPUT NAME=\\"DID*\\" SIZE=1><BR>"
                "Customer: <INPUT NAME=\\"CID*\\" SIZE=4> Name:
<INPUT NAME=\\"CLT*\\" SIZE=23><BR>"
                "Cust-Balance:<BR> <BR>"
                "Order-Number:                 Entry-Date:
Carrier-Number:<BR>"
                "Supply-W          Item-Id          Qty          Amount          Delivery-
Date<BR> <BR> <BR> <BR> <BR>");

```


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, " %6.6d %6.6d %2.2d
                %8.2f %2.2d-%2.2d-%4.4d<BR>",
                pOrderStatusData->OL[i].ol_supply_w_id,
                pOrderStatusData->OL[i].ol_i_id,
                pOrderStatusData->OL[i].ol_quantity,
                pOrderStatusData->OL[i].ol_amount,
                pOrderStatusData->OL[i].ol_delivery_d.day,
                pOrderStatusData->OL[i].ol_delivery_d.month,
                pOrderStatusData->OL[i].ol_delivery_d.year);
    }

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

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

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

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

    c = 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: %6.6d<BR> <BR>",
               (bInput && (pDeliveryData->exec_status_code != eOK)) ?
    ERR_TYPE_DELIVERY_POST : 0,
               DELIVERY_FORM, iTermId, Term.pClientData[iTermId].iSyncId,
    Term.pClientData[iTermId].w_id);

    if ( bInput )
    {
        strcpy( szForm+c,
               "Carrier Number: <INPUT NAME=\ "OCD*\ " SIZE=1<BR> <BR>"
               "Execution Status: <BR> <BR> <BR> <BR> <BR> <BR> <BR> <BR>"
               " <BR> <BR> <BR> <BR> <BR> <BR> <BR> <BR> <BR> <BR>"

               "<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 CWBCLNT_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 = 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] )
                throw new CWBCLNT_ERR(
ERR_NEWORDER_ITEMID_WITHOUT_SUPPW );
        }
    }
}
```

Appendix A - Application Source Code

```
        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.
 *
 * ARGUMENTS:    LPSTR                lpszQueryString        client
browser http command string
 *
 *                ORDER_STATUS_DATA  *pOrderStatusData
 */

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
#ifndef APSTUDIO_READONLY_SYMBOLS
#define _APS_NEXT_RESOURCE_VALUE    102
#define _APS_NEXT_COMMAND_VALUE    40001
#define _APS_NEXT_CONTROL_VALUE    1000
#define _APS_NEXT_SYMED_VALUE     101
#endif
#endif
```

common/src/ReadRegistry.cpp

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

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

Appendix A - Application Source Code

```
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 *)&szPath, &size) !=
ERROR_SUCCESS )
```

```
pReg->szPath[0] = 0;

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

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

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

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

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

RegCloseKey(hKey);

return FALSE;
}
```

common/src/ReadRegistry.h

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

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

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

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

Appendix A - Application Source Code

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

BOOL ReadTPCCRegistrySettings( TPCCREGISTRYDATA *pReg );
```

common/src/error.h

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

#pragma once

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

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

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

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

#define ERR_TYPE_LOGIC
-1 //logic error in program; internal error
```

```
#define ERR_SUCCESS
0 //success (a non-error error)
#define ERR_BAD_ITEM_ID
1 //expected abort record in txnRecord
#define ERR_TYPE_DELIVERY_POST
2 //expected delivery post failed
#define ERR_TYPE_WEBDLL
3 //tpcc web generated error
#define ERR_TYPE_SQL
4 //sql server generated error
#define ERR_TYPE_DBLIB
5 //dblib generated error
#define ERR_TYPE_ODBC
6 //odbc generated error
#define ERR_TYPE_SOCKET
7 //error on communication socket client rte only
#define ERR_TYPE_DEADLOCK
8 //dblib and odbc only deadlock condition
#define ERR_TYPE_COM
9 //error from COM call
#define ERR_TYPE_TUXEDO
10 //tuxedo error
#define ERR_TYPE_OS
11 //operating system error
#define ERR_TYPE_MEMORY
12 //memory allocation error
#define ERR_TYPE_TPCC_ODBC
13 //error from tpcc odbc txn module
#define ERR_TYPE_TPCC_DBLIB
14 //error from tpcc dblib txn module
#define ERR_TYPE_DELSRV
15 //delivery server error
#define ERR_TYPE_TXNLOG
16 //txn log error
#define ERR_TYPE_BCCONN
17 //Benchcraft connection class
#define ERR_TYPE_TPCC_CONN
18 //Benchcraft connection class
#define ERR_TYPE_ENCINA
19 //Encina error
#define ERR_TYPE_COMPONENT
20 //error from COM component
#define ERR_TYPE RTE
21 //Benchcraft rte
#define ERR_TYPE_AUTOMATION
22 //Benchcraft automation errors
#define ERR_TYPE_DRIVER
23 //Driver engine errors
#define ERR_TYPE RTE_BASE
24 //Framework errors
#define ERR_BUF_OVERFLOW
25 //Buffer overflow during receive
#define ERR_TYPE_SOAP_HTTP
26 //HTTP/SOAP dll generated error
// TPC-W error types
#define ERR_TYPE_TPCW_CONN
50 //Benchcraft connection class
#define ERR_TYPE_TPCW_HTML
51 //error from TpcwHtml dll
#define ERR_TYPE_TPCW_USER
52 //error from TPC-W user class
#define ERR_TYPE_TPCW_ENG_BASE
53
#define ERR_TYPE_TPCW_ENG_OS
54
```

Appendix A - Application Source Code

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

}; //short m_errType;

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

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


Appendix A - Application Source Code

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

Action m_eAction;
char *m_szErrorText;

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

};

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

        CSystemErr(Action eAction, LPCTSTR szLocation);
        CSystemErr(int iError, Action eAction, LPCTSTR szLocation);
        ErrorType() { return ERR_TYPE_OS;};
    };

    int ErrorType();
    char *ErrorText(void);
    void Draw(HWND hwnd, LPCTSTR szStr = NULL);
};
```

```
        Action m_eAction;

private:
    char m_szMsg[ERR_MSG_BUF_SIZE];
};

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

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

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

    int ErrorType() {return ERR_BUF_OVERFLOW;};

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

common/src/trans.h

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

// String length constants
#define SERVER_NAME_LEN 20
#define DATABASE_NAME_LEN 20
#define USER_NAME_LEN 20
#define PASSWORD_LEN 20
#define TABLE_NAME_LEN 20
#define I_DATA_LEN 50
#define I_NAME_LEN 24
#define BRAND_LEN 1
#define LAST_NAME_LEN 16
#define W_NAME_LEN 10
#define ADDRESS_LEN 20
#define STATE_LEN 2
```

Appendix A - Application Source Code

```
#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 dlib, so redefined here. Note: we are using the symbol
"__SQLTYPES"
// (declared in sqltypes.h) as a way to determine if TIMESTAMP_STRUCT has been declared.
#ifndef __SQLTYPES
typedef struct
{
    short /* SQLSMALLINT */ year;
    unsigned short /* SQLUSMALLINT */ month;
    unsigned short /* SQLUSMALLINT */ day;
    unsigned short /* SQLUSMALLINT */ hour;
    unsigned short /* SQLUSMALLINT */ minute;
    unsigned short /* SQLUSMALLINT */ second;
    unsigned long /* SQLUINTEGER */ fraction;
} TIMESTAMP_STRUCT;
#endif

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

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

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

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

```
long c_id;
short o_ol_cnt;

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

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

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

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

Appendix A - Application Source Code

```
        TIMESTAMP_STRUCT    ol_delivery_d;
} OL_ORDER_STATUS_DATA;

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

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

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

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

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

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

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

common/src/txn_base.h

```
/*      FILE:          TXN_BASE.H
```

```

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

#pragma once

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

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

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

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

install\src\install.c

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

Appendix A - Application Source Code

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

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

#include "resource.h"

#define WM_INITTEXT WM_USER+100

HICON hIcon;
HINSTANCE hInst;

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

// TPC-C registry settings
TPCCREGISTRYDATA Reg;

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

static int iIISMajorVersion;
static int iNumberOfProcessors;

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

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

```
static void UpdateDialog(HWND hDlg);
static void ConfigureIIS6(HWND hwnd, HWND hDlg);

SYSTEM_INFO siSysInfo;

BOOL install_com(char *szDllPath);

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

int WINAPI WinMain( HINSTANCE hInstance, HINSTANCE hPrevInstance, LPSTR lpCmdLine, int
nCmdShow )
{
    int iRc;

    hInst = hInstance;

    InitCommonControls();

    hIcon = LoadIcon(hInstance, MAKEINTRESOURCE(IDI_ICON1));

    iRc = DialogBox(hInstance, MAKEINTRESOURCE(IDD_DIALOG4), GetDesktopWindow(),
LicenseDlgProc);
    if ( iRc )
    {
        iRc = DialogBox(hInstance, MAKEINTRESOURCE(IDD_DIALOG1),
GetDesktopWindow(), MainDlgProc);
        if ( iRc )
        {
            DialogBoxParam(hInstance, MAKEINTRESOURCE(IDD_DIALOG2),
GetDesktopWindow(), UpdatedDlgProc, (LPARAM)iRc);
        }
    }

    DestroyIcon(hIcon);
    return 0;
}

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

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

Appendix A - Application Source Code

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

BOOL CALLBACK UpdatedDlgProc(HWND hwnd, UINT uMsg, WPARAM wParam, LPARAM lParam)
{
    switch(uMsg)
    {
        case WM_INITDIALOG:
            switch(lParam)
            {
                case 1:
                case 2:
                    SetDlgItemText(hwnd, IDC_RESULTS, "TPC-
C Web Client Installed");
                    break;
            }
            return TRUE;
        case WM_COMMAND:
            if ( wParam == IDOK )
                EndDialog(hwnd, TRUE);
            break;
        default:
            break;
    }
    return FALSE;
}

BOOL CALLBACK MainDlgProc(HWND hwnd, UINT uMsg, WPARAM wParam, LPARAM lParam)
{
    PAINTSTRUCT ps;
    MEMORYSTATUS memoryStatus;
    OSVERSIONINFO VI;
    char szTmp[256];
    static char szDllPath[256];
    static char szWindowsPath[256];
    static char szExePath[256];

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

```
        if ( GetWindowsInstallPath(szWindowsPath) )
        {
            MessageBox(hwnd, "Error: Cannot determine Windows
System Root.", NULL, MB_ICONSTOP | MB_OK);
            EndDialog(hwnd, FALSE);
            return TRUE;
        }
        if ( GetInstallPath(szDllPath) )
        {
            MessageBox(hwnd, "Error internet service inetsrv
is not installed.", NULL, MB_ICONSTOP | MB_OK);
            EndDialog(hwnd, FALSE);
            return TRUE;
        }

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

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

        ReadTPCCRegistrySettings( &Reg );
        ReadRegistrySettings();

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

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

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

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

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

Appendix A - Application Source Code

```
iPoolThreadLimit, FALSE);
SetDlgItemInt(hwnd, ED_IIS_MAX_THREAD_POOL_LIMIT,
FALSE);
SetDlgItemInt(hwnd, ED_IIS_THREAD_TIMEOUT, iThreadTimeout,
FALSE);
SetDlgItemInt(hwnd, ED_IIS_LISTEN_BACKLOG, iListenBackLog,
FALSE);
SetDlgItemInt(hwnd, ED_WEB_SERVICE_BACKLOG_QUEUE_SIZE,
iAcceptExOutstanding, FALSE);

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

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

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

return TRUE;
case WM_PAINT:
    if ( IsIconic(hwnd) )
    {
        BeginPaint(hwnd, &ps);
        DrawIcon(ps.hdc, 0, 0, hIcon);
        EndPaint(hwnd, &ps);
        return TRUE;
    }
    break;
case WM_COMMAND:
    if ( HIWORD(wParam) == BN_CLICKED )
    {
        switch( LOWORD(wParam) )
```

```
{
    case IDC_DBLIB:
        return TRUE;
    case IDC_ODBC:
        return TRUE;
    case IDOK:
        ProcessOK(hwnd, szDllPath,
        return TRUE;
    case IDCANCEL:
        EndDialog(hwnd, FALSE);
        return TRUE;
    default:
        return FALSE;
}
}
break;
default:
    break;
}
return FALSE;
}

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

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

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

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

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

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

Appendix A - Application Source Code

```
iPoolThreadLimit = GetDlgItemInt(hwnd, ED_IIS_MAX_THREAD_POOL_LIMIT, &d, FALSE);
iThreadTimeout = GetDlgItemInt(hwnd, ED_IIS_THREAD_TIMEOUT, &d, FALSE);
iListenBackLog = GetDlgItemInt(hwnd, ED_IIS_LISTEN_BACKLOG, &d, FALSE);
iAcceptExOutstanding = GetDlgItemInt(hwnd, ED_WEB_SERVICE_BACKLOG_QUEUE_SIZE,
&d, FALSE);

ShowWindow(hwnd, SW_HIDE);
hDlg = CreateDialog(hInst, MAKEINTRESOURCE(IDD_DIALOG3), hwnd, CopyDlgProc);
ShowWindow(hDlg, SW_SHOWNA);
UpdateDialog(hDlg);

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

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

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

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

//if we stopped service restart it.
if ( bSvcRunning )
{
    SetDlgItemText(hDlg, IDC_STATUS, "Starting Web Service.");
    SendDlgItemMessage(hDlg, IDC_PROGRESS1, PBM_STEPIT, 0, 0);
    UpdateDialog(hDlg);
    StartWWWService();
}

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

// register com proxy stub
strcpy(szFullName, szDllPath);
```

```
strcat(szFullName, "tpcc_com_ps.dll");
if (!RegisterDLL(szFullName))
{
    ShowWindow(hwnd, SW_SHOWNA);
    DestroyWindow(hDlg);
    strcpy( szErrTxt, "Error occurred when registering " );
    strcat( szErrTxt, szFullName );
    MessageBox(hwnd, szErrTxt, NULL, MB_ICONSTOP | MB_OK);
    EndDialog(hwnd, 0);
    return;
}

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

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

Sleep(100);

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

EndDialog(hwnd, rc);
return;
}

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

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

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

Appendix A - Application Source Code

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

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

        size = sizeof(iListenBackLog);
        if ( RegQueryValueEx(hKey, "ListenBackLog", 0, &type, (char
*)&iListenBackLog, &size) == ERROR_SUCCESS )
            if ( !iListenBackLog )
                iListenBackLog = 15;

        RegCloseKey(hKey);
    }

    if ( RegOpenKeyEx(HKEY_LOCAL_MACHINE,
"SYSTEM\\CurrentControlSet\\Services\\W3SVC\\Parameters", 0, KEY_READ, &hKey) ==
ERROR_SUCCESS )
    {
        size = sizeof(iAcceptExOutstanding);
        if ( RegQueryValueEx(hKey, "AcceptExOutstanding", 0, &type, (char
*)&iAcceptExOutstanding, &size) == ERROR_SUCCESS )
            if ( !iAcceptExOutstanding )
                iAcceptExOutstanding = 40;

        RegCloseKey(hKey);
    }

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

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

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

        RegCloseKey(hKey);
    }
}

static void WriteRegistrySettings(char *szDllPath)
{
    HKEY    hKey;
    DWORD   dwDisposition;
    char    szTmp[256];
    char    *ptr;
    int     iRc;

    if ( RegCreateKeyEx(HKEY_LOCAL_MACHINE, "SOFTWARE\\Microsoft\\TPCC", 0, NULL,
REG_OPTION_NON_VOLATILE, KEY_ALL_ACCESS, NULL, &hKey, &dwDisposition) == ERROR_SUCCESS )
    {
        strcpy(szTmp, szDllPath);
        ptr = strstr(szTmp, "tpcc");
        if ( ptr )
            *ptr = 0;

        RegSetValueEx(hKey, "Path", 0, REG_SZ, szTmp, strlen(szTmp)+1);

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

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

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

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

        RegFlushKey(hKey);
        RegCloseKey(hKey);
    }

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


Appendix A - Application Source Code

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

        RegSetValueEx(hKey, "ThreadTimeout", 0, REG_DWORD, (char
*)&iThreadTimeout, sizeof(iThreadTimeout));
        RegSetValueEx(hKey, "ListenBackLog", 0, REG_DWORD, (char
*)&iListenBackLog, sizeof(iListenBackLog));

        RegFlushKey(hKey);
        RegCloseKey(hKey);
    }

    if ( (iRc=RegCreateKeyEx(HKEY_LOCAL_MACHINE,
"SYSTEM\\CurrentControlSet\\Services\\W3SVC\\Parameters", 0, NULL,
REG_OPTION_NON_VOLATILE, KEY_ALL_ACCESS, NULL, &hKey, &dwDisposition)) == ERROR_SUCCESS )
    {
        RegSetValueEx(hKey, "AcceptExOutstanding", 0, REG_DWORD, (char
*)&iAcceptExOutstanding, sizeof(iAcceptExOutstanding));

        RegFlushKey(hKey);
        RegCloseKey(hKey);
    }

    return;
}

BOOL CALLBACK CopyDlgProc(HWND hwnd, UINT uMsg, WPARAM wParam, LPARAM lParam)
{
    if ( uMsg == WM_INITDIALOG )
    {
        SendDlgItemMessage(hwnd, IDC_PROGRESS1, PBM_SETRANGE, 0,
MAKELPARAM(0, 16));
        SendDlgItemMessage(hwnd, IDC_PROGRESS1, PBM_SETSTEP, (WPARAM)1, 0);
        return TRUE;
    }
    return FALSE;
}

BOOL RegisterDLL(char *szFileName)
{
    HINSTANCE hLib;
```

```
        FARPROC        lpDllEntryPoint;

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

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

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

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

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

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

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

        CloseHandle(hFile);

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

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

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

Appendix A - Application Source Code

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

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

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

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

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

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

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

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

// install tpcc_com_all.dll
```

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

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

return 1;
}

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

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

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

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

Appendix A - Application Source Code

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

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

    RegCloseKey(hKey);
}

return bRc;
}

static void GetVersionInfo(char *szDLLPath, char *szExePath)
{
    DWORD          d;
    DWORD          dwSize;
    DWORD          dwBytes;
    char           *ptr;
    VS_FIXEDFILEINFO *vs;

    versionDllMS = 0;
    versionDllLS = 0;
    if ( _access(szDLLPath, 0) == 0 )
    {
        dwSize = GetFileVersionInfoSize(szDLLPath, &d);
        if ( dwSize )
        {
            ptr = (char *)malloc(dwSize);
            GetFileVersionInfo(szDLLPath, 0, dwSize, ptr);
            VerQueryValue(ptr, "\\",&vs, &dwBytes);
            versionDllMS = vs->dwProductVersionMS;
            versionDllLS = vs->dwProductVersionLS;
            free(ptr);
        }
    }

    versionExeMS = 0x7FFF;
    versionExeLS = 0x7FFF;
    dwSize = GetFileVersionInfoSize(szExePath, &d);
    if ( dwSize )
    {
        ptr = (char *)malloc(dwSize);
        GetFileVersionInfo(szExePath, 0, dwSize, ptr);
        VerQueryValue(ptr, "\\",&vs, &dwBytes);

```

```
        versionExeMS = vs->dwProductVersionMS;
        versionExeLS = LOWORD(vs->dwProductVersionLS);
        versionExeMM = HIWORD(vs->dwProductVersionLS);
        free(ptr);
    }
    return;
}

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

    schSCManager = OpenSCManager(NULL, NULL, SC_MANAGER_ALL_ACCESS);
    schService = OpenService(schSCManager, TEXT("W3SVC"), SERVICE_ALL_ACCESS);
    if (schService == NULL)
        return FALSE;

    if (! QueryServiceStatus(schService, &ssStatus) )
        goto ServiceNotRunning;

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

    CloseServiceHandle(schService);
    return TRUE;
}

ServiceNotRunning:
    CloseServiceHandle(schService);
    return FALSE;
}

static BOOL StartWWWService(void)
{
    SC_HANDLE      schSCManager;
    SC_HANDLE      schService;
    SERVICE_STATUS ssStatus;
    DWORD          dwOldCheckPoint;

    schSCManager = OpenSCManager(NULL, NULL, SC_MANAGER_ALL_ACCESS);
    schService = OpenService(schSCManager, TEXT("W3SVC"), SERVICE_ALL_ACCESS);
    if (schService == NULL)
        return FALSE;

    if (! StartService(schService, 0, NULL) )
        goto StartWWWWebErr;
    //start Service pending, Check the status until the service is running.
    if (! QueryServiceStatus(schService, &ssStatus) )
        goto StartWWWWebErr;
    while( ssStatus.dwCurrentState != SERVICE_RUNNING)
    {
        dwOldCheckPoint = ssStatus.dwCheckPoint;
        //Save the current checkpoint.
        Sleep(ssStatus.dwWaitHint);
        //Wait for the specified interval.
        if ( !QueryServiceStatus(schService, &ssStatus) ) //Check the status
            again.
    }
}

```

Appendix A - Application Source Code

```
        break;
        if (dwOldCheckpoint >= ssStatus.dwCheckpoint)          //Break
if the checkpoint has not been incremented.
        break;
    }

    if (ssStatus.dwCurrentState == SERVICE_RUNNING)
        goto StartWWWebErr;

    CloseServiceHandle(schService);
    return TRUE;

StartWWWebErr:
    CloseServiceHandle(schService);
    return FALSE;
}

static BOOL StopWWWebService(void)
{
    SC_HANDLE          schSCManager;
    SC_HANDLE          schService;
    SERVICE_STATUS     ssStatus;
    DWORD              dwOldCheckpoint;

    schSCManager = OpenSCManager(NULL, NULL, SC_MANAGER_ALL_ACCESS);
    //schService = OpenService(schSCManager, TEXT("W3SVC"), SERVICE_ALL_ACCESS);
    schService = OpenService(schSCManager, TEXT("IISADMIN"), SERVICE_ALL_ACCESS);
    if (schService == NULL)
        return FALSE;

    if (! QueryServiceStatus(schService, &ssStatus) )
        goto StopWWWebErr;

    if ( !ControlService(schService, SERVICE_CONTROL_STOP, &ssStatus) )
        goto StopWWWebErr;
    //start Service pending, Check the status until the service is running.
    if (! QueryServiceStatus(schService, &ssStatus) )
        goto StopWWWebErr;
    while( ssStatus.dwCurrentState == SERVICE_RUNNING)
    {
        dwOldCheckpoint = ssStatus.dwCheckpoint;
        //Save the current checkpoint.
        Sleep(ssStatus.dwWaitHint);
        //Wait for the specified interval.
        if ( !QueryServiceStatus(schService, &ssStatus) ) //Check the status
again.
            break;
        if (dwOldCheckpoint >= ssStatus.dwCheckpoint)          //Break
if the checkpoint has not been incremented.
            break;
    }

    if (ssStatus.dwCurrentState == SERVICE_RUNNING)
        goto StopWWWebErr;

    CloseServiceHandle(schService);
    return TRUE;

StopWWWebErr:
    CloseServiceHandle(schService);
    return FALSE;
}
```

```
static void UpdateDialog(HWND hDlg)
{
    MSG msg;

    UpdateWindow(hDlg);
    while( PeekMessage(&msg, hDlg, 0, 0, PM_REMOVE) )
    {
        TranslateMessage(&msg);
        DispatchMessage(&msg);
    }
    Sleep(250);
    return;
}

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

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

    irc = system("IIS6_CONFIG.CMD");

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

install\\src\\install_com.cpp

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

Appendix A - Application Source Code

```
#define _WIN32_WINNT 0x0500

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

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

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

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

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

    CoInitializeEx(NULL, COINIT_MULTITHREADED);

    HRESULT hr = CoCreateInstance(CLSID_COMAdminCatalog,
    NULL,
    CLSCTX_INPROC_SERVER,
    IID_ICOMAdminCatalog,
    (void**) &pCOMAdminCat);

    if (!SUCCEEDED(hr)) goto Error;

    bstrTemp = "Applications";

    // Attempt to connect to "Applications" in the Catalog
    hr = pCOMAdminCat->GetCollection(bstrTemp,
    (IDispatch**) &pCatalogCollectionApp);
    if (!SUCCEEDED(hr)) goto Error;

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

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

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

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

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

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

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

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

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

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

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

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

pCatalogObjectApp->Release();
pCatalogObjectApp = NULL;

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

Appendix A - Application Source Code

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

hr = pCOMAdminCat->InstallComponent(bstrTemp,

    bstrTemp2,

    bstrTemp3,

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

        pCatalogObjectMethod->Release();
        pCatalogObjectMethod = NULL;

        lCountMethod--;
```

Appendix A - Application Source Code

```
    }

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

    pCatalogObjectItf->Release();
    pCatalogObjectItf = NULL;

    lCountItf--;

}

pCatalogObjectCo->Release();
pCatalogObjectCo = NULL;

lCountCo--;

}

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

pCatalogCollectionApp->Release();
pCatalogCollectionApp = NULL;

pCatalogCollectionCo->Release();
pCatalogCollectionCo = NULL;

pCatalogCollectionItf->Release();
pCatalogCollectionItf = NULL;

pCatalogCollectionMethod->Release();
pCatalogCollectionMethod = NULL;

Error:
CoUninitialize();

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

    NULL,

    hr,

    MAKELANGID(LANG_NEUTRAL, SUBLANG_DEFAULT),

    (LPTSTR) &lpBuf,

    0,

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

```
    return FALSE;
}
```

db_dblib_dll/src/tpcc_dblib.cpp

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

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

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

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

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

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

#define DEFCLPACKSIZE          4096

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

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

Appendix A - Application Source Code

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

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

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

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

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

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

    if (pConn != NULL)
    {
        pConn->SetDbLibError( severity, dberr, oserr, dberrstr, oserrstr );
    }
    return INT_CANCEL;
}

/* FUNCTION: int msg_handler(DBPROCESS *dbproc, DBINT msgno, int msgstate, int severity,
char *msgtext)
*
* PURPOSE: This function handles DB-Library SQL Server error messages
*
* ARGUMENTS: DBPROCESS *dbproc DBPROCESS id
pointer msgno
*
* message number DBINT msgstate
*
* message state int severity
*
* message severity char *msgtext
*
* printable message description
*
* RETURNS: int INT_CONTINUE
continue if error is SQLETIME else INT_CANCEL action
*
* INT_CANCEL cancel operation
*
* COMMENTS: This function also sets the dead lock dbproc variable if necessary.
*/
```

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

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

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

    if (pConn != NULL)
    {
        pConn->SetSqlError( msgno, msgstate, severity, msgtext );
    }
    return 0;
}

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


Appendix A - Application Source Code

```
customer."      { ERR_NO_SUCH_ORDER,          "No orders found for
succeeded."    { ERR_RETRIED_TRANS,          "Retries before transaction
               { 0,                      ""
               }
};
static char szNotFound[] = "Unknown error number.";
for(i=0; errorMsgs[i].szMsg[0]; i++)
{
    if ( m_errno == errorMsgs[i].iError )
        break;
}
if ( !errorMsgs[i].szMsg[0] )
    return szNotFound;
else
    return errorMsgs[i].szMsg;
}

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

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

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

    m_MaxRetries = 10;          // how many retries on deadlock

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

    // allocate a login structure
    login = dblogin();
    if (login == NULL)
```

```
        ThrowError(CDBLIBERR::eLogin);
        InterlockedIncrement( &iConnectionCount );

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

    if (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 dblib ver 6.0 client
behavior

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

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

    m_dbproc = dbopen(login, szServer);

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

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

    // save address of class instance so that the message and error handler
    // can get to data.
    dbsetuserdata(m_dbproc, (LVOID)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 (dbsqlxec(m_dbproc) == FAIL)
        ThrowError(CDBLIBERR::eDbSqlExec);

    DiscardNextResults(2);

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

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

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

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

Appendix A - Application Source Code

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

DiscardNextRows(0);
DiscardNextResults(0);
}

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

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

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

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

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

    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)
    {
        CSQLEERR *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++;
    }
}
```

Appendix A - Application Source Code

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

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

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

            DiscardNextRows(-1);
            iResultsRead++;
        }

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

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

        ResetError();

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

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

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

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

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

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

        int          iTryCount = 0;
        const BYTE   *pData;

        ResetError();

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

                dbrpcparam(m_dbproc, NULL, 0, SQLINT4, -1, -1, (BYTE *)
                    &m_txn.NewOrder.w_id);
                dbrpcparam(m_dbproc, NULL, 0, SQLINT1, -1, -1, (BYTE *)
                    &m_txn.NewOrder.d_id);
                dbrpcparam(m_dbproc, NULL, 0, SQLINT4, -1, -1, (BYTE *)
                    &m_txn.NewOrder.c_id);
            }
            catch (CSQLERR *e)
            {
                if ((e->m_msgno == 1205 ||
                    (e->m_msgno == iErrOleDbProvider &&
                    strstr(e->m_msgtext, sErrTimeoutExpired) !=
                    NULL)) &&
                    (++iTryCount <= iMaxRetries))
                {
                    // hit deadlock; backoff for increasingly longer
                    // period
                    delete e;
                    Sleep(10 * iTryCount);
                }
                else
                    throw;
            }
        } // while (TRUE)

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

Appendix A - Application Source Code

```
&m_txn.NewOrder.o_ol_cnt);
    dbrpcparam(m_dbproc, NULL, 0, SQLINT1, -1, -1, (BYTE *)
    // check whether any order lines are for a remote warehouse
    m_txn.NewOrder.o_all_local = 1;
    for (i = 0; i < m_txn.NewOrder.o_ol_cnt; i++)
    {
        if (m_txn.NewOrder.OL[i].ol_supply_w_id !=
m_txn.NewOrder.w_id)
        {
            m_txn.NewOrder.o_all_local = 0; // at
least one remote warehouse
            break;
        }
    }
    dbrpcparam(m_dbproc, NULL, 0, SQLINT1, -1, -1, (BYTE *)
&m_txn.NewOrder.o_all_local);
    for (i = 0; i < m_txn.NewOrder.o_ol_cnt; i++)
    {
        dbrpcparam(m_dbproc, NULL, 0, SQLINT4, -1, -1,
(BYTE *) &m_txn.NewOrder.OL[i].ol_i_id);
        dbrpcparam(m_dbproc, NULL, 0, SQLINT4, -1, -1,
(BYTE *) &m_txn.NewOrder.OL[i].ol_supply_w_id);
        dbrpcparam(m_dbproc, NULL, 0, SQLINT2, -1, -1,
(BYTE *) &m_txn.NewOrder.OL[i].ol_quantity);
    }
    if (dbrpcexec(m_dbproc) == FAIL)
        ThrowError(CDBLIBERR::eDbRpcExec);
    // Get order line results
    m_txn.NewOrder.total_amount = 0;
    for (i = 0; i < m_txn.NewOrder.o_ol_cnt; i++)
    {
        if (dbresults(m_dbproc) != SUCCEED)
            ThrowError(CDBLIBERR::eDbResults);
        if (dbnumcols(m_dbproc) != 5)
            ThrowError(CDBLIBERR::eWrongNumCols);
        if (dbnextrow(m_dbproc) != REG_ROW)
            ThrowError(CDBLIBERR::eDbNextRow);
        if (pData=dbdata(m_dbproc, 1))
            UtilStrCpy(m_txn.NewOrder.OL[i].ol_i_name, pData, dbdatlen(m_dbproc, 1));
        if (pData=dbdata(m_dbproc, 2))
            m_txn.NewOrder.OL[i].ol_stock =
        (*DBSMALLINT *) pData);
        if (pData=dbdata(m_dbproc, 3))
            UtilStrCpy(m_txn.NewOrder.OL[i].ol_brand_generic, pData, dbdatlen(m_dbproc,
3));
        if (pData=dbdata(m_dbproc, 4))
            dbconvert(m_dbproc, SQLNUMERIC,
(LPCBYTE)pData, dbdatlen(m_dbproc,4),
SQLFLT8, (BYTE
*)&m_txn.NewOrder.OL[i].ol_i_price, 8);
        if (pData=dbdata(m_dbproc, 5))
```

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

Appendix A - Application Source Code

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

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

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

    int            iTryCount = 0;
    const BYTE    *pData;

    ResetError();

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

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

            // if customer id is zero, then payment is by name
```

```
        if (m_txn.Payment.c_id == 0)
            dbrpcparam(m_dbproc, NULL, 0, SQLCHAR, -1,
strlen(m_txn.Payment.c_last), (unsigned char *)m_txn.Payment.c_last);

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

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

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

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

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

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

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

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

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

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

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

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

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

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

        if (pData=dbdata(m_dbproc, 13))
            UtilStrCpy(m_txn.Payment.d_zip, pData,
dbdatlen(m_dbproc, 13));

        if (pData=dbdata(m_dbproc, 14))
```

Appendix A - Application Source Code

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

DiscardNextRows(0);
DiscardNextResults(0);

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

return;
}
catch (CSQLERR *e)
```

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

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

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

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

    ResetError();

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

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

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

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

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

Appendix A - Application Source Code

```
CTPCC_DBLIB_ERR::ERR_NO_SUCH_ORDER );
    throw new CTPCC_DBLIB_ERR(
        else
            ThrowError(CDBLIBERR::eDbResults);
    }
    if (dbnumcols(m_dbproc) != 5)
        ThrowError(CDBLIBERR::eWrongNumCols);

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

        if(pData=dbdata(m_dbproc, 1))
            m_txn.OrderStatus.OL[i].ol_supply_w_id

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

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

(*(DBSMALLINT *) pData);
        if(pData=dbdata(m_dbproc, 4))
            dbconvert(m_dbproc, SQLNUMERIC,
                (LPBYTE)pData, dbdatlen(m_dbproc,4),
                SQLFLT8, (BYTE
                *)&m_txn.OrderStatus.OL[i].ol_amount, 8);
        if(pData=dbdata(m_dbproc, 5))
        {
            datetime = *((DBDATETIME *) pData);
            dbdatecrack(m_dbproc, &daterec,

&datetime);

            m_txn.OrderStatus.OL[i].ol_delivery_d.year    = daterec.year;
            m_txn.OrderStatus.OL[i].ol_delivery_d.month    = daterec.month;
            m_txn.OrderStatus.OL[i].ol_delivery_d.day      = daterec.day;
            m_txn.OrderStatus.OL[i].ol_delivery_d.hour    = daterec.hour;
            m_txn.OrderStatus.OL[i].ol_delivery_d.minute  = daterec.minute;
            m_txn.OrderStatus.OL[i].ol_delivery_d.second  = daterec.second;
        }
        i++;
        m_txn.OrderStatus.o_ol_cnt = i;

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

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

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

```

```
dbdatlen(m_dbproc,2));
dbdatlen(m_dbproc,3));
dbdatlen(m_dbproc, 4));

daterec.year;
daterec.month;
daterec.hour;
daterec.minute;
daterec.second;

pData);
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 ||
        (e->m_msgno == iErrOleDbProvider &&
        strstr(e->m_msgtext, sErrTimeoutExpired) !=
        NULL)) &&
        (++iTryCount <= iMaxRetries))
    {
        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,
                UtilStrCpy(m_txn.OrderStatus.c_first, pData,
                    UtilStrCpy(m_txn.OrderStatus.c_middle, pData,
                        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 =
                        }
                    }
                if(pData=dbdata(m_dbproc, 6))
                    m_txn.OrderStatus.o_carrier_id = (*(DBSMALLINT *)
                    if(pData=dbdata(m_dbproc, 7))
                        dbconvert(m_dbproc, SQLNUMERIC, (LPBYTE)pData,
                            SQLFLT8, (BYTE
                            *)&m_txn.OrderStatus.c_balance, 8);
                    if(pData=dbdata(m_dbproc, 8))
                        m_txn.OrderStatus.o_id = (*(DBINT *) pData);

                    DiscardNextRows(0);
                    DiscardNextResults(0);

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

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

