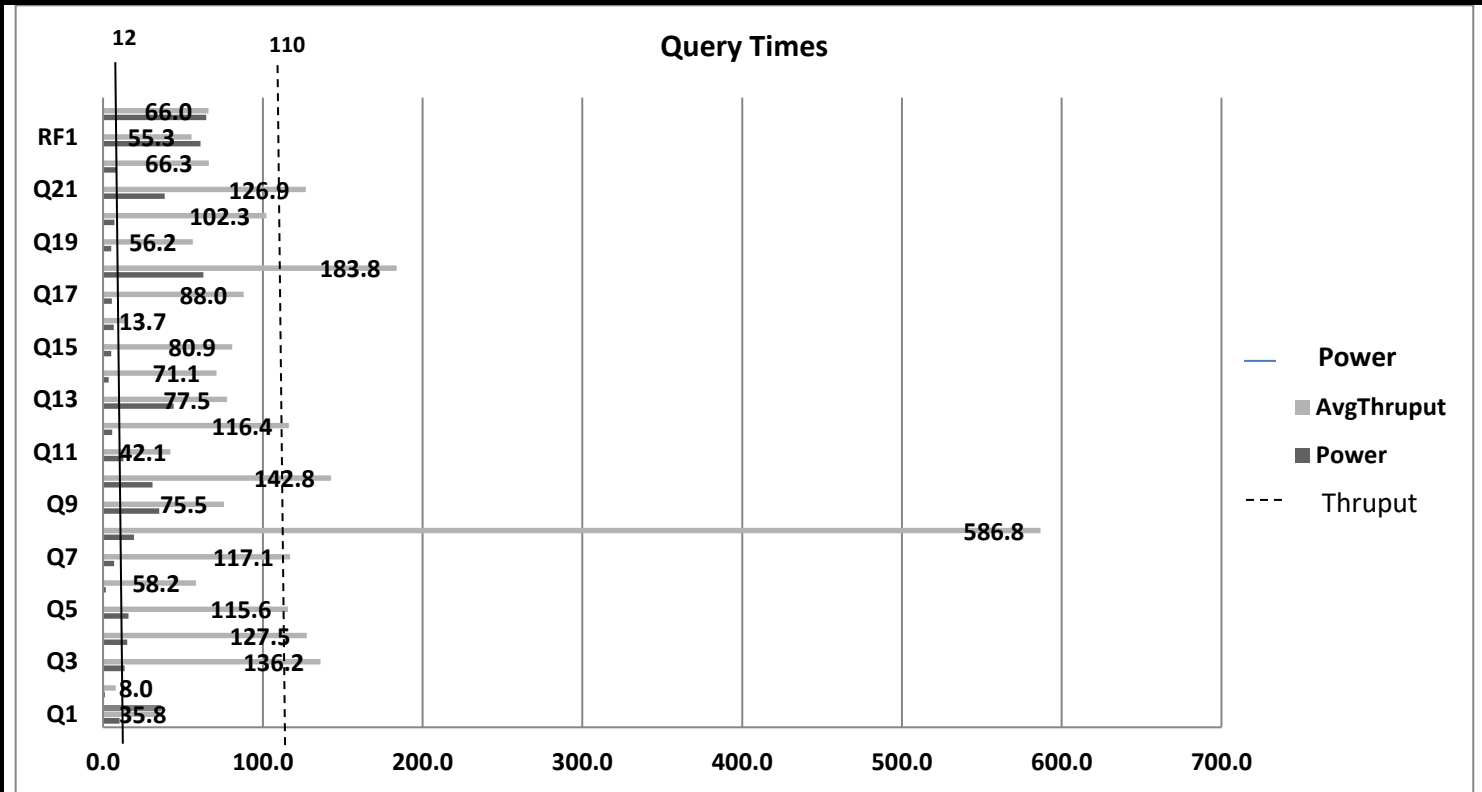


<b>lenovo</b>	<b>System x<sup>®</sup> 3850 X6</b> <b>Microsoft<sup>®</sup> SQL Server<sup>®</sup> 2014</b>			TPC-H Rev. 2.17.1 TPC-Pricing 2.0.0
				Report Date 5/05/15
Total System Cost	Composite Query-per-Hour Metric			Price/Performance
<b>\$691,524 USD</b>	<b>700,392.4 QphH @ 3000GB</b>			<b>\$0.99 per QphH @ 3000GB</b>
Database Size	Database Manager	Operating System	Other Software	Availability
<b>3,000GB</b>	<b>Microsoft SQL Server 2014 Enterprise Edition</b>	<b>Microsoft Windows Server<sup>®</sup> 2012R2 Standard Edition</b>	<b>n.a.</b>	<b>May 26, 2015</b>



Database Load Time: 00d 08h 14m 08s		Total Data Storage / Database Size: 7.57	Load Included Backup: Y	Memory Ratio=102.4%
RAID (Base Tables Only): N		RAID (Base Tables and Auxiliary Data Structures): N		RAID (All): N
Configuration				
Processors/Cores/Threads	4/72/144	Intel Xeon Processor E7-8890 v3, 2.50GHz, 45MB L3 Cache		
Memory	96	32GB PC3L-12800 ECC DDR3 1600MHz LP RDIMM		
Disk Controllers	1	Lenovo ServeRAID-M5210 SAS/SATA Controller		
Disk Drives	2	200GB 2.5" Enterprise SAS SSD		
	4	1200GB SAS 2.5" 10K rpm HDD		
	6	3,200GB Enterprise io3 Flash PCIe Adapter		
Total Disk Storage		24,400GB		



# System x<sup>®</sup> 3850 X6 Microsoft<sup>®</sup> SQL Server<sup>®</sup> 2014

TPC-H Rev. 2.17.1  
TPC-Pricing 2.0.0

Report Date 5/05/15

Description	Part Number	Price Source	Unit Price	Quantity	Extended Price	3-Yr. Maint. Price
<b>Server Hardware</b>						
Lenovo System x3850 X6 Configure-To-Order, includes:	6241AC1			1	164,425	
x3850 X6 4U Chassis	ASMH			1		
Midplane for 4U Chassis	A4A4			1		
X6 DDR3 Compute Book Intel Xeon E7-8890 v3	AS8Q			4		
