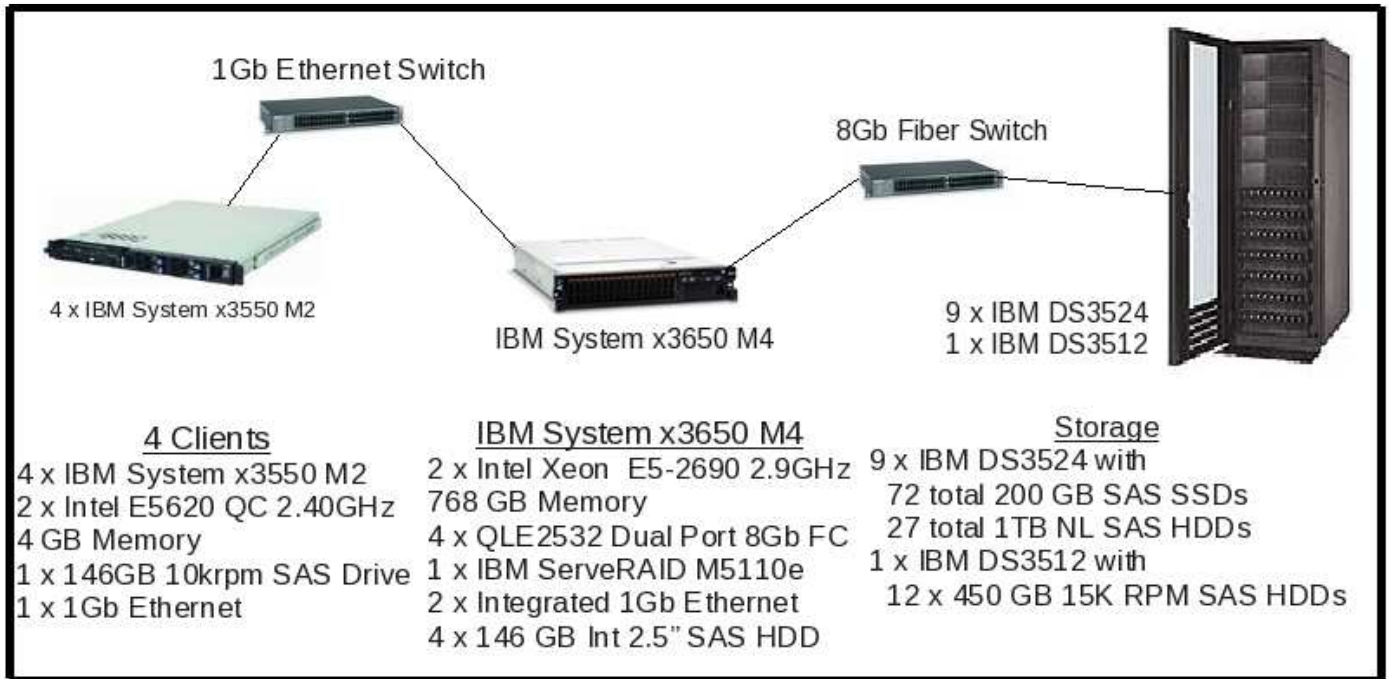


**IBM x3650 M4 with KVM
DB2® 9.7**

TPC-C Rev. 5.11

**Report Date:
February 25, 2013**

Total System Cost	TPC-C Throughput	Price/Performance	Availability Date	
\$667,882 USD	1,320,082	\$0.51 USD	February 25, 2013	
Database Processors/Cores/Threads	Database Manager	Operating System	Other Software	No. Users
2/16/32 2.90 GHz Intel Xeon E5-2690	DB2 9.7	RHEL 6.4 with KVM	Microsoft Visual C++ Microsoft COM+	1,040,400



System Components	Each of the 4 Clients		Server	
	Quantity	Description	Quantity	Description
Processors/Cores/Threads	2/8/16	2.4GHz Intel Xeon E5620 4 x 256KB L2, 1 x 12MB L3	2/16/32	2.90 GHz Intel Xeon E5-2690 8 x 256KB L2, 1 x 20MB L3
Memory	2	2 GB	24	32 GB
Disk Controllers	1	SAS	4 1	QLogic 8Gb FC Dual-port HBA IBM ServeRAID M5110e
Disk Drives	1	146 GB	27 12 72 4	1 TB 7200 RPM NL SAS 450 GB 15K RPM SAS 200GB SAS 2.5" SSD drives 146GB 15K RPM SAS HDD
Total Storage		146 GB		40.33 TB
Terminals	1	System Console	1	System Console

