



**IBM System x3950
DB2® 9**

TPC-C Rev. 5.7

**Report Date:
December 15, 2006**

| | | | | |
|--|-------------------------|--------------------------|--|------------------|
| Total System Cost | TPC-C Throughput | Price/Performance | Availability Date | |
| \$1,754,100 USD | 331,087 | \$5.30 USD | Feb 14, 2007 | |
| Database Processors/Cores/Threads | Database Manager | Operating System | Other Software | No. Users |
| 4/8/16 3.5 GHz Intel Xeon 7150N | DB2 9 | SLES 10 | Microsoft Visual C++ Microsoft COM+ | 280,320 |

Gigabit Switch

| | | |
|--|---|--|
| <p><u>16 Clients</u> IBM® System x3500 2x Intel 5160 DC 3.0GHz 2GB Memory 36GB Internal Drive 2 Gigabit Ethernet</p> | <p><u>IBM® System x3950</u> 4xIntel Xeon 7150N (3.5GHz) 128GB Memory 1x DS4000 Single Port 4GB FC 1x36GB Internal SAS Drives 6 x DS4000 Dual Port 4GB FC 2 x Intel Pro/1000 GT Ethernet</p> | <p><u>Storage</u> 6 x IBM® DS4800 Storage Servers 63x IBM® EXP810 DiskEnclosures 1008 x 36.4GB 15K RPM Drives 1 x DS3400 DC Storage Controller 7 x 73.4GB 15K RPM SAS Drives</p> |
|--|---|--|

| System Components | Each of the 16 Clients | | Server | |
|---------------------------------|------------------------|-----------------------------------|-----------------------|--|
| | Quantity | Description | Quantity | Description |
| Processors/Cores/Threads | 2/4/4 | 3.0GHz 2MB L2 Xeon 5160 Dual Core | 4/8/16 | 3.5 GHz Intel Xeon 7150N |
| Memory | 4 | 512 MB | 32 | 4 GB |
| Disk Controllers | 1 | SAS | 2 6 1 6 1 | Integrated SAS 4Gb dual-port FC Adapters 4Gb single-port FC Adapters IBM DS4800 Controllers for Data IBM DS3400 Controller for Log |
| Disk Drives | 1 | 36 GB | 1008 1 7 | 36.4GB 15K RPM FC 36GB 10K RPM SAS 73.4GB 15K RPM SAS |
| Total Storage | | 576 GB | | 36,820 GB |
| Terminals | 1 | System Console | 1 | System Console |