```

Appendix A - Application Source Code

```

period                                // hit deadlock; backoff for increasingly longer
                                        delete e;
                                        Sleep(10 * iTryCount);
                                }
                                else
                                        throw;
        }
        // while (TRUE)
//      if (iTryCount)
//          throw new CTPCC_DBLIB_ERR(CTPCC_DBLIB_ERR::ERR_RETRIED_TRANS,
iTryCount);
}

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

    ResetError();

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

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

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

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

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

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

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

            DiscardNextRows(0);
            DiscardNextResults(0);

            m_txn.Delivery.exec_status_code = eOK;
            return;
        }
        catch (CSQLERR *e)
        {
            if ((e->m_msgno == 1205 ||

```

```

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

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

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

    return;
}

```

db_dblib_dll/src/tpcc_dblib.h

```

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

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

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

```


Appendix A - Application Source Code

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

class CSQLErr : public CBaseErr
{
public:
    CSQLErr(void)
    {
        m_msgno = 0;
        m_msgstate = 0;
        m_severity = 0;
        m_msgtext = NULL;
    };

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

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

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

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

```
ooserr = 0)
    CDBLIBERR(ACTION eAction, int severity = 0, int dberror = 0, int
    {
        m_eAction = eAction;
        m_severity = severity;
        m_dberror = dberror;
        m_ooserr = ooserr;

        m_dberrstr = NULL;
        m_ooserrstr = NULL;
    };

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

    ACTION m_eAction;
    int m_severity;
    int m_dberror;
    int m_ooserr;
    char *m_dberrstr;
    char *m_ooserrstr;

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

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

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

    int m_errno;

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

    char *ErrorText();
};

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

Appendix A - Application Source Code

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

                    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 dblink
err_handler and msg_hangler
    // outside of the class
    void SetDbLibError(int severity, int dberr, int oserr, LPCSTR
dberrstr, LPCSTR oserrstr);
    void SetSqlError( int msgno, int msgstate, int severity, LPCSTR
msgtext );
};

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

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

tm_com_dll/src/tpcc_com.cpp

/*          FILE:          TPCC_COM.CPP
```

```
Microsoft TPC-C Kit Ver. 4.20.000
Copyright Microsoft, 1999

All Rights Reserved

not yet audited

PURPOSE: Source file for TPC-C COM+ class implementation.
Contact: Charles Levine (clevine@microsoft.com)

Change history:
4.20.000 - first version
*/

// needed for CoInitializeEx
#define _WIN32_WINNT 0x0400

#include <windows.h>

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

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

Appendix A - Application Source Code

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

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

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

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

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

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

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

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

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

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

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

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

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

void CTPCC_COM::NewOrder()
{
    VARIANT vTxn_out;

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

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

void CTPCC_COM::Payment()
{
    VARIANT vTxn_out;

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

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

void CTPCC_COM::StockLevel()
{
    VARIANT vTxn_out;

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

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

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

Appendix A - Application Source Code

```
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.
#ifdef DllDecl
#define DllDecl __declspec( dllimport )
#endif

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

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

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

```
int          m_hr;
int          m_iErrorType;
int          m_iError;

// A CCOMERR class can impersonate another class, which happens if
the error // was not actually a COM Services error, but was simply transmitted
back via COM.

int ErrorType()
{
    if (m_iErrorType == 0)
        return ERR_TYPE_COM;
    else
        return m_iErrorType;
}

int ErrorNum() {return m_hr;}

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

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

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

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

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

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

Appendix A - Application Source Code

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

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

// not supported
};

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

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

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

tpcc_com_all/src/methods.h

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

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

class CCOMPONENT_ERR : public CBaseErr
{
```

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

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

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

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

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

static void WriteMessageToEventLog(LPTSTR lpszMsg);

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

    CTPCC_Common();
    ~CTPCC_Common();

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

Appendix A - Application Source Code

```
        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;
        };

};

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

Appendix A - Application Source Code

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

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

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

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

tpcc_com_all/src/resource.h

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

// Next default values for new objects
//
#ifdef APSTUDIO_INVOKED
#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 <atbase.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 definitions of structures specific to TPC-C
#include "..\..\common\src\txn_base.h"
#include "..\..\common\src\error.h"
#include "..\..\common\src\ReadRegistry.h"
#include "..\..\db_dblib_dll\src\tpcc_dblib.h" // DBLIB implementation of
TPC-C txns
#include "..\..\db_odbc_dll\src\tpcc_odbc.h" // ODBC implementation of
TPC-C txns

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

CComModule _Module;
```

Appendix A - Application Source Code

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

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

static HINSTANCE hLibInstanceDb = NULL;

TYPE_CTPCC_DBLIB *pCTPCC_DBLIB_new;
TYPE_CTPCC_ODBC *pCTPCC_ODBC_new;

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

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

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

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

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

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

```
                hLibInstanceDb = LoadLibrary( szDllName );
                if (hLibInstanceDb == NULL)
                    throw new CCOMPONENT_ERR(
ERR_LOADDLL_FAILED, szDllName, GetLastError() );

                // get function pointer to wrapper for class
                constructor
                pCTPCC_ODBC_new = (TYPE_CTPCC_ODBC*)
GetProcAddress(hLibInstanceDb, "CTPCC_ODBC_new");
                if (pCTPCC_ODBC_new == NULL)
                    throw new CCOMPONENT_ERR(
ERR_GETPROCADDR_FAILED, szDllName, GetLastError() );
            }
            else
                throw new CCOMPONENT_ERR( ERR_UNKNOWN_DB_PROTOCOL
);
        }
        else if (dwReason == DLL_PROCESS_DETACH)
            _Module.Term();
    }
    catch (CBaseErr *e)
    {
        WriteMessageToEventLog(e->ErrorText());
        delete e;
        return FALSE;
    }
    catch (...)
    {
        WriteMessageToEventLog(TEXT("Unhandled exception in object
DllMain"));
        return FALSE;
    }
    return TRUE; // OK
}

////////////////////////////////////
// Used to determine whether the DLL can be unloaded by OLE
STDAPI DllCanUnloadNow(void)
{
    return (_Module.GetLockCount()==0) ? S_OK : S_FALSE;
}

////////////////////////////////////
// Returns a class factory to create an object of the requested type
STDAPI DllGetClassObject(REFCLSID rclsid, REFIID riid, LPVOID* ppv)
{
    return _Module.GetClassObject(rclsid, riid, ppv);
}

////////////////////////////////////
// DllRegisterServer - Adds entries to the system registry
STDAPI DllRegisterServer(void)
{
    // registers object, typelib and all interfaces in typelib
    return _Module.RegisterServer(TRUE);
}

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


Appendix A - Application Source Code

```
// 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
            (LPCWSTR *)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.
GetProcAddress 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)
        wprintf( szTmp+strlen(szTmp), " Error=%d", m_SystemErr );

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

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

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

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

    // get our object context
    HRESULT hr = CoGetObjectContext( IID_IObjectContext, (void **)&pObjectContext );

    pObjectContext->SetComplete();
    ReleaseInterface(pObjectContext);
    return hr;
}

//
// called by the ctor activator
//
STDMETHODIMP CTPCC_Common::Construct(IDispatch * pUnk)
```

Appendix A - Application Source Code

```
{
    // 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,
>rgsabound->cElements,                txn_in.parray-
>rgsabound->cElements);                txn_in.parray-
        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) )
||
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,
>rgsabound->cElements,                txn_in.parray-
>rgsabound->cElements);                txn_in.parray-
        pData = (COM_DATA*) txn_out->parray->pvData;

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

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

        pData->retval = e->ErrorType();
        pData->error = e->ErrorNum();
        delete e;

```

Appendix A - Application Source Code

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

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

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

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

```
    }
}

HRESULT CTPCC_Common::OrderStatus(VARIANT txn_in, VARIANT* txn_out)
{
    PORDER_STATUS_DATA pOrderStatus;
    COM_DATA            *pData;

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

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

        m_pTxn->OrderStatus();

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

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

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

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

tpcc_com_all/src/tpcc_com_all.def

Appendix A - Application Source Code

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

```
LIBRARY "tpcc_com_all.dll"
```

```
EXPORTS
```

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

tpcc_com_all/src/tpcc_com_all.h

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

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

```
/* File created by MIDL compiler version 5.03.0280 */
```

```
/* at Sat Apr 08 16:40:18 2000
```

```
*/
```

```
/* Compiler settings for .\src\tpcc_com_all.idl:
Oicf (OptLev=i2), 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__
```

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

```
#endif /* __TPCC_FWD_DEFINED__ */
```

```
#ifndef __NewOrder_FWD_DEFINED__
```

```
#define __NewOrder_FWD_DEFINED__
```

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

```
#endif /* __NewOrder_FWD_DEFINED__ */
```

```
#ifndef __OrderStatus_FWD_DEFINED__
#define __OrderStatus_FWD_DEFINED__
```

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

```
#endif /* __OrderStatus_FWD_DEFINED__ */
```

```
#ifndef __Payment_FWD_DEFINED__
#define __Payment_FWD_DEFINED__
```

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

```
#endif /* __Payment_FWD_DEFINED__ */
```

```
#ifndef __StockLevel_FWD_DEFINED__
#define __StockLevel_FWD_DEFINED__
```

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

```
#endif /* __StockLevel_FWD_DEFINED__ */
```

```
/* header files for imported files */
```

```
#include "oaidl.h"
#include "ocidl.h"
#include "tpcc_com_ps.h"
```

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

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

```
/* interface __MIDL_itf_tpcc_com_all_0000 */
/* [local] */
```

Appendix A - Application Source Code

```
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 */
```

```
#ifndef __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 "oidl.idl";
import "ocidl.idl";
import "..\tpcc_com_ps\src\tpcc_com_ps.idl";

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

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

    [
        uuid(975BAABF-84A7-11D2-BA47-00C04FBFE08B),
```

Appendix A - Application Source Code

```
        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"

//
// 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
FILEFLAGSMASK 0x3fL
#ifdef _DEBUG
FILEFLAGS 0x1L
#else
FILEFLAGS 0x0L
#endif
FILEOS 0x4L
FILETYPE 0x2L
FILESUBTYPE 0x0L
BEGIN
    BLOCK "StringFileInfo"
    BEGIN
        BLOCK "040904B0"
        BEGIN
            VALUE "CompanyName", "\0"
            VALUE "FileDescription", "tpcc_com_all Module\0"
            VALUE "FileVersion", "1, 0, 0, 1\0"
            VALUE "InternalName", "TPCCNEWORDER\0"
            VALUE "LegalCopyright", "Copyright 1997\0"
            VALUE "OriginalFilename", "tpcc_com_all.DLL\0"
            VALUE "ProductName", "tpcc_com_all Module\0"
            VALUE "ProductVersion", "1, 0, 0, 1\0"
            VALUE "OLESelfRegister", "\0"
```

Appendix A - Application Source Code

```
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.
//
l 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(  )

#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
#endif
```

Appendix A - Application Source Code

```
#define MIDL_DEFINE_GUID(type,name,l,w1,w2,b1,b2,b3,b4,b5,b6,b7,b8) \  
    DEFINE_GUID(name,l,w1,w2,b1,b2,b3,b4,b5,b6,b7,b8) \  
  
#else // !_MIDL_USE_GUIDDEF_  
  
#ifndef __IID_DEFINED__  
#define __IID_DEFINED__  
  
typedef struct _IID  
{  
    unsigned long x;  
    unsigned short s1;  
    unsigned short s2;  
    unsigned char c[8];  
} IID;  
  
#endif // __IID_DEFINED__  
  
#ifndef CLSID_DEFINED  
#define CLSID_DEFINED  
typedef IID CLSID;  
#endif // CLSID_DEFINED  
  
#define MIDL_DEFINE_GUID(type,name,l,w1,w2,b1,b2,b3,b4,b5,b6,b7,b8) \  
    const type name = {l,w1,w2,{b1,b2,b3,b4,b5,b6,b7,b8}}  
  
#endif !_MIDL_USE_GUIDDEF_  
  
MIDL_DEFINE_GUID(IID,  
LIBID_TPCCLib,0x122A3117,0x2520,0x11D3,0xBA,0x71,0x00,0xC0,0x4F,0xBF,0xE0,0x8B);  
  
MIDL_DEFINE_GUID(CLSID,  
CLSID_TPCC,0x122A3128,0x2520,0x11D3,0xBA,0x71,0x00,0xC0,0x4F,0xBF,0xE0,0x8B);  
  
MIDL_DEFINE_GUID(CLSID,  
CLSID_NewOrder,0x975BAABF,0x84A7,0x11D2,0xBA,0x47,0x00,0xC0,0x4F,0xBF,0xE0,0x8B);  
  
MIDL_DEFINE_GUID(CLSID,  
CLSID_OrderStatus,0x266836AD,0xA50D,0x11D2,0xBA,0x4E,0x00,0xC0,0x4F,0xBF,0xE0,0x8B);  
  
MIDL_DEFINE_GUID(CLSID,  
CLSID_Payment,0xCD02F7EF,0xA4FA,0x11D2,0xBA,0x4E,0x00,0xC0,0x4F,0xBF,0xE0,0x8B);  
  
MIDL_DEFINE_GUID(CLSID,  
CLSID_StockLevel,0x2668369E,0xA50D,0x11D2,0xBA,0x4E,0x00,0xC0,0x4F,0xBF,0xE0,0x8B);  
  
#undef MIDL_DEFINE_GUID  
  
#ifdef __cplusplus  
}  
#endif  
  
#endif /* !defined(_M_IA64) && !defined(_M_AXP64)*/
```

```
#pragma warning( disable: 4049 ) /* more than 64k source lines */  
  
/* this ALWAYS GENERATED file contains the IIDs and CLSIDs */  
  
/* link this file in with the server and any clients */  
  
/* File created by MIDL compiler version 5.03.0280 */  
/* at Sat Apr 08 16:40:18 2000 */  
/*  
/* Compiler settings for .\src\tpcc_com_all.idl:  
Oicf (OptLev=i2), 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  
{  
    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)*/
```


Appendix A - Application Source Code

```
const type name = {1,w1,w2,{b1,b2,b3,b4,b5,b6,b7,b8}}
#endif !_MIDL_USE_GUIDDEF_

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

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

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

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

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

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

#undef MIDL_DEFINE_GUID

#ifdef __cplusplus
}
#endif

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

tpcc_com_all/src/tpcc_com_no.rgs

```
HKCR
{
    TPCC.NewOrder.1 = s 'NewOrder Class'
    {
        CLSID = s '{975BAABF-84A7-11D2-BA47-00C04FBFE08B}'
    }
    TPCC.NewOrder = s 'NewOrder Class'
    {
        CurVer = s 'TPCC.NewOrder.1'
    }
    NoRemove CLSID
    {
        ForceRemove {975BAABF-84A7-11D2-BA47-00C04FBFE08B} = s 'NewOrder
Class'
    {
```

```
        ProgID = s 'TPCC.NewOrder.1'
        VersionIndependentProgID = s 'TPCC.NewOrder'
        InprocServer32 = s '%MODULE%'
        {
            val ThreadingModel = s 'Both'
        }
    }
}
```

tpcc_com_all/src/tpcc_com_os.rgs

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

tpcc_com_all/src/tpcc_com_pay.rgs

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

Appendix A - Application Source Code

```
        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*/
#ifndef __REQUIRED_RPCNDR_H_VERSION__
#define __REQUIRED_RPCNDR_H_VERSION__ 440
#endif

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

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

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

#ifndef __tpcc_com_ps_h__
#define __tpcc_com_ps_h__

/* Forward Declarations */

#ifndef __ITPCC_FWD_DEFINED__
#define __ITPCC_FWD_DEFINED__
typedef interface ITPCC ITPCC;
#endif /* __ITPCC_FWD_DEFINED__ */
```

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

#ifdef __cplusplus
extern "C"{
#endif

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

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

extern RPC_IF_HANDLE __MIDL_itf_tpcc_com_ps_0000_v0_0_c_ifspec;
extern RPC_IF_HANDLE __MIDL_itf_tpcc_com_ps_0000_v0_0_s_ifspec;

#ifndef __ITPCC_INTERFACE_DEFINED__
#define __ITPCC_INTERFACE_DEFINED__

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

EXTERN_C const IID IID_ITPCC;

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

MIDL_INTERFACE("FEE6AA2-84B1-11d2-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
{
```

Appendix A - Application Source Code

```
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 */

#ifdef __cplusplus
extern "C" {
#endif

    HRESULT STDMETHODCALLTYPE 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 STDMETHODCALLTYPE 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 STDMETHODCALLTYPE 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);

#ifdef __cplusplus
}
#endif
```

Appendix A - Application Source Code

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

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

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

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

HRESULT __stdcall ITPCC_CallSetComplete_Proxy(
    ITPCC __RPC_FAR * This);

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

#endif /* __ITPCC_INTERFACE_DEFINED__ */

/* Additional Prototypes for ALL interfaces */

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

/* end of Additional Prototypes */

#ifdef __cplusplus
}
#endif

#endif
```

tpcc_com_all/src/tpcc_com_sl.rgs

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

tpcc_com_ps/src/dlldata.c

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

DO NOT ALTER THIS FILE

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

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

*****
*/

#include <rpcproxy.h>

#ifdef __cplusplus
extern "C" {
#endif

EXTERN_PROXY_FILE( tpcc_com_ps )
```

Appendix A - Application Source Code

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

DLLDATA_ROUTINES( aProxyFileList, GET_DLL_CLSID )
```

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

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

tpcc_com_ps/src/tpcc_com_ps.def

```
LIBRARY      "tpcc_com_ps"

DESCRIPTION  'Proxy/Stub DLL'

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

tpcc_com_ps/src/tpcc_com_ps.h

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

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

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

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

MIDL_INTERFACE("FEEB6AA2-84B1-11d2-BA47-00C04FBFE08B")
ITPCC : public IUnknown
{
public:
    virtual HRESULT __stdcall NewOrder(
        /* [in] */ VARIANT txn_in,
        /* [out] */ VARIANT __RPC_FAR *txn_out) = 0;
};
#endif
```

Appendix A - Application Source Code

```
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 */

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);
```

Appendix A - Application Source Code

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

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

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

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

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

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

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

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

HRESULT __stdcall ITPCC_CallSetComplete_Proxy(
    ITPCC __RPC_FAR * This);

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

```
#endif /* __ITPCC_INTERFACE_DEFINED__ */
```

```
/* Additional Prototypes for ALL interfaces */
```

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

```
/* end of Additional Prototypes */
```

```
#ifdef __cplusplus
}
#endif
```

```
#endif
```

tpcc_com_ps/src/tpcc_com_ps.idl

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

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

[
    object,
    oleautomation,
    uuid(FEEE6AA2-84B1-11d2-BA47-00C04FBFE08B),
    helpstring("ITPCC Interface"),
    pointer_default(unique)
]
interface ITPCC : IUnknown
{
    HRESULT __stdcall NewOrder
```

Appendix A - Application Source Code

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

HRESULT _stdcall Payment

(
[in] VARIANT txn_in,
[out] VARIANT *txn_out
);

HRESULT _stdcall Delivery

(
[in] VARIANT txn_in,
[out] VARIANT *txn_out
);

HRESULT _stdcall StockLevel

(
[in] VARIANT txn_in,
[out] VARIANT *txn_out
);

HRESULT _stdcall OrderStatus

(
[in] VARIANT txn_in,
[out] VARIANT *txn_out
);

HRESULT _stdcall CallSetComplete

(
);

}; // interface ITPCC

tpcc_com_ps/src/tpcc_com_ps_i.c

#pragma warning( disable: 4049 ) /* more than 64k source lines */
/* this ALWAYS GENERATED file contains the IIDs and CLSIDs */
/* link this file in with the server and any clients */

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

#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,0xFEEB6AA2,0x84B1,0x11d2,0xBA,0x47,0x00,0xC0,0x4F,0xBF,0xE0,0x8B);

#undef MIDL_DEFINE_GUID

#ifdef __cplusplus
}
#endif

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


Appendix A - Application Source Code

```
#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( )

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

#ifdef __cplusplus
extern "C"{
#endif

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

#ifdef _MIDL_USE_GUIDDEF_

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

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

#else // !_MIDL_USE_GUIDDEF_

#ifndef __IID_DEFINED__
#define __IID_DEFINED__

typedef struct _IID
{
    unsigned long x;
    unsigned short s1;
    unsigned short s2;
    unsigned char c[8];
} IID;

#endif // __IID_DEFINED__

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

#endif // _MIDL_USE_GUIDDEF_

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

#endif // __cplusplus
#endif
```

```
#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,0xFEEB6AA2,0x84B1,0x11d2,0xBA,0x47,0x00,0xC0,0x4F,0xBF,0xE0,0x8B);

#undef MIDL_DEFINE_GUID

#ifdef __cplusplus
}
#endif

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

tpcc_com_ps/src/tpcc_com_ps_p.c

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

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

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

#endif
```

Appendix A - Application Source Code

```
#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,
    0
};

static const MIDL_STUBLESS_PROXY_INFO ITPCC_ProxyInfo =
```

```
{
    &Object_StubDesc,
    __MIDL_ProcFormatString.Format,
    &ITPCC_FormatStringOffsetTable[-3],
    0,
    0,
    0
};

CINTERFACE_PROXY_VTABLE(9) _ITPCCProxyVtbl =
{
    &ITPCC_ProxyInfo,
    &IID_ITPCC,
    IUnknown_QueryInterface_Proxy,
    IUnknown_AddRef_Proxy,
    IUnknown_Release_Proxy ,
    (void *)-1 /* ITPCC::NewOrder */ ,
    (void *)-1 /* ITPCC::Payment */ ,
    (void *)-1 /* ITPCC::Delivery */ ,
    (void *)-1 /* ITPCC::StockLevel */ ,
    (void *)-1 /* ITPCC::OrderStatus */ ,
    (void *)-1 /* ITPCC::CallSetComplete */
};

const CInterfaceStubVtbl _ITPCCStubVtbl =
{
    &IID_ITPCC,
    &ITPCC_ServerInfo,
    9,
    0, /* pure interpreted */
    CStdStubBuffer_METHODS
};

extern const USER_MARSHAL_ROUTINE_QUADRUPLE UserMarshalRoutines[ WIRE_MARSHAL_TABLE_SIZE
];

static const MIDL_STUB_DESC Object_StubDesc =
{
    0,
    NdrOleAllocate,
    NdrOleFree,
    0,
    0,
    0,
    0,
    0,
    __MIDL_TypeFormatString.Format,
    1, /* -error bounds_check flag */
    0x20000, /* Ndr library version */
    0,
    0x5030118, /* MIDL Version 5.3.280 */
    0,
    UserMarshalRoutines,
    0, /* notify & notify_flag routine table */
    0x1, /* MIDL flag */
    0, /* Reserved3 */
    0, /* Reserved4 */
    0, /* Reserved5 */
};

#pragma data_seg(".rdata")
```

Appendix A - Application Source Code

```
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 */
#ifdef _MIPS_
/* 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 */
/* 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 */
/* 26 */ NdrFcShort( 0x3da ), /* Type Offset=986 */
/* Return value */

/* 28 */ NdrFcShort( 0x70 ), /* Flags: out, return, base type, */
#ifdef _ALPHA_
#ifdef _PPC_
#if !defined(_MIPS_)
/* 30 */ NdrFcShort( 0x18 ), /* x86 Stack size/offset = 24 */
#else
NdrFcShort( 0x1c ), /* MIPS Stack size/offset = 28 */
#endif
#endif
NdrFcShort( 0x1c ), /* PPC Stack size/offset = 28 */
#endif
NdrFcShort( 0x20 ), /* Alpha Stack size/offset = 32 */
/* 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 */
#ifdef _ALPHA_
#ifdef _PPC_
#if !defined(_MIPS_)
/* 42 */ NdrFcShort( 0x1c ), /* x86 Stack size/offset = 28 */
#else
NdrFcShort( 0x20 ), /* MIPS Stack size/offset = 32 */
#endif
#endif

```

```
/* 18 */ NdrFcShort( 0x4 ), /* x86 Stack size/offset = 4 */
#else
NdrFcShort( 0x8 ), /* MIPS Stack size/offset = 8 */
#endif
#else
NdrFcShort( 0x8 ), /* PPC Stack size/offset = 8 */
#endif
NdrFcShort( 0x8 ), /* Alpha Stack size/offset = 8 */
/* 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 */
/* 26 */ NdrFcShort( 0x3da ), /* Type Offset=986 */
/* Return value */

/* 28 */ NdrFcShort( 0x70 ), /* Flags: out, return, base type, */
#ifdef _ALPHA_
#ifdef _PPC_
#if !defined(_MIPS_)
/* 30 */ NdrFcShort( 0x18 ), /* x86 Stack size/offset = 24 */
#else
NdrFcShort( 0x1c ), /* MIPS Stack size/offset = 28 */
#endif
#endif
NdrFcShort( 0x1c ), /* PPC Stack size/offset = 28 */
#endif
NdrFcShort( 0x20 ), /* Alpha Stack size/offset = 32 */
/* 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 */
#ifdef _ALPHA_
#ifdef _PPC_
#if !defined(_MIPS_)
/* 42 */ NdrFcShort( 0x1c ), /* x86 Stack size/offset = 28 */
#else
NdrFcShort( 0x20 ), /* MIPS Stack size/offset = 32 */
#endif
#endif

```

Appendix A - Application Source Code

```
#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, */
#ifdef _ALPHA_
#ifdef _PPC_
#if !defined(_MIPS_)
/* 52 */ NdrFcShort( 0x4 ), /* x86 Stack size/offset = 4 */
#else
                                NdrFcShort( 0x8 ), /* MIPS Stack size/offset = 8 */
#endif
#else
                                NdrFcShort( 0x8 ), /* PPC Stack size/offset = 8 */
#endif
#else
                                NdrFcShort( 0x8 ), /* Alpha Stack size/offset = 8 */
#endif
/* 54 */ NdrFcShort( 0x3c8 ), /* Type Offset=968 */

/* Parameter txn_out */

/* 56 */ NdrFcShort( 0x4113 ), /* Flags: must size, must free, out, simple ref,
srv alloc size=16 */
#ifdef _ALPHA_
#ifdef _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, */
#ifdef _ALPHA_
#ifdef _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 */
#ifdef _ALPHA_
#ifdef _PPC_
#if !defined(_MIPS_)
/* 76 */ NdrFcShort( 0x1c ), /* x86 Stack size/offset = 28 */
#else
                                NdrFcShort( 0x20 ), /* MIPS Stack size/offset = 32 */
#endif
#else
                                NdrFcShort( 0x20 ), /* PPC Stack size/offset = 32 */
#endif
#else
                                NdrFcShort( 0x28 ), /* Alpha Stack size/offset = 40 */
#endif
/* 78 */ NdrFcShort( 0x0 ), /* 0 */
/* 80 */ NdrFcShort( 0x8 ), /* 8 */
/* 82 */ 0x7, /* Oi2 Flags: srv must size, clt must size, has return, */
                                0x3, /* 3 */

/* Parameter txn_in */

/* 84 */ NdrFcShort( 0x8b ), /* Flags: must size, must free, in, by val, */
#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

```

Appendix A - Application Source Code

```
/* 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 */
#ifdef _ALPHA_
#ifdef _PPC_
#if !defined(_MIPS_)
/* 110 */ NdrFcShort( 0x1c ), /* x86 Stack size/offset = 28 */
#else
NdrFcShort( 0x20 ), /* MIPS Stack size/offset = 32 */
#endif
#else
NdrFcShort( 0x20 ), /* PPC Stack size/offset = 32 */
#endif
#else
NdrFcShort( 0x28 ), /* Alpha Stack size/offset = 40 */
#endif
/* 112 */ NdrFcShort( 0x0 ), /* 0 */
/* 114 */ NdrFcShort( 0x8 ), /* 8 */
/* 116 */ 0x7, /* Oi2 Flags: srv must size, clt must size, has return, */
0x3, /* 3 */
/* Parameter txn_in */
/* 118 */ NdrFcShort( 0x8b ), /* Flags: must size, must free, in, by val, */
#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
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 */
```

Appendix A - Application Source Code

```
/* 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
#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
#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
#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,
{
NdrFcShort( 0x0 ), /* 0 */
0x12, 0x0, /* FC_UP */
/* 4 */ NdrFcShort( 0x3b0 ), /* Offset= 944 (948) */
/* 6 */
0x2b, /* FC_NON_ENCAPSULATED_UNION */
0x9, /* FC_ULONG */
/* 8 */ 0x7, /* Corr desc: FC_USHORT */
0x0, /* */
/* 10 */ NdrFcShort( 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 */
```

Appendix A - Application Source Code

```
/* 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 ), /* Offset= 12 (298) */
/* 288 */
/* 290 */ NdrFcShort( 0x2 ), /* 2 */
/* 292 */ 0x9, /* Corr desc: FC_ULONG */
/* 294 */ NdrFcShort( 0xfffc ), /* -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 */
/* 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 */
/* 350 */ NdrFcShort( 0x1fc ), /* Offset= 508 (858) */
/* 352 */
```

Appendix A - Application Source Code

```

                                0x2a,          /* FC_ENCAPSULATED_UNION */
                                0x49,          /* 73 */
/* 354 */ NdrFcShort( 0x18 ), /* 24 */
/* 356 */ NdrFcShort( 0xa ), /* 10 */
/* 358 */ NdrFcLong( 0x8 ), /* 8 */
/* 362 */ NdrFcShort( 0x58 ), /* Offset= 88 (450) */
/* 364 */ NdrFcLong( 0xd ), /* 13 */
/* 368 */ NdrFcShort( 0x78 ), /* Offset= 120 (488) */
/* 370 */ NdrFcLong( 0x9 ), /* 9 */
/* 374 */ NdrFcShort( 0x94 ), /* Offset= 148 (522) */
/* 376 */ NdrFcLong( 0xc ), /* 12 */
/* 380 */ NdrFcShort( 0xbc ), /* Offset= 188 (568) */
/* 382 */ NdrFcLong( 0x24 ), /* 36 */
/* 386 */ NdrFcShort( 0x114 ), /* Offset= 276 (662) */
/* 388 */ NdrFcLong( 0x800d ), /* 32781 */
/* 392 */ NdrFcShort( 0x130 ), /* Offset= 304 (696) */
/* 394 */ NdrFcLong( 0x10 ), /* 16 */
/* 398 */ NdrFcShort( 0x148 ), /* Offset= 328 (726) */
/* 400 */ NdrFcLong( 0x2 ), /* 2 */
/* 404 */ NdrFcShort( 0x160 ), /* Offset= 352 (756) */
/* 406 */ NdrFcLong( 0x3 ), /* 3 */
/* 410 */ NdrFcShort( 0x178 ), /* Offset= 376 (786) */
/* 412 */ NdrFcLong( 0x14 ), /* 20 */
/* 416 */ NdrFcShort( 0x190 ), /* Offset= 400 (816) */
/* 418 */ NdrFcShort( 0xffffffff ), /* Offset= -1 (417) */
/* 420 */
                                0x1b,          /* FC_CARRAY */
                                0x3,          /* 3 */
/* 422 */ NdrFcShort( 0x4 ), /* 4 */
/* 424 */ 0x19, /* Corr desc: field pointer, FC_ULONG */
                                0x0,          /* */
/* 426 */ NdrFcShort( 0x0 ), /* 0 */
/* 428 */
                                0x4b,          /* FC_PP */
                                0x5c,          /* FC_PAD */
/* 430 */
                                0x48,          /* FC_VARIABLE_REPEAT */
                                0x49,          /* FC_FIXED_OFFSET */
/* 432 */ NdrFcShort( 0x4 ), /* 4 */
/* 434 */ NdrFcShort( 0x0 ), /* 0 */
/* 436 */ NdrFcShort( 0x1 ), /* 1 */
/* 438 */ NdrFcShort( 0x0 ), /* 0 */
/* 440 */ NdrFcShort( 0x0 ), /* 0 */
/* 442 */ 0x12, 0x0, /* FC_UP */
/* 444 */ NdrFcShort( 0xffffffff6e ), /* Offset= -146 (298) */
/* 446 */
                                0x5b,          /* FC_END */
                                0x8,          /* FC_LONG */
/* 448 */ 0x5c, /* FC_PAD */
                                0x5b,          /* FC_END */
/* 450 */
                                0x16,          /* FC_PSTRUCT */
                                0x3,          /* 3 */
/* 452 */ NdrFcShort( 0x8 ), /* 8 */
/* 454 */
                                0x4b,          /* FC_PP */
                                0x5c,          /* FC_PAD */
/* 456 */
                                0x46,          /* FC_NO_REPEAT */
                                0x5c,          /* FC_PAD */
/* 458 */ NdrFcShort( 0x4 ), /* 4 */
/* 460 */ NdrFcShort( 0x4 ), /* 4 */
```

```

/* 462 */ 0x11, 0x0, /* FC_RP */
/* 464 */ NdrFcShort( 0xffffffffd4 ), /* Offset= -44 (420) */
/* 466 */
                                0x5b,          /* FC_END */
                                0x8,          /* FC_LONG */
/* 468 */ 0x8, /* FC_LONG */
                                0x5b,          /* FC_END */
/* 470 */
                                0x21,          /* FC_BOGUS_ARRAY */
                                0x3,          /* 3 */
/* 472 */ NdrFcShort( 0x0 ), /* 0 */
/* 474 */ 0x19, /* Corr desc: field pointer, FC_ULONG */
                                0x0,          /* */
/* 476 */ NdrFcShort( 0x0 ), /* 0 */
/* 478 */ NdrFcLong( 0xffffffff ), /* -1 */
/* 482 */ 0x4c, /* FC_EMBEDDED_COMPLEX */
                                0x0,          /* 0 */
/* 484 */ NdrFcShort( 0xffffffff50 ), /* Offset= -176 (308) */
/* 486 */ 0x5c, /* FC_PAD */
                                0x5b,          /* FC_END */
/* 488 */
                                0x1a,          /* FC_BOGUS_STRUCT */
                                0x3,          /* 3 */
/* 490 */ NdrFcShort( 0x8 ), /* 8 */
/* 492 */ NdrFcShort( 0x0 ), /* 0 */
/* 494 */ NdrFcShort( 0x6 ), /* Offset= 6 (500) */
/* 496 */ 0x8, /* FC_LONG */
                                0x36,          /* FC_POINTER */
/* 498 */ 0x5c, /* FC_PAD */
                                0x5b,          /* FC_END */
/* 500 */
                                0x11, 0x0,          /* FC_RP */
/* 502 */ NdrFcShort( 0xffffffffe0 ), /* Offset= -32 (470) */
/* 504 */
                                0x21,          /* FC_BOGUS_ARRAY */
                                0x3,          /* 3 */
/* 506 */ NdrFcShort( 0x0 ), /* 0 */
/* 508 */ 0x19, /* Corr desc: field pointer, FC_ULONG */
                                0x0,          /* */
/* 510 */ NdrFcShort( 0x0 ), /* 0 */
/* 512 */ NdrFcLong( 0xffffffffff ), /* -1 */
/* 516 */ 0x4c, /* FC_EMBEDDED_COMPLEX */
                                0x0,          /* 0 */
/* 518 */ NdrFcShort( 0xffffffff40 ), /* Offset= -192 (326) */
/* 520 */ 0x5c, /* FC_PAD */
                                0x5b,          /* FC_END */
/* 522 */
                                0x1a,          /* FC_BOGUS_STRUCT */
                                0x3,          /* 3 */
/* 524 */ NdrFcShort( 0x8 ), /* 8 */
/* 526 */ NdrFcShort( 0x0 ), /* 0 */
/* 528 */ NdrFcShort( 0x6 ), /* Offset= 6 (534) */
/* 530 */ 0x8, /* FC_LONG */
                                0x36,          /* FC_POINTER */
/* 532 */ 0x5c, /* FC_PAD */
                                0x5b,          /* FC_END */
/* 534 */
                                0x11, 0x0,          /* FC_RP */
/* 536 */ NdrFcShort( 0xffffffffe0 ), /* Offset= -32 (504) */
/* 538 */
                                0x1b,          /* FC_CARRAY */
                                0x3,          /* 3 */
```


