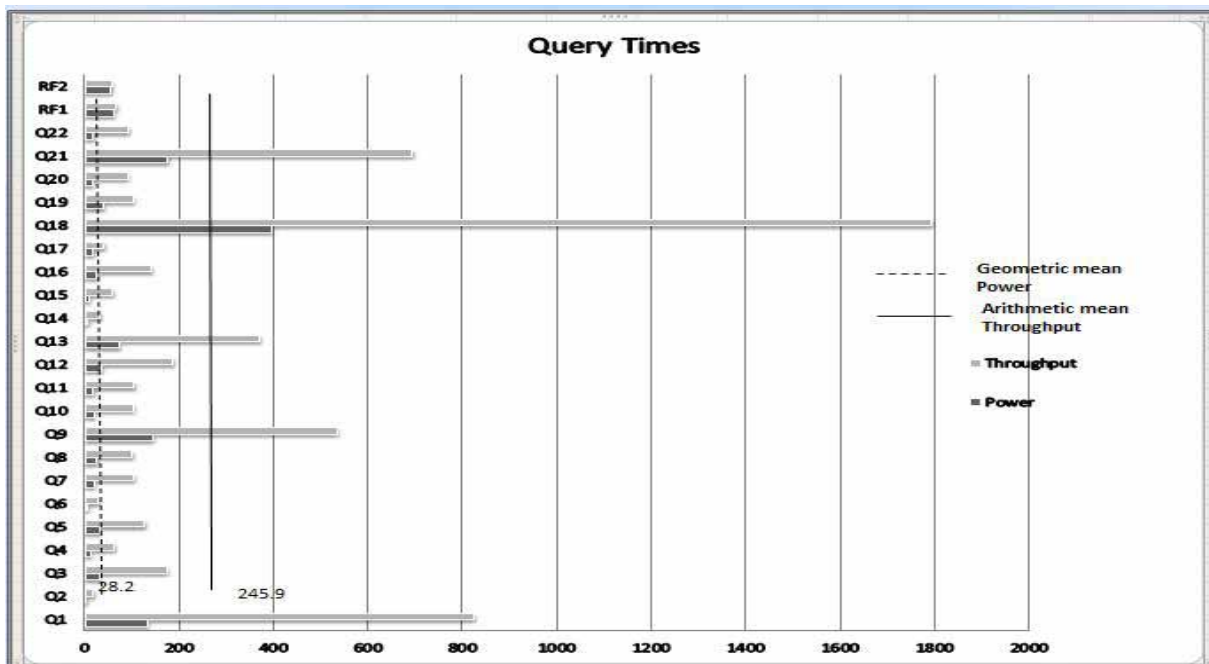


IBM Corporation	IBM® System™ x3850 X5 4P Microsoft® SQL Server 2008 R2			TPC-H Rev. 2.13.0
				Report Date 3/3/11
Total System Cost	Composite Query-per-Hour Metric			Price/Performance
\$179,133 USD	101,719.3 QphH @ 1000GB			\$1.76 per QphH @ 1000GB
Database Size	Database Manager	Operating System	Other software	Availability
1000GB	Microsoft SQL Server 2008 R2 Enterprise x64 Edition	Microsoft Windows Server R2 Enterprise x64 Edition	n.a.	March 3, 2011



Database Load Time: 38:28:51		Total Data Storage / Database Size: 6.8	Load Included Backup: N	Memory Ratio=150%
RAID (Base Tables Only): N		RAID (Base Tables and Auxiliary Data Structures): N		RAID (All): Y
Configuration				
Processors/Cores/Threads	4/32/64	Intel Xeon Processor X7560 2.26GHz, 24MB L3 Cache		
Memory	96	16GB (1x16GB) 4R PC3-8500 1066MHz LP RDIMM		
Disk Controllers	1	IBM ServeRAID-M5015 SAS/SATA Controller		
Disk Drives	2	146GB 15K 6Gbps SAS 2.5" SFF Slim-HS HDD		
	6	600GB 10K 6Gbps SAS 2.5" SFF Slim-HS HDD		
	2	640GB High IOPS MLC Duo Adapter for IBM System x		
	5	320GB High IOPS MS Class SSD PCIe Adapter		
Total Disk Storage		6800GB		

