

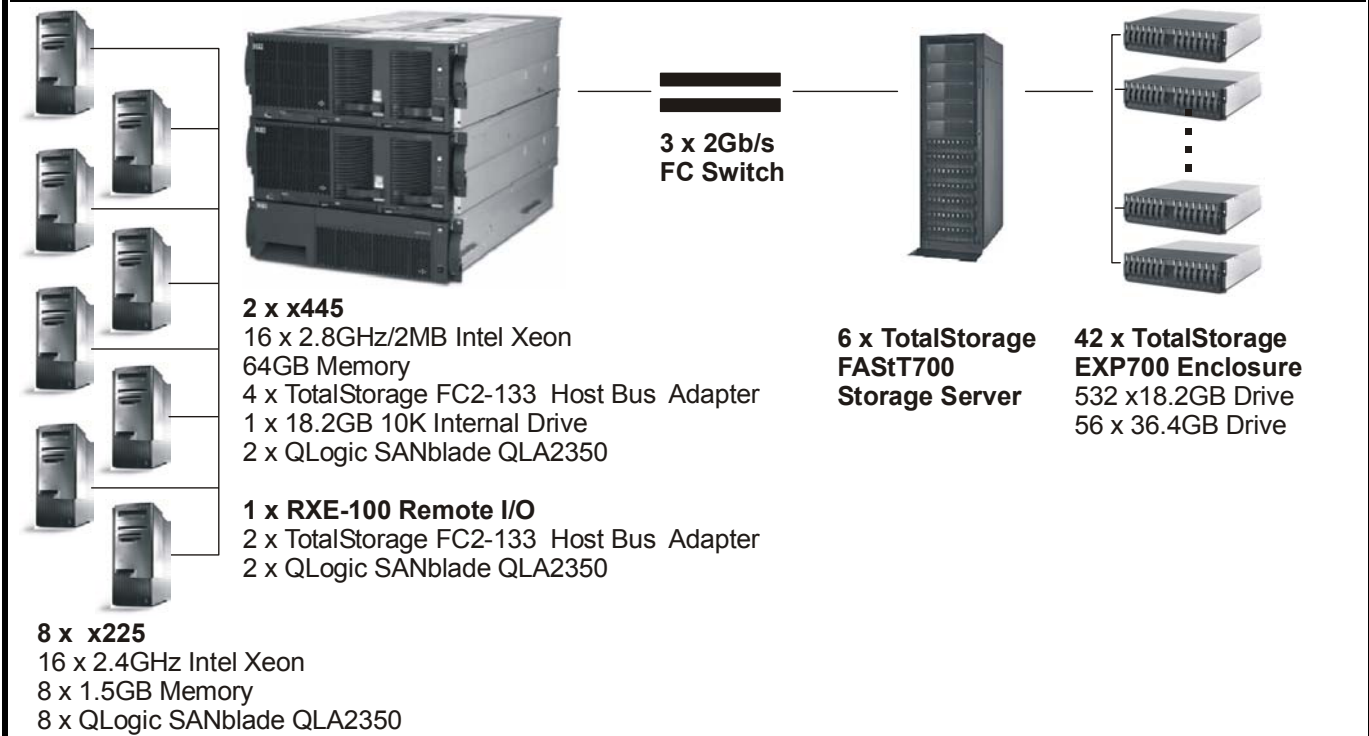
IBM® @server™ xSeries™ 445 c/s
with
Microsoft® SQL Server 2000

TPC-C Revision 5.1

Report Date: July 18, 2003

Total System Cost	TPC-C Throughput	Price/Performance	Availability Date
\$1,599,308	190,510.02 tpmC	\$8.39 / tpmC	Dec. 31, 2003

Database Server	Database Manager	Operating System	Other Software	Number of Users
Processors/Cores/Threads: 16/16/32 Intel Xeon Processor MP 2.8GHz	Microsoft SQL Server 2000 Enterprise Edition SP3 w/QFE	Microsoft Windows® Server 2003 Datacenter Edition w/QFE	Microsoft Visual C++ 6.0 Win32 Microsoft COM+	152,320