Appendix A - Application Source Code

```
/* 540 */ NdrFcShort( 0x4 ), /* 4 */
/* 542 */ 0x19, /* Corr desc: field pointer, FC_ULONG */
/* 544 */ NdrFcShort( 0x0 ), /* 0 */
/* 546 */
0x4b, /* FC_PP */
0x5c, /* FC_PAD */
/* 548 */
0x48, /* FC_VARIABLE_REPEAT */
0x49, /* FC_FIXED_OFFSET */
/* 550 */ NdrFcShort( 0x4 ), /* 4 */
/* 552 */ NdrFcShort( 0x0 ), /* 0 */
/* 554 */ NdrFcShort( 0x1 ), /* 1 */
/* 556 */ NdrFcShort( 0x0 ), /* 0 */
/* 558 */ NdrFcShort( 0x0 ), /* 0 */
/* 560 */ 0x12, 0x0, /* FC_UP */
/* 562 */ NdrFcShort( 0x182 ), /* Offset= 386 (948) */
/* 564 */
0x5b, /* FC_END */
0x8, /* FC_LONG */
/* 566 */ 0x5c, /* FC_PAD */
0x5b, /* FC_END */
/* 568 */
0x1a, /* FC_BOGUS_STRUCT */
0x3, /* 3 */
/* 570 */ NdrFcShort( 0x8 ), /* 8 */
/* 572 */ NdrFcShort( 0x0 ), /* 0 */
/* 574 */ NdrFcShort( 0x6 ), /* Offset= 6 (580) */
/* 576 */ 0x8, /* FC_LONG */
0x36, /* FC_POINTER */
/* 578 */ 0x5c, /* FC_PAD */
0x5b, /* FC_END */
/* 580 */
0x11, 0x0, /* FC_RP */
/* 582 */ NdrFcShort( 0xfffffd4 ), /* Offset= -44 (538) */
/* 584 */
0x2E, /* FC_IP */
0x5a, /* FC_CONSTANT_IID */
/* 586 */ NdrFcLong( 0x2f ), /* 47 */
/* 590 */ NdrFcShort( 0x0 ), /* 0 */
/* 592 */ NdrFcShort( 0x0 ), /* 0 */
/* 594 */ 0xc0, /* 192 */
0x0, /* 0 */
/* 596 */ 0x0, /* 0 */
0x0, /* 0 */
/* 598 */ 0x0, /* 0 */
0x0, /* 0 */
/* 600 */ 0x0, /* 0 */
0x46, /* 70 */
/* 602 */
0x1b, /* FC_CARRAY */
0x0, /* 0 */
/* 604 */ NdrFcShort( 0x1 ), /* 1 */
/* 606 */ 0x19, /* Corr desc: field pointer, FC_ULONG */
0x0, /* */
/* 608 */ NdrFcShort( 0x4 ), /* 4 */
/* 610 */ 0x1, /* FC_BYTE */
0x5b, /* FC_END */
/* 612 */
0x1a, /* FC_BOGUS_STRUCT */
0x3, /* 3 */
/* 614 */ NdrFcShort( 0x10 ), /* 16 */
/* 616 */ NdrFcShort( 0x0 ), /* 0 */
/* 618 */ NdrFcShort( 0xa ), /* Offset= 10 (628) */
/* 620 */ 0x8, /* FC_LONG */
0x8, /* FC_LONG */
/* 622 */ 0x4c, /* FC_EMBEDDED_COMPLEX */
0x0, /* 0 */
/* 624 */ NdrFcShort( 0xfffffd8 ), /* Offset= -40 (584) */
/* 626 */ 0x36, /* FC_POINTER */
0x5b, /* FC_END */
/* 628 */
0x12, 0x0, /* FC_UP */
/* 630 */ NdrFcShort( 0xfffffe4 ), /* Offset= -28 (602) */
/* 632 */
0x1b, /* FC_CARRAY */
0x3, /* 3 */
/* 634 */ NdrFcShort( 0x4 ), /* 4 */
/* 636 */ 0x19, /* Corr desc: field pointer, FC_ULONG */
0x0, /* */
/* 638 */ NdrFcShort( 0x0 ), /* 0 */
/* 640 */
0x4b, /* FC_PP */
0x5c, /* FC_PAD */
/* 642 */
0x48, /* FC_VARIABLE_REPEAT */
0x49, /* FC_FIXED_OFFSET */
/* 644 */ NdrFcShort( 0x4 ), /* 4 */
/* 646 */ NdrFcShort( 0x0 ), /* 0 */
/* 648 */ NdrFcShort( 0x1 ), /* 1 */
/* 650 */ NdrFcShort( 0x0 ), /* 0 */
/* 652 */ NdrFcShort( 0x0 ), /* 0 */
/* 654 */ 0x12, 0x0, /* FC_UP */
/* 656 */ NdrFcShort( 0xfffffd4 ), /* Offset= -44 (612) */
/* 658 */
0x5b, /* FC_END */
0x8, /* FC_LONG */
/* 660 */ 0x5c, /* FC_PAD */
0x5b, /* FC_END */
/* 662 */
0x1a, /* FC_BOGUS_STRUCT */
0x3, /* 3 */
/* 664 */ NdrFcShort( 0x8 ), /* 8 */
/* 666 */ NdrFcShort( 0x0 ), /* 0 */
/* 668 */ NdrFcShort( 0x6 ), /* Offset= 6 (674) */
/* 670 */ 0x8, /* FC_LONG */
0x36, /* FC_POINTER */
/* 672 */ 0x5c, /* FC_PAD */
0x5b, /* FC_END */
/* 674 */
0x11, 0x0, /* FC_RP */
/* 676 */ NdrFcShort( 0xfffffd4 ), /* Offset= -44 (632) */
/* 678 */
0x1d, /* FC_SMFARRAY */
0x0, /* 0 */
/* 680 */ NdrFcShort( 0x8 ), /* 8 */
/* 682 */ 0x2, /* FC_CHAR */
0x5b, /* FC_END */
/* 684 */
0x15, /* FC_STRUCT */
0x3, /* 3 */
/* 686 */ NdrFcShort( 0x10 ), /* 16 */
/* 688 */ 0x8, /* FC_LONG */
0x6, /* FC_SHORT */
```

Appendix A - Application Source Code

```
/* 690 */ 0x6,          /* FC_SHORT */
/* 692 */ 0x0,          0x4c,          /* FC_EMBEDDED_COMPLEX */
/*                               /* 0 */
/* 696 */              NdrFcShort( 0xffffffffl ), /* Offset= -15 (678) */
/*                               /* 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 */
/*                               0x36,          /* FC_POINTER */
/* 706 */ 0x4c,          /* FC_EMBEDDED_COMPLEX */
/*                               0x0,          /* 0 */
/* 708 */ NdrFcShort( 0xffffffffe8 ), /* Offset= -24 (684) */
/* 710 */ 0x5c,          /* FC_PAD */
/*                               0x5b,          /* FC_END */
/* 712 */
/* 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 */
/*                               0x5b,          /* FC_END */
/* 756 */
/*                               0x16,          /* FC_PSTRUCT */
/*                               0x3,          /* 3 */
/* 758 */ NdrFcShort( 0x8 ), /* 8 */
/* 760 */
/*                               0x4b,          /* FC_PP */
/*                               0x5c,          /* FC_PAD */
/* 762 */
/*                               0x46,          /* FC_NO_REPEAT */
/*                               0x5c,          /* FC_PAD */
/* 764 */ NdrFcShort( 0x4 ), /* 4 */
/* 766 */ NdrFcShort( 0x4 ), /* 4 */
/* 768 */ 0x12, 0x0,     /* FC_UP */
/* 770 */ NdrFcShort( 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 */
/*                               0x5b,          /* FC_END */
/* 786 */
/*                               0x16,          /* FC_PSTRUCT */
/*                               0x3,          /* 3 */
/* 788 */ NdrFcShort( 0x8 ), /* 8 */
/* 790 */
/*                               0x4b,          /* FC_PP */
/*                               0x5c,          /* FC_PAD */
/* 792 */
/*                               0x46,          /* FC_NO_REPEAT */
/*                               0x5c,          /* FC_PAD */
/* 794 */ NdrFcShort( 0x4 ), /* 4 */
/* 796 */ NdrFcShort( 0x4 ), /* 4 */
/* 798 */ 0x12, 0x0,     /* FC_UP */
/* 800 */ NdrFcShort( 0xffffffffe8 ), /* Offset= -24 (776) */
/* 802 */
/*                               0x5b,          /* FC_END */
/*                               0x8,          /* FC_LONG */
/* 804 */ 0x8,          /* FC_LONG */
/*                               0x5b,          /* FC_END */
/* 806 */
/*                               0x1b,          /* FC_CARRAY */
/*                               0x7,          /* 7 */
/* 808 */ NdrFcShort( 0x8 ), /* 8 */
/* 810 */ 0x19,          /* Corr desc: field pointer, FC_ULONG */
/*                               0x0,          /* */
/* 812 */ NdrFcShort( 0x0 ), /* 0 */
/* 814 */ 0xb,          /* FC_HYPER */
/*                               0x5b,          /* FC_END */
/* 816 */
/*                               0x16,          /* FC_PSTRUCT */
/*                               0x3,          /* 3 */
/* 818 */ NdrFcShort( 0x8 ), /* 8 */
/* 820 */
/*                               0x4b,          /* FC_PP */
/*                               0x5c,          /* FC_PAD */
/* 822 */
/*                               0x46,          /* FC_NO_REPEAT */
```

Appendix A - Application Source Code

```
/* 824 */ NdrFcShort( 0x4 ), /* 4 */
/* 826 */ NdrFcShort( 0x4 ), /* 4 */
/* 828 */ 0x12, 0x0, /* FC_UP */
/* 830 */ NdrFcShort( 0xffffffe8 ), /* Offset= -24 (806) */
/* 832 */
                                0x5b, /* FC_END */
                                0x8, /* FC_LONG */
/* 834 */ 0x8, /* FC_LONG */
                                0x5b, /* FC_END */
/* 836 */
                                0x15, /* FC_STRUCT */
                                0x3, /* 3 */
/* 838 */ NdrFcShort( 0x8 ), /* 8 */
/* 840 */ 0x8, /* FC_LONG */
/* 842 */ 0x5c, /* FC_PAD */
/* 844 */
                                0x5b, /* FC_END */
                                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 */
/* 858 */
                                0x5b, /* FC_END */
                                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( 0xfffffd7 ), /* Offset= -521 (352) */
                                0x5b, /* FC_END */
/* 876 */
                                0x12, 0x0, /* FC_UP */
/* 878 */ NdrFcShort( 0xfffffe6 ), /* Offset= -266 (612) */
/* 880 */
                                0x12, 0x8, /* FC_UP [simple_pointer] */
                                /* FC_BYTE */
/* 882 */ 0x1, /* FC_BYTE */
                                0x5c, /* FC_PAD */
/* 884 */
                                0x12, 0x8, /* FC_UP [simple_pointer] */
                                /* FC_SHORT */
/* 886 */ 0x6, /* FC_SHORT */
                                0x5c, /* FC_PAD */
/* 888 */
                                0x12, 0x8, /* FC_UP [simple_pointer] */
                                /* FC_LONG */
/* 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] */
                                /* FC_DOUBLE */
/* 898 */ 0xc, /* FC_DOUBLE */
                                0x5c, /* FC_PAD */
/* 900 */
                                0x12, 0x0, /* FC_UP */
/* 902 */ NdrFcShort( 0xfffffd90 ), /* Offset= -624 (278) */
/* 904 */
                                0x12, 0x10, /* FC_UP [pointer_deref] */
/* 906 */ NdrFcShort( 0xfffffd92 ), /* Offset= -622 (284) */
/* 908 */
                                0x12, 0x10, /* FC_UP [pointer_deref] */
/* 910 */ NdrFcShort( 0xfffffda6 ), /* Offset= -602 (308) */
/* 912 */
                                0x12, 0x10, /* FC_UP [pointer_deref] */
/* 914 */ NdrFcShort( 0xfffffdb4 ), /* Offset= -588 (326) */
/* 916 */
                                0x12, 0x10, /* FC_UP [pointer_deref] */
/* 918 */ NdrFcShort( 0xfffffdc2 ), /* Offset= -574 (344) */
/* 920 */
                                0x12, 0x10, /* FC_UP [pointer_deref] */
/* 922 */ NdrFcShort( 0x2 ), /* Offset= 2 (924) */
/* 924 */
                                0x12, 0x0, /* FC_UP */
/* 926 */ NdrFcShort( 0x16 ), /* Offset= 22 (948) */
/* 928 */
                                0x15, /* FC_STRUCT */
                                0x7, /* 7 */
/* 930 */ NdrFcShort( 0x10 ), /* 16 */
/* 932 */ 0x6, /* FC_SHORT */
                                0x1, /* FC_BYTE */
/* 934 */ 0x1, /* FC_BYTE */
                                0x38, /* FC_ALIGNM4 */
/* 936 */ 0x8, /* FC_LONG */
                                0x39, /* FC_ALIGNM8 */
/* 938 */ 0xb, /* FC_HYPER */
                                0x5b, /* FC_END */
/* 940 */
                                0x12, 0x0, /* FC_UP */
/* 942 */ NdrFcShort( 0xfffffff2 ), /* Offset= -14 (928) */
/* 944 */
                                0x12, 0x8, /* FC_UP [simple_pointer] */
                                /* FC_CHAR */
/* 946 */ 0x2, /* FC_CHAR */
                                0x5c, /* FC_PAD */
/* 948 */
                                0x1a, /* FC_BOGUS_STRUCT */
                                0x7, /* 7 */
/* 950 */ NdrFcShort( 0x20 ), /* 32 */
/* 952 */ NdrFcShort( 0x0 ), /* 0 */
/* 954 */ NdrFcShort( 0x0 ), /* Offset= 0 (954) */
/* 956 */ 0x8, /* FC_LONG */
                                0x8, /* FC_LONG */
/* 958 */ 0x6, /* FC_SHORT */
                                0x6, /* FC_SHORT */
/* 960 */ 0x6, /* FC_SHORT */
                                0x6, /* FC_SHORT */
/* 962 */ 0x4c, /* FC_EMBEDDED_COMPLEX */
                                0x0, /* 0 */
/* 964 */ NdrFcShort( 0xfffffc42 ), /* Offset= -958 (6) */
/* 966 */ 0x5c, /* FC_PAD */
                                0x5b, /* FC_END */
```

Appendix A - Application Source Code

```
/* 968 */ 0xb4, /* FC_USER_MARSHAL */
/* 970 */ NdrFcShort( 0x0 ), /* 0 */
/* 972 */ NdrFcShort( 0x10 ), /* 16 */
/* 974 */ NdrFcShort( 0x0 ), /* 0 */
/* 976 */ NdrFcShort( 0xfffffc32 ), /* Offset= -974 (2) */
/* 978 */
/* 980 */ NdrFcShort( 0x6 ), /* Offset= 6 (986) */
/* 982 */
/* 984 */ NdrFcShort( 0xfffffcdc ), /* Offset= -36 (948) */
/* 986 */ 0xb4, /* FC_USER_MARSHAL */
/* 988 */ NdrFcShort( 0x0 ), /* 0 */
/* 990 */ NdrFcShort( 0x10 ), /* 16 */
/* 992 */ NdrFcShort( 0x0 ), /* 0 */
/* 994 */ NdrFcShort( 0xfffffff4 ), /* Offset= -12 (982) */

0x0
};

const CInterfaceProxyVtbl * _tpcc_com_ps_ProxyVtblList[] =
{
( CInterfaceProxyVtbl *) &ITPCCProxyVtbl,
0
};

const CInterfaceStubVtbl * _tpcc_com_ps_StubVtblList[] =
{
( CInterfaceStubVtbl *) &ITPCCStubVtbl,
0
};

PCInterfaceName const _tpcc_com_ps_InterfaceNamesList[] =
{
"ITPCC",
0
};

#define _tpcc_com_ps_CHECK_IID(n) IID_GENERIC_CHECK_IID( _tpcc_com_ps, pIID, n)

int __stdcall _tpcc_com_ps_IID_Lookup( const IID * pIID, int * pIndex )
{
if(!_tpcc_com_ps_CHECK_IID(0))
{
*pIndex = 0;
return 1;
}

return 0;
}

const ExtendedProxyFileInfo tpcc_com_ps_ProxyFileInfo =
{
(PCInterfaceProxyVtblList *) &_tpcc_com_ps_ProxyVtblList,
(PCInterfaceStubVtblList *) &_tpcc_com_ps_StubVtblList,
(const PCInterfaceName *) &_tpcc_com_ps_InterfaceNamesList,
0, // no delegation
&_tpcc_com_ps_IID_Lookup,
```

```
1,
2,
0, /* table of [async_uuid] interfaces */
0, /* Filler1 */
0, /* Filler2 */
0 /* Filler3 */
};

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

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

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

/* File created by MIDL compiler version 5.03.0280 */
/* at Sat Apr 08 16:40:10 2000
*/
/* Compiler settings for .\src\tpcc_com_ps.idl:
Oicf (OptLev=i2), 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 _M_IA64 || defined(_M_AXP64)
#define USE_STUBLESS_PROXY

/* verify that the <rpcproxy.h> version is high enough to compile this file*/
#ifndef __REDQ_RPCPROXY_H_VERSION__
#define __REQUIRED_RPCPROXY_H_VERSION__ 475
#endif

#include "rpcproxy.h"
#ifndef __RPCPROXY_H_VERSION__
#error this stub requires an updated version of <rpcproxy.h>
#endif // __RPCPROXY_H_VERSION__

#include "tpcc_com_ps.h"

#define TYPE_FORMAT_STRING_SIZE 979
#define PROC_FORMAT_STRING_SIZE 253
#define TRANSMIT_AS_TABLE_SIZE 0
#define WIRE_MARSHAL_TABLE_SIZE 1

typedef struct _MIDL_TYPE_FORMAT_STRING
{
short Pad;
unsigned char Format[ TYPE_FORMAT_STRING_SIZE ];
} MIDL_TYPE_FORMAT_STRING;

typedef struct _MIDL_PROC_FORMAT_STRING
{
short Pad;
unsigned char Format[ PROC_FORMAT_STRING_SIZE ];
} MIDL_PROC_FORMAT_STRING;
```

Appendix A - Application Source Code

```
extern const MIDL_TYPE_FORMAT_STRING __MIDL_TypeFormatString;
extern const MIDL_PROC_FORMAT_STRING __MIDL_ProcFormatString;

/* Standard interface: __MIDL_itf_tpc_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,
    44,
    88,
    132,
    176,
    220
};

static const MIDL_SERVER_INFO ITPCC_ServerInfo =
{
    &Object_StubDesc,
    0,
    __MIDL_ProcFormatString.Format,
    &ITPCC_FormatStringOffsetTable[-3],
    0,
    0,
    0,
    0
};

static const MIDL_STUBLESS_PROXY_INFO ITPCC_ProxyInfo =
{
    &Object_StubDesc,
    __MIDL_ProcFormatString.Format,
    &ITPCC_FormatStringOffsetTable[-3],
    0,
    0,
    0
};

CINTERFACE_PROXY_VTABLE(9) _ITPCCProxyVtbl =
{
    &ITPCC_ProxyInfo,
    &IID_ITPCC,
    IUnknown_QueryInterface_Proxy,
    IUnknown_AddRef_Proxy,
    IUnknown_Release_Proxy ,

```

```
(void *)-1 /* ITPCC::NewOrder */ ,
(void *)-1 /* ITPCC::Payment */ ,
(void *)-1 /* ITPCC::Delivery */ ,
(void *)-1 /* ITPCC::StockLevel */ ,
(void *)-1 /* ITPCC::OrderStatus */ ,
(void *)-1 /* ITPCC::CallSetComplete */
};

const CInterfaceStubVtbl _ITPCCStubVtbl =
{
    &IID_ITPCC,
    &ITPCC_ServerInfo,
    9,
    0, /* pure interpreted */
    CStdStubBuffer_METHODS
};

extern const USER_MARSHAL_ROUTINE_QUADRUPLE UserMarshalRoutines[ WIRE_MARSHAL_TABLE_SIZE
];

static const MIDL_STUB_DESC Object_StubDesc =
{
    0,
    NdrOleAllocate,
    NdrOleFree,
    0,
    0,
    0,
    0,
    0,
    __MIDL_TypeFormatString.Format,
    1, /* -error bounds_check flag */
    0x50002, /* Ndr library version */
    0,
    0x5030118, /* MIDL Version 5.3.280 */
    0,
    UserMarshalRoutines,
    0, /* notify & notify_flag routine table */
    0x1, /* MIDL flag */
    0, /* Reserved3 */
    0, /* Reserved4 */
    0 /* Reserved5 */
};

#pragma data_seg(".rdata")

static const USER_MARSHAL_ROUTINE_QUADRUPLE UserMarshalRoutines[ WIRE_MARSHAL_TABLE_SIZE
] =
{
    {
        VARIANT_UserSize,
        VARIANT_UserMarshal,
        VARIANT_UserUnmarshal,
        VARIANT_UserFree
    }
};

#if !defined(__RPC_WIN64__)
#error Invalid build platform for this stub.
#endif
```

Appendix A - Application Source Code

```
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, */
        0x3,          /* 3 */
        /* 16 */ 0xa, /* 10 */
        0x7,          /* Ext Flags: new corr desc, clt corr

check, srv corr check, */
        /* 18 */ NdrFcShort( 0x20 ), /* 32 */
        /* 20 */ NdrFcShort( 0x20 ), /* 32 */
        /* 22 */ NdrFcShort( 0x0 ), /* 0 */
        /* 24 */ NdrFcShort( 0x0 ), /* 0 */

        /* Parameter txn_in */

        /* 26 */ NdrFcShort( 0x8b ), /* Flags: must size, must free, in, by val, */
#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, */
0x3, /* 3 */
/* 60 */ 0xa, /* 10 */
0x7, /* Ext Flags: new corr desc, clt corr

check, srv corr check, */
/* 62 */ NdrFcShort( 0x20 ), /* 32 */
/* 64 */ NdrFcShort( 0x20 ), /* 32 */
/* 66 */ NdrFcShort( 0x0 ), /* 0 */
/* 68 */ NdrFcShort( 0x0 ), /* 0 */

        /* Parameter txn_in */

        /* 70 */ NdrFcShort( 0x8b ), /* Flags: must size, must free, in, by val, */
#ifdef _ALPHA_
        /* 72 */ NdrFcShort( 0x10 ), /* ia64 Stack size/offset = 16 */
#else
        NdrFcShort( 0x8 ), /* axp64 Stack size/offset = 8 */
#endif
        /* 74 */ NdrFcShort( 0x3b6 ), /* Type Offset=950 */

        /* Parameter txn_out */

        /* 76 */ NdrFcShort( 0x6113 ), /* Flags: must size, must free, out, simple ref,
srv alloc size=24 */
#ifdef _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, */
#ifdef _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 */
#ifdef _ALPHA_
        /* 96 */ NdrFcShort( 0x38 ), /* ia64 Stack size/offset = 56 */
```

Appendix A - Application Source Code

```
#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, */
#ifdef _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 */
#ifdef _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, */
#ifdef _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 */
#ifdef _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, */
#ifdef _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 */
#ifdef _ALPHA_
/* 166 */ NdrFcShort( 0x28 ), /* ia64 Stack size/offset = 40 */
#else
                                NdrFcShort( 0x20 ), /* axp64 Stack size/offset = 32 */
#endif
/* 168 */ NdrFcShort( 0x3c8 ), /* Type Offset=968 */

/* Return value */

/* 170 */ NdrFcShort( 0x70 ), /* Flags: out, return, base type, */
#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 */
```

Appendix A - Application Source Code

```
/* 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 */ NdrFcShort( 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 */
        /* 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 */
    }
};
```


Appendix A - Application Source Code

```
/* 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 */ 0x5b, /* FC_END */

/* 288 */ NdrFcShort( 0xe ), /* FC_UP */
/* 290 */ 0x12, 0x0, /* Offset= 14 (302) */

/* 292 */ NdrFcShort( 0x2 ), /* FC_CARRAY */
/* 294 */ 0x9, /* 2 */
/* 296 */ 0x0, /* Corr desc: FC_ULONG */
/* 298 */ 0x0, /* Corr flags: early, */
/* 300 */ 0x6, /* FC_SHORT */
/* 302 */ 0x5b, /* FC_END */

/* 304 */ 0x17, /* FC_CSTRUCT */

0x3, /* 3 */
/* 304 */ NdrFcShort( 0x8 ), /* 8 */
/* 306 */ NdrFcShort( 0xffffffff0 ), /* Offset= -16 (290) */
/* 308 */ 0x8, /* FC_LONG */
/* 310 */ 0x5c, /* FC_PAD */
/* 312 */ 0x5b, /* FC_END */

0x2E, /* FC_IP */
0x5a, /* FC_CONSTANT_IID */
/* 314 */ NdrFcLong( 0x0 ), /* 0 */
/* 318 */ NdrFcShort( 0x0 ), /* 0 */
/* 320 */ NdrFcShort( 0x0 ), /* 0 */
/* 322 */ 0xc0, /* 192 */
0x0, /* 0 */
/* 324 */ 0x0, /* 0 */
0x0, /* 0 */
/* 326 */ 0x0, /* 0 */
0x0, /* 0 */
/* 328 */ 0x0, /* 0 */
0x46, /* 70 */
/* 330 */
0x2E, /* FC_IP */
0x5a, /* FC_CONSTANT_IID */
/* 332 */ NdrFcLong( 0x20400 ), /* 132096 */
/* 336 */ NdrFcShort( 0x0 ), /* 0 */
/* 338 */ NdrFcShort( 0x0 ), /* 0 */
/* 340 */ 0xc0, /* 192 */
0x0, /* 0 */
/* 342 */ 0x0, /* 0 */
0x0, /* 0 */
/* 344 */ 0x0, /* 0 */
0x0, /* 0 */
/* 346 */ 0x0, /* 0 */
0x46, /* 70 */
/* 348 */
0x12, 0x10, /* FC_UP [pointer_deref] */
/* 350 */ NdrFcShort( 0x2 ), /* Offset= 2 (352) */
/* 352 */
0x12, 0x0, /* FC_UP */
/* 354 */ NdrFcShort( 0x1e6 ), /* Offset= 486 (840) */
/* 356 */
0x2a, /* FC_ENCAPSULATED_UNION */
0x89, /* 137 */
/* 358 */ NdrFcShort( 0x20 ), /* 32 */
/* 360 */ NdrFcShort( 0xa ), /* 10 */
/* 362 */ NdrFcLong( 0x8 ), /* 8 */
/* 366 */ NdrFcShort( 0x50 ), /* Offset= 80 (446) */
/* 368 */ NdrFcLong( 0xd ), /* 13 */
/* 372 */ NdrFcShort( 0x70 ), /* Offset= 112 (484) */
/* 374 */ NdrFcLong( 0x9 ), /* 9 */
/* 378 */ NdrFcShort( 0x90 ), /* Offset= 144 (522) */
/* 380 */ NdrFcLong( 0xc ), /* 12 */
/* 384 */ NdrFcShort( 0xb0 ), /* Offset= 176 (560) */
/* 386 */ NdrFcLong( 0x24 ), /* 36 */
/* 390 */ NdrFcShort( 0x104 ), /* Offset= 260 (650) */
/* 392 */ NdrFcLong( 0x800d ), /* 32781 */
/* 396 */ NdrFcShort( 0x120 ), /* Offset= 288 (684) */
/* 398 */ NdrFcLong( 0x10 ), /* 16 */
/* 402 */ NdrFcShort( 0x13a ), /* Offset= 314 (716) */
/* 404 */ NdrFcLong( 0x2 ), /* 2 */
/* 408 */ NdrFcShort( 0x150 ), /* Offset= 336 (744) */
/* 410 */ NdrFcLong( 0x3 ), /* 3 */
```

Appendix A - Application Source Code

```
/* 414 */ NdrFcShort( 0x166 ), /* Offset= 358 (772) */
/* 416 */ NdrFcLong( 0x14 ), /* 20 */
/* 420 */ NdrFcShort( 0x17c ), /* Offset= 380 (800) */
/* 422 */ NdrFcShort( 0xffffffff ), /* Offset= -1 (421) */
/* 424 */
                                0x21, /* FC_BOGUS_ARRAY */
                                0x3, /* 3 */
/* 426 */ NdrFcShort( 0x0 ), /* 0 */
/* 428 */ 0x19, /* Corr desc: field pointer, FC_ULONG */
                                0x0, /* */
/* 430 */ NdrFcShort( 0x0 ), /* 0 */
/* 432 */ NdrFcShort( 0x1 ), /* Corr flags: early, */
/* 434 */ NdrFcLong( 0xffffffff ), /* -1 */
/* 438 */ NdrFcShort( 0x0 ), /* Corr flags: */
/* 440 */
                                0x12, 0x0, /* FC_UP */
/* 442 */ NdrFcShort( 0xffffffff74 ), /* Offset= -140 (302) */
/* 444 */ 0x5c, /* FC_PAD */
                                0x5b, /* FC_END */
/* 446 */
                                0x1a, /* FC_BOGUS_STRUCT */
                                0x3, /* 3 */
/* 448 */ NdrFcShort( 0x10 ), /* 16 */
/* 450 */ NdrFcShort( 0x0 ), /* 0 */
/* 452 */ NdrFcShort( 0x6 ), /* Offset= 6 (458) */
/* 454 */ 0x8, /* FC_LONG */
                                0x39, /* FC_ALIGNM8 */
/* 456 */ 0x36, /* FC_POINTER */
                                0x5b, /* FC_END */
/* 458 */
                                0x11, 0x0, /* FC_RP */
/* 460 */ NdrFcShort( 0xffffffffdc ), /* Offset= -36 (424) */
/* 462 */
                                0x21, /* FC_BOGUS_ARRAY */
                                0x3, /* 3 */
/* 464 */ NdrFcShort( 0x0 ), /* 0 */
/* 466 */ 0x19, /* Corr desc: field pointer, FC_ULONG */
                                0x0, /* */
/* 468 */ NdrFcShort( 0x0 ), /* 0 */
/* 470 */ NdrFcShort( 0x1 ), /* Corr flags: early, */
/* 472 */ NdrFcLong( 0xffffffff ), /* -1 */
/* 476 */ NdrFcShort( 0x0 ), /* Corr flags: */
/* 478 */ 0x4c, /* FC_EMBEDDED_COMPLEX */
                                0x0, /* 0 */
/* 480 */ NdrFcShort( 0xffffffff58 ), /* Offset= -168 (312) */
/* 482 */ 0x5c, /* FC_PAD */
                                0x5b, /* FC_END */
/* 484 */
                                0x1a, /* FC_BOGUS_STRUCT */
                                0x3, /* 3 */
/* 486 */ NdrFcShort( 0x10 ), /* 16 */
/* 488 */ NdrFcShort( 0x0 ), /* 0 */
/* 490 */ NdrFcShort( 0x6 ), /* Offset= 6 (496) */
/* 492 */ 0x8, /* FC_LONG */
                                0x39, /* FC_ALIGNM8 */
/* 494 */ 0x36, /* FC_POINTER */
                                0x5b, /* FC_END */
/* 496 */
                                0x11, 0x0, /* FC_RP */
/* 498 */ NdrFcShort( 0xffffffffdc ), /* Offset= -36 (462) */
/* 500 */
                                0x21, /* FC_BOGUS_ARRAY */
                                0x3, /* 3 */
/* 502 */ NdrFcShort( 0x0 ), /* 0 */
/* 504 */ 0x19, /* Corr desc: field pointer, FC_ULONG */
                                0x0, /* */
/* 506 */ NdrFcShort( 0x0 ), /* 0 */
/* 508 */ NdrFcShort( 0x1 ), /* Corr flags: early, */
/* 510 */ NdrFcLong( 0xffffffff ), /* -1 */
/* 514 */ NdrFcShort( 0x0 ), /* Corr flags: */
/* 516 */ 0x4c, /* FC_EMBEDDED_COMPLEX */
                                0x0, /* 0 */
/* 518 */ NdrFcShort( 0xffffffff44 ), /* Offset= -188 (330) */
/* 520 */ 0x5c, /* FC_PAD */
                                0x5b, /* FC_END */
/* 522 */
                                0x1a, /* FC_BOGUS_STRUCT */
                                0x3, /* 3 */
/* 524 */ NdrFcShort( 0x10 ), /* 16 */
/* 526 */ NdrFcShort( 0x0 ), /* 0 */
/* 528 */ NdrFcShort( 0x6 ), /* Offset= 6 (534) */
/* 530 */ 0x8, /* FC_LONG */
                                0x39, /* FC_ALIGNM8 */
/* 532 */ 0x36, /* FC_POINTER */
                                0x5b, /* FC_END */
/* 534 */
                                0x11, 0x0, /* FC_RP */
/* 536 */ NdrFcShort( 0xffffffffdc ), /* Offset= -36 (500) */
/* 538 */
                                0x21, /* FC_BOGUS_ARRAY */
                                0x3, /* 3 */
/* 540 */ NdrFcShort( 0x0 ), /* 0 */
/* 542 */ 0x19, /* Corr desc: field pointer, FC_ULONG */
                                0x0, /* */
/* 544 */ NdrFcShort( 0x0 ), /* 0 */
/* 546 */ NdrFcShort( 0x1 ), /* Corr flags: early, */
/* 548 */ NdrFcLong( 0xffffffff ), /* -1 */
/* 552 */ NdrFcShort( 0x0 ), /* Corr flags: */
/* 554 */
                                0x12, 0x0, /* FC_UP */
/* 556 */ NdrFcShort( 0x176 ), /* Offset= 374 (930) */
/* 558 */ 0x5c, /* FC_PAD */
                                0x5b, /* FC_END */
/* 560 */
                                0x1a, /* FC_BOGUS_STRUCT */
                                0x3, /* 3 */
/* 562 */ NdrFcShort( 0x10 ), /* 16 */
/* 564 */ NdrFcShort( 0x0 ), /* 0 */
/* 566 */ NdrFcShort( 0x6 ), /* Offset= 6 (572) */
/* 568 */ 0x8, /* FC_LONG */
                                0x39, /* FC_ALIGNM8 */
/* 570 */ 0x36, /* FC_POINTER */
                                0x5b, /* FC_END */
/* 572 */
                                0x11, 0x0, /* FC_RP */
/* 574 */ NdrFcShort( 0xffffffffdc ), /* Offset= -36 (538) */
/* 576 */
                                0x2f, /* FC_IP */
                                0x5a, /* FC_CONSTANT_IID */
/* 578 */ NdrFcLong( 0x2f ), /* 47 */
/* 582 */ NdrFcShort( 0x0 ), /* 0 */
/* 584 */ NdrFcShort( 0x0 ), /* 0 */
/* 586 */ 0xc0, /* 192 */
                                0x0, /* 0 */
/* 588 */ 0x0, /* 0 */
                                0x0, /* 0 */
```

