



Dell PowerEdge R720xd using EXASolution 5.0

TPC-H Rev. 2.17.0
TPC-Pricing Rev. 1.7.0

Report Date
September 22, 2014

Total System Cost

Composite Query per Hour Metric

Price / Performance

\$179,795

1,582,736.4
QphH@100GB

\$0.12
\$/QphH@100GB

Database Size

Database Manager

Operating System

Other Software

Availability Date

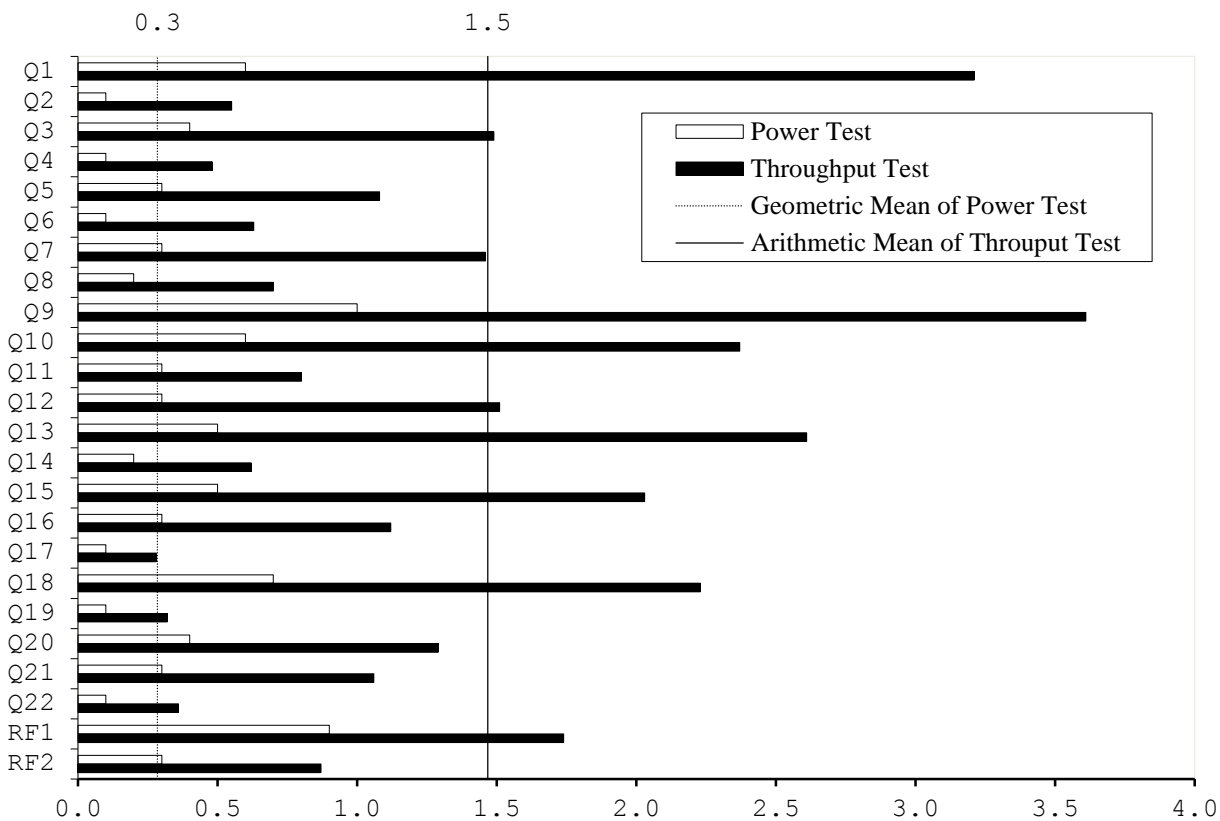
100GB

EXASolution 5.0

EXAClusterOS 5.0

None

September 22, 2014



Database Load Time = 0:05:09
Load Includes Backup: N
Total Data Storage / Database Size = 150.32
Memory to Database Size Percentage = 96.0%

Storage Redundancy Levels:

Base Tables	Level One
Auxiliary Data Structures	Level One
DBMS Temporary Space	Level One
OS and DBMS Software	Level One

System Configuration:

6 x Dell PowerEdge R720xd Server, each with:
16 GB RAM
2 x Intel Xeon E5-2680v2 10C 2.8 GHz processors (each 10 cores, 20 threads)
2 x 146 GB (15k rpm) internal SAS disks
2 x 1199 GB (10k rpm) internal SAS disks