X6 Primary I/O Book	AS7Q			1		
X6 Storage Book	A4A1			1		
X6 Half-length I/O Book	A4A2			2		
4x 2.5" HDD Riser	A4A6			2		
ServerRAID M5210 SAS/SATA Controller for System x	A3YZ			1		
1.2TB 10K 6Gbps SAS 2.5" G3HS HDD	A4TP			4		
200GB 12G SAS 2.5" MLC G3HS Enterprise SSD	AS7C			2		
Intel X540 ML2 Dual Port 10GbaseT Adapter for System x	A40P			1		
1400W HE Redundant Power Supply	A54E			4		
System x Rail Kit	A4AA			1		
Power Cable	6311			4		
32GB PC3L-12800 CL11 ECC DDR3 1600MHz LP LRDIMM	A3SR			96		
Preferred Pro Keyboard USB - US English 103P RoHS v2	00AM600	1	29	1	29	
2-Button Optical Mouse - Black - USB	40K9200	1	19	1	19	
3200GB Enterprise Value i03 Flash Adapter for System x	00AE989	1	20,399	6	122,394	
ServicePac for 3-Year 24x7x4 Support (x3850 X6)	67568BU	1	1,500	1		1500
ThinkVision E1922 18.5-inch LED Backlit LCD Monitor	60B8AAR6US	1	110	1	110	
				<b>Subtotal</b>	<b>286,977</b>	<b>1,500</b>
<b>Server Software</b>						
SQL Server 2014 Enterprise Edition	7JQ-00750	2a	13,472.50	36	485,010	
Windows Server 2012 R2 Standard Edition	P73-06284	2	1,123	2	2,246	
Windows Server 2012 R2 Client Access License	R18-04280	2	35	80	2,800	
Microsoft Problem Resolution Services	N/A	2a	259	1		259
				<b>Subtotal</b>	<b>490,056</b>	<b>259</b>
<b>Infrastructure</b>						
Ethernet Cables	78004256	1	6	2	12	
S2 42U Standard Rack	93074RX	1	1,565	1	1,565	
ServicePac for 3-Year 24x7x4 Support (Rack)	41L2760	1	315	1		315
				<b>Subtotal</b>	<b>1,577</b>	<b>315</b>
				<b>Total</b>	<b>778,610</b>	<b>2,074</b>
Dollar Volume Discount (See Note 1)	30.14%	1			87,533	
Microsoft Open Program Discount Schedule	32.25%	2			1,627	