Appendix A - Application Source Code

```
/* 590 */ 0x0, /* 0 */
/* 592 */ 0x0, /* 0 */
/* 594 */ 0x46, /* 70 */
/* 596 */ NdrFcShort( 0x1 ), /* 1 */
/* 598 */ 0x19, /* Corr desc: field pointer, FC_ULONG */
/* 600 */ NdrFcShort( 0x4 ), /* 4 */
/* 602 */ NdrFcShort( 0x1 ), /* Corr flags: early, */
/* 604 */ 0x1, /* FC_BYTE */
/* 606 */ 0x5b, /* FC_END */
/* 608 */ 0x1a, /* FC_BOGUS_STRUCT */
/* 610 */ 0x3, /* 3 */
/* 612 */ NdrFcShort( 0x18 ), /* 24 */
/* 614 */ 0x0, /* 0 */
/* 616 */ NdrFcShort( 0xc ), /* Offset= 12 (624) */
/* 618 */ 0x8, /* FC_LONG */
/* 620 */ 0x4c, /* FC_EMBEDDED_COMPLEX */
/* 622 */ 0x0, /* 0 */
/* 624 */ NdrFcShort( 0xfffffd6 ), /* Offset= -42 (576) */
/* 626 */ 0x39, /* FC_ALIGNM8 */
/* 628 */ 0x36, /* FC_POINTER */
/* 630 */ 0x5c, /* FC_PAD */
/* 632 */ 0x5b, /* FC_END */
/* 634 */ 0x12, 0x0, /* FC_UP */
/* 636 */ NdrFcShort( 0xfffffe0 ), /* Offset= -32 (594) */
/* 638 */ 0x21, /* FC_BOGUS_ARRAY */
/* 640 */ 0x3, /* 3 */
/* 642 */ NdrFcShort( 0x0 ), /* 0 */
/* 644 */ 0x19, /* Corr desc: field pointer, FC_ULONG */
/* 646 */ 0x0, /* 0 */
/* 648 */ NdrFcShort( 0x1 ), /* Corr flags: early, */
/* 650 */ NdrFcLong( 0xffffffff ), /* -1 */
/* 652 */ NdrFcShort( 0x0 ), /* Corr flags: */
/* 654 */ 0x12, 0x0, /* FC_UP */
/* 656 */ NdrFcShort( 0xfffffd8 ), /* Offset= -40 (606) */
/* 658 */ 0x5c, /* FC_PAD */
/* 660 */ 0x5b, /* FC_END */
/* 662 */ 0x1a, /* FC_BOGUS_STRUCT */
/* 664 */ 0x3, /* 3 */
/* 666 */ NdrFcShort( 0x10 ), /* 16 */
/* 668 */ NdrFcShort( 0x0 ), /* 0 */
/* 670 */ NdrFcShort( 0x6 ), /* Offset= 6 (662) */
/* 672 */ 0x8, /* FC_LONG */
/* 674 */ 0x39, /* FC_ALIGNM8 */
/* 676 */ 0x36, /* FC_POINTER */
/* 678 */ 0x5b, /* FC_END */
/* 680 */ 0x11, 0x0, /* FC_UP */
/* 682 */ NdrFcShort( 0xfffffdc ), /* Offset= -36 (628) */
/* 684 */ 0x1d, /* FC_SMFARRAY */
/* 686 */ 0x0, /* 0 */
/* 688 */ NdrFcShort( 0x8 ), /* 8 */
/* 690 */ 0x2, /* FC_CHAR */
/* 692 */ 0x5b, /* FC_END */
/* 694 */ 0x15, /* FC_STRUCT */
/* 696 */ 0x3, /* 3 */
/* 698 */ NdrFcShort( 0x10 ), /* 16 */
/* 700 */ 0x8, /* FC_LONG */
/* 702 */ 0x6, /* FC_SHORT */
/* 704 */ 0x6, /* FC_SHORT */
/* 706 */ 0x4c, /* FC_EMBEDDED_COMPLEX */
/* 708 */ 0x0, /* 0 */
/* 710 */ NdrFcShort( 0xfffffff1 ), /* Offset= -15 (666) */
/* 712 */ 0x5b, /* FC_END */
/* 714 */ 0x1a, /* FC_BOGUS_STRUCT */
/* 716 */ 0x3, /* 3 */
/* 718 */ NdrFcShort( 0x20 ), /* 32 */
/* 720 */ NdrFcShort( 0x0 ), /* 0 */
/* 722 */ NdrFcShort( 0xa ), /* Offset= 10 (700) */
/* 724 */ 0x8, /* FC_LONG */
/* 726 */ 0x39, /* FC_ALIGNM8 */
/* 728 */ 0x36, /* FC_POINTER */
/* 730 */ 0x4c, /* FC_EMBEDDED_COMPLEX */
/* 732 */ 0x0, /* 0 */
/* 734 */ NdrFcShort( 0xffffffe7 ), /* Offset= -25 (672) */
/* 736 */ 0x5b, /* FC_END */
/* 738 */ 0x11, 0x0, /* FC_UP */
/* 740 */ NdrFcShort( 0xfffffff10 ), /* Offset= -240 (462) */
/* 742 */ 0x1b, /* FC_CARRAY */
/* 744 */ 0x0, /* 0 */
/* 746 */ NdrFcShort( 0x1 ), /* 1 */
/* 748 */ 0x19, /* Corr desc: field pointer, FC_ULONG */
/* 750 */ 0x0, /* 0 */
/* 752 */ NdrFcShort( 0x0 ), /* 0 */
/* 754 */ NdrFcShort( 0x1 ), /* Corr flags: early, */
/* 756 */ 0x1, /* FC_BYTE */
/* 758 */ 0x5b, /* FC_END */
/* 760 */ 0x1a, /* FC_BOGUS_STRUCT */
/* 762 */ 0x3, /* 3 */
/* 764 */ NdrFcShort( 0x10 ), /* 16 */
/* 766 */ NdrFcShort( 0x0 ), /* 0 */
/* 768 */ NdrFcShort( 0x6 ), /* Offset= 6 (728) */
/* 770 */ 0x8, /* FC_LONG */
/* 772 */ 0x39, /* FC_ALIGNM8 */
/* 774 */ 0x36, /* FC_POINTER */
/* 776 */ 0x5b, /* FC_END */
/* 778 */ 0x12, 0x0, /* FC_UP */
/* 780 */ NdrFcShort( 0xfffffe6 ), /* Offset= -26 (704) */
/* 782 */ 0x1b, /* FC_CARRAY */
/* 784 */ 0x1, /* 1 */
/* 786 */ NdrFcShort( 0x2 ), /* 2 */
/* 788 */ 0x19, /* Corr desc: field pointer, FC_ULONG */
/* 790 */ 0x0, /* 0 */
/* 792 */ NdrFcShort( 0x0 ), /* 0 */
/* 794 */ NdrFcShort( 0x1 ), /* Corr flags: early, */
/* 796 */ 0x4, /* FC_SHORT */
/* 798 */ 0x6, /* FC_SHORT */
/* 800 */ 0x5b, /* FC_END */
```

Appendix A - Application Source Code

```
/* 744 */
    0x1a,          /* FC_BOGUS_STRUCT */
    0x3,          /* 3 */
/* 746 */ NdrFcShort( 0x10 ), /* 16 */
/* 748 */ NdrFcShort( 0x0 ), /* 0 */
/* 750 */ NdrFcShort( 0x6 ), /* Offset= 6 (756) */
/* 752 */ 0x8,          /* FC_LONG */
    0x39,        /* FC_ALIGNM8 */
/* 754 */ 0x36,        /* FC_POINTER */
    0x5b,        /* FC_END */
/* 756 */
    0x12, 0x0,   /* FC_UP */
/* 758 */ NdrFcShort( 0xffffffff6 ), /* Offset= -26 (732) */
/* 760 */
    0x1b,        /* FC_CARRAY */
    0x3,        /* 3 */
/* 762 */ NdrFcShort( 0x4 ), /* 4 */
/* 764 */ 0x19,        /* Corr desc: field pointer, FC_ULONG */
    0x0,        /* */
/* 766 */ NdrFcShort( 0x0 ), /* 0 */
/* 768 */ NdrFcShort( 0x1 ), /* Corr flags: early, */
/* 770 */ 0x8,          /* FC_LONG */
    0x5b,        /* FC_END */
/* 772 */
    0x1a,          /* FC_BOGUS_STRUCT */
    0x3,          /* 3 */
/* 774 */ NdrFcShort( 0x10 ), /* 16 */
/* 776 */ NdrFcShort( 0x0 ), /* 0 */
/* 778 */ NdrFcShort( 0x6 ), /* Offset= 6 (784) */
/* 780 */ 0x8,          /* FC_LONG */
    0x39,        /* FC_ALIGNM8 */
/* 782 */ 0x36,        /* FC_POINTER */
    0x5b,        /* FC_END */
/* 784 */
    0x12, 0x0,   /* FC_UP */
/* 786 */ NdrFcShort( 0xffffffff6 ), /* Offset= -26 (760) */
/* 788 */
    0x1b,        /* FC_CARRAY */
    0x7,        /* 7 */
/* 790 */ NdrFcShort( 0x8 ), /* 8 */
/* 792 */ 0x19,        /* Corr desc: field pointer, FC_ULONG */
    0x0,        /* */
/* 794 */ NdrFcShort( 0x0 ), /* 0 */
/* 796 */ NdrFcShort( 0x1 ), /* Corr flags: early, */
/* 798 */ 0xb,        /* FC_HYPER */
    0x5b,        /* FC_END */
/* 800 */
    0x1a,          /* FC_BOGUS_STRUCT */
    0x3,          /* 3 */
/* 802 */ NdrFcShort( 0x10 ), /* 16 */
/* 804 */ NdrFcShort( 0x0 ), /* 0 */
/* 806 */ NdrFcShort( 0x6 ), /* Offset= 6 (812) */
/* 808 */ 0x8,          /* FC_LONG */
    0x39,        /* FC_ALIGNM8 */
/* 810 */ 0x36,        /* FC_POINTER */
    0x5b,        /* FC_END */
/* 812 */
    0x12, 0x0,   /* FC_UP */
/* 814 */ NdrFcShort( 0xffffffff6 ), /* Offset= -26 (788) */
/* 816 */
    0x15,        /* FC_STRUCT */
    0x3,        /* 3 */
/* 818 */ NdrFcShort( 0x8 ), /* 8 */

/* 820 */ 0x8,          /* FC_LONG */
    0x8,          /* FC_LONG */
/* 822 */ 0x5c,        /* FC_PAD */
    0x5b,        /* FC_END */
/* 824 */
    0x1b,        /* FC_CARRAY */
    0x3,        /* 3 */
/* 826 */ NdrFcShort( 0x8 ), /* 8 */
/* 828 */ 0x7,        /* Corr desc: FC_USHORT */
    0x0,        /* */
/* 830 */ NdrFcShort( 0xffc8 ), /* -56 */
/* 832 */ NdrFcShort( 0x1 ), /* Corr flags: early, */
/* 834 */ 0x4c,        /* FC_EMBEDDED_COMPLEX */
    0x0,        /* 0 */
/* 836 */ NdrFcShort( 0xfffffec ), /* Offset= -20 (816) */
/* 838 */ 0x5c,        /* FC_PAD */
    0x5b,        /* FC_END */
/* 840 */
    0x1a,          /* FC_BOGUS_STRUCT */
    0x3,          /* 3 */
/* 842 */ NdrFcShort( 0x38 ), /* 56 */
/* 844 */ NdrFcShort( 0xfffffec ), /* Offset= -20 (824) */
/* 846 */ NdrFcShort( 0x0 ), /* Offset= 0 (846) */
/* 848 */ 0x6,        /* FC_SHORT */
    0x6,        /* FC_SHORT */
/* 850 */ 0x38,        /* FC_ALIGNM4 */
    0x8,        /* FC_LONG */
/* 852 */ 0x8,        /* FC_LONG */
    0x4c,        /* FC_EMBEDDED_COMPLEX */
/* 854 */ 0x4,        /* 4 */
    NdrFcShort( 0xfffffe0d ), /* Offset= -499 (356) */
    0x5b,        /* FC_END */
/* 858 */
    0x12, 0x0,   /* FC_UP */
/* 860 */ NdrFcShort( 0xfffff02 ), /* Offset= -254 (606) */
/* 862 */
    0x12, 0x8,   /* FC_UP [simple_pointer] */
    0x5c,        /* FC_BYTE */
/* 864 */ 0x1,        /* FC_PAD */
    0x5c,        /* FC_PAD */
/* 866 */
    0x12, 0x8,   /* FC_UP [simple_pointer] */
    0x5c,        /* FC_SHORT */
/* 868 */ 0x6,        /* FC_PAD */
    0x5c,        /* FC_PAD */
/* 870 */
    0x12, 0x8,   /* FC_UP [simple_pointer] */
    0x5c,        /* FC_LONG */
/* 872 */ 0x8,        /* FC_PAD */
    0x5c,        /* FC_PAD */
/* 874 */
    0x12, 0x8,   /* FC_UP [simple_pointer] */
    0x5c,        /* FC_FLOAT */
/* 876 */ 0xa,        /* FC_PAD */
    0x5c,        /* FC_PAD */
/* 878 */
    0x12, 0x8,   /* FC_UP [simple_pointer] */
    0x5c,        /* FC_DOUBLE */
/* 880 */ 0xc,        /* FC_PAD */
    0x5c,        /* FC_PAD */
/* 882 */
    0x12, 0x0,   /* FC_UP */
/* 884 */ NdrFcShort( 0xffffda4 ), /* Offset= -604 (280) */
/* 886 */
    0x12, 0x10,  /* FC_UP [pointer_deref] */
/* 888 */ NdrFcShort( 0xffffda6 ), /* Offset= -602 (286) */
/* 890 */
    0x12, 0x10,  /* FC_UP [pointer_deref] */
```

Appendix A - Application Source Code

```
/* 892 */ NdrFcShort( 0xfffffdb8 ), /* Offset= -580 (312) */
/* 894 */
/* 896 */ NdrFcShort( 0xfffffdca ), /* Offset= -566 (330) */
/* 898 */
/* 900 */ NdrFcShort( 0xfffffdd8 ), /* Offset= -552 (348) */
/* 902 */
/* 904 */ NdrFcShort( 0x2 ), /* Offset= 2 (906) */
/* 906 */
/* 908 */ NdrFcShort( 0x16 ), /* Offset= 22 (930) */
/* 910 */
/* 912 */ NdrFcShort( 0x10 ), /* 16 */
/* 914 */ 0x6, /* FC_SHORT */
/* 916 */ 0x1, /* FC_BYTE */
/* 918 */ 0x8, /* FC_ALIGNM4 */
/* 920 */ 0xb, /* FC_ALIGNM8 */
/* 922 */
/* 924 */ NdrFcShort( 0xffffffe2 ), /* Offset= -14 (910) */
/* 926 */
/* 928 */ 0x2, /* FC_UP [simple_pointer] */
/* 930 */
/* 932 */ NdrFcShort( 0x20 ), /* 32 */
/* 934 */ NdrFcShort( 0x0 ), /* 0 */
/* 936 */ NdrFcShort( 0x0 ), /* 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 */ NdrFcShort( 0x0 ), /* 0 */
/* 954 */ NdrFcShort( 0x18 ), /* 24 */
/* 956 */ NdrFcShort( 0x0 ), /* 0 */
/* 958 */ NdrFcShort( 0xfffffc44 ), /* Offset= -956 (2) */
/* 960 */
/* 962 */ NdrFcShort( 0x6 ), /* Offset= 6 (968) */
/* 964 */
/* 966 */ NdrFcShort( 0xfffffcdc ), /* Offset= -36 (930) */
/* 968 */ 0xb4, /* FC_USER_MARSHAL */
/* 970 */ 0x83, /* 131 */
```

```
/* 970 */ NdrFcShort( 0x0 ), /* 0 */
/* 972 */ NdrFcShort( 0x18 ), /* 24 */
/* 974 */ NdrFcShort( 0x0 ), /* 0 */
/* 976 */ NdrFcShort( 0xfffffff4 ), /* Offset= -12 (964) */
/* 978 */ 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) */
```

Appendix A - Application Source Code

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.
 */

#ifdef _INC_Spinlock

    const LONG LockClosed      = 1;
    const LONG LockOpen        = 0;

    /*****
     *
     * Spinlock and Semaphore locking.
     *
     * This class provides a very conservative locking scheme.
     * The assumption behind the code is that locks will be
     * held for a very short time. When a lock is taken a memory
     */

```

```
 * location is exchanged. All other threads that want this
 * lock wait by spinning and sometimes sleeping on a semaphore
 * until it becomes free again. The only other choice is not
 * to wait at all and move on to do something else. This
 * module should normally be used in conjunction with cache
 * aligned memory in minimize cache line misses.
 *
 *****/

```

```
class Spinlock
{
    // Private data.
    HANDLE          Semaphore;
    volatile LONG   m_Spinlock;
    volatile LONG   Waiting;

#ifdef _DEBUG
    // Counters for debugging builds.
    volatile LONG   TotalLocks;
    volatile LONG   TotalSleeps;
    volatile LONG   TotalSpins;
    volatile LONG   TotalWaits;
#endif

public:
    // Public functions.

    Spinlock( void );

    inline BOOL ClaimLock( BOOL Wait = TRUE );
    inline void ReleaseLock( void );
    ~Spinlock( void );
    // Disabled operations.
    Spinlock( const Spinlock & Copy );
    void operator=( const Spinlock & Copy );

private:
    // Private functions.
    inline BOOL ClaimSpinlock( volatile LONG *sl );
    void WaitForLock( void );
    void WakeAllSleepers( void );
};

/*****
 *
 * A guaranteed atomic exchange.
 *
 * An attempt is made to claim the Spinlock. This action is
 * guaranteed to be atomic.
 *
 *****/

inline BOOL Spinlock::ClaimSpinlock( volatile LONG *Spinlock )
{
#ifdef _DEBUG
    InterlockedIncrement( (LPLONG) &TotalLocks );
#endif
    return ( ((*Spinlock) == LockOpen) && ( InterlockedExchange(
(LPLONG)Spinlock, LockClosed ) == LockOpen) );
}

/*****
 *
 */

```

Appendix A - Application Source Code

```
* 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
*
* in Full Disclosure Reports.
*
* Copyright Microsoft, 1999
*
* PURPOSE: Structure definitions for logging delivery txn completion stats.
* Contact: Charles Levine (clevine@microsoft.com)
*/

typedef struct _TXN_NEWORDER
{
```

```
BYTE OL_Count; //range 0 to 31
BYTE OL_Remote_Count; //range 0 to 31
WORD c_id;
int o_id;
} TXN_NEWORDER;

typedef struct _TXN_PAYMENT
{
    BYTE CustByName;
    BYTE IsRemote;
} TXN_PAYMENT;

typedef struct _TXN_ORDERSTATUS
{
    BYTE CustByName;
} TXN_ORDERSTATUS;

typedef union _TXN_DETAILS
{
    TXN_NEWORDER NewOrder;
    TXN_PAYMENT Payment;
    TXN_ORDERSTATUS OrderStatus;
} TXN_DETAILS;

// Common header for all records in txn log. The TxnType field is
// a switch which identifies the particular variant.
#define TXN_REC_TYPE_CONTROL 1 //
#define TXN_REC_TYPE_TPCC 2 // replaces
TRANSACTION_TYPE_TPCC
#define TXN_REC_TYPE_TPCC_DELIV_DEF 3

typedef struct _TXN_RECORD_HEADER
{
    JULIAN_TIME TxnStartT0; // start of txn
    BYTE TxnType; // one of TXN_REC_TYPE_*
    BYTE TxnSubType; // depends on
TxnType
} TXN_RECORD_HEADER, *PTXN_RECORD_HEADER;

typedef struct _TXN_RECORD_CONTROL
{
    // common header; must exactly match TXN_RECORD_HEADER
    JULIAN_TIME TxnStartT0; // start of txn
    BYTE TxnType; // = TXN_REC_TYPE_CONTROL
    BYTE TxnSubType; // depends on
TxnType
// end of common header
DWORD Len; // number of bytes
after this field
} TXN_RECORD_CONTROL, *PTXN_RECORD_CONTROL;

// TPC-C Txn Record Layout:
//
// 'TxnStartT0' is a Julian timestamp corresponding to the moment the
// txn is sent to the SUT, i.e., beginning of response time. Deltas
// are in milliseconds. Note that if RTDelay > 0, then the txn was
// delayed by this amount. The delay occurs at the beginning of the
// response time. So if RTDelay > 0, then the txn was actually sent
// at TxnStartT0 + RTDelay.
```

Appendix A - Application Source Code

```

//
//Graphically:
//
// time -->
//
// |--- Menu ---|--- Keying ---|--- Response ---|--- Think ---|
// <- DeltaT1 -> <- DeltaT2 -> <- DeltaT4 -> <- DeltaT3 ->
//
//           ^
//           ^ TxnStartT0
//
//RTDelay is the amount of response time delay included in DeltaT4.
//RTDelay is recorded per txn because this value can be changed on
//the fly, and so may vary from txn to txn.
//
//TxnStatus is the txn completion code. It is used to indicate errors.
//For example, in the New Order txn, 1% of txns abort. TxnStatus will
//reflect this.

typedef struct _TXN_RECORD_TPCC
{
    // common header; must exactly match TXN_RECORD_HEADER
    JULIAN_TIME TxnStartT0; // start of txn
    BYTE TxnType; // = TXN_REC_TYPE_TPCC
    BYTE TxnSubType; // depends on TxnType
    // end of common header

    int DeltaT1; // menu time (ms)
    int DeltaT2; // keying time (ms)
    int DeltaT3; // think time (ms)
    int DeltaT4; // response time (ms)
    int RTDelay; // response time delay (ms)
    int TxnError; // error code providing more detail for TxnStatus

    WORD w_id; // warehouse ID
    BYTE d_id; // assigned district ID for this thread
    BYTE d_id_ThisTxn; // district ID chosen for this particular
    BYTE TxnStatus; // completion status for txn to indicate errors
    BYTE reserved; // for word alignment
    TXN_DETAILS TxnDetails; //
} TXN_RECORD_TPCC, *PTXN_RECORD_TPCC;

//
// TPC-C Deferred Delivery Txn Record Layout:
//
//Incorporating delivery transaction information into the above
//structure would increase the size of TXN_DETAILS from 8 to 42 bytes.
//Hence, we store delivery transaction details in a separate structure.
//
typedef struct _TXN_RECORD_TPCC_DELIV_DEF
{
    // common header; must exactly match TXN_RECORD_HEADER
    JULIAN_TIME TxnStartT0; // start of txn
    BYTE TxnType; // = TXN_REC_TYPE_TPCC_DELIV_DEF
    BYTE TxnSubType; // = 0
    // end of common header

    int DeltaT4; // response time (ms)
    int DeltaTxnExec; // execution time (ms)
    WORD w_id; // warehouse ID

```

```

BYTE TxnStatus; // completion status for txn
to indicate errors
BYTE reserved; // for word alignment
short o_carrier_id; // carrier id
long o_id[10]; // returned delivery transaction ids
} TXN_RECORD_TPCC_DELIV_DEF, *PTXN_RECORD_TPCC_DELIV_DEF;

#define TXN_LOG_VERSION 1
#define TXN_DATA_START 4096 // offset in log file where log records start
#define TXN_LOG_EYE_CATCHER "BC" // signature bytes at the start of log file

////////////////////////////////////
// The transaction log has a header as the first 4K block.
//
typedef struct _TXN_LOG_HEADER
{
    char EyeCatcher[2]; // signature bytes; should always be "BC"
    int LogVersion;
    // set to TXN_LOG_VERSION
    JULIAN_TIME BeginTxnTS; // timestamp of first (lowest) txn start
    JULIAN_TIME EndTxnTS; // timestamp of last (highest) txn completion time
    int iRecCount; // number of records in log file
    BOOL bLogSorted;
    int iFileSize; // file size in bytes

    // the record map provides a fast way to get close to a particular timestamp in a sorted log file.
    // struct
    // {
    //     JULIAN_TIME TS;
    //     int iPos;
    //     int 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

```


Appendix A - Application Source Code

```
#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(LPCTSTR szFileName, DWORD dwOpts);
    ~CTxnLog(void);

    int WriteToLog(PTXN_RECORD_TPCC pTxnRcnd);
    int WriteToLog(PTXN_RECORD_TPCC_DELIV_DEF pTxnRcnd);
    int WriteToLog(PTXN_RECORD_CONTROL pCtrlRec);
    int WriteToLog(PTXN_RECORD_HEADER pCtrlRec);

    int WriteCtrlRecToLog(BYTE SubType, LPTSTR lpStr, DWORD dwLen);

    void CloseTransactionLogFile(void);

    PTXN_RECORD_HEADER GetNextRecord(BOOL bSkipCtrlRecs = FALSE);
    PTXN_RECORD_HEADER GetNextRecord(JULIAN_TIME SeekTimeT0, BOOL
bSkipCtrlRecs = FALSE);

    int Sort(void);
    PTXN_RECORD_HEADER GetSortedRecord(int index);

    inline BOOL IsSorted(void) { return bLogSorted; };
    inline JULIAN_TIME BeginTS(void) { return BeginTxnTS; };
    inline JULIAN_TIME EndTS(void) { return EndTxnTS; };
    inline int RecordCount(void) { return iRecCount; };
};

class CTXNLOG_ERR : public CBaseErr
{
public:
    enum CTPCC_DBLIB_ERRS
    {
        ERR_BAD_FILE_FORMAT = 1, // "File format is invalid."
        ERR_UNKNOWN_LOG_VERSION, // "Log file version is
unknown."
        ERR_BROKEN_LOG_FILE, // "Log file is
broken."
        ERR_LOG_NOT_SORTED, // "Log file is not
sorted"
        ERR_INVALID_TIME_SEQ, // "Internal Error:
Record Time Sequence invalid."
    };

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

    int m_errno;

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

    // TODO: need to complete...
    char *ErrorText() {return "";};
};
```

Appendix A - Application Source Code

|

Appendix B - Database Design

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 dblib
goto usage
:dblib
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 *****

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 *****

:end

-- 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_cl' )
    drop index district.district_cl

create unique clustered index  district_cl 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_cl' )
    drop index item.item_cl

create unique clustered index item_cl 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_cl' )
    drop index new_order.new_order_cl

create unique clustered index new_order_cl 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_cl' )
    drop index new_order.new_order_cl

create unique clustered index new_order_cl 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

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,
    0, @ol_qty10 smallint = 0,
    0, @ol_qty11 smallint = 0,
    0, @ol_qty12 smallint = 0,
    0, @ol_qty13 smallint = 0,
```

```
    @i_id14 int = 0, @s_w_id14 smallint =
    @i_id15 int = 0, @s_w_id15 smallint =

    0, @ol_qty14 smallint = 0,
    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 - @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),
        @o_id          int,
        @o_entry_d     datetime,
        @o_carrier_id  smallint,
        @cnt           smallint
        @d_id
        @c_id
        @c_last char(16)

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
```

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 uplock)
                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 <sqllex.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
    // 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_line_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
    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
```

Appendix B - Database Design

```
    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");
                }
            }
            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");
                }
                // 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
    //
    //=====
```

Appendix B - Database Design

```
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          bcp hint[128];

    // Seed with unique number
    seed(1);

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

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

    InitString(i_name, I_NAME_LEN+1);
    InitString(i_data, I_DATA_LEN+1);

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

    rc = bcp_init(i_hdbc1, name, NULL, "logs\\item.err", DB_IN);
    if (rc != SUCCEED)
        HandleErrorDBC(i_hdbc1);

    if ((aptr->build_index == 1) && (aptr->index_order == 1))
    {
        sprintf(bcp hint, "tablock, order (i_id), ROWS_PER_BATCH = 100000");
        rc = bcp_control(i_hdbc1, BCPHINTS, (void*) bcp hint);
        if (rc != SUCCEED)
            HandleErrorDBC(i_hdbc1);
    }

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

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

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

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

    rc = bcp_bind(i_hdbc1, (BYTE *) i_data, 0, I_DATA_LEN, NULL, 0, 0, 5);
    if (rc != SUCCEED)
        HandleErrorDBC(i_hdbc1);
```

```
time_start = (TimeNow() / MILLI);

item_rows_loaded = 0;

for (i_id = 1; i_id <= max_items; i_id++)
{
    i_im_id = RandomNumber(1L, 10000L);

    MakeAlphaString(14, 24, I_NAME_LEN, i_name);

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

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

    rc = bcp_sendrow(i_hdbc1);
    if (rc != SUCCEED)
        HandleErrorDBC(i_hdbc1);

    item_rows_loaded++;
    CheckForCommit(i_hdbc1, i_hstmt1, item_rows_loaded, "item",
&time_start);
}

rcint = bcp_done(i_hdbc1);
if (rcint < 0)
    HandleErrorDBC(i_hdbc1);

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

SQLFreeStmt(i_hstmt1, SQL_DROP);
SQLDisconnect(i_hdbc1);
SQLFreeConnect(i_hdbc1);

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

//=====
//
// Function : LoadWarehouse
//
// Loads WAREHOUSE table and loads Stock and District as Warehouses are created
//
//=====

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

Appendix B - Database Design

```
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 bcp hint[128];

// Seed with unique number
seed(4);

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

d_ytd = 30000.0;
d_next_o_id = orders_per_district+1;
time_start = (TimeNow() / MILLI);

for (w_id = aptr->starting_warehouse; w_id <= aptr->num_warehouses; w_id++)
{
    d_w_id = w_id;
    for (d_id = 1; d_id <= DISTRICT_PER_WAREHOUSE; d_id++)
    {
        MakeAlphaString(6,10,D_NAME_LEN, d_name);
        MakeAddress(d_street_1, d_street_2, d_city, d_state,
d_zip);
        d_tax = ((float) RandomNumber(0L,2000L))/10000.00;
        rc = bcp_sendrow(w_hdbc1);
        if (rc != SUCCEED)
            HandleErrorDBC(w_hdbc1);

        district_rows_loaded++;
        CheckForCommit(w_hdbc1, w_hstml, 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");
```


Appendix B - Database Design

```
    return;
}

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

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

    // Seed with unique number
    seed(3);

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Appendix B - Database Design

```
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 bcp[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(bcp, "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*) bcp);
        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(bcp, "tablock");
    rc = bcp_control(c_hdbc2, BCPHINTS, (void*) bcp);
    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");
```

Appendix B - Database Design

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

        // Generate HISTORY data
        MakeAlphaString(12, 24, H_DATA_LEN, customer_buf[i].h_data);
    }
}
//=====
//
// Function   : LoadCustomerTable
//
//=====

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

    // fix to avoid ODBC float to numeric conversion problem.
    // double      c_balance;
    char        c_balance[6];

    double      c_ytd_payment;
    short       c_payment_cnt;
    short       c_delivery_cnt;
    char        c_data[C_DATA_LEN+1];
    char        c_since[C_SINCE_LEN+1];
    RETCODE     rc;

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

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

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

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

    rc = bcp_bind(c_hdbc1, (BYTE *) c_middle, 0, MIDDLE_NAME_LEN, NULL, 0, 0, 5);
```

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Appendix B - Database Design

```
        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)

```

Appendix B - Database Design

```
        HandleErrorDBC(o_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("idxmodcl");
        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,"");
        }
    }
}
//=====
//
```


Appendix B - Database Design

```
// 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 != SUCCEEDED)
        HandleErrorDBC(o_hdbc1);

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

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

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

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

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

Appendix B - Database Design

```
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("idxmodc1");
    }

}

//=====
```

Appendix B - Database Design

```
//
// 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;
```

Appendix B - Database Design

```
    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)
```

Appendix B - Database Design

```
        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);
```

Appendix B - Database Design

```
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_PACKSIZE;
    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("[%d]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("[%d]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("[%d]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("[%d]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;  
  
//=====  
//  
// Function name: TimeNow  
//  
//=====  
  
long TimeNow()  
{  
    long      time_now;  
    struct _timeb el_time;  
  
#ifdef DEBUG  
    printf("[%ld]DBG: Entering TimeNow()\n", (int) GetCurrentThreadId());  
#endif  
  