Total Storage: 15,032 GB



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Description	Key	Part Number	Unit Price \$	Qty	Ext. Price \$	3 Yr. Maint.
Hardware						
Server Hardware	1		15,157.29	6	90,943.74	included
OEM R720XD Chassis up to 24 HDDs+2 Flex bays	1	210-ABNG		1		
Intel Xeon E5-2680v2, 2.8Hz, 10C	1	338-BCUH		2		
4GB RDIMM, 1,866MT/s, Single Rank	1	370-ABBM		4		
1.2TB SAS 6Gbit/s, 2.5", 10k, Hot Plug HDD	1	400-AAHL		2		
146GB, SAS 6Gbit/s, 2.5", 15k Hit Plug HDD (Flex Bay)	1	408-10128		2		
PERC H710p integrated RAID-Controller 1GB Cache	1	405-12071		1		
Hot-Plug redundant Power Supply (1+1) 750W	1	450-17885		1		
Intel Ethernet i350 QP 1Gbit/s Network Daughtercard	1	540-11050		1		
Intel X520 DP 10Gbit/s DA/SFP+ Serveradapter	1	540-11063		2		
iDRAC7 Enterprise including 8GB SD Card	1	528-10006		1		
Sliding Ready Rack Rails with cable management arm	1	770-11607		1		
39M ProSupport for OEM and Next Business Day On-Site Service	1	710-33226		1		
Exasol Bezel Branding	1	CFI BGMK01		1		
DELL DISCOUNT 30%	1				-27,283.12	
Dell Networking N4032F 24x10GbE-SFP+ Switch	1	210-ABVT	18,256.07	1	18,256.07	included
Dell Networking N2024, L2, 24x 1GbE+2x10GbE-SFP+Switch	1	210-ABNV	3,595.57	1	3,595.57	included
Rack TFT + Keyboard	1	A7485906	1,621.55	1	1,621.55	included
DELL DISCOUNT 30%	1				-7,041.96	
Dell Networking, Cable, SFP+ to SFP+, 10GbE, 3 meter	1	470-13555	186.48	12	2,237.76	
C2G Cat6 550MHz Snagless Patch Cable, 3 meter	1	A6928965	4.11	12	49.32	
DELL DISCOUNT 10%	1				-228.71	
APC Basic Rack PDU Zero U, 120/208/230 V	1	A7067488	429.89	2	859.78	included
Dell NetShelter SX Deep Enclosure 42U	1	A7545497	1,486.42	1	1,486.42	included
POWER CORD IEC 320 C19 TO IEC 320 C20 NS	1	A7294276	97.92	1	97.92	included
Reference offer Dell: 29860559	1					
Hardware Subtotal					84,594.34	
Software						
EXASolution 5.0 (incl. EXACluster OS 5.0)	2	51-100GB	85,000.00	1	85,000.00	10,200.00
Software Subtotal					85,000.00	10,200.00
Total					\$169,594.34	\$10,200.00

Three-Year Cost of Ownership:
QphH@100GB: 1,582,736.4
\$/QphH@100GB: \$0.12

Price Key: 1 DELL Emanuel Lippmann emanuel_lippmann@dell.com
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2 EXASOL Aaron Auld sales@exasol.com

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	100 GB
Total Data Storage / Database Size	150.32
Percentage Memory / Database Size	96.0%
Start of Database Load	2014-08-25 12:58:35
End of Database Load	2014-08-25 13:03:44
Database Load Time	0:05:09
Query Streams for Throughput Test	9
TPC-H Power	1,265,179.1
TPC-H Throughput	1,980,000.0
TPC-H Composite Query-per-Hour Metric (QpH@100GB)	1,582,736.4
Total System Price Over 3 Years	\$179,795
TPC-H Price/ Performance Metric (\$/QpH@100GB)	\$0.12

Measurement Interval

Measurement Interval in Throughput Test (Ts) 57 seconds

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
	825130344	2014-08-25 13:04:29	00 00:00:09	2014-08-25 13:04:28	2014-08-25 13:04:38
		2014-08-25 13:04:38	9	2014-08-25 13:04:29	2014-08-25 13:04:38

