



Dell PowerEdge R710 using EXASolution 4.0

TPC-H Rev. 2.14.0

Report Date
April 5, 2011

Total System Cost

Composite Query per Hour Metric

Price / Performance

\$ 3,720,294

7,128,255.1
QphH@10000GB

\$ 0.53
\$ / QphH@10000GB

Database Size

Database Manager

Operating System

Other Software

Availability Date

10000 GB

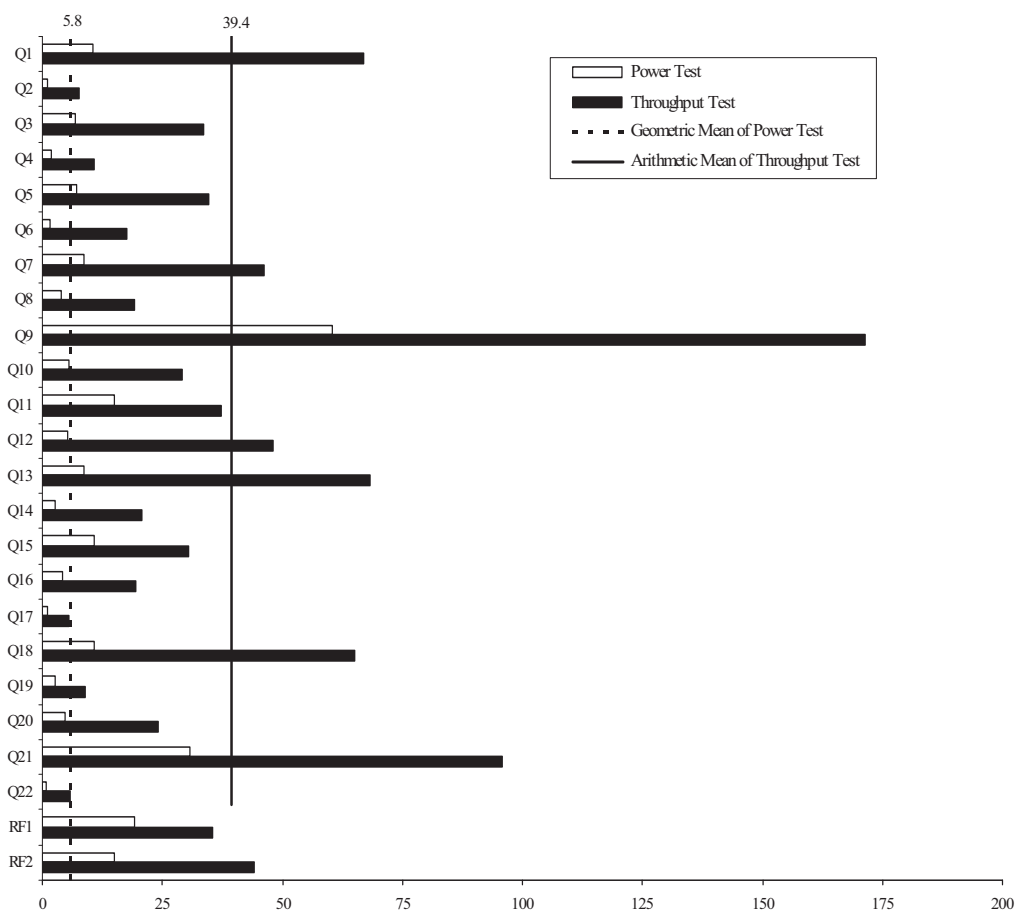
EXASolution 4.0

EXACluster OS 4.0

C++ Compiler

October 1, 2011

Query Times in seconds



Storage Redundancy Levels:

Database Load Time = 2:16:06

Base Tables

2

Load Includes Backup: N

Auxiliary Data Structures

2

Total Data Storage / Database Size = 6.71

DBMS Temporary Space

1

Memory to Database Size Percentage = 43.2

OS and DBMS Software

1

System Configuration:

- 60 x Dell PowerEdge R710 Server, each with:
 - 2 Intel Xeon X5690 QC 3.46 GHz processors (each is 1 chip, 6 cores, 12 threads)
 - 72 GB RAM
 - 2x 600 GB (10k rpm) internal SAS disks

Total Storage: 67,055 GB (GB = 1024*1024*1024 bytes)