System Component	Qty	Server:	Qty	Each Client:
Processors/Cores/Threads	16/16/32	2.8GHz Xeon Processor MP w/2MB L3 Cache	2/2/4	2.4GHz Xeon DP w/512KB L2 Cache
Cache		1GB ECC SDRAM	1	1.5GB Memory
Memory	64	TotalStorage FC2-133 Host Bus Adapter	1	Ultra320 SCSI Interface
Disk Controllers	4	18.2GB (15000 rpm)	1	18.2GB (10000 rpm)
Disk Drives	532	36.4GB (15000 rpm)		
	56	18.2GB (10000 rpm)		
	1	10919.85GB		
Total Storage		20/40GB SCSI Tape Drive		
Tape Drive	1			

IBM Corporation	IBM @server xSeries 445 c/s with Microsoft SQL Server 2000			TPC-C Revision 5.1			
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Description	Part Number	Third Party Brand	Pricing	Unit Price	Quantity	Extended Price	3-Yr. Maint. Price
Server Hardware							
x445 with 2 x 2.8GHz/2MB Xeon Processor	8870-4AX	IBM	1	25,599	2	51,198	6,780
xSeries 2.8GHz/2MB Processor	02R2064	IBM	1	6,599	12	79,188	0
xSeries 445 SMP Expansion Module	02R1870	IBM	1	4,849	2	9,698	0
1GB PC2100 DDR ECC SDRAM RDIMM	33L5039	IBM	1	659	64	42,176	0
IBM TotalStorage FASTT FC2-133 Host Bus Adapter	24P0960	IBM	1	1,485	4	5,940	0
18.2GB 10K Ultra160 SCSI Drive	06P5754	IBM	1	275	1	275	0
QLogic SANBlade QLA2350 FC-VI Adapter (2 spares)	QLA2350-BK	QLogic	3	2,095	6	12,570	0
3.5M Interconnect Management Cable Kit	31P6087	IBM	1	49	5	245	0
E54 15" (13.8" Viewable) Color Monitor	633147N	IBM	1	129	1	129	90
IBM Preferred Pro Full-Size Keyboard PS/2	31P7415	IBM	1	29	1	29	0
IBM Sleek 2-Button Mouse	28L3673	IBM	1	19	1	19	0
Subtotal						201,467	6,870
Server Storage							
IBM RXE-100 Remote Expansion Enclosure	8684-1RX	IBM	1	4,569	1	4,569	1,330
IBM Remote I/O PCI-X 6-Slot Expansion Kit	31P5998	IBM	1	1,699	1	1,699	0
IBM TotalStorage FASTT FC2-133 Host Bus Adapter	24P0960	IBM	1	1,485	2	2,970	0
IBM TotalStorage FASTT700 Storage Server	17421RU	IBM	1	46,499	6	278,994	4,560
IBM FASTT700 Mini Hub	19K1269	IBM	1	899	10	8,990	0
IBM Short Wave SFP Module	19K1271	IBM	1	499	180	89,820	0
IBM 1m LC-LC Fibre Channel Cable	19K1247	IBM	1	79	62	4,898	0
IBM 5m LC-LC Fibre Channel Cable	19K1248	IBM	1	129	40	5,160	0
IBM TotalStorage FASTT EXP700 Storage Exp. Unit	17401RU	IBM	1	6,000	42	252,000	31,920
2Gbps FC 36.4GB 15K Hot-Swap HDD	06P5772	IBM	1	1,115	56	62,440	0
2Gbps FC 18.2GB 15K Hot-Swap HDD	06P5771	IBM	1	681	532	362,292	0
20/40GB DDS/4 Tape AutoLoader	00N7991	IBM	1	699	1	699	0
IBM NetMEDIA Storage Expansion Unit EL	3551001	IBM	1	689	1	689	0
NetBAY42SX Standard Rack	9306421	IBM	1	1,439	5	7,195	840
IBM UPS 500	33L3477	IBM	1	99	1	99	0
Enterprise Rack Prep Fee	06P7514	IBM	1	500	5	2,500	0
Enterprise Rack Installation Fee	06P7515	IBM	1	150	5	750	0
Option Integration Fee	58P8665	IBM	1	110	5	550	0
Image Load Fee	06P7505	IBM	1	150	1	150	0
Subtotal						1,086,464	38,650
Server Software							
Microsoft SQL Server 2000 Enterprise Edition	810-00846	Microsoft	2	16,541	16	264,656	
Database Software Support Package		Microsoft	2	1,950	3		5,850
IBM Preload Kit for Datacenter 2003 (1-16 Processors)	4816-4DU	IBM	1	54,555	1	54,555	41,850
IBM Maintenance Update Subscription (1-16 Processors - 1 Year)	4816-CDX	IBM	1	1,299	3	3,897	0
Subtotal						323,108	47,700
Client Hardware							
x225 with 2.4GHz/512KB Xeon DP, 512MB Memory	8647-3AX	IBM	1	1,269	8	10,152	5,512
2.4GHz/512KB Xeon DP Processor Upgrade	59P5108	IBM	1	699	8	5,592	0
512MB PC2100 ECC SDRAM RDIMM	33L5038	IBM	1	305	16	4,880	0
18.2GB 10K Ultra160 SCSI Drive	06P5754	IBM	1	275	8	2,200	0
QLogic SANblade QLA 2350 FC-VI Adapter	QLA2350-BK	QLogic	3	2,095	8	16,760	0
IBM 10/100 Dual-Port Server Adapter	22P4901	IBM	1	209	16	3,344	0
Adaptec Quartet64 4-Port Adapter	ANA62044	Adaptec	1	550	8	4,400	0
E54 15" (13.8" Viewable) Color Monitor	633147N	IBM	1	129	8	1,032	720
Subtotal						48,360	6,232
Client Software							
Microsoft Windows 2000 Server with COM+	C11-00821	Microsoft	2	738	8	5,904	0
Microsoft Visual C++ Professional 6.0	254-00170	Microsoft	2	109	1	109	0
Subtotal						6,013	0
Network Components							
IBM TotalStorage SAN Fibre Channel Switch Model F08	3534F08	IBM	1	7,000	4	28,000	4,608
IBM Short Wave SFP Module	19K1271	IBM	2	499	14	6,986	0
IBM 5M LC-LC Fibre Channel Cable	19K1248	IBM	2	129	12	1,548	0
Subtotal						36,534	4,608
Discount						206,698	
Total						1,495,248	104,060
Large purchase discount 14% on xSeries; 15% on TotalStorage. Pricing: 1 - IBM - 1-919-254-0367; 2 - Microsoft; 3 - QLogic				Three-Year Cost of Ownership: \$1,599,308			
Audited by Brad Askins, InfoSizing, Inc.				tpmC: 190,510.02			
				\$/tpmC: \$8.39			
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 stated prices are not available according to these terms, please inform the TPC at pricing@tpc.org.							