    _ftime(&el_time);  
  
    time_now = ((el_time.time - start_sec) * 1000) + el_time.millitm;  
  
    return time_now;  
}
```

Appendix C – Tunable Parameters

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++. 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

System Information report written at: 11/19/04 13:51:00

System Name: PE2850

[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 PE2850

System Manufacturer Dell Computer Corporation

System Model PowerEdge 2850

System Type X86-based PC

Processor x86 Family 15 Model 2 Stepping 5 GenuineIntel ~3189 Mhz

Processor x86 Family 15 Model 2 Stepping 5 GenuineIntel ~3189 Mhz

BIOS Version/Date Dell Computer Corporation X28, 9/23/2004

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 PE2850\Administrator

Time Zone Central Standard Time

Total Physical Memory 2,560.00 MB

Available Physical Memory 837.16 MB

Total Virtual Memory 6.85 GB

Available Virtual Memory 3.19 GB

Page File Space 4.35 GB

Page File C:\pagefile.sys

[Hardware Resources]

[Conflicts/Sharing]

Appendix C – Tunable Parameters

| Resource | Device |
|---------------------------------------|--|
| Memory Address 0xF0000000-0xF7FFFFFF | PCI bus |
| Memory Address 0xF0000000-0xF7FFFFFF | 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 |
| Memory Address 0xFD000000-0xFEBFFFFFF | PCI bus |
| Memory Address 0xFD000000-0xFEBFFFFFF | RAGE XL PCI Family (Microsoft Corporation) |
| Memory Address 0xE0000000-0xEFDFEFFF | PCI bus |
| Memory Address 0xE0000000-0xEFDFEFFF | Dell PERC 3/Di RAID Controller |
| Memory Address 0xA0000-0xBFFFF | PCI bus |
| Memory Address 0xA0000-0xBFFFF | RAGE XL PCI Family (Microsoft Corporation) |
| Memory Address 0xF8000000-0xFCFFFFFF | PCI bus |
| Memory Address 0xF8000000-0xFCFFFFFF | DELL PERC 3/DC Plus RAID Controller |
| 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 | PCI standard PCI-to-PCI bridge |

[DMA]

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

[Forced Hardware]

Appendix C – Tunable Parameters

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 |
| 0x000003E0-0x00000CF7 | 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 |
| 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 |

Appendix C – Tunable Parameters

| | | |
|-----------------------|--------------------------------|----|
| 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 |
| 0x0000C000-0x0000CFFF | PCI bus | OK |
| 0x0000C000-0x0000CFFF | PCI standard PCI-to-PCI bridge | OK |
| 0x0000CC00-0x0000CCFF | Dell PERC 3 RAID (SCSI chip) | OK |
| 0x0000C800-0x0000C8FF | Dell PERC 3 RAID (SCSI chip) | OK |
| 0x0000D000-0x0000DFFF | PCI bus | OK |

[IRQs]

| Resource | Device | Status |
|----------|---|--------|
| IRQ 9 | Microsoft ACPI-Compliant System | OK |
| IRQ 11 | PCI Device | OK |
| IRQ 10 | PCI Device | OK |
| IRQ 7 | PCI Device | 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 (COM2) | OK |
| IRQ 3 | Communications Port (COM1) | OK |

Appendix C – Tunable Parameters

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 |
| 0xFD000000-0xFEBFFFFF | PCI bus | OK |
| 0xFD000000-0xFEBFFFFF | 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 |
| 0xE0000000-0xEFDFFFFF | PCI bus | OK |
| 0xE0000000-0xEFDFFFFF | Dell PERC 3/Di RAID Controller | OK |
| 0xEFC00000-0xEFDFFFFF | PCI standard PCI-to-PCI bridge | OK |
| 0xEFCFF000-0xEFCFFFFF | Dell PERC 3 RAID (SCSI chip) | OK |
| 0xEFCFE000-0xEFCFEFFF | Dell PERC 3 RAID (SCSI chip) | OK |
| 0xEFE00000-0xEFFFFFFF | PCI bus | OK |
| 0xEFF10000-0xEFF1FFFF | Broadcom NetXtreme Gigabit Ethernet #3 | OK |
| 0xEFF00000-0xEFF0FFFF | Broadcom NetXtreme Gigabit Ethernet #4 | OK |
| 0xF0000000-0xF7FFFFFF | PCI bus | OK |
| 0xF0000000-0xF7FFFFFF | DELL PERC 3/DC Plus RAID Controller | OK |
| 0xF8000000-0xFCFFFFFF | PCI bus | OK |
| 0xF8000000-0xFCFFFFFF | DELL PERC 3/DC Plus RAID Controller | OK |

Appendix C – Tunable Parameters

[Components]

[Multimedia]

[Audio Codecs]

| CODEC | Manufacturer | Description | Status | File | Version | Size | Creation Date |
|-------|--------------|----------------------------------|------------------------------------|-----------------------------------|---|-------------------------------------|---------------|
| | | | | 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\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\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\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\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\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 | |

Appendix C – Tunable Parameters

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\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

[Video Codecs]

| CODEC | Manufacturer | Description | Status | File | Version | Size | Creation Date |
|----------------------------------|----------------------------------|------------------------------------|--------|------|---------|---------------------------|--------------------|
| 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\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\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\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 |
| 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:

Appendix C – Tunable Parameters

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 PCIIVEN_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 Driversati2drad.dll
Driver Version 5.10.3663.6013
INF Fileatiixpad.inf (ati2mpad section)
Color Planes 1
Color Table Entries 65536
Resolution 1024 x 768 x 60 hertz
Bits/Pixel 16
Memory Address 0xFD000000-0xFEBFFFFF
I/O Port 0x0000E800-0x0000E8FF
Memory Address 0xFE101000-0xFE101FFF
I/O Port 0x000003B0-0x000003DF

Appendix C – Tunable Parameters

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

Appendix C – Tunable Parameters

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

Installed Yes

PNP Device ID Not Available

Last Reset 1/8/2004 4:54 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

Appendix C – Tunable Parameters

Installed Yes
PNP Device ID Not Available
Last Reset 1/8/2004 4:54 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 1/8/2004 4:54 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 ROOTMS_L2TPMINIPORT\0000

Appendix C – Tunable Parameters

Last Reset 1/8/2004 4:54 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_PPTP\MINIPORT\0000
Last Reset 1/8/2004 4:54 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)

Appendix C – Tunable Parameters

Installed Yes
PNP Device ID ROOT\MS_PPPOEMINI\PORT\0000
Last Reset 1/8/2004 4:54 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_PT\IMINI\PORT\0000
Last Reset 1/8/2004 4:54 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)

Appendix C – Tunable Parameters

Adapter Type Not Available
Product Type WAN Miniport (IP)
Installed Yes
PNP Device ID ROOTMS_NDISWANIP\0000
Last Reset 1/8/2004 4:54 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 PCIIVEN_14E4&DEV_16A7&SUBSYS_01211028&REV_02\3&172E68DD&0&30
Last Reset 1/8/2004 4:54 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 0xEFF10000-0xEFF1FFFF
IRQ Channel IRQ 28

Appendix C – Tunable Parameters

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)

Name [00000010] Broadcom NetXtreme Gigabit Ethernet
Adapter Type Ethernet 802.3
Product Type Broadcom NetXtreme Gigabit Ethernet
Installed Yes
PNP Device ID PCIIVEN_14E4&DEV_16A7&SUBSYS_01211028&REV_02\3&172E68DD&0&40
Last Reset 1/8/2004 4:54 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 0xEFF00000-0xEFF0FFFF
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 Tcpip [TCP/IP]
Connectionless Service No
Guarantees Delivery Yes
Guarantees Sequencing Yes
Maximum Address Size 16 bytes
Maximum Message Size 0 bytes
Message Oriented No
Minimum Address Size 16 bytes
Pseudo Stream Oriented No

Appendix C – Tunable Parameters

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 Tcip [UDP/IP]

Connectionless Service Yes
Guarantees Delivery No
Guarantees SequencingNo
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 SequencingNo
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

Appendix C – Tunable Parameters

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}] SECPACKET 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

Appendix C – Tunable Parameters

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_{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)

Appendix C – Tunable Parameters

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
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

Appendix C – Tunable Parameters

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

Appendix C – Tunable Parameters

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_{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

Appendix C – Tunable Parameters

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)

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

Appendix C – Tunable Parameters

Supports Multicasting No

Name MSAFD NetBIOS [Device\NetBT_Tcpip_{AA843776-1681-4379-B2C9-EC445DC298EF}]

SEQPACKET 3

Connectionless Service No

Guarantees Delivery Yes

Guarantees SequencingYes

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 SequencingNo

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

Appendix C – Tunable Parameters

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 (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

Appendix C – Tunable Parameters

Supports Special Characters No
Baud Rate 9600
Bits/Byte 8
Stop Bits 1
Parity None
Busy No
Abort Read/Write on Error No
Binary Mode Enabled Yes
Continue XMit on XOff No
CTS Outflow Control No
Discard NULL Bytes No
DSR Outflow Control 0
DSR Sensitivity 0
DTR Flow Control Type Enable
EOF Character 0
Error Replace Character 0
Error Replacement Enabled No
Event Character 0
Parity Check Enabled No
RTS Flow Control Type Enable
XOff Character 19
XOffXMit Threshold 512
XOn Character 17
XOnXMit Threshold 2048
XOnXOff InFlow Control 0
XOnXOff OutFlow Control 0
I/O Port 0x000003F8-0x000003FF
IRQ Channel IRQ 4
Driver c:\windows\system32\drivers\serial.sys (5.2.3790.0 (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

Appendix C – Tunable Parameters

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

Appendix C – Tunable Parameters

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]

[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 3.44 GB (3,694,940,160 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

Appendix C – Tunable Parameters

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 U:

Description Local Fixed Disk

Compressed No

File System NTFS

Size 159.93 GB (171,719,131,136 bytes)

Free Space 95.41 GB (102,441,680,896 bytes)

Volume Name Backup1

Volume Serial Number C47CFDC0

Drive V:

Description Local Fixed Disk

Compressed No

File System NTFS

Size 159.93 GB (171,719,131,136 bytes)

Free Space 95.41 GB (102,441,746,432 bytes)

Appendix C – Tunable Parameters

Volume Name Backup2
Volume Serial Number 6C8D077B

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

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 |

Appendix C – Tunable Parameters

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 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 156.26 GB (167,779,229,184 bytes)
Partition Starting Offset 32,256 bytes
Partition Disk #1, Partition #1
Partition Size 156.26 GB (167,779,261,440 bytes)
Partition Starting Offset 167,779,261,440 bytes
Partition Disk #1, Partition #2

Appendix C – Tunable Parameters

Partition Size 159.93 GB (171,719,170,560 bytes)
Partition Starting Offset 335,558,522,880 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 156.26 GB (167,779,229,184 bytes)
Partition Starting Offset 32,256 bytes
Partition Disk #0, Partition #1
Partition Size 156.26 GB (167,779,261,440 bytes)
Partition Starting Offset 167,779,261,440 bytes
Partition Disk #0, Partition #2
Partition Size 159.93 GB (171,719,170,560 bytes)
Partition Starting Offset 335,558,522,880 bytes

[SCSI]

Item Value
Name Dell PERC 3 RAID (SCSI chip)
Manufacturer Dell
Status OK

Appendix C – Tunable Parameters

PNP Device ID

PCIIVEN_9005&DEV_00C5&SUBSYS_00C51028&REV_01\4&22300438&0&3040

I/O Port 0x0000CC00-0x0000CCFF

Memory Address 0xEFCFF000-0xEFCFFFFF

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

PCIIVEN_9005&DEV_00C5&SUBSYS_00C51028&REV_01\4&22300438&0&3140

I/O Port 0x0000C800-0x0000C8FF

Memory Address 0xEFCFE000-0xEFCFEFFF

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 PCIIVEN_1028&DEV_000A&SUBSYS_01211028&REV_01\3&474B838&0&41

Memory Address 0xE0000000-0xEFDFEFFF

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 PCIIVEN_101E&DEV_1960&SUBSYS_04941028&REV_01\3&29E81982&0&30

Memory Address 0xF0000000-0xF7FFFFFF

IRQ Channel IRQ 24

Driver c:\windows\system32\drivers\mraid35x.sys (5.2.22.4 built by: WinDDK, 17.88 KB (18,304
bytes), 1/9/2003 11:54 AM)

Appendix C – Tunable Parameters

Name DELL PERC 3/DC Plus RAID Controller
Manufacturer DELL
Status OK
PNP Device ID PCIIVEN_101E&DEV_1960&SUBSYS_04941028&REV_01\3&1070020&0&40
Memory Address 0xF8000000-0xFCFFFFFF
IRQ Channel IRQ 20
Driver c:\windows\system32\drivers\mraid35x.sys (5.2.22.4 built by: WinDDK, 17.88 KB (18,304 bytes), 1/9/2003 11:54 AM)

[IDE]

Item Value
Name CSB5 IDE Controller
Manufacturer ServerWorks
Status OK
PNP Device ID PCIIVEN_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
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

Appendix C – Tunable Parameters

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 |
|------|--------|-----------|-------------|
|------|--------|-----------|-------------|

[Problem Devices]

| Device | PNP Device ID | Error Code |
|--------|---------------|------------|
|--------|---------------|------------|

| | | |
|------------|--|--|
| PCI Device | PCIIVEN_1028&DEV_000C&SUBSYS_000C1028&REV_00\3&13C0B0C5&0&20 | The drivers for this device are not installed. |
|------------|--|--|

| | | |
|------------|--|--|
| PCI Device | PCIIVEN_1028&DEV_0008&SUBSYS_00081028&REV_00\3&13C0B0C5&0&21 | The drivers for this device are not installed. |
|------------|--|--|

| | | |
|------------|--|--|
| PCI Device | PCIIVEN_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 |
|---|

| |
|--|
| PCIIVEN_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 | | | |

Appendix C – Tunable Parameters

| | | | | | | | | |
|----------|--|--|---------------|---------|----------|---------|-----|-----|
| 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 | | | |
| 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 | | | | | |
| 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 | |
| b57w2k | Broadcom NetXtreme Gigabit Ethernet | c:\windows\system32\drivers\b57xp32.sys | | | | | | |
| | Kernel Driver | Yes | Manual | Running | OK | Normal | No | Yes |

Appendix C – Tunable Parameters

| | | | | | | | |
|-----------|---------------------------------------|--|--------------------|---------------|---------------|----------------|-----|
| 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 | CmldIde | Not Available | Kernel Driver | No | Disabled | Stopped | OK |
| | Normal | No | No | | | | |
| cpqarray | Cpqarray | | Not Available | Kernel Driver | No | Disabled | |
| | Stopped | OK | Normal | No | No | | |
| cpqarry2 | cpqarry2 | | Not Available | Kernel Driver | No | Disabled | |
| | Stopped | OK | Normal | No | No | | |
| cpqcissm | cpqcissm | | Not Available | Kernel Driver | No | Disabled | |
| | Stopped | OK | Normal | No | No | | |
| cpqfcalm | cpqfcalm | | Not Available | Kernel Driver | No | Disabled | |
| | Stopped | OK | Normal | No | No | | |
| crcdisk | CRC Disk Filter Driver | c:\windows\system32\drivers\crcdisk.sys | Kernel Driver | Yes | | | |
| | Boot | Running | OK | Normal | No | Yes | |
| 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 |

Appendix C – Tunable Parameters

| | | | | | | | | |
|----------|---|--|--------------------|--------|----------|---------|-----|--|
| disk | Disk Driver | c:\windows\system32\drivers\disk.sys | Kernel Driver | Yes | Boot | | | |
| | Running | OK | Normal | No | Yes | | | |
| dmboot | dmboot | c:\windows\system32\drivers\dmboot.sys | Kernel Driver | No | | | | |
| | Disabled | Stopped | OK | Normal | No | No | | |
| dmio | Logical Disk Manager Driver | c:\windows\system32\drivers\dmio.sys | Kernel Driver | | | | | |
| | Yes | Boot | Running | OK | Normal | No | Yes | |
| dmload | dmload | c:\windows\system32\drivers\dmload.sys | Kernel Driver | Yes | Boot | | | |
| | Running | OK | Normal | No | Yes | | | |
| dpti2o | dpti2o | Not Available | Kernel Driver | No | Disabled | Stopped | OK | |
| | Normal | No | No | | | | | |
| fastfat | Fastfat | c:\windows\system32\drivers\fastfat.sys | File System Driver | Yes | | | | |
| | Disabled | Running | OK | Normal | No | Yes | | |
| fdc | Floppy Disk Controller Driver | c:\windows\system32\drivers\fdc.sys | Kernel Driver | | | | | |
| | Yes | Manual | Running | OK | Normal | No | Yes | |
| fips | Fips | c:\windows\system32\drivers\fips.sys | Kernel Driver | Yes | System | | | |
| | Running | OK | Normal | No | Yes | | | |
| flpydisk | Floppy Disk Driver | c:\windows\system32\drivers\flpydisk.sys | Kernel Driver | | | | | |
| | Yes | Manual | Running | OK | Normal | No | Yes | |
| ftdisk | Volume Manager Driver | c:\windows\system32\drivers\ftdisk.sys | Kernel Driver | Yes | | | | |
| | Boot | Running | OK | Normal | No | Yes | | |
| gpc | Generic Packet Classifier | c:\windows\system32\drivers\msgpc.sys | Kernel Driver | | | | | |
| | Yes | Manual | Running | OK | Normal | No | Yes | |
| hpn | hpn | Not Available | Kernel Driver | No | Disabled | Stopped | OK | |
| | Normal | No | No | | | | | |
| hpt3xx | hpt3xx | Not Available | Kernel Driver | No | Disabled | Stopped | OK | |
| | Normal | No | No | | | | | |
| http | HTTP | c:\windows\system32\drivers\http.sys | Kernel Driver | No | Manual | | | |
| | Stopped | OK | Normal | No | No | | | |
| i2omgmt | i2omgmt | Not Available | Kernel Driver | No | System | Stopped | | |
| | OK | Normal | No | No | | | | |
| i2omp | i2omp | Not Available | Kernel Driver | No | Disabled | Stopped | OK | |
| | Normal | No | No | | | | | |
| i8042prt | i8042 Keyboard and PS/2 Mouse Port Driver | c:\windows\system32\drivers\i8042prt.sys | Kernel Driver | Yes | System | | | |
| | Running | OK | Normal | No | Yes | | | |

Appendix C – Tunable Parameters

| | | | | | | | |
|----------------|-------------------------------|--|---------------|----------|----------|---------|----|
| 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 | |
| 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 | |

Appendix C – Tunable Parameters

| | | | | | | | | | | | |
|----------|--------------------------------|--|--------------------|----------|---------|---------|--------|----------|-----|---------|--------|
| 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 | Running | OK | Normal | No | Yes | | Yes | System |
| mup | Mup | c:\windows\system32\drivers\mup.sys | File System Driver | Running | OK | Normal | No | Yes | | Yes | Boot |
| ndis | NDIS System Driver | c:\windows\system32\drivers\ndis.sys | Kernel Driver | Boot | Running | OK | Normal | No | Yes | | 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 | Running | OK | Normal | No | Yes | | Yes | Manual |
| ndproxy | NDIS Proxy | c:\windows\system32\drivers\ndproxy.sys | Kernel Driver | Manual | Running | OK | Normal | No | Yes | | Yes |
| netbios | NetBIOS Interface Driver | 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 | System | Running | OK | Normal | No | Yes | | Yes |
| nfrd960 | nfrd960 | Not Available | Kernel Driver | Normal | No | No | | Disabled | | Stopped | OK |
| npfs | Npfs | c:\windows\system32\drivers\npfs.sys | File System Driver | Running | OK | Normal | No | Yes | | Yes | System |
| ntfs | Ntfs | c:\windows\system32\drivers\ntfs.sys | File System Driver | Disabled | Running | OK | Normal | No | Yes | | Yes |
| null | Null | c:\windows\system32\drivers\null.sys | Kernel Driver | Running | OK | Normal | No | Yes | | Yes | System |
| parport | Parport | c:\windows\system32\drivers\parport.sys | Kernel Driver | Stopped | OK | Ignore | No | No | | No | Manual |
| partmgr | Partition Manager | c:\windows\system32\drivers\partmgr.sys | Kernel Driver | Yes | Boot | Running | OK | Normal | No | Yes | |

Appendix C – Tunable Parameters

| | | | | | | | |
|--------------|-----------------------------|--|---------------|-----|----------|---------|-----|
| 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 | | Kernel Driver | No | Manual | Stopped | OK |
| | Ignore | No | No | | | | |
| pdframe | PDFRAME | | Kernel Driver | No | Manual | Stopped | |
| | OK | Ignore | No | No | | | |
| pdreli | PDRELI | | Kernel Driver | No | Manual | Stopped | OK |
| | Ignore | No | No | | | | |
| pdrframe | PDRFRAME | | 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\raspppt.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 | | | | |

Appendix C – Tunable Parameters

| | | | | | | | |
|----------|---|--|--------------------|-----|----------------|---------|---------------|
| 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 | 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 | Yes | Manual Running | OK | Ignore No Yes |
| redbook | Digital CD Audio Playback Filter Driver | c:\windows\system32\drivers\redbook.sys | Kernel Driver | Yes | System Running | OK | Normal No Yes |
| scsiprnt | Microsoft SCSI/1394 Generic Printer Class | c:\windows\system32\drivers\scsiprnt.sys | Kernel Driver | No | Manual Stopped | OK | Normal No No |
| 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 | | | | |

Appendix C – Tunable Parameters

| | | | | | | | |
|---------|-------------------------|--|--------------------|--------|----------|---------|-----|
| 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 | Yes | Manual | | |
| | Running | OK | Ignore | No | Yes | | |
| 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 |

Appendix C – Tunable Parameters

usbhcsi Microsoft USB Open Host Controller Miniport Driver

| | | | | | | | | |
|------------------------------------|---|---------------|---------|----------|---------|-----|--------|--|
| | c:\windows\system32\drivers\usbhcsi.sys | Kernel Driver | Yes | Manual | | | | |
| Running | OK | Normal | No | Yes | | | | |
| usbstor USB Mass Storage Driver | c:\windows\system32\drivers\usbstor.sys | Kernel | | | | | | |
| Driver | No | Manual | Stopped | OK | Normal | No | No | |
| vgasave VGA Display Controller. | c:\windows\system32\drivers\vga.sys | Kernel Driver | | | | | | |
| Yes | System | Running | OK | Ignore | No | Yes | | |
| viaide Vialde | 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 | 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 | | | |
| PCI bus | No | SYSTEM | 5.2.3790.0 | 10/1/2002 | (Standard system devices) | |
| | machine.inf | Not Available | ACPI\PNP0A03\1 | | | |

Appendix C – Tunable Parameters

ServerWorks (RCC) CMIC_LE Processor to PCI Bridge(*) No SYSTEM
5.2.3790.0 10/1/2002 ServerWorks (RCC) machine.inf Not Available
PCIIVEN_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
PCIIVEN_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
PCIIVEN_1166&DEV_0014&SUBSYS_00000000&REV_00\3&13C0B0C5&0&02

PCI Device Not Available UNKNOWN Not Available Not Available Not Available
Not Available Not Available
PCIIVEN_1028&DEV_000C&SUBSYS_000C1028&REV_00\3&13C0B0C5&0&20

PCI Device Not Available UNKNOWN Not Available Not Available Not Available
Not Available Not Available
PCIIVEN_1028&DEV_0008&SUBSYS_00081028&REV_00\3&13C0B0C5&0&21

PCI Device Not Available UNKNOWN Not Available Not Available Not Available
Not Available Not Available
PCIIVEN_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
PCIIVEN_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
PCIIVEN_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

Appendix C – Tunable Parameters

System speakerNo 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

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 MouseNo 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) msports.inf Not Available ACPI\PNP0501\1

Communications Port No PORTS 5.2.3790.0 10/1/2002 (Standard port types) msports.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
PCI\IDE\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 ChannelNo HDC 5.2.3790.0 10/1/2002 (Standard IDE ATA/ATAPI controllers) mshdc.inf Not Available
PCI\IDE\IDECHANNEL\4&10A8249&0&1

Appendix C – Tunable Parameters

ServerWorks (RCC) PCI to USB Open Host Controller No USB 5.2.3790.0
10/1/2002 ServerWorks (RCC) usbport.inf Not Available
PCIIVEN_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
PCIIVEN_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
PCIIVEN_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
PCIIVEN_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
PCIIVEN_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 Not Available
PCIIVEN_1166&DEV_0101&SUBSYS_00000000&REV_03\3&13C0B0C5&0&8A

PCI busNo 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
PCIIVEN_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
PCIIVEN_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
PCIIVEN_9005&DEV_00C5&SUBSYS_00C51028&REV_01\4&22300438&0&3140

Appendix C – Tunable Parameters

Dell PERC 3/Di RAID Controller No SCSIADAPTER 5.2.3790.0 10/1/2002 Dell
 pnpscsi.inf Not Available
 PCIIVEN_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
 SCSIIDISK&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
 SCSIIPROCESSOR&VEN_DELL&PROD_MANAGEMENT&REV_V1.0\4&318925A3&0&500

PCI busNo SYSTEM 5.2.3790.0 10/1/2002 (Standard system devices)
 machine.inf Not Available ACPIPNP0A03\4

Broadcom NetXtreme Gigabit Ethernet No NET 2.91.0.0 10/1/2002
 Broadcom netb57xp.inf Not Available
 PCIIVEN_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
 PCIIVEN_14E4&DEV_16A7&SUBSYS_01211028&REV_02\3&172E68DD&0&40

PCI busNo SYSTEM 5.2.3790.0 10/1/2002 (Standard system devices)
 machine.inf Not Available ACPIPNP0A03\3

DELL PERC 3/DC Plus RAID Controller No SCSIADAPTER 5.2.22.4 12/3/2002
 DELL oem1.inf Not Available
 PCIIVEN_101E&DEV_1960&SUBSYS_04941028&REV_01\3&29E81982&0&30

DELL PV22XS Backplane No SYSTEM 5.2.3790.0 10/1/2002 Dell
 scsidev.inf Not Available
 SCSIIPROCESSOR&VEN_DELL&PROD_PV22XS&REV_E.10\4&19309C39&0&060

DELL PV22XS Backplane No SYSTEM 5.2.3790.0 10/1/2002 Dell
 scsidev.inf Not Available
 SCSIIPROCESSOR&VEN_DELL&PROD_PV22XS&REV_E.10\4&19309C39&0&160

RAID Virtual Device No SYSTEM 5.2.3790.0 10/1/2002 American
 Megatrends, Inc. scsidev.inf Not Available
 SCSIOTHER&VEN__RAID&PROD_DUMMYDEVICE&REV_0000\4&19309C39&0&2F0

Disk drive No DISKDRIVE 5.2.3790.0 10/1/2002 (Standard disk drives)
 disk.inf Not Available
 SCSIIDISK&VEN_PERC&PROD_LD_0_PERCRAID&REV_\4&19309C39&0&300

Appendix C – Tunable Parameters

PCI busNo SYSTEM 5.2.3790.0 10/1/2002 (Standard system devices)
 machine.inf Not Available ACPI\PNP0A03\2

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_04941028&REV_01\3&1070020&0&40

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\4&116608EE&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\4&116608EE&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\4&116608EE&0&2F
 0

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_4&116608EE&0&300

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&SIGNATURECF72CF72OFFSET7E00LENGTH23
 254F800

Generic volume No VOLUME 5.2.3790.0 10/1/2002 Microsoft
 volume.inf Not Available
 STORAGE\VOLUME\1&30A96598&0&SIGNATURECF72CF72OFFSET232557600LEN
 GTHEC082AE00

Generic volume No VOLUME 5.2.3790.0 10/1/2002 Microsoft
 volume.inf Not Available

Appendix C – Tunable Parameters

STORAGE\VOLUME\1&30A96598&0&SIGNATUREE18FCF8B0FFSET7E00LENGTH27106BDE00

| | | | | |
|-------------------|---------------|------------|-----------|-----------|
| Generic volume No | VOLUME | 5.2.3790.0 | 10/1/2002 | Microsoft |
| volume.inf | Not Available | | | |

STORAGE\VOLUME\1&30A96598&0&SIGNATUREE18FCF8B0FFSET27106C5C00LENGTH27106C5C00

| | | | | |
|-------------------|---------------|------------|-----------|-----------|
| Generic volume No | VOLUME | 5.2.3790.0 | 10/1/2002 | Microsoft |
| volume.inf | Not Available | | | |

STORAGE\VOLUME\1&30A96598&0&SIGNATUREE18FCF8B0FFSET4E20D8B800LENGTH27FB429A00

| | | | | |
|-------------------|---------------|------------|-----------|-----------|
| Generic volume No | VOLUME | 5.2.3790.0 | 10/1/2002 | Microsoft |
| volume.inf | Not Available | | | |

STORAGE\VOLUME\1&30A96598&0&SIGNATUREE18FCF85OFFSET7E00LENGTH27106BDE00

| | | | | |
|-------------------|---------------|------------|-----------|-----------|
| Generic volume No | VOLUME | 5.2.3790.0 | 10/1/2002 | Microsoft |
| volume.inf | Not Available | | | |

STORAGE\VOLUME\1&30A96598&0&SIGNATUREE18FCF85OFFSET27106C5C00LENGTH27106C5C00

| | | | | |
|-------------------|---------------|------------|-----------|-----------|
| Generic volume No | VOLUME | 5.2.3790.0 | 10/1/2002 | Microsoft |
| volume.inf | Not Available | | | |

STORAGE\VOLUME\1&30A96598&0&SIGNATUREE18FCF85OFFSET4E20D8B800LENGTH27FB429A00

| | | | | |
|------------------------------------|---------------|---------------|---------------|--|
| 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 | |

| | | | | | |
|---------------|---------------|-------------------------|---------------|---------------|---------------|
| dmbot | 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 | | | |

Appendix C – Tunable Parameters

| | | | | | |
|--------------------------------------|---------------|---------------|--------------------------|-------------------------|---------------|
| Generic Packet Classifier | Not Available | LEGACYDRIVER | Not Available | Not Available | Not Available |
| Available | Not Available | Not Available | Not Available | ROOTLEGACY_GPC\0000 | |
| IPSEC driver | Not Available | LEGACYDRIVER | Not Available | Not Available | Not Available |
| Available | Not Available | Not Available | ROOTLEGACY_IPSEC\0000 | | |
| ksecdd | Not Available | LEGACYDRIVER | Not Available | Not Available | Not Available |
| | Not Available | Not Available | ROOTLEGACY_KSECDD\0000 | | |
| mnmdd | Not Available | LEGACYDRIVER | Not Available | Not Available | Not Available |
| | Not Available | Not Available | ROOTLEGACY_MNMDD\0000 | | |
| mountmgr | Not Available | LEGACYDRIVER | Not Available | Not Available | Not Available |
| Available | Not Available | Not Available | ROOTLEGACY_MOUNTMGR\0000 | | |
| NDIS System Driver | Not Available | LEGACYDRIVER | Not Available | Not Available | Not Available |
| | Not Available | Not Available | ROOTLEGACY_NDIS\0000 | | |
| Remote Access NDIS TAPI Driver | Not Available | LEGACYDRIVER | Not Available | Not Available | Not Available |
| | Not Available | Not Available | Not Available | Not Available | |
| | | | ROOTLEGACY_NDISTAPI\0000 | | |
| NDIS Usermode I/O Protocol | Not Available | LEGACYDRIVER | Not Available | Not Available | Not Available |
| Available | Not Available | Not Available | Not Available | ROOTLEGACY_NDISUIO\0000 | |
| NDProxy | Not Available | LEGACYDRIVER | Not Available | Not Available | Not Available |
| Available | Not Available | Not Available | ROOTLEGACY_NDPROXY\0000 | | |
| NetBios over Tcip | Not Available | LEGACYDRIVER | Not Available | Not Available | Not Available |
| | Not Available | Not Available | Not Available | ROOTLEGACY_NETBT\0000 | |
| Null | Not Available | LEGACYDRIVER | Not Available | Not Available | Not Available |
| | Not Available | Not Available | ROOTLEGACY_NULL\0000 | | |
| Partition Manager | Not Available | LEGACYDRIVER | Not Available | Not Available | Not Available |
| | Not Available | Not Available | Not Available | ROOTLEGACY_PARTMGR\0000 | |
| Remote Access Auto Connection Driver | Not Available | LEGACYDRIVER | Not Available | Not Available | Not Available |
| | Not Available | Not Available | Not Available | Not Available | |
| | | | ROOTLEGACY_RASACD\0000 | | |
| RDPCDD | Not Available | LEGACYDRIVER | Not Available | Not Available | Not Available |
| Available | Not Available | Not Available | ROOTLEGACY_RDPCDD\0000 | | |
| RDPWD | Not Available | LEGACYDRIVER | Not Available | Not Available | Not Available |
| Available | Not Available | Not Available | ROOTLEGACY_RDPWD\0000 | | |
| TCP/IP Protocol Driver | Not Available | LEGACYDRIVER | Not Available | Not Available | Not Available |
| | Not Available | Not Available | Not Available | ROOTLEGACY_TCPIP\0000 | |
| TDPIPE | Not Available | LEGACYDRIVER | Not Available | Not Available | Not Available |
| Available | Not Available | Not Available | ROOTLEGACY_TDPIPE\0000 | | |

Appendix C – Tunable Parameters

| | | | | | | |
|-----------------------------------|---------------|------------------------|---------------------------|---------------------------|---------------|--|
| TDTCP | Not Available | LEGACYDRIVER | Not Available | Not Available | Not Available | |
| | Not Available | Not Available | ROOTLEGACY_TDTCP\0000 | | | |
| VGA Display Controller. | Not Available | LEGACYDRIVER | Not Available | Not Available | | |
| | Not Available | Not Available | Not Available | ROOTLEGACY_VGASAVE\0000 | | |
| volsnap | Not Available | LEGACYDRIVER | Not Available | Not Available | Not Available | |
| | Not Available | Not Available | ROOTLEGACY_VOLSNAP\0000 | | | |
| Remote Access IP ARP Driver | Not Available | LEGACYDRIVER | Not Available | Not Available | Not Available | |
| Available | Not Available | Not Available | Not Available | | | |
| | | | ROOTLEGACY_WANARP\0000 | | | |
| Audio Codecs | No | MEDIA 5.2.3790.0 | 10/1/2002 | (Standard system devices) | | |
| | wave.inf | Not Available | ROOTMEDIA\MS_MMACM | | | |
| Legacy Audio Drivers | No | MEDIA 5.2.3790.0 | 10/1/2002 | (Standard system devices) | | |
| | wave.inf | Not Available | ROOTMEDIA\MS_MMDRV | | | |
| Media Control Devices | No | MEDIA 5.2.3790.0 | 10/1/2002 | (Standard system devices) | | |
| | wave.inf | Not Available | ROOTMEDIA\MS_MMMCI | | | |
| Legacy Video Capture Devices | No | MEDIA 5.2.3790.0 | 10/1/2002 | (Standard system devices) | | |
| | wave.inf | Not Available | ROOTMEDIA\MS_MMVCD | | | |
| Video Codecs | No | MEDIA 5.2.3790.0 | 10/1/2002 | (Standard system devices) | | |
| | wave.inf | Not Available | ROOTMEDIA\MS_MMVID | | | |
| WAN Miniport (L2TP) | No | NET 5.2.3790.0 | 10/1/2002 | Microsoft | | |
| | netrasa.inf | Not Available | ROOTMS_L2TPMINIPORT\0000 | | | |
| WAN Miniport (IP) | No | NET 5.2.3790.0 | 10/1/2002 | Microsoft | | |
| | netrasa.inf | Not Available | ROOTMS_NDISWANIP\0000 | | | |
| WAN Miniport (PPPOE) | No | NET 5.2.3790.0 | 10/1/2002 | Microsoft | | |
| | netrasa.inf | Not Available | ROOTMS_PPPOEMINIPORT\0000 | | | |
| WAN Miniport (PPTP) | No | NET 5.2.3790.0 | 10/1/2002 | Microsoft | | |
| | netrasa.inf | Not Available | ROOTMS_PPTPMINIPORT\0000 | | | |
| Direct Parallel | No | NET 5.2.3790.0 | 10/1/2002 | Microsoft | netrasa.inf | |
| | Not Available | ROOTMS_PTMINIPORT\0000 | | | | |
| Terminal Server Device Redirector | No | SYSTEM 5.2.3790.0 | 10/1/2002 | | | |
| (Standard system devices) | machine.inf | Not Available | ROOT\RD\PDR\0000 | | | |
| Terminal Server Keyboard Driver | No | SYSTEM 5.2.3790.0 | 10/1/2002 | | | |
| (Standard system devices) | machine.inf | Not Available | ROOT\RD\KBD\0000 | | | |
| Terminal Server Mouse Driver | No | SYSTEM 5.2.3790.0 | 10/1/2002 | | | |
| (Standard system devices) | machine.inf | Not Available | ROOT\RD\MOU\0000 | | | |

Appendix C – Tunable Parameters

| | | | | |
|--|----|-------------|---------------|------------------|
| 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\Wbem; C:\PROGRA~1\MICROS~1\80\Tools\BINN;C:\Program Files\Microsoft SQL Server\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 | PE2850\Administrator |
| TMP | %USERPROFILE%\Local Settings\Temp | PE2850\Administrator |

[Print Jobs]

Appendix C – Tunable Parameters

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

[Network Connections]

| Local Name | Remote Name | Type | Status | User Name |
|------------|-------------|------|--------|-----------|
|------------|-------------|------|--------|-----------|

[Running Tasks]

| Name | Path | Process ID | Priority | Min Working Set | Max Working Set | Start Time | Version | Size | File Date |
|---------------------|----------------------------------|---------------|----------|-----------------|-----------------|------------------|------------------------------------|---------------------------|--------------------|
| system idle process | | Not Available | 0 | 0 | Not Available | Not Available | Not Available | Not Available | Not Available |
| system | Not Available | 4 | 8 | 0 | 1413120 | Not Available | Not Available | Not Available | Not Available |
| smss.exe | Not Available | 344 | 11 | 204800 | 1413120 | 1/8/2004 4:54 PM | Not Available | Not Available | Not Available |
| csrss.exe | Not Available | 540 | 13 | Not Available | Not Available | 1/8/2004 4:54 PM | Not Available | Not Available | Not Available |
| winlogon.exe | c:\windows\system32\winlogon.exe | 564 | 13 | 204800 | 1413120 | 1/8/2004 4:54 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 | 1/8/2004 4:54 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 | 1/8/2004 4:54 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 | 1/8/2004 4:54 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 | 864 | 8 | 204800 | 1413120 | 1/8/2004 4:54 PM | 5.2.3790.0 (srv03_rtm.030324-2048) | 13.00 KB (13,312 bytes) | 3/29/2003 12:00 AM |

Appendix C – Tunable Parameters

svchost.exe c:\windows\system32\svchost.exe 1016 8 204800 1413120
1/8/2004 4:54 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 1188 8 204800 1413120 1/8/2004 4:55
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\binn\sqlmangr.exe 1268 8
204800 1413120 1/8/2004 4:55 PM 2000.080.0760.00 72.57 KB
(74,308 bytes) 11/7/2003 2:42 PM

winvnc.exe c:\program files\orl\vnc\winvnc.exe 1276 8 204800 1413120
1/8/2004 4:55 PM 3, 3, 3, 7 204.00 KB (208,896 bytes) 5/30/2003 4:28
PM

mmc.exe c:\windows\system32\mmc.exe 1424 8 204800 1413120
1/8/2004 4:55 PM 5.2.3790.0 (srv03_rtm.030324-2048) 762.50 KB (780,800
bytes) 3/29/2003 12:00 AM

cmd.exe c:\windows\system32\cmd.exe 1828 8 204800 1413120
1/8/2004 4:55 PM 5.2.3790.0 (srv03_rtm.030324-2048) 374.00 KB (382,976
bytes) 3/29/2003 12:00 AM

sqlservr.exe c:\program files\microsoft sql server\mssql\binn\sqlservr.exe 1872 13
204800 1413120 1/8/2004 4:55 PM 2000.080.0857.00 7.18 MB
(7,532,584 bytes) 11/7/2003 2:42 PM

wmioprse.exe Not Available 276 8 Not Available Not Available 1/8/2004 4:56
PM Not Available Not Available Not Available

cmd.exe c:\windows\system32\cmd.exe 1584 8 204800 1413120
1/9/2004 2:41 PM 5.2.3790.0 (srv03_rtm.030324-2048) 374.00 KB (382,976
bytes) 3/29/2003 12:00 AM

isql.exe c:\progra~1\microso~1\80\tools\binn\isql.exe 1116 8 204800 1413120
1/9/2004 2:41 PM 2000.080.0194.00 96.00 KB (98,304 bytes) 11/7/2003 2:42
PM

tail.exe c:\mks\mksnt\tail.exe 200 8 204800 1413120 1/9/2004 2:42 PM
5.2 build 63 43.50 KB (44,544 bytes) 6/2/2003 11:09 AM

helpctr.exe c:\windows\pchealth\helpctr\binaries\helpctr.exe 180 8 204800
1413120 1/9/2004 2:52 PM 5.2.3790.0 (srv03_rtm.030324-2048) 764.00
KB (782,336 bytes) 5/30/2003 3:10 PM

Appendix C – Tunable Parameters

| | | | | | |
|--------------------|---|-------------------|------------------------------------|---------------|---------------|
| helpsvc.exe | c:\windows\pchealth\helpctr\binaries\helpsvc.exe | 920 | 8 | 204800 | |
| | 1413120 | 1/9/2004 2:52 PM | 5.2.3790.0 (srv03_rtm.030324-2048) | 720.00 | |
| KB (737,280 bytes) | | 5/30/2003 3:10 PM | | | |
| helphost.exe | c:\windows\pchealth\helpctr\binaries\helphost.exe | 828 | 8 | 204800 | |
| | 1413120 | 1/9/2004 2:52 PM | 5.2.3790.0 (srv03_rtm.030324-2048) | 106.00 | |
| KB (108,544 bytes) | | 5/30/2003 3:10 PM | | | |
| helpctr.exe | c:\windows\pchealth\helpctr\binaries\helpctr.exe | 1772 | 8 | 204800 | |
| | 1413120 | 1/9/2004 2:52 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 | 720 | 8 | Not Available | 1/9/2004 2:52 |
| PM | Not Available | Not Available | Not Available | | |

[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 | |

Appendix C – Tunable Parameters

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

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

Appendix C – Tunable Parameters

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 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

Appendix C – Tunable Parameters

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

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)
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

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

scserv 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\scserv.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

umpnpgm 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\umpnpgm.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

Appendix C – Tunable Parameters

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

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

Appendix C – Tunable Parameters

| | | | |
|----------|------------------------------------|-------------------------------------|--------------------|
| 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 | |
| adslidpc | 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\adslidpc.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 | |
| rdpwsx | 5.2.3790.0 (srv03_rtm.030324-2048) | 80.13 KB (82,056 bytes) | 5/30/2003 3:07 PM |
| | Microsoft Corporation | c:\windows\system32\rdpwsx.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

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

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

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

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

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

Appendix C – Tunable Parameters

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

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

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

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

ntlsapi 5.2.3790.0 (srv03_rtm.030324-2048) 8.00 KB (8,192 bytes) 3/29/2003 12:00 AM
Microsoft Corporation c:\windows\system32\ntlsapi.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

Appendix C – Tunable Parameters

| | | |
|--|-------------------------------------|--|
| apphelp5.2.3790.0 (srv03_rtm.030324-2048) | 122.00 KB (124,928 bytes) | 3/29/2003 |
| 12:00 AM | Microsoft Corporation | c:\windows\system32\apphelp.dll |
| themeui6.00.3790.0 (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 |
| 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 |
| ntshru | 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\ntshru.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 |

Appendix C – Tunable Parameters

browselc 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\browselc.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

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

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

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)11/7/2003 2:42 PM
Microsoft Corporation c:\program files\microsoft sql server\80\tools\binn\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)11/7/2003 2:42 PM
Microsoft Corporation c:\program files\microsoft sql server\80\tools\binn\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)11/7/2003 2:42 PM Microsoft
Corporation c:\program files\microsoft sql server\80\tools\binn\sqlsvc.dll

odbcbcsp 2000.085.1022.00 (srv03_rtm.030324-2048) 24.00 KB (24,576 bytes)
3/29/2003 12:00 AM Microsoft Corporation c:\windows\system32\odbcbcsp.dll

sqlresld 2000.080.0382.00 28.56 KB (29,248 bytes)11/7/2003 2:42 PM Microsoft
Corporation c:\program files\microsoft sql server\80\tools\binn\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

Appendix C – Tunable Parameters

| | | | | | |
|---------------|-------------------------------------|---------------------------|--------------------|------------------------------|---|
| sqlsvc | 2000.080.0194.00 | 24.00 KB (24,576 bytes) | 11/7/2003 2:42 PM | Microsoft Corporation | c:\program files\microsoft sql server\80\tools\binn\resources\1033\sqlsvc.rll |
| sqlmangr | 2000.080.0194.00 | 96.00 KB (98,304 bytes) | 11/7/2003 2:42 PM | Microsoft Corporation | c:\program files\microsoft sql server\80\tools\binn\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 |
| vnhooks | 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\vnhooks.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 |
| 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 |
| sysmon | 5.2.3790.0 (srv03_rtm.030324-2048) | 241.50 KB (247,296 bytes) | 3/29/2003 12:00 AM | Microsoft Corporation | c:\windows\system32\sysmon.ocx |
| 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 |
| perfos | 5.2.3790.0 (srv03_rtm.030324-2048) | 24.50 KB (25,088 bytes) | 3/29/2003 12:00 AM | Microsoft Corporation | c:\windows\system32\perfos.dll |
| perfdisk | 5.2.3790.0 (srv03_rtm.030324-2048) | 25.00 KB (25,600 bytes) | 3/29/2003 12:00 AM | Microsoft Corporation | c:\windows\system32\perfdisk.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 |
| mscoree | 1.1.4322.573 | 152.00 KB (155,648 bytes) | 5/30/2003 3:07 PM | Microsoft Corporation | c:\windows\system32\mscoree.dll |

Appendix C – Tunable Parameters

PerfCounter 1.1.4322.573 88.00 KB (90,112 bytes)5/30/2003 3:08 PM Microsoft Corporation c:\windows\microsoft.net\framework\v1.1.4322\perfcounter.dll

msvcr71 7.10.3052.4 340.00 KB (348,160 bytes) 5/30/2003 3:08 PM Microsoft Corporation c:\windows\microsoft.net\framework\v1.1.4322\msvcr71.dll

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

sqlservr2000.080.0857.00 7.18 MB (7,532,584 bytes) 11/7/2003 2:42 PM Microsoft Corporation c:\program files\microsoft sql server\mssql\binn\sqlservr.exe

opends60 2000.080.0194.00 24.06 KB (24,639 bytes)11/7/2003 2:42 PM Microsoft Corporation c:\program files\microsoft sql server\mssql\binn\opends60.dll

ums 2000.080.0760.00 52.55 KB (53,808 bytes)11/7/2003 2:42 PM Microsoft Corporation c:\program files\microsoft sql server\mssql\binn\ums.dll

sqlsort 2000.080.0760.00 576.56 KB (590,396 bytes) 11/7/2003 2:42 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)11/7/2003 2:42 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 2000.080.0851.00 80.07 KB (81,989 bytes)11/7/2003 2:42 PM Microsoft Corporation c:\program files\microsoft sql server\mssql\binn\ssnetlib.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)11/7/2003 2:42 PM Microsoft Corporation c:\program files\microsoft sql server\mssql\binn\ssmslpcn.dll

ssnmpn70 2000.080.0534.00 24.56 KB (25,148 bytes)11/7/2003 2:42 PM Microsoft Corporation c:\program files\microsoft sql server\mssql\binn\ssnmpn70.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

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

xpstar 2000.080.0760.00 280.56 KB (287,296 bytes) 11/7/2003 2:42 PM
Microsoft Corporation c:\program files\microsoft sql server\mssql\binn\xpstar.dll

sqlresld 2000.080.0382.00 28.56 KB (29,248 bytes) 11/7/2003 2:42 PM Microsoft
Corporation c:\program files\microsoft sql server\mssql\binn\sqlresld.dll

sqlsvc 2000.080.0760.00 92.56 KB (94,784 bytes) 11/7/2003 2:42 PM Microsoft
Corporation c:\program files\microsoft sql server\mssql\binn\sqlsvc.dll

w95scm 2000.080.0760.00 48.56 KB (49,728 bytes) 11/7/2003 2:42 PM
Microsoft Corporation c:\program files\microsoft sql server\mssql\binn\w95scm.dll

shfolder 6.00.3790.0 (srv03_rtm.030324-2048) 23.00 KB (23,552 bytes) 3/29/2003 12:00 AM
Microsoft Corporation c:\windows\system32\shfolder.dll

sqlsvc 2000.080.0194.00 24.00 KB (24,576 bytes) 11/7/2003 2:42 PM Microsoft
Corporation c:\program files\microsoft sql server\mssql\binn\resources\1033\sqlsvc.rll

xpstar 2000.080.0760.00 36.00 KB (36,864 bytes) 11/7/2003 2:42 PM Microsoft
Corporation c:\program files\microsoft sql server\mssql\binn\resources\1033\xpstar.rll

isql 2000.080.0194.00 96.00 KB (98,304 bytes) 11/7/2003 2:42 PM Microsoft
Corporation c:\progra~1\microso~1\80\tools\binn\isql.exe

ntwdblib 2000.080.0194.00 268.06 KB (274,489 bytes) 6/1/2003 1:13 PM
Microsoft Corporation c:\windows\system32\ntwdblib.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

tail 5.2 build 63 43.50 KB (44,544 bytes) 6/2/2003 11:09 AM Mortice Kern Systems
Inc. c:\mks\mksnt\tail.exe

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

Appendix C – Tunable Parameters

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

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

jscrip 5.6.0.8515 436.00 KB (446,464 bytes) 3/29/2003 12:00 AM Microsoft
Corporation c:\windows\system32\jscrip.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

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

imgutil 5.2.3790.0 (srv03_rtm.030324-2048) 35.00 KB (35,840 bytes) 3/29/2003 12:00 AM
Microsoft Corporation c:\windows\system32\imgutil.dll

wbemdisp 5.2.3790.0 (srv03_rtm.030324-2048) 165.50 KB (169,472 bytes)
5/30/2003 3:07 PM Microsoft Corporation
c:\windows\system32\wbem\wbemdisp.dll

wshom 5.6.0.8515 92.00 KB (94,208 bytes) 3/29/2003 12:00 AM Microsoft Corporation
c:\windows\system32\wshom.ocx

scrrun 5.6.0.8515 148.00 KB (151,552 bytes) 3/29/2003 12:00 AM Microsoft
Corporation c:\windows\system32\scrrun.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

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

helphost 5.2.3790.0 (srv03_rtm.030324-2048) 106.00 KB (108,544 bytes)
5/30/2003 3:10 PM Microsoft Corporation
c:\windows\pchealth\helpctr\binaries\helphost.exe

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

Appendix C – Tunable Parameters