**IBM
Corporation**

**IBM® System™ x3850 X5 4P
Microsoft® SQL Server 2008 R2**

**TPC-H
Rev. 2.13.0**

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Description	Part Number	Brand	Price Source	Unit Price	Quantity	Extended Price	3-Yr. Maint. Price
Server Hardware							
x3850 X5 with MAX5 (2 x Intel Xeon Processor X7560, 2.26GHz / 2MB L2 Cache / 24MB L3 Cache, 4 x 4GB Memory, 2 memory cards)	71455RU	IBM	1	\$19,275	1	\$19,275	
Intel Xeon Processor X7560 (2.26GHz/2MB L2/24MB L3)	49Y4300	IBM	1	4,999	2	9,998	
16GB (1x16GB) QuadRank PC3-8500 1066MHz LP RDIMM	46C7483	IBM	1	999	96	95,904	
IBM x3850X5 Memory Expansion Card	46M0071	IBM	1	299	6	1,794	
IBM ServeRAID-M5015 SAS/SATA Controller	46M0829	IBM	1	649	1	649	
IBM 146GB 15K 6Gbps SAS 2.5" SFF Slim-HS HDD	49Y1896	IBM	1	429	2	858	
IBM 600GB 10K 6Gbps SAS 2.5" SFF Slim-HS HDD	49Y2003	IBM	1	799	6	4,794	
640GB High IOPS MLC Duo Adapter for IBM System x	81Y4519	IBM	1	14,999	2	29,998	
IBM 320GB High IOPS MS Class SSD PCIe Adapter	46M0898	IBM	1	8,099	5	40,495	
IBM Preferred Pro USB Keyboard	40K9584	IBM	1	29	1	29	
IBM 3-Button Optical Mouse - Black - USB	40K9201	IBM	1	19	1	19	
IBM MAX5 for System x	59Y6265	IBM	1	7,495	1	7,495	
IBM MAX5 to x3850 X5 Cable Kit	59Y6267	IBM	1	1,795	1	1,795	
ServicePac for 3-Year 24x7x4 Support (x3850 X5)	84Y2233	IBM	1	1,250	1		1,250
Acer V173Djb Black 17" 5ms LCD Monitor (2 spares)	V173Djb		3	96	3	288	
					Subtotal	213,391	1,250
Server Software							
Microsoft SQL Server 2008 R2 Enterprise Edition w/ 25 CALs	810-08553	Microsoft	2	8,318	1	8,318	
Microsoft SQL Server 2008 R2 Client Access License	359-05354	Microsoft	2	114	45	5,130	
Microsoft Windows Server 2008 R2 Enterprise Edition	P72-04217	Microsoft	2	2,310	1	2,310	
Microsoft Problem Resolution Services	N/A	Microsoft	2	259	1		259
					Subtotal	15,758	259
					Total	\$229,149	\$1,509

Dollar Volume Discount (See Note 1.)	24.04%	1				\$51,525	
Pricing: 1 - IBM - 1-800-656-0833, ext. 35330; 2 - Microsoft; 3 - newegg.com						Three-Year Cost of Ownership USD:	\$179,133
Note 1: Discount applies to all line items where Pricing=1; pricing is for these or similar quantities.						QpH@1000GB:	101,719.30
Discounts for similarly sized configurations will be similar to what is quoted here, but may vary based on the components in the price quotation						\$ USD/QpH@1000GB:	\$1.76
Benchmark results and methodology 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.

IBM Corporation	IBM® System™ x3850 X5 4P Microsoft® SQL Server 2008 R2	TPC-H Rev. 2.13.0
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Measurement Results	
Database Scale Factor	1000
Total Data Storage/Database Size	6.8
Start of Database Load	02/24/11 16:17:14
End of Database Load	02/26/11 6:46:05
Database Load Time	38:28:51
Query Streams for Throughput Test	7
TPC-H Power	127,676.1
TPC-H Throughput	81,039.6
TPC-H Composite Query-per-Hour (QphH@1000GB)	101,719.3
Total System Price over 3 Years	\$179,133 USD
TPC-H Price/Performance Metric (\$/QphH@1000GB)	\$ 1.76 USD