IBM Corporation		IBM x3650 M4 with KVM and DB2 9.7				TPC-C Revision 5.11		
Description		Part Number	Brand	Price Source	Unit Price	Qty	Extended Price	3-Yr. Maint. Price
Server Hardware								
IBM System x3650 M4	7915AC1	IBM	1	59275	1	59275		
x3650 M4 PCIe Riser Card 1 (1 x8 FH/FL + 2 x8 FH/HL Slots)	A1JT		1		1			
1.5m Blue Cat5e Cable	3802		1		2			
x3650 M4 8x 2.5" H5 HDD Assembly Kit	A1JX		1		1			
IBM UltraSlim Enhanced SATA DVD-ROM	4161		1		1			
x3650 M4 PCIe Gen-III Riser Card 2 (1 x8 FH/FL + 2 x8 FH/HL Slots)	A1JU		1		1			
IBM System x3650 M4 2.5" Base without Power Supply	A1KF		1		1			
QLogic 8Gb FC Dual-port HBA for IBM System x	3579		1		4			
IBM System x 750W High Efficiency Platinum AC Power Supply	A1H5		1		2			
Addl Intel Xeon Processor E5-2690 8C 2.9GHz 20MB 135W W/Fan	A2QL		1		1			
ServeRAID M5110e SAS/SATA Controller for IBM System x	A2N2		1		1			
IBM System x Gen-III CMA	A229		1		1			
IBM System x Advanced Lightpath Kit	A2U6		1		1			
32GB (1x32GB, 1.5V) PC3-8500 CL7 ECC DDR3 1066MHz LP HyperCloud DIMM	A3EJ		1		24			
Intel Xeon Processor E5-2690 8C 2.9GHz 20MB Cache 1600MHz 135W	A2VN		1		1			
ServeRAID M5100 Series 1GB Flash/RAID 5 Upgrade for IBM System x	A1WY		1		1			
4.3m, 10A/100-250V, C13 to IEC 320-C14 Rack Power Cable	6263		1		2			
IBM 146GB 15K 6Gbps SAS 2.5" SFF G2H5 HDD	A2XB		1		4			
IBM System x Gen-III Slides Kit	A228		1		1			
x3650 M4 ODD Cable	A22N		1		1			
IBM System x3650 M4 Planar	A1KH		1		1			
3 Year Onsite Repair 24x7 4 Hour Response	67567XR	IBM	1	790	1			790
Acer S181HLGb Black 18.5" 5ms Widescreen LED Backlight LCD Monitor (2 spares)	N82E1682400939:	Newegg	2	95.99	3	287.97		
Kensington K72436AM Black USB Wired Standard Keyboard for Life Desktop Set (2 spares)	N82E1682315506:	Newegg	2	19.99	3	59.97		
						Subtotal	59,623	790
Server Storage								
IBM System Storage DS3524 Express	1746C4A	IBM	1	54322	9	488898		
Turbo Performance	4400		1		9			
Fiber Cable, 5 meter multimode LC-LC	5605		1		18			
IBM System Storage DS3524 Express Dual Controller Storage System	2812		1		9			
8Gb FC 4 Port Daughter Card (2)	3622		1		18			
United States 10A line C13 to NEMA 5-15P (2.8M)	6313		1		18			
200GB 2.5" 3Gb SAS SSD	5500		1		72			
1TB 7,200 rpm 6Gb SAS NL 2.5" HDD	5270		1		27			
3 Year Onsite Repair 24x7 4 Hour Response (DS3524)	67567DT	IBM	1	1350	9			12150
IBM System Storage DS3512 Express	1746C2A	IBM	1	19241	1	19241		
Fiber Cable, 5 meter multimode LC-LC	5605		1		2			
IBM System Storage DS3512 Express Dual Controller Storage System	2802		1		1			
8Gb FC 4 Port Daughter Card (2)	3622		1		2			
United States 10A line C13 to NEMA 5-15P (2.8M)	6313		1		2			
450GB 15,000 rpm 6Gb SAS 3.5" HDD	5105		1		12			
3 Year Onsite Repair 24x7 4 Hour Response (DS3512)	67567DN	IBM	1	1350	1			1350
IBM System Storage SAN24B-4 Express	2498B24	IBM	1	15850	1	15850		
8 Port Activation	7200		1		2			
Fiber Cable LC/LC 5M Multimode	5605		1		6			
SFP Transceiver 8 Gbps SW	2801		1		24			
3 Year Onsite Repair 24x7 4 Hour Response (SAN23B-4)	6756692	IBM	1	1785	1			1785
NetBAY S2 42U Rack Cabinet	9307RC4	IBM	1	1459	1	1459		
						Subtotal	525,448	15,285
Server Software								
DB2 ESE 9.7 5W License and Maintenance – 12 Months		IBM	1	451	1120	505,120		
DB2 ESE 9.7 5W Maintenance Renewal – 1 Year		IBM	1	90	2240			201,600
Red Hat Enterprise Linux Server, Premium (1-2 sockets) (Up to 1 guest)		Red Hat	3	1299	3	3897		
						Subtotal	509,017	201,600
Client Hardware								
IBM System x3550 M3	7944AC1	IBM	1	3924	4	15696		
PCI-Express (1 x16 slot; LP) Riser Card 1	5076		1		4			
2GB (1x2GB, 1Rx4, 1.5V) PC3-10600 CL9 ECC DDR3 1333MHz LP RDIMM	8935		1		8			
1.5m Blue Cat5e Cable	3802		1		4			
IBM System x3550 M3 4 HDD and Optical Drive Kit	1788		1		4			
IBM UltraSlim Enhanced SATA DVD-ROM	4161		1		4			
PCI-Express (1 x16; FH/HL) Riser Card 2	4375		1		4			
Base with 460W Redundant AC Power Supply	A0ZX		1		4			
IBM 460W Redundant Power Supply Unit	A0ZH		1		4			
Addl Intel Xeon Proc. E5620 4C 2.40GHz 12MB Cache 1066MHz 80w W/Fan	4600		15		4			
ServeRAID-BR10i SAS/SATA Controller	3577		1		4			
IBM 146GB 15K 6Gbps SAS 2.5" SFF Slim-HS HDD	5536		1		4			
Intel Xeon Processor E5620 4C 2.40GHz 12MB Cache 1066MHz 80w	4586		15		4			
2.8m, 10A/100-250V, C13 to IEC 320-C14 Rack Power Cable	6311		1		8			
System Common Planar for 1U/2U	5663		1		4			
3 Year Onsite Repair 24x7 4 Hour Response	6756298	IBM	1	495	4			1980
						Subtotal	15,696	1,980
Client Software								
Windows Server Web Edition 2008 R2	LWA-00984	Microsoft	4	469	4	1,876		
Microsoft Visual Studio 2008 Professional	127-00166	Microsoft	4	250	1	250		
Microsoft Problem Resolution Services	NA	Microsoft	4	259	1			259
						Subtotal	2,126	259
Third-Party Components								
UPS – powercom KIN-1500AP 1500 VA 900 Watts (2 spares)	N82E1684210611:	Newegg	2	149.99	3	449.97		
NETGEAR 48 Port Gigabit Smart Switch w/ 4 Combo ports – G5748T (2 spares)	N82E1683312214:	Newegg	2	499.99	3	1499.97		
						Subtotal	1,950	0
						Total	1,113,860	219,914
IBM Dollar Volume Discount (See Note 1)							Note 1 Discount	665,951
Pricing: 1 - IBM - 1-800-656-0833 x35334; 2 – newegg.com; 3 – Red Hat; 4 – Microsoft							Three-Year Cost of Ownership USD: 667,822	
Note 1: Discount based on IBM Direct guidance applies to all line items where Pricing=1.							tpmC: 1,320,082	
Pricing is for this system and software or one of similar size.							\$ USD/tpmC: 0.51	
S - One or more components of the measured configuration have been substituted in the Priced Configuration. See the FDR for details								
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. Thank you.								