```

vbscript 5.6.0.8515      404.00 KB (413,696 bytes)      3/29/2003 12:00 AM      Microsoft
Corporation      c:\windows\system32\vbscript.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
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
  
```

[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 | Normal NT | AUTHORITY\LocalService | 0 |
| Application Layer Gateway Service | | | ALG | Stopped | c:\windows\system32\alg.exe | Normal NT | AUTHORITY\LocalService | 0 |
| Application Management | | | AppMgmt | Stopped | c:\windows\system32\svchost.exe -k netsvcs | Normal | LocalSystem | 0 |
| Windows Audio | AudioSrv | Stopped | | Manual Share Process | c:\windows\system32\svchost.exe -k netsvcs | Normal | LocalSystem | 0 |
| Background Intelligent Transfer Service | | | BITS | Stopped | c:\windows\system32\svchost.exe -k netsvcs | Normal | LocalSystem | 0 |
| Computer Browser | Browser | Stopped | | Disabled | c:\windows\system32\svchost.exe -k netsvcs | Normal | LocalSystem | 0 |
| Indexing Service | CiSvc | Stopped | | Disabled | c:\windows\system32\cisvc.exe | Normal | LocalSystem | 0 |
| ClipBook | ClipSrv | Stopped | | Own Process | c:\windows\system32\clipsrv.exe | Normal | LocalSystem | 0 |
| COM+ System Application | | | COMSysApp | Stopped | c:\windows\system32\dllhost.exe /processid:{02d4b3f1-fd88-11d1-960d-00805fc79235} | Normal | LocalSystem | 0 |
| Cryptographic Services | CryptSvc | Stopped | | Manual Share Process | c:\windows\system32\svchost.exe -k netsvcs | Normal | LocalSystem | 0 |

Appendix C – Tunable Parameters

| | | | | | | |
|---|---|---------|----------|-----------------------------|---|--|
| 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 | dmdadmin | Stopped | Manual | Share | | |
| Process | c:\windows\system32\dmdadmin.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\lssrv.exe | | Normal | NT AUTHORITY\NetworkService | 0 | |

Appendix C – Tunable Parameters

| | | | | | |
|-------------------------------------|--|---------|-------------|-----------------------------|-------------------------------|
| TCP/IP NetBIOS Helper | LmHosts | Stopped | Manual | Share Process | |
| | c:\windows\system32\svchost.exe -k localservice | | Normal | NT | |
| AUTHORITY\LocalService | | 0 | | | |
| Messenger | Messenger | Stopped | Disabled | Share Process | |
| | c:\windows\system32\svchost.exe -k netsvcs | | Normal | LocalSystem | 0 |
| NetMeeting Remote Desktop Sharing | mnmsrvc | Stopped | Disabled | Own | |
| Process | c:\windows\system32\mnmsrvc.exe | | Normal | LocalSystem | 0 |
| Distributed Transaction Coordinator | MSDTC | 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 |
| MSSQLSERVER | MSSQLSERVER | Stopped | Manual | Own Process | |
| | c:\progra~1\microso~1\mssql\binn\sqlservr.exe | | Normal | LocalSystem | 0 |
| MSSQLServerADHelper | MSSQLServerADHelper | Stopped | Manual | Own Process | |
| | c:\program files\microsoft sql server\80\tools\binn\sqladhlp.exe | | Normal | LocalSystem | 0 |
| Network DDE | NetDDE | Stopped | Disabled | Share Process | |
| | c:\windows\system32\netdde.exe | | Normal | LocalSystem | 0 |
| Network DDE DSDM | NetDDEdsdm | Stopped | Disabled | Share Process | |
| | c:\windows\system32\netdde.exe | | Normal | LocalSystem | 0 |
| Net Logon | Netlogon | Stopped | Manual | Share Process | |
| | c:\windows\system32\lsass.exe | | Normal | LocalSystem | 0 |
| Network Connections | Netman | Running | Manual | Share Process | |
| | c:\windows\system32\svchost.exe -k netsvcs | | Normal | LocalSystem | 0 |
| Network Location Awareness (NLA) | Nla | Running | Manual | Share Process | |
| | c:\windows\system32\svchost.exe -k netsvcs | | Normal | LocalSystem | 0 |
| File Replication Service | 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 Policy Agent | | Stopped | Manual | Share Process | |
| | c:\windows\system32\lsass.exe | | Normal | LocalSystem | 0 |

Appendix C – Tunable Parameters

| | | | |
|--|--|------------------------------------|------------------------|
| Protected Storage | ProtectedStorage | Stopped | Manual Share Process |
| | c:\windows\system32\lsass.exe | Normal LocalSystem | 0 |
| Remote Access Auto Connection Manager Process | RasAuto | Stopped | Manual Share Process |
| | c:\windows\system32\svchost.exe -k netsvcs | Normal LocalSystem | 0 |
| Remote Access Connection Manager | RasMan | Stopped | Manual Share Process |
| | c:\windows\system32\svchost.exe -k netsvcs | Normal LocalSystem | 0 |
| Remote Desktop Help Session Manager | RDSessMgr | Stopped | Manual Own Process |
| | c:\windows\system32\sessmgr.exe | Normal LocalSystem | 0 |
| Routing and Remote Access | RemoteAccess | Stopped | Disabled Share Process |
| | c:\windows\system32\svchost.exe -k netsvcs | Normal LocalSystem | 0 |
| Remote Registry | RemoteRegistry | Stopped | Manual Share Process |
| | c:\windows\system32\svchost.exe -k regsvc | Normal NT AUTHORITY\LocalService | 0 |
| Remote Procedure Call (RPC) Locator | RpcLocator | Stopped | Manual Own Process |
| | c:\windows\system32\locator.exe | Normal NT AUTHORITY\NetworkService | 0 |
| Remote Procedure Call (RPC) | RpcSs | Running | Auto Share Process |
| | c:\windows\system32\svchost -k rpcss | Normal LocalSystem | 0 |
| Resultant Set of Policy Provider | RSOPProv | Stopped | Manual Share Process |
| | c:\windows\system32\rsopprov.exe | Normal LocalSystem | 0 |
| Special Administration Console Helper | sacsvr | Stopped | Manual Share Process |
| | c:\windows\system32\svchost.exe -k netsvcs | Normal LocalSystem | 0 |
| Security Accounts Manager | SamSs | 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) | | Stopped | Disabled Share Process |
| | c:\windows\system32\svchost.exe -k netsvcs | Normal LocalSystem | 0 |

Appendix C – Tunable Parameters

| | | | | |
|---|---|----------------------|-----------------------------|---------------|
| 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\binn\sqlagent.exe | Normal | LocalSystem | 0 |
| Windows Image Acquisition (WIA) | stisvc | Stopped | Disabled | Share Process |
| | c:\windows\system32\svchost.exe -k imgsvc | Normal | NT AUTHORITY\LocalService | 0 |
| Microsoft Software Shadow Copy Provider | swprv | Stopped | Manual Own Process | |
| | c:\windows\system32\svchost.exe -k swprv | Normal | LocalSystem | 0 |
| Performance Logs and Alerts | SysmonLog | Stopped | Manual Own Process | |
| | c:\windows\system32\smlogsvc.exe | Normal | NT Authority\NetworkService | 0 |
| Telephony | TapiSrv Stopped | Manual Share Process | | |
| | c:\windows\system32\svchost.exe -k tapisrv | Normal | LocalSystem | 0 |
| Terminal Services | TermService | Running | Manual Share Process | |
| | c:\windows\system32\svchost.exe -k termsvcs | Normal | LocalSystem | 0 |
| Themes | Themes | Stopped | Disabled | Share Process |
| | c:\windows\system32\svchost.exe -k netsvcs | Normal | LocalSystem | 0 |
| Telnet | TlntSvr | Stopped | Disabled | Own Process |
| | c:\windows\system32\tlntsvr.exe | Normal | NT AUTHORITY\LocalService | 0 |
| Distributed Link Tracking Server | TrkSvr | Stopped | Disabled | Share Process |
| | c:\windows\system32\svchost.exe -k netsvcs | Normal | LocalSystem | 0 |
| Distributed Link Tracking Client | TrkWks | Stopped | Manual Share Process | |
| | c:\windows\system32\svchost.exe -k netsvcs | Normal | LocalSystem | 0 |
| Terminal Services Session Directory | Tssdis | Stopped | Disabled | Own Process |
| | c:\windows\system32\tssdis.exe | Normal | LocalSystem | 0 |
| 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 |

Appendix C – Tunable Parameters

```

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\wmiapsrv.exe Normal LocalSystem 0
Automatic Updates wuauerv Stopped Manual Share Process
      c:\windows\system32\svchost.exe -k netsvcs Normal LocalSystem 0
Wireless Configuration WZCSVC Stopped Manual Share Process
      c:\windows\system32\svchost.exe -k netsvcs Normal LocalSystem 0

```

[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

```

Appendix C – Tunable Parameters

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 PE2850\Administrator:Accessories PE2850\Administrator
Accessories\Accessibility PE2850\Administrator:Accessories\Accessibility PE2850\Administrator
Accessories\Entertainment PE2850\Administrator:Accessories\Entertainment PE2850\Administrator
Administrative Tools PE2850\Administrator:Administrative Tools PE2850\Administrator
Startup PE2850\Administrator:Startup PE2850\Administrator

[Startup Programs]

| Program | Command | User Name | Location |
|-----------------------|---|----------------------|----------------|
| desktop | desktop.ini | NT AUTHORITY\SYSTEM | Startup |
| desktop | desktop.ini | PE2850\Administrator | Startup |
| Run WinVNC (App Mode) | run winvnc (app mode).lnk | PE2850\Administrator | Startup |
| desktop | desktop.ini | .DEFAULT | Startup |
| desktop | desktop.ini | All Users | Common Startup |
| Service Manager | c:\progra~1\microso~1\80\tools\binn\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 |

Appendix C – Tunable Parameters

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 | C:\WINDOWS\system32 | Microsoft Corporation |

Appendix C – Tunable Parameters

| | | | | | |
|---------------|-----------------------|---------------|---------------|------------------------------------|---------------|
| advpack.dll | 6.0.3790.0 | 94 KB | 3/29/2003 | C:\WINDOWS\system32 | |
| | Microsoft Corporation | | | | |
| asctrls.ocx | 6.0.3790.0 | 90 KB | 3/29/2003 | C:\WINDOWS\system32 | |
| | Microsoft Corporation | | | | |
| browselc.dll | 6.0.3790.0 | 62 KB | 3/29/2003 | C:\WINDOWS\system32 | |
| | Microsoft Corporation | | | | |
| browseui.dll | 6.0.3790.0 | 1,033 KB | 3/29/2003 | C:\WINDOWS\system32 | |
| | Microsoft Corporation | | | | |
| cdfview.dll | 6.0.3790.0 | 144 KB | 3/29/2003 | C:\WINDOWS\system32 | |
| | Microsoft Corporation | | | | |
| comctl32.dll | 5.82.3790.0 | 561 KB | 3/29/2003 | C:\WINDOWS\system32 | |
| | Microsoft Corporation | | | | |
| dxtrans.dll | 6.3.3790.0 | 198 KB | 3/29/2003 | C:\WINDOWS\system32 | |
| | Microsoft Corporation | | | | |
| dxtmsft.dll | 6.3.3790.0 | 344 KB | 3/29/2003 | C:\WINDOWS\system32 | |
| | Microsoft Corporation | | | | |
| iecont.dll | <File Missing> | Not Available | Not Available | Not Available | Not Available |
| iecontlc.dll | <File Missing> | Not Available | Not Available | Not Available | Not Available |
| iedkcs32.dll | 16.0.3790.0 | 300 KB | 3/29/2003 | C:\WINDOWS\system32 | |
| | Microsoft Corporation | | | | |
| iepeers.dll | 6.0.3790.0 | 230 KB | 3/29/2003 | C:\WINDOWS\system32 | |
| | Microsoft Corporation | | | | |
| iesetup.dll | 6.0.3790.0 | 59 KB | 3/29/2003 | C:\WINDOWS\system32 | |
| | Microsoft Corporation | | | | |
| ieunit.inf | Not Available | 20 KB | 3/29/2003 | C:\WINDOWS\system32 | Not Available |
| | Available | | | | |
| ieexplore.exe | 6.0.3790.0 | 90 KB | 3/29/2003 | C:\Program Files\Internet Explorer | |
| | Microsoft Corporation | | | | |
| imgutil.dll | 5.2.3790.0 | 35 KB | 3/29/2003 | C:\WINDOWS\system32 | |
| | Microsoft Corporation | | | | |
| inetctl.cpl | 6.0.3790.0 | 303 KB | 3/29/2003 | C:\WINDOWS\system32 | |
| | Microsoft Corporation | | | | |
| inetctl.dll | 6.0.3790.0 | 109 KB | 3/29/2003 | C:\WINDOWS\system32 | |
| | Microsoft Corporation | | | | |
| inseng.dll | 6.0.3790.0 | 72 KB | 3/29/2003 | C:\WINDOWS\system32 | |
| | Microsoft Corporation | | | | |

Appendix C – Tunable Parameters

| | | | | | |
|-----------------------|-------------|----------|-----------|---------------------|-------------------|
| mlang.dll | 6.0.3790.0 | 570 KB | 3/29/2003 | C:\WINDOWS\system32 | |
| Microsoft Corporation | | | | | |
| msencode.dll | 2002.10.4.0 | 112 KB | 3/29/2003 | C:\WINDOWS\system32 | Not Available |
| mshta.exe | 6.0.3790.0 | 26 KB | 3/29/2003 | C:\WINDOWS\system32 | |
| Microsoft Corporation | | | | | |
| mshtml.dll | 6.0.3790.0 | 2,848 KB | 3/29/2003 | C:\WINDOWS\system32 | |
| Microsoft Corporation | | | | | |
| mshtml.tlb | 6.0.3790.0 | 1,319 KB | 3/29/2003 | C:\WINDOWS\system32 | |
| Microsoft Corporation | | | | | |
| mshtml.ed.dll | 6.0.3790.0 | 444 KB | 3/29/2003 | C:\WINDOWS\system32 | |
| Microsoft Corporation | | | | | |
| mshtmlr.dll | 6.0.3790.0 | 55 KB | 3/29/2003 | C:\WINDOWS\system32 | |
| Microsoft Corporation | | | | | |
| msident.dll | 6.0.3790.0 | 47 KB | 3/29/2003 | C:\WINDOWS\system32 | |
| Microsoft Corporation | | | | | |
| msidntld.dll | 6.0.3790.0 | 15 KB | 3/29/2003 | C:\WINDOWS\system32 | |
| Microsoft Corporation | | | | | |
| msieftp.dll | 6.0.3790.0 | 230 KB | 3/29/2003 | C:\WINDOWS\system32 | |
| Microsoft Corporation | | | | | |
| msrating.dll | 6.0.3790.0 | 132 KB | 3/29/2003 | C:\WINDOWS\system32 | |
| Microsoft Corporation | | | | | |
| mstime.dll | 6.0.3790.0 | 491 KB | 3/29/2003 | C:\WINDOWS\system32 | |
| Microsoft Corporation | | | | | |
| occache.dll | 6.0.3790.0 | 89 KB | 3/29/2003 | C:\WINDOWS\system32 | |
| Microsoft Corporation | | | | | |
| proctexe.ocx | 6.3.3790.0 | 78 KB | 3/29/2003 | C:\WINDOWS\system32 | Intel Corporation |
| sendmail.dll | 6.0.3790.0 | 52 KB | 3/29/2003 | C:\WINDOWS\system32 | |
| Microsoft Corporation | | | | | |
| shdoclc.dll | 6.0.3790.0 | 589 KB | 3/29/2003 | C:\WINDOWS\system32 | |
| Microsoft Corporation | | | | | |
| shdocvw.dll | 6.0.3790.0 | 1,361 KB | 3/29/2003 | C:\WINDOWS\system32 | |
| Microsoft Corporation | | | | | |
| shfolder.dll | 6.0.3790.0 | 23 KB | 3/29/2003 | C:\WINDOWS\system32 | |
| Microsoft Corporation | | | | | |

Appendix C – Tunable Parameters

| | | | | | |
|-----------------------|------------|--------|-----------|---------------------|-----------------------|
| shlwapi.dll | 6.0.3790.0 | 281 KB | 3/29/2003 | C:\WINDOWS\system32 | |
| Microsoft Corporation | | | | | |
| tdc.ocx | 1.3.0.3130 | 58 KB | 3/29/2003 | C:\WINDOWS\system32 | Microsoft Corporation |
| url.dll | 6.0.3790.0 | 36 KB | 3/29/2003 | C:\WINDOWS\system32 | Microsoft Corporation |
| urlmon.dll | 6.0.3790.0 | 502 KB | 3/29/2003 | C:\WINDOWS\system32 | Microsoft Corporation |
| webcheck.dll | 6.0.3790.0 | 262 KB | 3/29/2003 | C:\WINDOWS\system32 | Microsoft Corporation |
| wininet.dll | 6.0.3790.0 | 609 KB | 3/29/2003 | 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

Appendix C – Tunable Parameters

Total Disk Space Not Available
Available Disk Space Not Available
Maximum Cache Size Not Available
Available Cache Size Not Available

[List of Objects]

Program File Status CodeBase
No cached object information available

[Content]

[Following are sub-categories of this main category]

[Summary]

Item Value
Content AdvisorDisabled

[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

Appendix C – Tunable Parameters

My Computer Custom
Local intranet Medium-low
Trusted sites Medium
Internet High
Restricted sites High

Microsoft Windows 2003 Server System Info For PE1600SC

System Information report written at: 11/19/04 13:49:13

System Name: CLIENT80

[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 | CLIENT80 |
| System Manufacturer | Dell Computer Corporation |
| System Model | PowerEdge 1600SC |
| System Type | X86-based PC |
| Processor | x86 Family 15 Model 2 Stepping 9 GenuineIntel ~2292 Mhz |
| Processor | x86 Family 15 Model 2 Stepping 9 GenuineIntel ~2292 Mhz |
| Processor | x86 Family 15 Model 2 Stepping 9 GenuineIntel ~2292 Mhz |
| Processor | x86 Family 15 Model 2 Stepping 9 GenuineIntel ~2292 Mhz |
| BIOS Version/Date | Dell Computer Corporation A03, 2/19/2003 |
| 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 | CLIENT80\Administrator |
| Time Zone | Central Standard Time |
| Total Physical Memory | 1,024.00 MB |
| Available Physical Memory | 809.03 MB |
| Total Virtual Memory | 3.41 GB |
| Available Virtual Memory | 3.08 GB |
| Page File Space | 2.41 GB |
| Page File | C:\pagefile.sys |

[Hardware Resources]

[Conflicts/Sharing]

| Resource | Device |
|---------------------------------------|--|
| I/O Port 0x00000000-0x000003AF | PCI bus |
| I/O Port 0x00000000-0x000003AF | Direct memory access controller |
| Memory Address 0xFD000000-0xFE1FFFFFF | PCI bus |
| Memory Address 0xFD000000-0xFE1FFFFFF | RAGE XL PCI Family (Microsoft Corporation) |

Appendix C – Tunable Parameters

| | |
|--------------------------------------|--|
| 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) |
| 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 |
| 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 (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 |
| 0x00000800-0x00000819 | System board | OK |
| 0x00000880-0x0000089F | System board | OK |
| 0x000008C0-0x000008C3 | 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 |
| 0xFCF10000-0xFCF1FFFF | LSI Logic PCI-X Ultra320 SCSI Host Adapter | OK |
| 0xFCF00000-0xFCF0FFFF | LSI Logic PCI-X Ultra320 SCSI Host Adapter | OK |

Appendix C – Tunable Parameters

0xFCB00000-0xFCDF0000 PCI busOK
0xFCB00000-0xFCDF0000 Intel(R) PRO/100+ Server Adapter (PILA8470B) OK
0xFCDF0000-0xFCDF00FF Intel(R) PRO/100+ Server Adapter (PILA8470B) OK

[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\msaud32.acm | Microsoft Corporation | | 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\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\msg723.acm | Microsoft Corporation | | OK | | | | |
| | | C:\WINDOWS\system32\MSG723.ACM | | 4.4.4000 | | 116.00 KB (118,784 bytes) | 11/13/2003 1:32 PM |
| 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\sl_anet.acm | Sipro Lab Telecom Inc. | | OK | | | | |
| | | C:\WINDOWS\system32\SL_ANET.ACM | | 3.02 | | 84.00 KB (86,016 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\l3codeca.acm | Fraunhofer Institut Integrierte Schaltungen IIS | | 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\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\msh261.drv | Microsoft Corporation | | OK | | | | |
| | | C:\WINDOWS\system32\MSH261.DRV | | 4.4.4000 | | 180.00 KB (184,320 bytes) | 11/13/2003 1:32 PM |
| 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 |

Appendix C – Tunable Parameters

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\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\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

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\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 SC-148C
Manufacturer (Standard CD-ROM drives)
Status OK
Transfer Rate Not Available
SCSI Target ID 0
PNP Device ID IDE\CDROMSAMSUNG_CD-ROM_SC-
148C_____B105___\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

[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)
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

Dell 270

October 2004

Appendix C – Tunable Parameters

I/O Port 0x000003B0-0x000003DF
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), 11/13/2003 7:22 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] Intel(R) PRO/1000 MT Network Connection
Adapter Type Ethernet 802.3