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Description	Part Number	Pricing	Unit Price	Qty	Extended Price	3 yr. Maint. Price	
Server Hardware							
R710 with Chassis for up to 8, 2.5-in. Hard Drives	210-31964	1	\$13,399.10	60	\$803,946.00	included	
Intel Xeon X5690,3.46GHz,12M.XN,6.4GT/s,8C	213-12953	1	\$0.00	60	\$0.00		
Intel Xeon X5690,3.46GHz,12M.XN,6.4GT/s,8C	374-13955	1	\$0.00	60	\$0.00		
HO Pwr Sply,Redundant,870W UFG	450-12451	1	\$0.00	60	\$0.00		
Rizer with 2 PCIe x8 +2 PCIe x4 Slots	330-10106	1	\$0.00	60	\$0.00		
72GB,16x4G,1333M,2R,RDIMM	370-19363	1	\$0.00	60	\$0.00		
IDRAC6 Enterprise	665-10114	1	\$0.00	60	\$0.00		
PERC H700 INTG RAID CTL 512MB,x8	405-11392	1	\$0.00	60	\$0.00		
HDD, 800GB 10K SAS,8G,2.5,Hot Plug	400-20817	1	\$0.00	120	\$0.00		
DVD+-RW, SATA, INTERNAL	420-14713	1	\$0.00	60	\$0.00		
Broadcom GbE 4P LOM with TOE	541-10013	1	\$0.00	60	\$0.00		
Qlogic Infinband Adapter QLE7340-CK	690-98219	1	\$0.00	60	\$0.00		
Sliding Ready Rack Rails with Cable Management	770-10783	1	\$0.00	60	\$0.00		
3Yr ProSupport and Next Business Day On-Site Service	710-18539	1	\$0.00	60	\$0.00		
PE 4220 42U Rack with Doors and Side Panels	210-28840	1	\$2,705.21	4	\$10,820.84		
DELL PowerConnect 5548 Switch 48 GbE Ports	210-34476	1	\$1,903.24	3	\$5,709.72		
RPS720 External Red. PSU for PC 5524 Switch	450-18399	1	\$770.87	1	\$770.87		
Dell Discount (30%)		1			-\$248,374.23		
PATCH CABLE CAT5E 5M GREY STP	A2900570	1	\$4.39	120	\$526.80		
Mouse : Dell Optical USB	570-11147	1	\$9.78	1	\$9.78		
Keyboard Dell Standard Quietkey USB	680-14755	1	\$15.53	1	\$15.53		
Qlogic 12300-D40, 96-port Infiniband QDR Switch	A4897761	1	\$59,250.00	1	\$59,250.00		
Qlogic 5.0M Copper 26 AWG QSFP to QSFP Passive	A4897774	1	\$160.33	60	\$9,619.80		
DELL 17" TFT Display E1709W	855-10385	1	\$141.22	3	\$423.66		
Dell Discount (10%)		1			-\$8,084.56		
					Subtotal	\$637,734.21	\$0.00
Storage							
No external storage required							
Software							
EXASolution 4.0 licence (1GB DB RAM*)	EXA-1G	2	\$1,560.00	3,800	\$5,928,000.00		
EXASOL Support 24x7 (4% per year)	EXA-SUP	2				\$711,360.00	
Discount (80%)		2			-\$3,556,800.00		
					Subtotal	\$2,371,200.00	\$711,360.00
					Total	\$3,008,934.21	\$711,360.00

3-Year Cost of Ownership \$3,720,294

QphH Rating: 7,128,255.1

\$/QphH@10000GB: \$0.53

Price Key: 1-Dell: Pricing may be verified by calling 1-800-BUY-DELL
contact: Ronny Lenz, ronny_lenz@dell.com
and referencing quote # 24900447.3
2-EXASOL, contact: Steffen Weissbarth, sales@exasol.com

* Memory size allocated to EXASolution (see also section 7.2)

All discounts are based on list prices and for similar quantities and configurations.

Results independently audited by: Francois Raab of 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 the stated prices are not available according to these terms please inform the TPC at pricing@tpc.org. Thank you.



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Numerical Quantities

Measurement Results

Database Scale Factor	10000 GB
Total Data Storage / Database Size	6.71
Start of Database Load	4:07:32
End of Database Load	6:23:38
Database Load Time	2h 16m 06 s
Query Streams for Throughput Test	9
TPC-H Power	6,216,060.9
TPC-H Throughput	8,174,311.9
TPC-H Composite Query-per-Hour Metric (QpH@10000GB)	7,128,255.1
Total System Price Over 3 Years	\$3,720,294
TPC-H Price/ Performance Metric (\$/QpH@10000GB)	\$0.53

Measurement Interval

Measurement Interval in Throughput Test (Ts)	872 seconds
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Duration of Stream Execution