Measurement Interval
Measurement Interval in Throughput Test (Ts) = 6841.1

Duration of Stream Execution:					
	Seed	Query Start (D/T) Query End (D/T)	RF1 Start (D/T) RF1 Stop (D/T)	RF2 Start (D/T) RF2 Stop (D/T)	Duration
Stream 0	226064605	2/26/11 09:07:27 2/26/11 09:28:11	2/26/11 09:06:27 2/26/11 09:07:27	2/26/11 09:28:11 2/26/11 09:29:07	00:22:41
Stream 1	226064606	2/26/11 09:29:08 2/26/11 11:07:19	2/26/11 11:09:13 2/26/11 11:10:11	2/26/11 11:10:11 2/26/11 11:11:06	01:38:11
Stream 2	226064607	2/26/11 09:29:08 2/26/11 11:09:12	2/26/11 11:01:07 2/26/11 11:12:08	2/26/11 11:12:08 2/26/11 11:13:02	01:40:05
Stream 3	226064608	2/26/11 09:29:08 2/26/11 11:02:34	2/26/11 11:13:03 2/26/11 11:14:02	2/26/11 11:14:03 2/26/11 11:14:59	01:33:26
Stream 4	226064609	2/26/11 09:29:08 2/26/11 11:08:54	2/26/11 11:15:00 2/26/11 11:15:59	2/26/11 11:16:00 2/26/11 11:17:01	01:39:46
Stream 5	226064610	2/26/11 09:29:08 2/26/11 11:08:13	2/26/11 11:17:01 2/26/11 11:18:22	2/26/11 11:18:22 2/26/11 11:19:17	01:39:05
Stream 6	226064611	2/26/11 09:29:08 2/26/11 11:05:40	2/26/11 11:19:18 2/26/11 11:20:17	2/26/11 11:20:18 2/26/11 11:21:12	01:36:32
Stream 7	226064612	2/26/11 09:29:08 2/26/11 11:01:48	2/26/11 11:21:13 2/26/11 11:22:12	2/26/11 11:22:12 2/26/11 11:23:09	01:32:39

**IBM
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**IBM® System™ x3850 X5 4P
Microsoft® SQL Server 2008 R2**

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TPC-H Timing Intervals (in seconds)

Query	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12
Stream0	132.2	2.2	30.4	11.4	30.1	5.7	19.3	24.9	143.2	19.2	17.7	35.2
Stream1	962.1	17.1	166.3	47.3	106	19.2	73.3	108.9	535.7	96.5	90.7	163.2
Stream2	1032.8	29	148.9	62.4	121.2	28.4	105.9	87.5	627.7	123.5	163	191
Stream3	728.2	15.2	151.3	82.3	153.4	23.4	111.8	113.8	578.5	98.1	104.1	182.9
Stream4	1033.6	18.1	87.4	59.2	138.9	24.6	96.1	91.2	581.9	104.6	57	164.8
Stream5	943.8	16.3	201.4	62	124.7	35	98.9	102.8	451.4	94.1	160.6	208.5
Stream6	818.9	14.4	221.3	71.3	130.1	33.5	120.6	111.2	604	103.3	62	152.2
Stream7	631.4	15.7	152.1	53.9	119.9	26.6	106.3	86.3	512.9	96.3	80.9	212.4
Mininum	132.2	2.2	30.4	11.4	30.1	5.7	19.3	24.9	143.2	19.2	17.7	35.2
Maximum	1033.6	29.0	221.3	82.3	153.4	35.0	120.6	113.8	627.7	123.5	163.0	212.4
Average	785.4	16.0	144.9	56.2	115.5	24.6	91.5	90.8	504.4	92.0	92.0	163.8

Query	Q13	Q14	Q15	Q16	Q17	Q18	Q19	Q20	Q21	Q22	RF1	RF2
Stream0	72.7	6.4	9	25	17.7	394.7	38.6	15.7	175.5	17	60.6	55.9
Stream1	379.1	36.1	57	139.7	42.9	1691.5	78.6	118.9	853.8	106.7	57.9	55.2
Stream2	324.2	32.9	64.9	167.9	41.8	1804.3	171.1	112.8	443.2	120.1	60.5	54.6
Stream3	338.8	36.1	53	131.1	46.7	1621.5	60.5	94.8	812.6	67.6	59.2	56.8
Stream4	304.6	28.5	57.4	112	47.6	1924.1	142.3	34.4	807.6	69.9	59.3	61.2
Stream5	349.4	38.4	51.6	153.4	28.3	1637.1	132.1	101.6	854.5	98.8	80.3	55.3
Stream6	415.8	29.1	73.9	140.5	28.9	1617.1	67.6	106.9	775.7	93.4	59.2	54.8
Stream7	378.1	29.3	48.2	129.9	57.2	2058	78.1	88.6	514.4	82.1	58.8	56.5
Mininum	72.7	6.4	9.0	25.0	17.7	394.7	38.6	15.7	175.5	17.0	57.9	54.6
Maximum	415.8	38.4	73.9	167.9	57.2	2058.0	171.1	118.9	854.5	120.1	80.3	61.2
Average	320.3	29.6	51.9	124.9	38.9	1593.5	96.1	84.2	654.7	82.0	62.0	56.3