Pricing: 1 - Lenovo 1-877-782-7134; 2 - Microsoft; 2a - Microsoft - No discount Note 1: Discount applies to all line items where Pricing=1; pricing is for these or similar quantities. Discounts for similarly sized configurations will be similar to what is quoted here, but may vary based on the specific components priced.	<b>Three-Year Cost of Ownership USD:</b> \$691,524 <b>QphH@3000GB:</b> 700,392.40 <b>\$ USD/QphH@3000GB:</b> \$0.99
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**Benchmark results and test methodology audited by Francois Raab for 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 section 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.



**System x<sup>®</sup> 3850 X6**  
**Microsoft<sup>®</sup> SQL Server<sup>®</sup> 2014**

TPC-H Rev.  
2.17.1  
TPC-Pricing  
2.0.0

Report Date  
5/05/15

**Measurement Results**

Database Scale Factor	3000
Total Data Storage/Database Size	7.57
Memory/Database Size	102.4%
Start of Database Load	04/06/2015 23:13:00
End of Database Load	04/07/2015 07:27:07
Database Load Time	00d 08h 14m 08s
Query Streams for Throughput Test	8
TPC-H Power	906,360.4
TPC-H Throughput	541,230.1
TPC-H Composite Query-per-Hour (QphH@3000GB)	700,392.4
Total System Price over 3 Years	\$691,524 USD
TPC-H Price/Performance Metric (\$/QphH@3000GB)	\$ 0.99 USD

**Measurement Interval**

Measurement Interval in Throughput Test (Ts) = 3,512

**Duration of Stream Execution:**

Power Run	Seed	Query Start Time	Duration (sec)	RF1 Start Time	RF2 Start Time
		Query End Time		RF1 End Time	RF2 End Time
	407072707	2015-04-08 00:02:56	358	2015-04-08 00:01:55	2015-04-08 00:08:54
		2015-04-08 00:08:54		2015-04-08 00:02:56	2015-04-08 00:09:58
Throughput Stream	Seed	Query Start Time Query End Time	Duration (sec)	RF1 Start Time RF1 End Time	RF2 Start Time RF2 End Time
1	407072708	2015-04-08 00:09:57	2,424	2015-04-08 00:52:15	2015-04-08 00:53:14
		2015-04-08 00:50:21		2015-04-08 00:53:14	2015-04-08 00:54:20
2	407072709	2015-04-08 00:09:58	2,538	2015-04-08 00:54:20	2015-04-08 00:55:15
		2015-04-08 00:52:16		2015-04-08 00:55:15	2015-04-08 00:56:22
3	407072710	2015-04-08 00:09:58	2,315	2015-04-08 00:56:22	2015-04-08 00:57:16
		2015-04-08 00:48:33		2015-04-08 00:57:16	2015-04-08 00:58:21
4	407072711	2015-04-08 00:09:58	2,476	2015-04-08 00:58:22	2015-04-08 00:59:15
		2015-04-08 00:51:14		2015-04-08 00:59:15	2015-04-08 01:00:20
5	407072712	2015-04-08 00:09:58	2,287	2015-04-08 01:00:20	2015-04-08 01:01:13
		2015-04-08 00:48:05		2015-04-08 01:01:13	2015-04-08 01:02:19
6	407072713	2015-04-08 00:09:58	2,465	2015-04-08 01:02:19	2015-04-08 01:03:15
		2015-04-08 00:51:03		2015-04-08 01:03:15	2015-04-08 01:04:22
7	407072714	2015-04-08 00:09:58	2,425	2015-04-08 01:04:22	2015-04-08 01:05:20
		2015-04-08 00:50:23		2015-04-08 01:05:20	2015-04-08 01:06:27
8	407072715	2015-04-08 00:09:58	2,502	2015-04-08 01:06:27	2015-04-08 01:07:23
		2015-04-08 00:51:40		2015-04-08 01:07:23	2015-04-08 01:08:29