Stream ID	Seed	Start Date	Start Time	End Date	End Time	Duration
Stream 0	331062338	2011-03-31	06:42:00	2011-03-31	06:57:54	4:00 min
Stream 1	331062339	2011-03-31	06:46:00	2011-03-31	07:00:31	14:31 min
Stream 2	331062340	2011-03-31	06:46:00	2011-03-31	07:00:31	14:31 min
Stream 3	331062341	2011-03-31	06:46:00	2011-03-31	07:00:20	14:20 min
Stream 4	331062342	2011-03-31	06:46:00	2011-03-31	07:00:23	14:23 min
Stream 5	331062343	2011-03-31	06:46:00	2011-03-31	07:00:26	14:26 min
Stream 6	331062344	2011-03-31	06:46:00	2011-03-31	07:00:27	14:27 min
Stream 7	331062345	2011-03-31	06:46:00	2011-03-31	07:00:25	14:25 min
Stream 8	331062346	2011-03-31	06:46:00	2011-03-31	07:00:22	14:22 min
Stream 9	331062347	2011-03-31	06:46:00	2011-03-31	07:00:30	14:30 min
Refresh		2011-03-31	06:46:00	2011-03-31	06:57:54	11:54 min



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TPC-H Timing Intervals (in seconds)

Query	Power	Stream 1	Stream 2	Stream 3	Stream 4	Stream 5	Stream 6	Stream 7	Stream 8	Stream 9	Min Q _i	Avg Q _i	Max Q _i
1	10.6	57.8	68.1	70.2	69.5	66.7	67.3	69.3	71.0	63.6	57.8	67.1	71.0
2	1.1	9.3	8.3	7.9	5.8	5.9	8.3	6.9	10.4	6.7	5.8	7.7	10.4
3	6.9	31.6	41.3	29.7	31.5	34.4	34.7	31.7	34.7	33.8	29.7	33.7	41.3
4	1.8	2.8	12.1	10.5	11.8	13.3	11.6	12.7	10.7	11.7	2.8	10.8	13.3
5	7.2	37.5	32.4	34.2	36.0	32.8	36.1	33.7	35.0	33.6	32.4	34.6	37.5
6	1.7	15.2	17.3	19.7	16.7	19.0	17.6	16.2	17.9	17.5	15.2	17.5	19.7
7	8.7	50.2	49.8	38.4	44.9	41.1	48.5	47.1	55.8	40.2	38.4	46.2	55.8
8	3.9	15.6	21.1	22.4	25.1	14.0	16.9	18.6	16.6	22.3	14.0	19.2	25.1
9	60.4	179.3	168.8	168.4	172.0	168.2	164.4	179.6	160.7	181.3	160.7	171.4	181.3
10	5.4	31.4	28.4	29.7	25.7	30.2	25.5	32.9	28.6	29.7	25.5	29.1	32.9
11	15.0	38.3	38.4	27.7	35.8	36.0	43.0	41.5	32.4	42.5	27.7	37.3	43.0
12	5.2	50.3	50.7	48.2	48.3	50.8	51.0	40.7	43.0	48.3	40.7	47.9	51.0
13	8.8	62.9	64.0	75.9	75.1	71.0	67.4	62.6	64.3	71.1	62.6	68.3	75.9
14	2.7	19.4	22.6	20.8	21.7	17.7	24.0	18.5	20.9	20.1	17.7	20.6	24.0
15	10.8	31.9	33.1	26.5	31.8	33.5	30.9	30.0	26.2	28.8	26.2	30.3	33.5
16	4.2	23.1	22.1	18.8	19.1	22.1	22.2	20.3	15.8	10.4	10.4	19.3	23.1
17	1.1	4.6	4.8	4.5	8.0	5.6	4.2	5.6	7.4	5.1	4.2	5.5	8.0
18	10.8	70.3	63.6	64.0	65.9	65.6	63.6	64.8	63.4	65.6	63.4	65.2	70.3
19	2.7	6.8	7.9	11.0	9.2	7.6	8.8	6.8	13.9	9.5	6.8	9.0	13.9
20	4.8	26.9	26.9	26.6	18.2	23.1	23.0	25.1	19.9	27.6	18.2	24.2	27.6
21	30.6	99.5	84.0	100.3	85.1	103.2	92.3	95.7	106.8	96.2	84.0	95.9	106.8
22	0.9	6.4	5.1	5.0	6.2	4.9	6.0	5.5	7.2	5.1	4.9	5.7	7.2
RF1	19.2	33.4	33.0	36.6	32.4	36.6	33.8	38.4	37.2	36.4	32.4	35.3	38.4
RF2	15.1	46.7	53.5	50.2	45.6	47.0	31.4	29.1	37.0	56.2	29.1	44.1	56.2