Appendix C – Tunable Parameters

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 11/19/2004 11:09 AM
Index 1
Service Name E1000
IP Address 192.1.101.80
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:20:1A:5D
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), 11/13/2003 7:22 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 11/19/2004 11:09 AM
Index 2
Service Name E100B
IP Address 192.1.2.80
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 00:02:B3:5B:6B:B3
Memory Address 0xFCD00000-0xFCD00FFF
I/O Port 0x0000CCC0-0x0000CCFF
Memory Address 0xFCB00000-0xFCDF0000
IRQ Channel IRQ 24
Driver c:\windows\system32\drivers\e100b325.sys (6.6.8.1 built by: WinDDK, 138.50 KB (141,824 bytes), 11/13/2003 7:22 AM)

Name [00000003] Intel(R) PRO/100+ Dual Port Server Adapter
Adapter Type Not Available
Product Type Intel(R) PRO/100+ Dual Port Server Adapter
Installed Yes
PNP Device ID Not Available
Last Reset 11/19/2004 11:09 AM
Index 3
Service Name E100B
IP Address Not Available
IP Subnet Not Available
Default IP Gateway Not Available
DHCP Enabled No

Appendix C – Tunable Parameters

DHCP Server Not Available
DHCP Lease Expires Not Available
DHCP Lease Obtained Not Available
MAC Address Not Available

Name [00000004] Intel(R) PRO/100+ Dual Port Server Adapter
Adapter Type Not Available
Product Type Intel(R) PRO/100+ Dual Port Server Adapter
Installed Yes
PNP Device ID Not Available
Last Reset 11/19/2004 11:09 AM
Index 4
Service Name E100B
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 [00000005] RAS Async Adapter
Adapter Type Not Available
Product Type RAS Async Adapter
Installed Yes
PNP Device ID Not Available
Last Reset 11/19/2004 11:09 AM
Index 5
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 [00000006] WAN Miniport (L2TP)
Adapter Type Not Available
Product Type WAN Miniport (L2TP)
Installed Yes
PNP Device ID ROOTMS_L2TPMINIPORT\0000
Last Reset 11/19/2004 11:09 AM
Index 6
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

Appendix C – Tunable Parameters

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 [00000007] WAN Miniport (PPTP)
Adapter Type Wide Area Network (WAN)
Product Type WAN Miniport (PPTP)
Installed Yes
PNP Device ID ROOT\MS_PPTP\MINIPORT\0000
Last Reset 11/19/2004 11:09 AM
Index 7
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\rasppt.sys (5.2.3790.0 (srv03_rtm.030324-2048), 70.50 KB (72,192 bytes), 3/29/2003 12:00 AM)

Name [00000008] WAN Miniport (PPPOE)
Adapter Type Wide Area Network (WAN)
Product Type WAN Miniport (PPPOE)
Installed Yes
PNP Device ID ROOT\MS_PPPOE\MINIPORT\0000
Last Reset 11/19/2004 11:09 AM
Index 8
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 [00000009] Direct Parallel
Adapter Type Not Available
Product Type Direct Parallel
Installed Yes
PNP Device ID ROOT\MS_PT\MINIPORT\0000
Last Reset 11/19/2004 11:09 AM
Index 9
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

Appendix C – Tunable Parameters

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 [00000010] WAN Miniport (IP)
Adapter Type Not Available
Product Type WAN Miniport (IP)
Installed Yes
PNP Device ID ROOT\MS_NDISWANIP\0000
Last Reset 11/19/2004 11:09 AM
Index 10
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 [00000011] Intel(R) PRO/100+ Dual Port Server Adapter
Adapter Type Not Available
Product Type Intel(R) PRO/100+ Dual Port Server Adapter
Installed Yes
PNP Device ID Not Available
Last Reset 11/19/2004 11:09 AM
Index 11
Service Name E100B
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 [00000012] Intel(R) PRO/100+ Dual Port Server Adapter
Adapter Type Not Available
Product Type Intel(R) PRO/100+ Dual Port Server Adapter
Installed Yes
PNP Device ID Not Available
Last Reset 11/19/2004 11:09 AM
Index 12
Service Name E100B
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

Appendix C – Tunable Parameters

DHCP Lease Obtained Not Available

MAC Address Not Available

[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

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

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_{B80CA3A3-83AF-40AE-A96F-2222156091B2}]
SEQPACKET 7
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_{B80CA3A3-83AF-40AE-A96F-2222156091B2}]
DATAGRAM 7
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

Supports Encryption No
Supports Expedited Data No
Supports Graceful Closing No
Supports Guaranteed Bandwidth No
Supports Multicasting No

Name MSAFD NetBIOS [\Device\NetBT_Tcpip_{2DD87328-2844-4CE7-8CFF-F6D863AC0734}] SEQPACKET 6
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_{2DD87328-2844-4CE7-8CFF-F6D863AC0734}] DATAGRAM 6
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_{833FA836-11FC-4387-9F56-9082062D338A}] 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

Appendix C – Tunable Parameters

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_{833FA836-11FC-4387-9F56-9082062D338A}]
DATAGRAM 0

Connectionless Service Yes
Guarantees Delivery No
Guarantees SequencingNo
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_{915E7CCF-F641-4E79-A07A-8707F1BF2257}]
SEQPACKET 1

Connectionless Service No
Guarantees Delivery Yes
Guarantees SequencingYes
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_{915E7CCF-F641-4E79-A07A-8707F1BF2257}]
DATAGRAM 1

Connectionless Service Yes
Guarantees Delivery No
Guarantees SequencingNo
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

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_{D92CDA13-25CE-4C24-8E01-DEE40289EF21}] 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_{D92CDA13-25CE-4C24-8E01-DEE40289EF21}] 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_{A92BF397-E0A5-448C-B3AE-8B34875D7FA4}] 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)

Appendix C – Tunable Parameters

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_{A92BF397-E0A5-448C-B3AE-8B34875D7FA4}] 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

Name MSAFD NetBIOS [\Device\NetBT_Tcpip_{A1741045-84FE-47EA-904F-5DFCE3307C20}] 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_{A1741045-84FE-47EA-904F-5DFCE3307C20}] DATAGRAM 4

Connectionless Service Yes
Guarantees Delivery No
Guarantees Sequencing No

Appendix C – Tunable Parameters

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_{F767E01D-2EAF-4E3A-AC93-B92C2D2CB4A4}] 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
Supports Encryption No
Supports Expedited Data No
Supports Graceful Closing No
Supports Guaranteed Bandwidth No
Supports Multicasting No

Name MSAFD NetBIOS [\Device\NetBT_Tcpip_{F767E01D-2EAF-4E3A-AC93-B92C2D2CB4A4}] 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

[WinSock]

Item Value

Appendix C – Tunable Parameters

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 |
| 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 |

Appendix C – Tunable Parameters

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 33.91 GB (36,413,280,256 bytes)

Free Space 30.41 GB (32,657,707,008 bytes)

Volume Name

Volume Serial Number 98DEBC9B

Drive D:

Description CD-ROM Disc

Drive E:

Description Removable Disk

[Disks]

Item Value

Description Disk drive

Manufacturer (Standard disk drives)

Model FUJITSU MAP3367NP 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

Appendix C – Tunable Parameters

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 33.91 GB (36,413,282,304 bytes)
Partition Starting Offset 32,256 bytes

Description Disk drive
Manufacturer (Standard disk drives)
Model Sony Storage Media USB Device
Bytes/Sector 512
Media Loaded Yes
Media Type Removable media
Partitions 1
SCSI Bus Not Available
SCSI Logical Unit Not Available
SCSI Port Not Available
SCSI Target ID Not Available
Sectors/Track 63
Size 117.66 MB (123,379,200 bytes)
Total Cylinders 15
Total Sectors 240,975
Total Tracks 3,825
Tracks/Cylinder 255
Partition Disk #1, Partition #0
Partition Size 125.00 MB (131,072,000 bytes)
Partition Starting Offset 0 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)

Appendix C – Tunable Parameters

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)

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
 Generic USB Hub USB\VID_054C&PID_0105\5&253165DE&0&2
 USB Mass Storage Device USB\VID_054C&PID_008B\6&2755DE64&0&1
 Sony Storage Media USB Device
 USBSTOR\DISK&VEN_SONY&PROD_STORAGE_MEDIA&REV_PROL\7&292B1B3&0
 Generic volume STORAGE\REMOVABLEMEDIA\8&379454EB&0&RM

[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 | | | |

Appendix C – Tunable Parameters

| | | | | | | | |
|-----------|--|---------------|--|--------------------|----------|----------|-----|
| adpu320 | adpu320 | Not Available | Kernel Driver | No | Disabled | | |
| | Stopped | OK | Normal | 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 | | | |
| 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 | | | | |
| asynmac | RAS Asynchronous Media Driver | | c:\windows\system32\drivers\asynmac.sys | Kernel Driver | No | Manual | |
| | Stopped | OK | Normal | 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 |
| 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 | | | |
| cd20xrnt | cd20xrnt | Not Available | Kernel Driver | No | Disabled | | |
| | Stopped | OK | Normal | 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 | | | | |
| 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 | | | |
| cpqarray2 | cpqarray2 | Not Available | Kernel Driver | No | Disabled | | |
| | Stopped | OK | Normal | No | | | |
| cpqcissm | cpqcissm | Not Available | Kernel Driver | No | Disabled | | |
| | Stopped | OK | Normal | No | | | |
| cpqfcalm | cpqfcalm | Not Available | Kernel Driver | No | Disabled | | |
| | Stopped | OK | Normal | 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 | | | |

Appendix C – Tunable Parameters

| | | | | | | | |
|----------------|---|--|--------------------|--------|----------|---------|-----|
| dellcerc | dellcerc | Not Available | Kernel Driver | No | Disabled | Stopped | OK |
| | Normal | 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 | | | | | |
| e1000 | Intel(R) PRO/1000 Device Driver | c:\windows\system32\drivers\e1000325.sys | Kernel Driver | Yes | Manual | Running | OK |
| | 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 | Yes | | | |
| | Disabled | Running | OK | Normal | No | Yes | |
| fdc | Floppy Disk Controller Driver | c:\windows\system32\drivers\fdc.sys | Kernel Driver | | | | |
| | Yes | Manual | Running | OK | Normal | No | Yes |
| fips | Fips | c:\windows\system32\drivers\fips.sys | Kernel Driver | Yes | System | | |
| | Running | OK | Normal | No | Yes | | |
| flpydisk | Floppy Disk Driver | c:\windows\system32\drivers\flpydisk.sys | Kernel Driver | | | | |
| | Yes | Manual | Running | OK | Normal | No | Yes |
| ftdisk | Volume Manager Driver | c:\windows\system32\drivers\ftdisk.sys | Kernel Driver | Yes | | | |
| | Boot | Running | OK | Normal | No | Yes | |
| gpc | Generic Packet Classifier | c:\windows\system32\drivers\msgpc.sys | Kernel Driver | | | | |
| | Yes | Manual | Running | OK | Normal | No | Yes |
| hpn | hpn | Not Available | Kernel Driver | No | Disabled | Stopped | OK |
| | Normal | No | | | | | |
| hpt3xx | hpt3xx | Not Available | Kernel Driver | No | Disabled | Stopped | OK |
| | Normal | 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 | | | | | |
| 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 | | | | | |
| 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 | | | | | |
| 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 |

Appendix C – Tunable Parameters

| | | | | | | | | | |
|----------|--------------------------------|--|--------------------|---------|----------|---------|--------------------|-----|--|
| 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 | | |
| mountmgr | Mount Point Manager | c:\windows\system32\drivers\mountmgr.sys | | | | | Kernel | | |
| Driver | Yes | Boot | Running | OK | Normal | No | Yes | | |
| mraid35x | mraid35x | Not Available | Kernel Driver | No | Disabled | | | | |
| | Stopped | OK | Normal | No | No | | | | |
| mrxdav | WebDav Client Redirector | c:\windows\system32\drivers\mrxdav.sys | | | | | File | | |
| System | Driver | No | Manual | Stopped | OK | Normal | No | No | |
| mrxsmb | MRXSMB | c:\windows\system32\drivers\mrxsmb.sys | | | | | File System Driver | | |
| | Yes | System | Running | OK | Normal | No | Yes | | |
| msfs | Msfs | c:\windows\system32\drivers\msfs.sys | File System Driver | Yes | System | | | | |
| | Running | OK | Normal | No | Yes | | | | |
| mup | Mup | c:\windows\system32\drivers\mup.sys | File System Driver | Yes | Boot | | | | |
| | Running | OK | Normal | No | Yes | | | | |
| ndis | NDIS System Driver | c:\windows\system32\drivers\ndis.sys | Kernel Driver | Yes | | | | | |
| | Boot | Running | OK | Normal | No | Yes | | | |
| ndistapi | Remote Access NDIS TAPI Driver | c:\windows\system32\drivers\ndistapi.sys | | | | | | | |
| | Kernel Driver | Yes | Manual | Running | OK | Normal | No | Yes | |
| ndisuio | NDIS Usermode I/O Protocol | c:\windows\system32\drivers\ndisuio.sys | Kernel Driver | | | | | | |
| | 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 | | | | |

Appendix C – Tunable Parameters

| | | | | | | | | |
|--------------|--------------------------------------|--|---------------|-----|----------------|---------|----|--|
| 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 | | | | | | |
| 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 | | | | | | |
| 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\raspppt.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 | | | | | | |
| 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 | | | |

Appendix C – Tunable Parameters

| | | | | | | | | | | |
|---------|--|---|--------------------|-----|----------|----------|---------|--------|--------|-----|
| rdcss | Rdbss | c:\windows\system32\drivers\rdcss.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 | Yes | Manual | Running | OK | Ignore | No | Yes |
| 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 | 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 | Yes | Manual | Running | OK | Ignore | No | Yes |
| 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 | System | Disabled | Stopped | OK | Normal | 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 | Microsoft USB Standard Hub Driver | c:\windows\system32\drivers\usbhub.sys | Kernel Driver | Yes | Manual | Running | OK | Normal | No | Yes |

Appendix C – Tunable Parameters

| | | | | | | | | | |
|--|---|---------------|---------|---------------|---------|--------|--------|--|--|
| usbhcsi Microsoft USB Open Host Controller Miniport Driver | | | | | | | | | |
| | c:\windows\system32\drivers\usbhcsi.sys | | | Kernel Driver | Yes | Manual | | | |
| | Running | OK | Normal | No | Yes | | | | |
| usbstor USB Mass Storage Driver | | | | | | | | | |
| | c:\windows\system32\drivers\usbstor.sys | | | Kernel Driver | | | | | |
| 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 Vialde | | | | | | | | | |
| | 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 | | | | | |
| 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 | Not Available | HTREE\ROOT\0 | | | |
| ACPI Multiprocessor PC computers) | Yes | COMPUTER | 5.2.3790.0 | 10/1/2002 | (Standard | |
| | 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 types) | Yes | PROCESSOR | 5.2.3790.0 | 10/1/2002 | (Standard processor | |
| | cpu.inf | Not Available | ACPI\GENUINEINTEL_-_X86_FAMILY_15_MODEL_2\0 | | | |
| Processor types) | Yes | PROCESSOR | 5.2.3790.0 | 10/1/2002 | (Standard processor | |
| | cpu.inf | Not Available | ACPI\GENUINEINTEL_-_X86_FAMILY_15_MODEL_2\1 | | | |
| Processor types) | Yes | PROCESSOR | 5.2.3790.0 | 10/1/2002 | (Standard processor | |
| | cpu.inf | Not Available | ACPI\GENUINEINTEL_-_X86_FAMILY_15_MODEL_2\2 | | | |
| Processor types) | Yes | PROCESSOR | 5.2.3790.0 | 10/1/2002 | (Standard processor | |
| | cpu.inf | Not Available | ACPI\GENUINEINTEL_-_X86_FAMILY_15_MODEL_2\3 | | | |
| PCI bus types) | Yes | SYSTEM | 5.2.3790.0 | 10/1/2002 | (Standard system devices) | |
| | machine.inf | Not Available | ACPI\PNP0A03\1 | | | |
| ServerWorks Grand Champion | Yes | 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_01\3&13C0B0C5&0&00 | | | | | |
| ServerWorks Grand Champion | Yes | 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 | | | | | |
| Intel(R) PRO/1000 MT Network Connection | Yes | NET | 6.3.6.31 | 10/1/2002 | | |
| | Intel | nete1000.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 |
| | PCI\VEN_1002&DEV_4752&SUBSYS_01351028&REV_27\3&13C0B0C5&0&70 | | | | | |
| Default Monitor types) | Yes | MONITOR | 5.1.2001.0 | 6/6/2001 | (Standard monitor | |
| | monitor.inf | Not Available | | | | |
| | DISPLAY\DEFAULT_MONITOR\4&38274D1&0&80000000&00&0E | | | | | |

Appendix C – Tunable Parameters

| | | | | |
|--|-----|--------------|---------------|---|
| 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) |
| (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) |
| (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) |
| (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) |
| (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) |
| (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 |
| (Microsoft mouse) | | msmouse.inf | Not Available | ACPI\PNP0F13\4&25F73A82&0 |
| Communications Port | Yes | PORTS | 5.2.3790.0 | 10/1/2002 (Standard port types) |
| (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) |
| (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) |
| (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 | | | | |
| Primary IDE Channel | Yes | HDC | 5.2.3790.0 | 10/1/2002 (Standard IDE ATA/ATAPI controllers) |
| (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) |
| (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) |
| (Standard CD-ROM drives) | | cdrom.inf | Not Available | IDE\CDROMSAMSUNG_CD-ROM_SC-148C_____B105____\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 | |
| PCI\VEN_1166&DEV_0220&SUBSYS_02201166&REV_05\3&13C0B0C5&0&7A | | | | |
| USB Root Hub | Yes | USB | 5.2.3790.0 | 10/1/2002 (Standard USB Host Controller) |
| (Standard USB Host Controller) | | usbport.inf | Not Available | USB\ROOT_HUB\4&1A0F8909&0 |

Appendix C – Tunable Parameters

| | | | | | |
|---|-------------------|--|--------------------------|---------------|---------------------------|
| Generic USB Hub | Yes | USB | 5.2.3790.0 | 10/1/2002 | (Generic USB Hub) |
| usb.inf | Not Available | USB\VID_054C&PID_0105\5&253165DE&0&2 | | | |
| USB Mass Storage Device | Yes | USB | 5.2.3790.0 | 10/1/2002 | Compatible |
| USB storage device | usbstor.inf | Not Available | | | |
| | | USB\VID_054C&PID_008B\6&2755DE64&0&1 | | | |
| Disk drive | Yes | DISKDRIVE | 5.2.3790.0 | 10/1/2002 | (Standard disk drives) |
| disk.inf | Not Available | | | | |
| | | USBSTOR\DISK&VEN_SONY&PROD_STORAGE_MEDIA&REV_PROL\7&292B1B3&0 | | | |
| Generic volume | Yes | VOLUME | 5.2.3790.0 | 10/1/2002 | Microsoft |
| volume.inf | Not Available | STORAGE\REMOVABLEMEDIA\8&379454EB&0&RM | | | |
| 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_0225&SUBSYS_00000000&REV_00\3&13C0B0C5&0&7B | | | |
| 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) |
| 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. | pnpscsi.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_FUJITSU&PROD_MAP3367NP&REV_5605\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 | | | |
| Generic volume | Yes | VOLUME | 5.2.3790.0 | 10/1/2002 | Microsoft |
| volume.inf | Not Available | | | | |
| | | STORAGE\VOLUME\1&30A96598&0&SIGNATURE99879987OFFSET7E00LENGTH87A669800 | | | |
| 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 | 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 | | |

Appendix C – Tunable Parameters

| | | | | | |
|--------------------------------------|---------------|---------------|--------------------------|---------------|---------------|
| dmboot | Not Available | LEGACYDRIVER | Not Available | Not Available | Not Available |
| | Not Available | Not Available | ROOTLEGACY_DMBOOT\0000 | | |
| dmload | Not Available | LEGACYDRIVER | Not Available | Not Available | Not Available |
| | Not Available | Not Available | ROOTLEGACY_DMLOAD\0000 | | |
| Fips | Not Available | LEGACYDRIVER | Not Available | Not Available | Not Available |
| | Not Available | Not Available | ROOTLEGACY_FIPS\0000 | | |
| Generic Packet Classifier | Not Available | LEGACYDRIVER | Not Available | Not Available | Not Available |
| | Not Available | Not Available | ROOTLEGACY_GPC\0000 | | |
| HTTP | Not Available | LEGACYDRIVER | Not Available | Not Available | Not Available |
| | Not Available | Not Available | ROOTLEGACY_HTTP\0000 | | |
| IPSEC driver | Not Available | LEGACYDRIVER | Not Available | Not Available | Not Available |
| | Not Available | Not Available | ROOTLEGACY_IPSEC\0000 | | |
| ksecdd | Not Available | LEGACYDRIVER | Not Available | Not Available | Not Available |
| | Not Available | Not Available | ROOTLEGACY_KSECDD\0000 | | |
| mnmd | Not Available | LEGACYDRIVER | Not Available | Not Available | Not Available |
| | Not Available | Not Available | ROOTLEGACY_MNMDD\0000 | | |
| mountmgr | Not Available | LEGACYDRIVER | Not Available | Not Available | Not Available |
| | Not Available | Not Available | ROOTLEGACY_MOUNTMGR\0000 | | |
| NDIS System Driver | Not Available | LEGACYDRIVER | Not Available | Not Available | Not Available |
| | Not Available | Not Available | ROOTLEGACY_NDIS\0000 | | |
| Remote Access NDIS TAPI Driver | Not Available | LEGACYDRIVER | Not Available | Not Available | Not Available |
| | Not Available | Not Available | ROOTLEGACY_NDISTAPI\0000 | | |
| NDIS Usermode I/O Protocol | Not Available | LEGACYDRIVER | Not Available | Not Available | Not Available |
| | Not Available | Not Available | ROOTLEGACY_NDISUIO\0000 | | |
| NDProxy | Not Available | LEGACYDRIVER | Not Available | Not Available | Not Available |
| | Not Available | Not Available | ROOTLEGACY_NDPROXY\0000 | | |
| NetBios over Tcpi | Not Available | LEGACYDRIVER | Not Available | Not Available | Not Available |
| | Not Available | Not Available | ROOTLEGACY_NETBT\0000 | | |
| Null | Not Available | LEGACYDRIVER | Not Available | Not Available | Not Available |
| | Not Available | Not Available | ROOTLEGACY_NULL\0000 | | |
| Partition Manager | Not Available | LEGACYDRIVER | Not Available | Not Available | Not Available |
| | Not Available | Not Available | ROOTLEGACY_PARTMGR\0000 | | |
| Parvdm | Not Available | LEGACYDRIVER | Not Available | Not Available | Not Available |
| | Not Available | Not Available | ROOTLEGACY_PARVDM\0000 | | |
| Remote Access Auto Connection Driver | Not Available | LEGACYDRIVER | Not Available | Not Available | Not Available |
| | Not Available | Not Available | ROOTLEGACY_RASACD\0000 | | |
| RDPCDD | Not Available | LEGACYDRIVER | Not Available | Not Available | Not Available |
| | Not Available | Not Available | ROOTLEGACY_RDPCDD\0000 | | |
| RDPWD | Not Available | LEGACYDRIVER | Not Available | Not Available | Not Available |
| | Not Available | Not Available | ROOTLEGACY_RDPWD\0000 | | |
| TCP/IP Protocol Driver | Not Available | LEGACYDRIVER | Not Available | Not Available | Not Available |
| | Not Available | Not Available | ROOTLEGACY_TCPIP\0000 | | |
| TDTCP | Not Available | LEGACYDRIVER | Not Available | Not Available | Not Available |
| | Not Available | Not Available | ROOTLEGACY_TDTCP\0000 | | |
| VGA Display Controller | Not Available | LEGACYDRIVER | Not Available | Not Available | Not Available |
| | Not Available | Not Available | ROOTLEGACY_VGASAVE\0000 | | |
| volsnap | Not Available | LEGACYDRIVER | Not Available | Not Available | Not Available |
| | Not Available | Not Available | ROOTLEGACY_VOLSNAP\0000 | | |
| Remote Access IP ARP Driver | Not Available | LEGACYDRIVER | Not Available | Not Available | Not Available |
| | Not Available | Not Available | ROOTLEGACY_WANARP\0000 | | |

Appendix C – Tunable Parameters

| | | | | | |
|--|-----|---------------------------|---------------------------|----------------------|---------------------------|
| Audio Codecs | Yes | MEDIA | 5.2.3790.0 | 10/1/2002 | (Standard system devices) |
| wave.inf | | Not Available | ROOTMEDIAMS_MMACM | | |
| Legacy Audio Drivers | Yes | MEDIA | 5.2.3790.0 | 10/1/2002 | (Standard system devices) |
| wave.inf | | Not Available | ROOTMEDIAMS_MMDRV | | |
| Media Control Devices | Yes | MEDIA | 5.2.3790.0 | 10/1/2002 | (Standard system devices) |
| wave.inf | | Not Available | ROOTMEDIAMS_MMMCI | | |
| Legacy Video Capture Devices | Yes | MEDIA | 5.2.3790.0 | 10/1/2002 | (Standard system devices) |
| wave.inf | | Not Available | ROOTMEDIAMS_MMVCD | | |
| Video Codecs | Yes | MEDIA | 5.2.3790.0 | 10/1/2002 | (Standard system devices) |
| wave.inf | | Not Available | ROOTMEDIAMS_MMVID | | |
| WAN Miniport (L2TP) | Yes | NET | 5.2.3790.0 | 10/1/2002 | Microsoft |
| netrasa.inf | | Not Available | ROOTMS_L2TPMINIPORT\0000 | | |
| WAN Miniport (IP) | Yes | NET | 5.2.3790.0 | 10/1/2002 | Microsoft |
| netrasa.inf | | Not Available | ROOTMS_NDISWANIP\0000 | | |
| WAN Miniport (PPPOE) | Yes | NET | 5.2.3790.0 | 10/1/2002 | Microsoft |
| netrasa.inf | | Not Available | ROOTMS_PPPOEMINIPORT\0000 | | |
| WAN Miniport (PPTP) | Yes | NET | 5.2.3790.0 | 10/1/2002 | Microsoft |
| netrasa.inf | | Not Available | ROOTMS_PPTPMINIPORT\0000 | | |
| Direct Parallel | Yes | NET | 5.2.3790.0 | 10/1/2002 | Microsoft |
| Not Available | | | ROOTMS_PTMINIPORT\0000 | | netrasa.inf |
| Terminal Server Device Redirector | Yes | SYSTEM | 5.2.3790.0 | 10/1/2002 | |
| (Standard system devices) | | machine.inf | Not Available | ROOT\RDPPDR\0000 | |
| Terminal Server Keyboard Driver | Yes | SYSTEM | 5.2.3790.0 | 10/1/2002 | |
| (Standard system devices) | | machine.inf | Not Available | ROOT\RDPPDR_KBD\0000 | |
| Terminal Server Mouse Driver | Yes | SYSTEM | 5.2.3790.0 | 10/1/2002 | |
| (Standard system devices) | | machine.inf | Not Available | ROOT\RDPPDR_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 9, GenuineIntel | <SYSTEM> |
| PROCESSOR_REVISION | 0209 | <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 |

Appendix C – Tunable Parameters

| | | |
|------|-----------------------------------|------------------------------|
| TMP | %USERPROFILE%\Local Settings\Temp | NT AUTHORITY\SYSTEM |
| TEMP | %USERPROFILE%\Local Settings\Temp | NT AUTHORITY\LOCAL SERVICE |
| TMP | %USERPROFILE%\Local Settings\Temp | NT AUTHORITY\LOCAL SERVICE |
| TEMP | %USERPROFILE%\Local Settings\Temp | NT AUTHORITY\NETWORK SERVICE |
| TMP | %USERPROFILE%\Local Settings\Temp | NT AUTHORITY\NETWORK SERVICE |
| TEMP | %USERPROFILE%\Local Settings\Temp | CLIENT80\Administrator |
| TMP | %USERPROFILE%\Local Settings\Temp | CLIENT80\Administrator |

[Print Jobs]

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

[Network Connections]

| Local Name | Remote Name | Type | Status | User Name |
|------------|-------------|------|--------|-----------|
|------------|-------------|------|--------|-----------|

[Running Tasks]

| Name | Path | Process ID | Priority | Min Working Set | Max Working Set | Start |
|---------------------|----------------------------------|------------------------------------|---------------|-----------------|-------------------------|---------------------|
| Time | Version | Size | File Date | | | |
| system idle process | | Not Available | 0 | 0 | Not Available | Not Available |
| Available | | Not Available | Not Available | Not Available | | Not |
| system | Not Available | 4 | 8 | 0 | 1413120 | Not Available |
| | Not Available | Not Available | | | | Not Available |
| smss.exe | Not Available | 492 | 11 | 204800 | 1413120 | 11/19/2004 11:09 AM |
| | Not Available | Not Available | Not Available | | | |
| csrss.exe | Not Available | 540 | 13 | Not Available | Not Available | 11/19/2004 |
| 11:09 AM | Not Available | Not Available | Not Available | | | |
| winlogon.exe | c:\windows\system32\winlogon.exe | | 572 | 13 | 204800 1413120 | |
| | 11/19/2004 11:09 AM | 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 | | 616 | 9 | 204800 1413120 | |
| | 11/19/2004 11:09 AM | 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 | | 628 | 9 | 204800 1413120 | |
| | 11/19/2004 11:09 AM | 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 | | 796 | 8 | 204800 1413120 | |
| | 11/19/2004 11:09 AM | 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 | | 844 | 8 | 204800 1413120 | |
| | 11/19/2004 11:09 AM | 5.2.3790.0 (srv03_rtm.030324-2048) | | | 13.00 KB (13,312 bytes) | |
| | 3/29/2003 12:00 AM | | | | | |
| svchost.exe | Not Available | 1004 | 8 | Not Available | Not Available | 11/19/2004 |
| 11:09 AM | Not Available | Not Available | Not Available | | | |
| svchost.exe | Not Available | 1076 | 8 | Not Available | Not Available | 11/19/2004 |
| 11:09 AM | Not Available | Not Available | Not Available | | | |
| svchost.exe | c:\windows\system32\svchost.exe | | 1088 | 8 | 204800 1413120 | |
| | 11/19/2004 11:09 AM | 5.2.3790.0 (srv03_rtm.030324-2048) | | | 13.00 KB (13,312 bytes) | |
| | 3/29/2003 12:00 AM | | | | | |
| spoolsv.exe | c:\windows\system32\spoolsv.exe | | 1308 | 8 | 204800 1413120 | |
| | 11/19/2004 11:09 AM | 5.2.3790.0 (srv03_rtm.030324-2048) | | | 55.00 KB (56,320 bytes) | |
| | 3/29/2003 12:00 AM | | | | | |