System x<sup>®</sup> 3850 X6  
Microsoft<sup>®</sup> SQL Server<sup>®</sup> 2014

TPC-H  
Rev. 2.17.1  
TPC-Pricing  
2.0.0

Report Date  
5/05/15

TPC-H Timing Intervals (in seconds)

Stream ID	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12
0	10.4	1.1	13.6	15.1	16.0	1.8	6.9	19.3	35.2	31.0	12.8	5.7
1	36.3	9.2	83.6	153.9	96.6	29.8	97.7	712.6	75.1	104.9	27.6	79.4
2	43.2	1.7	162.5	178.5	92.3	95.6	94.6	605.1	60.1	59.3	33.2	131.0
3	23.8	10.0	177.8	128.4	94.0	47.1	84.3	571.4	44.8	188.8	70.3	112.9
4	50.3	10.3	182.0	48.9	143.1	76.0	176.3	608.0	101.3	102.3	51.3	24.0
5	11.9	4.9	76.7	163.5	88.2	21.2	100.4	682.4	55.6	183.3	47.9	166.4
6	94.4	13.7	93.5	103.4	158.4	17.0	43.0	562.0	122.5	186.6	47.7	89.6
7	12.0	4.0	147.7	97.3	82.5	91.0	206.0	487.1	67.7	193.8	28.0	165.6
8	14.3	9.9	165.5	146.2	169.5	87.8	134.1	465.6	77.1	123.1	30.9	162.0
Min	10.4	1.1	13.6	15.1	16.0	1.8	6.9	19.3	35.2	31.0	12.8	5.7
Avg	33.0	7.2	122.5	115.0	104.5	51.9	104.8	523.7	71.0	130.3	38.9	104.1
Max	94.4	13.7	182.0	178.5	169.5	95.6	206.0	712.6	122.5	193.8	70.3	166.4
Stream ID	Q13	Q14	Q15	Q16	Q17	Q18	Q19	Q20	Q21	Q22	RF1	RF2
0	44.1	3.6	5.2	6.8	5.5	62.7	5.1	7.1	38.5	8.8	61.0	64.6
1	115.2	88.3	103.3	6.9	11.8	154.8	13.9	106.3	205.2	110.4	58.1	66.3
2	102.8	55.3	85.8	20.3	167.8	267.0	95.3	96.0	40.3	49.3	54.8	66.5
3	54.5	95.3	60.9	12.4	35.7	182.3	95.1	123.6	89.4	12.2	53.9	65.3
4	79.4	45.4	27.2	17.7	82.4	229.8	124.1	54.2	121.6	120.2	53.2	64.7
5	66.1	18.9	66.0	9.5	103.7	78.7	8.0	121.6	204.5	6.6	52.6	66.2
6	69.4	87.8	88.6	24.3	141.2	180.5	35.6	118.6	174.3	12.7	55.6	66.7
7	56.0	110.3	101.0	8.7	94.8	245.4	6.8	76.1	45.6	96.6	57.8	66.7
8	76.9	67.1	114.1	9.4	66.2	132.1	71.0	122.2	134.5	122.0	56.3	65.8
Min	44.1	3.6	5.2	6.8	5.5	62.7	5.1	7.1	38.5	6.6	52.6	64.6
Avg	73.8	63.6	72.5	12.9	78.8	170.4	50.5	91.7	117.1	59.9	55.9	65.9
Max	115.2	110.3	114.1	24.3	167.8	267.0	124.1	123.6	205.2	122.0	61.0	66.7