Numerical Quantities Summary for the IBM System x 3650 M4 with KVM Virtualization

MQTH, computed Maximum Qualified Throughput: 1,320,082 tpmC

<u>Response Times (in seconds)</u>	<u>90th %</u>	<u>Average</u>	<u>Maximum</u>
New Order	0.160	0.124	1.875
Payment	0.160	0.121	3.078
Order-Status	0.160	0.122	0.953
Delivery (interactive)	0.160	0.117	0.703
Delivery (deferred)	0.03	0.02	1.01
Stock-Level	0.160	0.123	1.110
Menu	0.141	0.117	1.046

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	44.953%
Payment	43.018%
Order-Status	4.011%
Delivery	4.008%
Stock-Level	4.010%

<u>Keying/Think Times (in seconds)</u>	<u>Min.</u>	<u>Average</u>	<u>Max.</u>
New Order	18.000/0.00	18.000/12.035	18.062/120.343
Payment	3.000/0.00	3.000/12.037	3.062/120.344
Order-Status	2.000/0.00	2.000/10.033	2.047/100.329
Delivery	2.000/0.00	2.000/5.036	2.047/50.328
Stock-Level	2.000/0.00	2.000/5.035	2.047/50.328

Test Duration

Ramp-up Time	41 minutes 51 seconds
Measurement interval	2 hours 0 minutes
Transactions during measurement interval (all types)	352,391,356

Checkpoints

Number of checkpoints	N/A
Checkpoint interval	N/A