| IBM Corporation | IBM System x3950 c/s | | | TPC-C Revision 5.7 | | | |
|---|----------------------|-------------------|---------|--|----------|------------------|--------------------|
| | DB2 9 | | | Report Date: Dec. 15, 2006 | | | |
| Description | Part Number | Third Party Brand | Pricing | Unit Price | Quantity | Extended Price | 3-Yr. Maint. Price |
| Server Hardware | | | | | | | |
| IBM System x3950 (2 x Intel Xeon Processor 7150N 3.5GHz 667MHz, 2 x 1 MB L2 Cache and 16MB L3 Cache) | 8878-5RU | IBM | 1 | 25,199 | 1 | 25,199 | |
| Intel Xeon Processor 7150N 3.5GHz/2x1MB L2, 16MB L3 | 43V4553 | IBM | 1 | 5,999 | 2 | 11,998 | |
| x3950 E (0 Processors, 0 Memory, 2 Memory Cards) | 8879-1RU | IBM | 1 | 6,999 | 1 | 6,999 | |
| Scalability Cable 2.3.M | 13M7414 | IBM | 1 | 299 | 2 | 598 | |
| 8GB (2x4GB) PC2-3200 CL3 2RX4 ECC DDR2 SDRAM RDIMM | 30R5145 | IBM | 1 | 5,569 | 16 | 89,104 | |
| Active Memory 4-Slot Memory Expansion Card | 41Y5000 | IBM | 1 | 499 | 2 | 998 | |
| IBM 36.4GB 10K 2.5 inch SAS Drive | 40K1051 | IBM | 1 | 279 | 1 | 279 | |
| Intel Pro/1000 GT Single Port Server Adapter | 39Y6105 | IBM | 1 | 139 | 2 | 278 | |
| Display | 49387NU | IBM | 1 | 149 | 1 | 149 | |
| IBM Preferred Pro USB Keyboard | 40K9584 | IBM | 1 | 29 | 1 | 29 | |
| IBM 3-Button Optical Mouse - Black - USB | 40K9201 | IBM | 1 | 19 | 1 | 19 | |
| ServicePac for 3-Year 24x7x4 Support (x3950) | 96P2688 | IBM | 1 | 3,390 | 1 | | 3,390 |
| ServicePac for 3-Year 24x7x4 Support (x3950 E) | 10N3059 | IBM | 1 | 1,695 | 1 | | 1,695 |
| ServicePac for 3-Year 24x7x4 Support (Display) | 30L9183 | IBM | 1 | 90 | 1 | | 90 |
| Subtotal | | | | | | 135,650 | 5,175 |
| Server Storage | | | | | | | |
| IBM DS4000 FC 4Gbps - PCI-X Dual Port HBA | 39M5895 | IBM | 1 | 2,485 | 6 | 14,910 | |
| IBM TotalStorage DS4800 Midrange Disk Subsystem | 1815-82H | IBM | 1 | 65,245 | 6 | 391,470 | |
| IBM Short Wave SFP Module (4 Pack) | 22R0483 | IBM | 1 | 550 | 54 | 29,700 | |
| IBM 1m LC-LC Fibre Channel Cable | 39M5696 | IBM | 1 | 79 | 144 | 11,376 | |
| IBM 5m LC-LC Fibre Channel Cable | 39M5697 | IBM | 1 | 129 | 12 | 1,548 | |
| IBM TotalStorage DS4000 EXP810 Storage Exp. Unit | 1812-81H | IBM | 1 | 6,000 | 72 | 432,000 | |
| 36.4GB 15K 2Gbps FC Drive | 06P5772 | IBM | 1 | 1,115 | 1008 | 1,123,920 | |
| IBM System Storage DS3400 Dual Controller | 1726-42X | IBM | 1 | 10,224 | 1 | 10,224 | |
| IBM Short Wave SFP Module | 19K1271 | IBM | 1 | 499 | 1 | 499 | |
| 73.4GB 15K SAS Hot-Swap HDD | 40K1043 | IBM | 1 | 399 | 7 | 2,793 | |
| IBM DS4000 FC 4Gbps - PCI-X Single-Port HBA | 39M5894 | IBM | 1 | 1,485 | 1 | 1,485 | |
| 1M Fibre Optic Cable | 39M5696 | IBM | 1 | 79 | 1 | 79 | |
| IBM S2 42U Standard Rack | 93074RX | IBM | 1 | 1,489 | 6 | 8,934 | |
| ServicePac for 3-Year 24x7x4 Support (EXP810) | 41L2768 | IBM | 1 | 760 | 72 | | 54,720 |
| ServicePac for 3-Year 24x7x4 Support (DS4800) | 96P2062 | IBM | 1 | 1,087 | 6 | | 6,522 |
| ServicePac for 3-Year 24x7x4 Support (DS3400) | 41L2768 | IBM | 1 | 760 | 1 | | 760 |
| ServicePac for 3-Year 24x7x4 Support (Rack) | 41L2760 | IBM | 1 | 300 | 6 | | 1,800 |
| Subtotal | | | | | | 2,028,938 | 63,802 |
| Server Software | | | | | | | |
| DB2 ESE 9 | | IBM | 2 | 262.65 | 400 | 105,060 | |
| Extended Systems - SW License and Maintenance 12 Months | | | | | | | |
| SW Maintenance Renewal - 1 Year | | IBM | 2 | 12.51 | 800 | | 10,008 |
| SUSE Linux Enterprise Server 10 for x86, AMD64, and Intel EM64T with Priority Support for 3 Years | 4584142100 | SUSE | 3 | 3,748 | 1 | 3,748 | |
| Subtotal | | | | | | 108,808 | 10,008 |
| Client Hardware | | | | | | | |
| Linksys ProConnect KVM Switch - 2 ports (2 spares) | 430446 | | 6 | 40 | 3 | 120 | |
| IBM System x3500 (Dual-Core Intel Xeon 5160 3.00GHz, 2x512MB RAM) | 7977-92U | IBM | 1 | 2,639 | 16 | 42,224 | |
| 3.00GHz/1333MHz/2x2MB L2 Xeon Processor 5160 Upgrade | 40K1236 | IBM | 1 | 1,279 | 16 | 20,464 | |
| 1GB (2x512MB) PC2-5300 CL5 ECC DDR2 FBD 667MHz | 39M5782 | IBM | 1 | 259 | 16 | 4,144 | |
| 36.4GB 15K SAS Hot-Swap Drive | 40K1042 | IBM | 1 | 249 | 16 | 3,984 | |
| ServicePac for 3-Year 24x7x4 Support (x3550) | 96P2250 | IBM | 1 | 586 | 16 | | 9,376 |
| Subtotal | | | | | | 70,936 | 9,376 |
| Client Software | | | | | | | |
| Microsoft Windows Server 2000 with COM+ | C11-00821 | Microsoft | 4a | 738 | 16 | 11,808 | |
| Microsoft Visual C++ Professional 6.0 | 254-00170 | Microsoft | 4 | 109 | 1 | 109 | |
| Microsoft Problem Resolution Services | | Microsoft | 4 | 245 | 1 | | 245 |
| Subtotal | | | | | | 11,917 | 245 |
| Network Components | | | | | | | |
| D-LINK DGS-1024D 24-Port 10/100/1000 Switch (2 spares) | DGS1024D | | 5 | 235 | 3 | 705 | |
| Ethernet Cable (2 spares) | CC5E-B14B | | 7 | 3 | 20 | 60 | |
| Subtotal | | | | | | 765 | |
| Total | | | | | | 2,357,014 | 88,606 |
| Large Purchase Discount (See Note 1.) | 29.89% | | 1 | | | | 691,520 |
| Pricing: 1 - IBM - 1-888-SHOP-IBM, ext. 5821; 2 - IBM; 3 - Novell; 4 - Microsoft, 4a = 8% discount; 5 - compuplus.com; 6 - CDW.com; 7 - newegg.com | | | | Three-Year Cost of Ownership USD: | | \$1,754,100 | |
| Note 1: Discount based on IBM Direct guidance applies to all line items where Pricing=1. Pricing is for this system or one of similar size. | | | | tpmC: | | 331,087 | |
| Note 2: Pricing for DB2 9 is based on Value Units (VUs) as shown in the price quote in Appendix D. | | | | \$ USD/tpmC: | | \$5.30 | |
| Note 3: Fifteen x335 were substituted for the priced clients. | | | | | | | |
| Audited by Francois Raab, InfoSizing, Inc. (www.sizing.com) | | | | | | | |
| 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 for the IBM System x3950