Throughput Stream	Seed	Query Start Time	Duration (sec)	RF1 Start Time	RF2 Start Time
		Query End Time		RF1 End Time	RF2 End Time
1	825130345	2014-08-25 13:04:37	00 00:00:32	2014-08-25 13:04:37	2014-08-25 13:04:40
		2014-08-25 13:05:09	32	2014-08-25 13:04:40	2014-08-25 13:04:42
2	825130346	2014-08-25 13:04:37	00 00:00:36	2014-08-25 13:04:42	2014-08-25 13:04:44
		2014-08-25 13:05:13	36	2014-08-25 13:04:44	2014-08-25 13:04:45
3	825130347	2014-08-25 13:04:37	00 00:00:36	2014-08-25 13:04:45	2014-08-25 13:04:46
		2014-08-25 13:05:13	36	2014-08-25 13:04:46	2014-08-25 13:04:47
4	825130348	2014-08-25 13:04:37	00 00:00:33	2014-08-25 13:04:47	2014-08-25 13:04:49
		2014-08-25 13:05:10	33	2014-08-25 13:04:49	2014-08-25 13:04:49
5	825130349	2014-08-25 13:04:38	00 00:00:33	2014-08-25 13:04:49	2014-08-25 13:04:51
		2014-08-25 13:05:11	33	2014-08-25 13:04:51	2014-08-25 13:04:52
6	825130350	2014-08-25 13:04:39	00 00:00:33	2014-08-25 13:04:52	2014-08-25 13:04:54
		2014-08-25 13:05:12	33	2014-08-25 13:04:54	2014-08-25 13:04:55
7	825130351	2014-08-25 13:04:39	00 00:00:34	2014-08-25 13:04:55	2014-08-25 13:04:57
		2014-08-25 13:05:13	34	2014-08-25 13:04:57	2014-08-25 13:04:58
8	825130352	2014-08-25 13:04:40	00 00:00:32	2014-08-25 13:04:58	2014-08-25 13:05:00
		2014-08-25 13:05:12	32	2014-08-25 13:05:00	2014-08-25 13:05:01
9	825130353	2014-08-25 13:04:40	00 00:00:32	2014-08-25 13:05:01	2014-08-25 13:05:02
		2014-08-25 13:05:12	32	2014-08-25 13:05:02	2014-08-25 13:05:03



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TPC-H Timing Intervals (in seconds)

Stream ID	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12
0	0.6	0.1	0.4	0.1	0.3	0.1	0.3	0.2	1.0	0.6	0.3	0.3
1	3.2	0.5	1.3	0.5	1.3	0.6	1.7	0.7	3.6	2.2	0.8	1.8
2	4.2	0.6	1.5	0.6	1.5	0.6	1.9	0.8	4.0	2.7	0.5	2.4
3	4.3	1.1	0.4	0.5	0.9	0.6	1.6	0.7	4.9	3.0	1.6	0.4
4	3.4	0.6	1.9	0.5	0.7	0.7	1.3	0.7	3.7	2.8	1.1	2.2
5	3.1	0.4	2.1	0.5	1.2	0.9	1.6	0.7	3.3	2.2	0.8	1.9
6	3.0	0.5	1.8	0.7	1.1	0.7	1.6	0.7	4.1	2.2	0.8	1.8
7	3.6	0.5	1.9	0.5	1.4	0.7	1.7	0.9	4.4	2.7	0.9	0.6
8	3.5	0.5	1.8	0.4	1.5	0.6	1.5	0.8	3.7	2.4	0.4	2.1
9	3.2	0.7	1.8	0.5	0.9	0.8	1.4	0.8	3.4	2.9	0.8	1.6
Min	0.6	0.1	0.4	0.1	0.3	0.1	0.3	0.2	1.0	0.6	0.3	0.3
Avg	3.2	0.6	1.5	0.5	1.1	0.6	1.5	0.7	3.6	2.4	0.8	1.5
Max	4.3	1.1	2.1	0.7	1.5	0.9	1.9	0.9	4.9	3.0	1.6	2.4

Stream ID	Q13	Q14	Q15	Q16	Q17	Q18	Q19	Q20	Q21	Q22	RF1	RF2
0	0.5	0.2	0.5	0.3	0.1	0.7	0.1	0.4	0.3	0.1	0.9	0.3
1	3.2	0.8	2.2	1.3	0.3	2.0	0.3	1.2	0.8	0.3	1.5	2.5
2	3.1	0.5	2.4	1.2	0.2	3.2	0.4	1.4	0.5	0.4	1.7	0.7
3	2.1	0.9	2.8	0.5	0.5	3.4	0.3	2.2	2.0	0.4	1.8	0.5
4	2.8	0.5	2.0	1.2	0.3	2.3	0.3	1.1	0.9	0.4	1.8	0.6
5	2.9	0.7	2.0	1.4	0.3	2.5	0.3	1.3	1.0	0.4	1.9	0.5
6	3.0	0.6	2.5	1.5	0.3	2.3	0.3	1.1	0.8	0.3	2.1	1.4
7	3.0	0.6	1.7	1.7	0.3	2.1	0.4	1.5	1.7	0.4	2.3	0.7
8	2.6	0.8	2.1	1.3	0.3	1.5	0.3	1.5	1.1	0.4	1.7	0.9
9	2.9	0.6	2.1	0.8	0.2	2.3	0.5	1.2	1.5	0.5	1.7	0.6
Min	0.5	0.2	0.5	0.3	0.1	0.7	0.1	0.4	0.3	0.1	0.9	0.3
Avg	2.6	0.6	2.0	1.1	0.3	2.2	0.3	1.3	1.1	0.4	1.7	0.9
Max	3.2	0.9	2.8	1.7	0.5	3.4	0.5	2.2	2.0	0.5	2.3	2.5