Appendix C – Tunable Parameters

```

msdtc.exe      Not Available  1352  8      Not Available  Not Available  11/19/2004
11:09 AM      Not Available  Not Available  Not Available
svchost.exe   c:\windows\system32\svchost.exe  1540  8      204800 1413120
11/19/2004 11:09 AM  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\inetinfo.exe  1612  8      204800
1413120      11/19/2004 11:09 AM  6.0.3790.0 (srv03_rtm.030324-2048)  13.00
KB (13,312 bytes)  11/13/2003 2:13 PM
svchost.exe  Not Available  1756  8      Not Available  Not Available  11/19/2004
11:09 AM      Not Available  Not Available  Not Available
explorer.exe  c:\windows\explorer.exe 220  8      204800 1413120  11/19/2004
11:09 AM      6.00.3790.0 (srv03_rtm.030324-2048)  1,008.50 KB (1,032,704 bytes)
3/29/2003 12:00 AM
dfssvc.exe   c:\windows\system32\dfssvc.exe  328  8      204800 1413120
11/19/2004 11:09 AM  5.2.3790.0 (srv03_rtm.030324-2048)  130.50 KB (133,632
bytes) 3/29/2003 12:00 AM
wmiprvse.exe Not Available  1752  8      Not Available  Not Available  11/19/2004
11:11 AM      Not Available  Not Available  Not Available
iexplore.exe c:\program files\internet explorer\iexplore.exe 204  8      204800
1413120      11/19/2004 11:14 AM  6.00.3790.0 (srv03_rtm.030324-2048)  90.00
KB (92,160 bytes)  11/13/2003 1:32 PM
dllhost.exe  c:\windows\system32\dllhost.exe  2056  8      204800 1413120
11/19/2004 11:14 AM  5.2.3790.0 (srv03_rtm.030324-2048)  5.50 KB (5,632 bytes)
3/29/2003 12:00 AM
cmd.exe      c:\windows\system32\cmd.exe  3424  8      204800 1413120
11/19/2004 11:22 AM  5.2.3790.0 (srv03_rtm.030324-2048)  374.00 KB (382,976
bytes) 3/29/2003 12:00 AM
sleep.exe    c:\check\sleep.exe  3272  8      204800 1413120  11/19/2004
1:22 PM      Not Available  41.00 KB (41,984 bytes) 11/18/2004 11:25 AM
helpctr.exe  c:\windows\pchealth\helpctr\binaries\helpctr.exe 3408  8      204800
1413120      11/19/2004 1:47 PM  5.2.3790.0 (srv03_rtm.030324-2048)  764.00
KB (782,336 bytes)  11/13/2003 1:32 PM
wmiprvse.exe Not Available  3704  8      Not Available  Not Available  11/19/2004
1:47 PM      Not Available  Not Available  Not Available
helpsvc.exe  c:\windows\pchealth\helpctr\binaries\helpsvc.exe 520  8      204800
1413120      11/19/2004 1:47 PM  5.2.3790.0 (srv03_rtm.030324-2048)  720.00
KB (737,280 bytes)  11/13/2003 1:32 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 |

Appendix C – Tunable Parameters

| | | | |
|--------------------|--------------------------------------|---|--------------------|
| 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 | |
| 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) | 11/13/2003 |
| 7:16 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 | |

Appendix C – Tunable Parameters

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

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

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

comctl32 5.82 (srv03_rtm.030324-2048) 561.00 KB (574,464 bytes) 11/13/2003
7:16 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

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)
11/13/2003 1:29 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) 11/13/2003
1:29 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) 11/13/2003
1:29 PM Microsoft Corporation c:\windows\system32\wbem\wbemsvc.dll

fastprox 5.2.3790.0 (srv03_rtm.030324-2048) 443.00 KB (453,632 bytes) 11/13/2003
1:29 PM Microsoft Corporation c:\windows\system32\wbem\fastprox.dll

msvc60 6.05.2144.0 388.00 KB (397,312 bytes) 3/29/2003 12:00 AM
Microsoft Corporation c:\windows\system32\msvc60.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

scserv 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\scserv.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

Appendix C – Tunable Parameters

umppmgrp 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\umppmgrp.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
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
cryptnet 5.131.3790.0 (srv03_rtm.030324-2048) 59.50 KB (60,928 bytes) 3/29/2003 12:00 AM
Microsoft Corporation c:\windows\system32\cryptnet.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
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
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
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
ntlsa 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\ntlsa.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

Appendix C – Tunable Parameters

| | | | |
|--------------------|------------------------------------|----------------------------------|--------------------|
| 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 | |
| ipsecsvc | 5.2.3790.0 (srv03_rtm.030324-2048) | 162.50 KB (166,400 bytes) | |
| 3/29/2003 12:00 AM | Microsoft Corporation | c:\windows\system32\ipsecsvc.dll | |
| oakley | 5.2.3790.0 (srv03_rtm.030324-2048) | 325.50 KB (333,312 bytes) | 3/29/2003 |
| 12:00 AM | Microsoft Corporation | c:\windows\system32\oakley.dll | |
| winipsec | 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\winipsec.dll | |
| 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 | |
| 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 | |
| wlbsctrl | 5.2.3790.0 (srv03_rtm.030324-2048) | 78.00 KB (79,872 bytes) | 3/29/2003 12:00 AM |
| | Microsoft Corporation | c:\windows\system32\wlbsctrl.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 | |
| 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) | 11/13/2003 |
| 1:29 PM | Microsoft Corporation | c:\windows\system32\termsrv.dll | |
| icaapi | 5.2.3790.0 (srv03_rtm.030324-2048) | 10.50 KB (10,752 bytes) | 11/13/2003 1:29 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 | |
| adslidpc | 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\adslidpc.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 | |
| rdpwsx | 5.2.3790.0 (srv03_rtm.030324-2048) | 80.13 KB (82,056 bytes) | 11/13/2003 1:29 PM |
| | Microsoft Corporation | c:\windows\system32\rdpwsx.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 | |
| 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 | |

Appendix C – Tunable Parameters

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
schedsvc 5.2.3790.0 (srv03_rtm.030324-2048) 176.00 KB (180,224 bytes)
11/13/2003 1:32 PM Microsoft Corporation c:\windows\system32\schedsvc.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
msidle 6.00.3790.0 (srv03_rtm.030324-2048) 5.50 KB (5,632 bytes) 3/29/2003 12:00 AM
Microsoft Corporation c:\windows\system32\msidle.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
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
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
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
pchsvc 5.2.3790.0 (srv03_rtm.030324-2048) 31.50 KB (32,256 bytes) 11/13/2003 1:32 PM
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
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
trkwks 5.2.3790.0 (srv03_rtm.030324-2048) 85.00 KB (87,040 bytes) 3/29/2003 12:00 AM
Microsoft Corporation c:\windows\system32\trkwks.dll
wmisvc 5.2.3790.0 (srv03_rtm.030324-2048) 131.00 KB (134,144 bytes) 11/13/2003
1:29 PM Microsoft Corporation c:\windows\system32\wbem\wmisvc.dll
wuauserv 5.4.3790.0 (srv03_rtm.030324-2048) 10.50 KB (10,752 bytes) 11/13/2003
1:29 PM Microsoft Corporation c:\windows\system32\wuauserv.dll
wuaueng 5.4.3790.0 (srv03_rtm.030324-2048) 188.50 KB (193,024 bytes)
11/13/2003 1:29 PM Microsoft Corporation c:\windows\system32\wuaueng.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
winrn 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\winrn.dll

Appendix C – Tunable Parameters

comsvcs 2001.12.4720.0 (srv03_rtm.030324-2048) 1.14 MB (1,199,616 bytes)
11/13/2003 1:29 PM Microsoft Corporation c:\windows\system32\comsvcs.dll

browser5.2.3790.0 (srv03_rtm.030324-2048) 70.50 KB (72,192 bytes)3/29/2003 12:00 AM
Microsoft Corporation c:\windows\system32\browser.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

netrap 5.2.3790.0 (srv03_rtm.030324-2048) 11.50 KB (11,776 bytes)3/29/2003 12:00 AM
Microsoft Corporation c:\windows\system32\netrap.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

wzcsapi5.2.3790.0 (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

wbemcore 5.2.3790.0 (srv03_rtm.030324-2048) 457.00 KB (467,968 bytes)
11/13/2003 1:29 PM Microsoft Corporation
c:\windows\system32\wbem\wbemcore.dll

esscli 5.2.3790.0 (srv03_rtm.030324-2048) 235.50 KB (241,152 bytes) 11/13/2003
1:29 PM Microsoft Corporation c:\windows\system32\wbem\esscli.dll

wmiutils5.2.3790.0 (srv03_rtm.030324-2048) 90.50 KB (92,672 bytes)11/13/2003 1:29 PM
Microsoft Corporation c:\windows\system32\wbem\wmiutils.dll

repdrvfs 5.2.3790.0 (srv03_rtm.030324-2048) 165.00 KB (168,960 bytes)
11/13/2003 1:29 PM Microsoft Corporation c:\windows\system32\wbem\repdrvfs.dll

wmiprvsd 5.2.3790.0 (srv03_rtm.030324-2048) 405.50 KB (415,232 bytes)
11/13/2003 1:29 PM Microsoft Corporation
c:\windows\system32\wbem\wmiprvsd.dll

wbemess 5.2.3790.0 (srv03_rtm.030324-2048) 256.50 KB (262,656 bytes)
11/13/2003 1:29 PM 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

winhttp 5.2.3790.0 (srv03_rtm.030324-2048) 327.50 KB (335,360 bytes) 11/13/2003
7:16 AM Microsoft Corporation
c:\windows\winsxs\x86_microsoft.windows.winhttp_6595b64144ccf1df_5.1.0.0_x-
ww_e0651936\winhttp.dll

ncprov 5.2.3790.0 (srv03_rtm.030324-2048) 43.00 KB (44,032 bytes)11/13/2003 1:29 PM
Microsoft Corporation c:\windows\system32\wbem\ncprov.dll

xactsrv 5.2.3790.0 (srv03_rtm.030324-2048) 86.50 KB (88,576 bytes)3/29/2003 12:00 AM
Microsoft Corporation c:\windows\system32\xactsrv.dll

wbemcons 5.2.3790.0 (srv03_rtm.030324-2048) 69.00 KB (70,656 bytes)11/13/2003
1:29 PM Microsoft Corporation c:\windows\system32\wbem\wbemcons.dll

spoolsv 5.2.3790.0 (srv03_rtm.030324-2048) 55.00 KB (56,320 bytes)3/29/2003 12:00 AM
Microsoft Corporation c:\windows\system32\spoolsv.exe

spoolss 5.2.3790.0 (srv03_rtm.030324-2048) 79.00 KB (80,896 bytes)3/29/2003 12:00 AM
Microsoft Corporation c:\windows\system32\spoolss.dll

localspl 5.2.3790.0 (srv03_rtm.030324-2048) 304.50 KB (311,808 bytes) 3/29/2003
12:00 AM Microsoft Corporation c:\windows\system32\localspl.dll

cnbjmon 5.2.3680.0 (Lab03_dev(skatari).020509-1043) 45.50 KB (46,592 bytes)
3/24/2003 7:48 PM Microsoft Corporation c:\windows\system32\cnbjmon.dll

pjlmon 5.2.3790.0 (srv03_rtm.030324-2048) 15.00 KB (15,360 bytes)3/24/2003 7:49 PM
Microsoft Corporation c:\windows\system32\pjlmon.dll

Appendix C – Tunable Parameters

tcpmon 5.2.3790.0 (srv03_rtm.030324-2048) 44.00 KB (45,056 bytes) 3/29/2003 12:00 AM
Microsoft Corporation c:\windows\system32\tcpmon.dll

mgmtapi 5.2.3790.0 (srv03_rtm.030324-2048) 14.00 KB (14,336 bytes) 3/29/2003
12:00 AM Microsoft Corporation c:\windows\system32\mgmtapi.dll

snmpapi 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\snmpapi.dll

wsnmp32 5.2.3790.0 (srv03_rtm.030324-2048) 39.50 KB (40,448 bytes) 3/29/2003
12:00 AM Microsoft Corporation c:\windows\system32\wsnmp32.dll

usbmon 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\usbmon.dll

win32spl 5.2.3790.0 (srv03_rtm.030324-2048) 94.50 KB (96,768 bytes) 3/29/2003
12:00 AM Microsoft Corporation c:\windows\system32\win32spl.dll

inetpp 5.2.3790.0 (srv03_rtm.030324-2048) 71.50 KB (73,216 bytes) 3/29/2003 12:00 AM
Microsoft Corporation c:\windows\system32\inetpp.dll

icmp 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\icmp.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) 11/13/2003 2:13 PM
Microsoft Corporation c:\windows\system32\inetsrv\inetinfo.exe

iisutil 6.0.3790.0 (srv03_rtm.030324-2048) 177.00 KB (181,248 bytes) 11/13/2003
2:13 PM Microsoft Corporation c:\windows\system32\inetsrv\iisutil.dll

rpcref 6.0.3790.0 (srv03_rtm.030324-2048) 4.00 KB (4,096 bytes) 11/13/2003 2:13 PM
Microsoft Corporation c:\windows\system32\inetsrv\rpcref.dll

iisrtl 6.0.3790.0 (srv03_rtm.030324-2048) 129.00 KB (132,096 bytes) 11/13/2003
2:13 PM Microsoft Corporation c:\windows\system32\iisrtl.dll

iisadmin 6.0.3790.0 (srv03_rtm.030324-2048) 18.50 KB (18,944 bytes) 11/13/2003
2:13 PM Microsoft Corporation c:\windows\system32\inetsrv\iisadmin.dll

coadmin 6.0.3790.0 (srv03_rtm.030324-2048) 48.50 KB (49,664 bytes) 11/13/2003
2:13 PM Microsoft Corporation c:\windows\system32\inetsrv\coadmin.dll

admwprox 6.0.3790.0 (srv03_rtm.030324-2048) 44.00 KB (45,056 bytes) 11/13/2003
2:13 PM Microsoft Corporation c:\windows\system32\admwprox.dll

iiscfg 6.0.3790.0 (srv03_rtm.030324-2048) 1.06 MB (1,116,160 bytes) 11/13/2003
2:13 PM Microsoft Corporation c:\windows\system32\inetsrv\iiscfg.dll

metadata 6.0.3790.0 (srv03_rtm.030324-2048) 218.50 KB (223,744 bytes)
11/13/2003 2:13 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) 11/13/2003 2:13 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) 11/13/2003 2:13 PM
Microsoft Corporation c:\windows\system32\iismap.dll

wamreg 6.0.3790.0 (srv03_rtm.030324-2048) 52.00 KB (53,248 bytes) 11/13/2003 2:13 PM
Microsoft Corporation c:\windows\system32\inetsrv\wamreg.dll

explorer 6.0.3790.0 (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 6.0.3790.0 (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 6.0.3790.0 (srv03_rtm.030324-2048) 1.33 MB (1,393,664 bytes)
3/29/2003 12:00 AM Microsoft Corporation c:\windows\system32\shdocvw.dll

themeui 6.0.3790.0 (srv03_rtm.030324-2048) 360.50 KB (369,152 bytes) 3/29/2003
12:00 AM Microsoft Corporation c:\windows\system32\themeui.dll

Appendix C – Tunable Parameters

| | | | |
|--------------------|-------------------------------------|---|--------------------|
| 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 | |
| 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 | |
| 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 | |
| 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 | |
| browselc | 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\browselc.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 | |
| usbui | 5.2.3790.0 (srv03_rtm.030324-2048) | 69.50 KB (71,168 bytes) | 11/13/2003 7:22 AM |
| | Microsoft Corporation | c:\windows\system32\usbui.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 | |
| 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 | |
| dfssvc | 5.2.3790.0 (srv03_rtm.030324-2048) | 130.50 KB (133,632 bytes) | 3/29/2003 |
| 12:00 AM | Microsoft Corporation | c:\windows\system32\dfssvc.exe | |
| 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 | |
| iexplore | 6.00.3790.0 (srv03_rtm.030324-2048) | 90.00 KB (92,160 bytes) | 11/13/2003 1:32 PM |
| | Microsoft Corporation | c:\program files\internet explorer\iexplore.exe | |
| 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 | |

Appendix C – Tunable Parameters

| | | | |
|--------------------|--|---|---------------------|
| 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 | |
| msls31 | 3.10.349.0 | 147.00 KB (150,528 bytes) | 3/29/2003 12:00 AM |
| | Microsoft Corporation | c:\windows\system32\msls31.dll | |
| mshtmlled | 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\mshtmlled.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 | |
| mtxoci | 2001.12.4720.0 (srv03_rtm.030324-2048) | 101.00 KB (103,424 bytes) | |
| 11/13/2003 1:29 PM | Microsoft Corporation | c:\windows\system32\mtxoci.dll | |
| 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 | |
| xolehlp | 2001.12.4720.0 (srv03_rtm.030324-2048) | 8.50 KB (8,704 bytes) | 11/13/2003 |
| 1:29 PM | Microsoft Corporation | c:\windows\system32\xolehlp.dll | |
| msdtcprx | 2001.12.4720.0 (srv03_rtm.030324-2048) | 427.50 KB (437,760 bytes) | |
| 11/13/2003 1:29 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 | |
| catsrv | 2001.12.4720.0 (srv03_rtm.030324-2048) | 256.00 KB (262,144 bytes) | |
| 11/13/2003 1:29 PM | Microsoft Corporation | c:\windows\system32\catsrv.dll | |
| clbcatex | 2001.12.4720.0 (srv03_rtm.030324-2048) | 96.00 KB (98,304 bytes) | |
| 11/13/2003 1:29 PM | Microsoft Corporation | c:\windows\system32\clbcatex.dll | |
| 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 | |
| sleep | Not Available | 41.00 KB (41,984 bytes) | 11/18/2004 11:25 AM |
| | | c:\check\sleep.exe | Not Available |
| helpctr | 5.2.3790.0 (srv03_rtm.030324-2048) | 764.00 KB (782,336 bytes) | 11/13/2003 |
| 1:32 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) | 11/13/2003 |
| 1:32 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) | |
| 11/13/2003 1:32 PM | Microsoft Corporation | c:\windows\pchealth\helpctr\binaries\pchshell.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 | Microsoft |
| vbscript | 5.6.0.8515 | 404.00 KB (413,696 bytes) | 3/29/2003 12:00 AM |
| | Microsoft Corporation | c:\windows\system32\vbscript.dll | Microsoft |
| mfc42 | 6.05.3014.0 | 960.00 KB (983,040 bytes) | 3/29/2003 12:00 AM |
| | Microsoft Corporation | c:\windows\system32\mfc42.dll | Microsoft |
| msinfo | 5.2.3790.0 (srv03_rtm.030324-2048) | 358.50 KB (367,104 bytes) | 11/13/2003 |
| 1:32 PM | Microsoft Corporation | c:\windows\pchealth\helpctr\binaries\msinfo.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 | |
| 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) | 11/13/2003 |
| 1:32 PM | Microsoft Corporation | c:\windows\pchealth\helpctr\binaries\helpsvc.exe | |

Appendix C – Tunable Parameters

[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 | Normal NT | |
| AUTHORITY\LocalService | | | 0 | | | | |
| Application Layer Gateway Service | | | ALG | Stopped | Manual Own Process | | |
| | c:\windows\system32\alg.exe | | Normal | NT AUTHORITY\LocalService | | | 0 |
| Application Management | | | AppMgmt | Stopped | Manual Share Process | | |
| | c:\windows\system32\svchost.exe -k netsvcs | | Normal | LocalSystem | | | 0 |
| Windows Audio | AudioSrv | Running | | Auto | Share Process | | |
| | c:\windows\system32\svchost.exe -k netsvcs | | Normal | LocalSystem | | | 0 |
| Background Intelligent Transfer Service | BITS | Stopped | | | Manual Share Process | | |
| | c:\windows\system32\svchost.exe -k netsvcs | | Normal | LocalSystem | | | 0 |
| Computer Browser | Browser | Running | | Auto | 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\dlhhost.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 | Running | | Auto | Own Process | | |
| | c:\windows\system32\dfsrv.exe | | Normal | LocalSystem | | | 0 |
| DHCP Client | Dhcp | Running | | Auto | Share Process | | |
| | c:\windows\system32\svchost.exe -k networkservice | | Normal | NT | | | |
| AUTHORITY\NetworkService | | | 0 | | | | |
| Logical Disk Manager Administrative Service | dmadmin | Stopped | | | Manual Share | | |
| Process | c:\windows\system32\dmadmin.exe /com | | Normal | LocalSystem | | | 0 |
| Logical Disk Manager | dmserver | Running | | Auto | Share Process | | |
| | c:\windows\system32\svchost.exe -k netsvcs | | Normal | LocalSystem | | | 0 |
| DNS Client | Dnscache | Running | | Auto | 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 | | | 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\inetrv\inetinfo.exe | | Normal | LocalSystem | | | 0 |
| IMAPI CD-Burning COM Service | ImapiService | Stopped | | | Disabled | | Own |
| Process | c:\windows\system32\imapi.exe | | Normal | LocalSystem | | | 0 |

Appendix C – Tunable Parameters

| | | | | |
|---------------------------------------|---|---------|-----------------------------|---------------|
| 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 | Running | Auto | Share Process |
| | c:\windows\system32\svchost.exe -k localservice | Normal | NT | |
| AUTHORITY\LocalService | | 0 | | |
| Messenger | Messenger | Stopped | Disabled | Share Process |
| | c:\windows\system32\svchost.exe -k netsvcs | Normal | LocalSystem | 0 |
| NetMeeting Remote Desktop Sharing | mnmsrvc | Stopped | Disabled | Own |
| Process | c:\windows\system32\mnmsrvc.exe | Normal | LocalSystem | 0 |
| Distributed Transaction Coordinator | MSDTC | Running | Auto | Own Process |
| | c:\windows\system32\msdtc.exe | Normal | NT AUTHORITY\NetworkService | 0 |
| Windows Installer | MSIServer | Stopped | Manual | Share Process |
| | c:\windows\system32\msiexec.exe /v | Normal | LocalSystem | 0 |
| 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 | Running | Auto | 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 | Running | Auto | Share Process |
| | c:\windows\system32\svchost.exe -k regsvc | Normal | NT AUTHORITY\LocalService | 0 |

Appendix C – Tunable Parameters

| | | | |
|--|------------------|-----------------------------|------------------------|
| 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 | sacsrv | Stopped | Manual Share Process |
| c:\windows\system32\svchost.exe -k netsvcs | Normal | LocalSystem | 0 |
| Security Accounts Manager | SamSs | Running | Auto Share Process |
| c:\windows\system32\lsass.exe | Normal | LocalSystem | 0 |
| Smart Card | SCardSvr | Stopped | Manual Share Process |
| c:\windows\system32\scardsvr.exe | Ignore | NT AUTHORITY\LocalService | 0 |
| Task Scheduler Schedule | | Running | Auto 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 | Auto Share Process |
| c:\windows\system32\svchost.exe -k netsvcs | Normal | LocalSystem | 0 |
| Internet Connection Firewall (ICF) / Internet Connection Sharing (ICS) | | 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 | Running | Auto 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 |
| Distributed Link Tracking Client | TrkWks | Running | Auto 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 |

Appendix C – Tunable Parameters

```

Windows Time W32Time Running Auto Share Process
c:\windows\system32\svchost.exe -k netsvcs Normal LocalSystem 0
World Wide Web Publishing Service W3SVC Stopped 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\wmiapsrv.exe Normal LocalSystem 0
Automatic Updates wuauclt 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
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
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 CLIENT80\Administrator:Accessories CLIENT80\Administrator
Accessories\Accessibility CLIENT80\Administrator:Accessories\Accessibility
CLIENT80\Administrator
Accessories\Entertainment CLIENT80\Administrator:Accessories\Entertainment
CLIENT80\Administrator
Administrative Tools CLIENT80\Administrator:Administrative Tools
CLIENT80\Administrator
Startup CLIENT80\Administrator:Startup CLIENT80\Administrator

```

Appendix C – Tunable Parameters

[Startup Programs]

| Program | Command | User Name | Location |
|---------------------|---------|------------------------|----------------|
| desktop\desktop.ini | | NT AUTHORITY\SYSTEM | Startup |
| desktop\desktop.ini | | CLIENT80\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" |
| 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 | | C:\WINDOWS\system32 |
| | | | | | Microsoft Corporation |
| advpack.dll | 6.0.3790.0 | 94 KB | 3/29/2003 | | C:\WINDOWS\system32 |
| | | | | | Microsoft Corporation |
| asctrls.ocx | 6.0.3790.0 | 90 KB | 3/29/2003 | | C:\WINDOWS\system32 |
| | | | | | Microsoft Corporation |

Appendix C – Tunable Parameters

| | | | | | |
|---------------|--------------------------------------|---------------|---------------|------------------------------------|---------------|
| browselc.dll | 6.0.3790.0 Microsoft Corporation | 62 KB | 3/29/2003 | C:\WINDOWS\system32 | |
| browseui.dll | 6.0.3790.0 Microsoft Corporation | 1,033 KB | 3/29/2003 | C:\WINDOWS\system32 | |
| cdfview.dll | 6.0.3790.0 Microsoft Corporation | 144 KB | 3/29/2003 | C:\WINDOWS\system32 | |
| comctl32.dll | 5.82.3790.0 Microsoft Corporation | 561 KB | 3/29/2003 | C:\WINDOWS\system32 | |
| dxttrans.dll | 6.3.3790.0 Microsoft Corporation | 198 KB | 3/29/2003 | C:\WINDOWS\system32 | |
| dxtmsft.dll | 6.3.3790.0 Microsoft Corporation | 344 KB | 3/29/2003 | C:\WINDOWS\system32 | |
| iecont.dll | <File Missing> | Not Available | Not Available | Not Available | Not Available |
| iecontlc.dll | <File Missing> | Not Available | Not Available | Not Available | Not Available |
| iedkcs32.dll | 16.0.3790.0 Microsoft Corporation | 300 KB | 3/29/2003 | C:\WINDOWS\system32 | |
| iepeers.dll | 6.0.3790.0 Microsoft Corporation | 230 KB | 3/29/2003 | C:\WINDOWS\system32 | |
| iesetup.dll | 6.0.3790.0 Microsoft Corporation | 59 KB | 3/29/2003 | C:\WINDOWS\system32 | |
| ieuinit.inf | Not Available Available | 20 KB | 3/29/2003 | C:\WINDOWS\system32 | Not |
| ieexplore.exe | 6.0.3790.0 Microsoft Corporation | 90 KB | 3/29/2003 | C:\Program Files\Internet Explorer | |
| imgutil.dll | 5.2.3790.0 Microsoft Corporation | 35 KB | 3/29/2003 | C:\WINDOWS\system32 | |
| inetctl.cpl | 6.0.3790.0 Microsoft Corporation | 303 KB | 3/29/2003 | C:\WINDOWS\system32 | |
| inetctlc.dll | 6.0.3790.0 Microsoft Corporation | 109 KB | 3/29/2003 | C:\WINDOWS\system32 | |
| inseng.dll | 6.0.3790.0 Microsoft Corporation | 72 KB | 3/29/2003 | C:\WINDOWS\system32 | |
| mlang.dll | 6.0.3790.0 Microsoft Corporation | 570 KB | 3/29/2003 | C:\WINDOWS\system32 | |
| msencode.dll | 2002.10.4.0 Available | 112 KB | 3/29/2003 | C:\WINDOWS\system32 | Not |
| mshta.exe | 6.0.3790.0 Microsoft Corporation | 26 KB | 3/29/2003 | C:\WINDOWS\system32 | |
| mshtml.dll | 6.0.3790.0 Microsoft Corporation | 2,848 KB | 3/29/2003 | C:\WINDOWS\system32 | |
| mshtml.tlb | 6.0.3790.0 Microsoft Corporation | 1,319 KB | 3/29/2003 | C:\WINDOWS\system32 | |
| mshtmlled.dll | 6.0.3790.0 Microsoft Corporation | 444 KB | 3/29/2003 | C:\WINDOWS\system32 | |
| mshtmlr.dll | 6.0.3790.0 Microsoft Corporation | 55 KB | 3/29/2003 | C:\WINDOWS\system32 | |
| msident.dll | 6.0.3790.0 Microsoft Corporation | 47 KB | 3/29/2003 | C:\WINDOWS\system32 | |
| msidntld.dll | 6.0.3790.0 Microsoft Corporation | 15 KB | 3/29/2003 | C:\WINDOWS\system32 | |
| msieftp.dll | 6.0.3790.0 Microsoft Corporation | 230 KB | 3/29/2003 | C:\WINDOWS\system32 | |
| msrating.dll | 6.0.3790.0 Microsoft Corporation | 132 KB | 3/29/2003 | C:\WINDOWS\system32 | |

Appendix C – Tunable Parameters

| | | | | | |
|--------------|-----------------------|----------|-----------|---------------------|-----------------------|
| mstime.dll | 6.0.3790.0 | 491 KB | 3/29/2003 | C:\WINDOWS\system32 | |
| | Microsoft Corporation | | | | |
| occache.dll | 6.0.3790.0 | 89 KB | 3/29/2003 | C:\WINDOWS\system32 | |
| | Microsoft Corporation | | | | |
| proctexe.ocx | 6.3.3790.0 | 78 KB | 3/29/2003 | C:\WINDOWS\system32 | Intel Corporation |
| sendmail.dll | 6.0.3790.0 | 52 KB | 3/29/2003 | C:\WINDOWS\system32 | |
| | Microsoft Corporation | | | | |
| shdoclc.dll | 6.0.3790.0 | 589 KB | 3/29/2003 | C:\WINDOWS\system32 | |
| | Microsoft Corporation | | | | |
| shdocvw.dll | 6.0.3790.0 | 1,361 KB | 3/29/2003 | C:\WINDOWS\system32 | |
| | Microsoft Corporation | | | | |
| shfolder.dll | 6.0.3790.0 | 23 KB | 3/29/2003 | C:\WINDOWS\system32 | |
| | Microsoft Corporation | | | | |
| shlwapi.dll | 6.0.3790.0 | 281 KB | 3/29/2003 | C:\WINDOWS\system32 | |
| | Microsoft Corporation | | | | |
| tdc.ocx | 1.3.0.3130 | 58 KB | 3/29/2003 | C:\WINDOWS\system32 | Microsoft Corporation |
| url.dll | 6.0.3790.0 | 36 KB | 3/29/2003 | C:\WINDOWS\system32 | Microsoft Corporation |
| urlmon.dll | 6.0.3790.0 | 502 KB | 3/29/2003 | C:\WINDOWS\system32 | |
| | Microsoft Corporation | | | | |
| webcheck.dll | 6.0.3790.0 | 262 KB | 3/29/2003 | C:\WINDOWS\system32 | |
| | Microsoft Corporation | | | | |
| wininet.dll | 6.0.3790.0 | 609 KB | 3/29/2003 | 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

Appendix C – Tunable Parameters

[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 AdvisorDisabled

[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

RTE Input Parameters

BenchCraft Configuration File

Profile: PE2850
File Path: C:\Documents and Settings\Administrator\Desktop\NOV2850\PE2850.txt
Version: 4

Number of Engines: 3

Name: DRIVER1
Description: rte103_1
Directory: c:\tpcclog\rte103_1.log
Machine: rte103
Parameter Set: PARAM2
Index: 700000000
Seed: 59915
Configured Users: 7000
Pipe Name: DRIVER8-922426029

Appendix C – Tunable Parameters

Connect Rate: 2000
Start Rate: 1500
Max. Concurrency: -1
Concurrency Rate: 10
CLIENT_NURAND: 233
CPU: 0
Additional Options:

Name: DRIVER2
Description: rte103_2
Directory: c:\tpcclog\rte103_2.log
Machine: rte103
Parameter Set: PARAM2
Index: 100000000
Seed: 59915
Configured Users: 7000
Pipe Name: DRIVER2-1764008608
Connect Rate: 2000
Start Rate: 1500
Max. Concurrency: -1
Concurrency Rate: 10
CLIENT_NURAND: 233
CPU: 1
Additional Options:

Name: DRIVER3
Description: rte103_3
Directory: c:\tpcclog\rte103_3.log
Machine: rte103
Parameter Set: PARAM2
Index: 200000000
Seed: 59915
Configured Users: 7000
Pipe Name: DRIVER3-1689047983
Connect Rate: 2000
Start Rate: 1500
Max. Concurrency: -1
Concurrency Rate: 10
CLIENT_NURAND: 233
CPU: 2
Additional Options:

Number of User groups: 3

Driver Engine: DRIVER1
IIS Server: client90
SQL Server: pe2850
Database: tpcc
User: sa
Protocol: HTML
w_id Range: 1 - 700
w_id Min Warehouse: 1
w_id Max Warehouse: 2100
Scale: Normal
User Count: 7000
District id: 1
Scale Down: No

Driver Engine: DRIVER2
IIS Server: client90
SQL Server: pe2850
Database: tpcc
User: sa
Protocol: HTML
w_id Range: 701 - 1400
w_id Min Warehouse: 1
w_id Max Warehouse: 2100
Scale: Normal

Appendix C – Tunable Parameters

User Count: 7000
 District id: 1
 Scale Down: No

 Driver Engine: DRIVER3
 IIS Server: client90
 SQL Server: pe2850
 Database: tpcc
 User: sa
 Protocol: HTML
 w_id Range: 1401 - 2100
 w_id Min Warehouse: 1
 w_id Max Warehouse: 2100
 Scale: Normal
 User Count: 7000
 District id: 1
 Scale Down: No

Number of Parameter Sets: 5

~Default

Default Parameter Set

| Txn | Think | Key | RT | RT | Menu | | |
|--------------|-------|------|-------|-------|-------|-------|------|
| Weight | Time | Time | Delay | Fence | Delay | | |
| New Order | 10.00 | | 12.05 | 18.01 | 0.10 | 5.00 | 0.10 |
| Payment | 10.00 | | 12.05 | 3.01 | 0.10 | 5.00 | 0.10 |
| Delivery | 1.00 | 5.05 | 2.01 | 0.10 | 5.00 | 0.10 | |
| Stock Level | 1.00 | | 5.05 | 2.01 | 0.10 | 20.00 | 0.10 |
| Order Status | 1.00 | | 10.05 | 2.01 | 0.10 | 5.00 | 0.10 |

PARAM2

| Txn | Think | Key | RT | RT | Menu | | |
|--------------|-------|------|-------|-------|-------|-------|------|
| Weight | Time | Time | Delay | Fence | Delay | | |
| New Order | 44.89 | | 12.04 | 18.02 | 0.10 | 5.00 | 0.10 |
| Payment | 43.03 | | 12.04 | 3.02 | 0.10 | 5.00 | 0.10 |
| Delivery | 4.03 | 5.04 | 2.02 | 0.10 | 5.00 | 0.10 | |
| Stock Level | 4.03 | | 5.04 | 2.02 | 0.10 | 20.00 | 0.10 |
| Order Status | 4.03 | | 10.04 | 2.02 | 0.10 | 5.00 | 0.10 |

50run

| Txn | Think | Key | RT | RT | Menu | | |
|--------------|-------|-------|-------|-------|-------|-------|------|
| Weight | Time | Time | Delay | Fence | Delay | | |
| New Order | 44.84 | | 30.00 | 18.02 | 0.10 | 5.00 | 0.10 |
| Payment | 43.04 | | 30.00 | 3.02 | 0.10 | 5.00 | 0.10 |
| Delivery | 4.05 | 15.00 | 2.02 | 0.10 | 5.00 | 0.10 | |
| Stock Level | 4.05 | | 15.00 | 2.02 | 0.10 | 20.00 | 0.10 |
| Order Status | 4.05 | | 25.00 | 2.02 | 0.10 | 5.00 | 0.10 |

50run2

| Txn | Think | Key | RT | RT | Menu | | |
|--------------|-------|-------|-------|-------|-------|-------|------|
| Weight | Time | Time | Delay | Fence | Delay | | |
| New Order | 44.84 | | 33.00 | 18.02 | 0.10 | 5.00 | 0.10 |
| Payment | 43.04 | | 33.00 | 3.02 | 0.10 | 5.00 | 0.10 |
| Delivery | 4.05 | 18.00 | 2.02 | 0.10 | 5.00 | 0.10 | |
| Stock Level | 4.05 | | 18.00 | 2.02 | 0.10 | 20.00 | 0.10 |
| Order Status | 4.05 | | 28.00 | 2.02 | 0.10 | 5.00 | 0.10 |

80run

| Txn | Think | Key | RT | RT | Menu | | |
|-----------|-------|-------|-------|-------|-------|------|------|
| Weight | Time | Time | Delay | Fence | Delay | | |
| New Order | 44.84 | | 19.00 | 18.02 | 0.10 | 5.00 | 0.10 |
| Payment | 43.04 | | 19.00 | 3.02 | 0.10 | 5.00 | 0.10 |
| Delivery | 4.05 | 14.00 | 2.02 | 0.10 | 5.00 | 0.10 | |

Appendix C – Tunable Parameters

| | | | | | | |
|--------------|------|-------|------|------|-------|------|
| Stock Level | 4.05 | 14.00 | 2.02 | 0.10 | 20.00 | 0.10 |
| Order Status | 4.05 | 9.00 | 2.02 | 0.10 | 5.00 | 0.10 |

Appendix E – Price Quotations


Appendix E - Price Quotations

Shopping Cart - Microsoft Internet Explorer

Address: <http://order.store.yahoo.com/cgi-bin/wg-order?unique=e6942&catalog=lanadapters&et=417e704a8&basket=b%3D5C50808d800ad4941ccdd518088d813e2a69f0410716a5fb4c938c5d6%26%3D%2>

LanAdapters.com

NEW! [Send](#) to more than one address. [What's This?](#)

| Item | Options | Unit Price | Quantity | Subtotal | |
|--|--------------------|------------|--------------------------------|----------|------------------------|
|  7ft Category 5e crossover Cable RJ45/RJ45 PC To PC Cat5 LIFETIME WARRANTY 3ft available also Crossover Cable with molded ends (backwards compatible with cat5) | Select_color: gray | 1.60 | <input type="text" value="3"/> | 4.80 | Remove |
| Subtotal for LanAdapters.com | | | | 4.80 | |

[Update Quantities](#) [Check Out](#) [Express checkout with YAHOO! WALLET](#)

[Keep Shopping](#)

Navigation menu (left): Home, WE ARE ANTI SPAM, Blacklisted Brands, Barcode, SCSI, Storage, Networking, Power, Print servers, Printing Supplies and Cables, Cables, Miscellaneous Items, Network Cables & Parts, Cat5, Cat5e, Cat6, Software, Show Order, Privacy Policy, Info & Shipping Notes & Ways to delay Processing of order, Search, Index, Y! SHOPPING

Appendix E – Price Quotations

Microsoft Corporation
One Microsoft Way
Redmond, WA 98052-6399

Tel 425 882 8080
Fax 425 936 7329
<http://www.microsoft.com/>

Microsoft

October 15, 2004

Dell
Kong Yang
1 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 (\$).

| Part Number | Description | Unit Price | Quantity | Price |
|-------------|---|------------|----------|---------|
| 228-01079 | SQL Server 2000 Standard Edition <i>Per Processing Licensing</i> <i>Discount Schedule: No Discounts Applied</i> | \$4,999 | 1 | \$4,999 |
| P73-00295 | Windows Server 2003, Standard Edition <i>Server License Only - No CALs</i> <i>Discount Schedule: Open Program - No Level</i> <i>Unit Price reflects a 26% discount from the</i> <i>retail unit price of \$999.</i> | \$738 | 2 | \$1,476 |
| 254-00170 | Visual C++ Standard Edition <i>Discount Schedule: No Discounts Applied</i> | \$109 | 1 | \$109 |
| | Microsoft Problem Resolution Services <i>Professional Support</i> <i>(1 incident)</i> | \$245 | 1 | \$245 |

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.

Reference ID: PCkoya0415100150

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