Numerical Quantities Summary			
MQTh, Computed Maximum Qualified Throughput: 190,510.02 tpmC			
Response Times (in seconds)	90th Percentile	Average	Maximum
New-Order	0.47	0.37	16.25
Payment	0.41	0.31	17.44
Delivery (Interactive)	0.11	0.16	4.58
Stock Level	1.08	0.70	12.76
Order Status	0.45	0.35	16.77
Delivery (Deferred)	0.19	0.14	4.64
Menu	0.11	0.17	4.61
Response time delay added for emulated components: 0.1 Seconds			
Transaction Mix (in percent of total transactions)			Percent
New-Order			44.94
Payment			43.03
Delivery			4.01
Stock Level			4.01
Order Status			4.01
Keying/Think Times (in seconds)	Minimum	Average	Maximum
New-Order	18.00 / 0.00	18.02 / 12.05	18.05 / 120.51
Payment	3.00 / 0.00	3.02 / 12.05	3.05 / 120.90
Delivery	2.00 / 0.00	2.02 / 5.06	2.04 / 50.51
Stock Level	2.00 / 0.00	2.02 / 5.05	2.04 / 50.51
Order Status	2.00 / 0.00	2.02 / 10.04	2.04 / 100.51
Test Duration			
Ramp-up time			53 minutes 45 seconds
Measurement interval			120 minutes
Number of checkpoints			4
Checkpoint interval			30 minutes
Number of transactions (all types) completed in measurement interval			52,906,744