MQTH, computed Maximum Qualified Throughput: 331,087 tpmC

| <u>Response Times (in seconds)</u> | <u>90th %</u> | <u>Average</u> | <u>Maximum</u> |
|------------------------------------|--------------------------|----------------|----------------|
| New Order | 2.11 | 1.17 | 5.35 |
| Payment | 2.20 | 1.19 | 6.10 |
| Order-Status | 1.95 | 1.15 | 4.40 |
| Delivery (interactive) | 1.30 | 0.64 | 4.40 |
| Delivery (deferred) | 0.30 | 0.19 | 0.81 |
| Stock-Level | 2.09 | 1.30 | 5.00 |
| Menu | 1.42 | 0.65 | 5.21 |

Response time delay added for emulated components was 0.1 seconds

| <u>Transaction Mix, in percent of total transactions</u> | <u>Percent</u> |
|--|----------------|
| New Order | 44.90% |
| Payment | 43.03% |
| Order-Status | 4.01% |
| Delivery | 4.01% |
| Stock-Level | 4.02% |

| <u>Keying/Think Times (in seconds)</u> | <u>Min.</u> | <u>Average</u> | <u>Max.</u> |
|--|-------------|----------------|--------------|
| New Order | 18.00/0.01 | 18.01/12.02 | 18.08/120.20 |
| Payment | 3.00/0.01 | 3.01/12.02 | 3.05/120.20 |
| Order-Status | 2.00/0.01 | 2.01/10.01 | 2.05/100.10 |
| Delivery | 2.00/0.01 | 2.01/5.02 | 2.03/50.20 |
| Stock-Level | 2.00/0.01 | 2.01/5.02 | 2.05/50.20 |

Test Duration

| | |
|--|--------------------|
| Ramp-up Time | 2 hours 19 minutes |
| Measurement interval | 2 hours 00 minutes |
| Transactions during measurement interval (all types) | 88469266 |
| Ramp-down time | 17 minutes |

Checkpoints

| | |
|-----------------------|-----|
| Number of checkpoints | N/A |
| Checkpoint interval | N/A |