

DELL
PowerEdge R730/R730xd
w/ Cloudera CDH 5.4.2

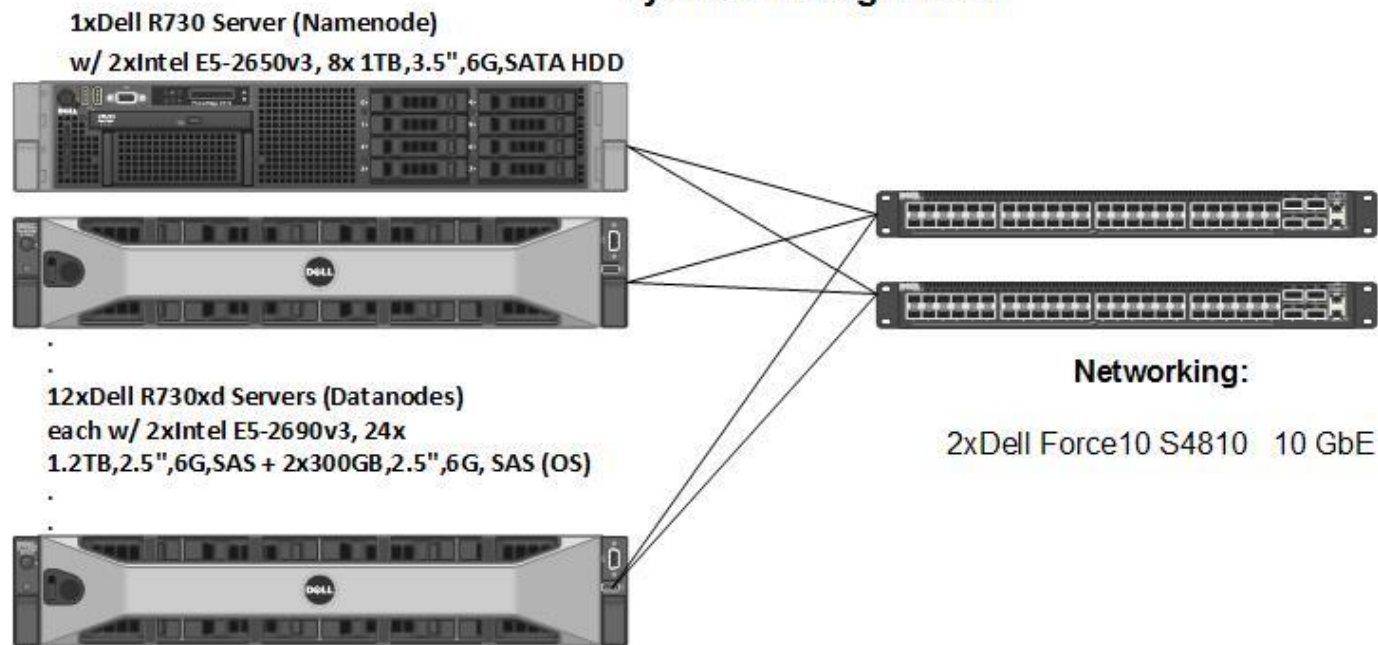
TPCx-HS Rev. 1.3.0
 TPC-Pricing Rev. 2.0.0

Report Date:
 October 15, 2015

Total System Cost	TPCx-HS Performance Metric	Price/Performance
USD 345,578	7.39 HSph@1TB	46,762.93 \$/HSph@1TB

Apache Hadoop Compatible Software	Operating System	Other Software	System Availability Date
Cloudera CDH 5.4.2 HDFS API Ver 2, Map Reduce API ver 1	Red Hat Enterprise Linux Server 6.5	OpenJDK 64-bit Server 1.7.0_45	October 15, 2015

System Configuration



Physical Storage/Scale Factor	Scale Factor/Physical Memory
360.80	0.60

Servers: 1 x Dell PowerEdge R730 / 12 x PowerEdge R730xd
 Processors/Cores/Threads : 26/308/616

Server Configuration	R730	R730xd
Processors	2xIntel Xeon E5-2650 v3 2.3GHz, 25MB L3	2xIntel Xeon E5-2690 v3 2.6GHz, 30MB L3
Memory	128GB	
Storage Controller	Dell PERC H730 Mini	
Storage Device	8 x 1TB, 3.5", 7.2K, 6G SATA	24x1.2TB, 2.5", 10K, 6G, SAS
Network Interface Cards	Intel x520 DP 10Gb Intel x520 DP 10GbE + I350 DP 1GbE	Intel x520 DP 10GbE + I350 DP 1GbE
Switches	2x Dell Force10 S4810	



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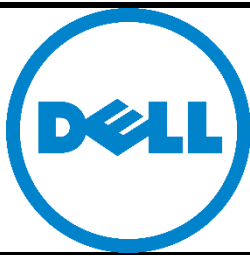
Report Date:
 September-30-2015

Description	Part Number	Key	Unit Price	Qty	Extended Price	3 yr. Maint. Price
HARDWARE COMPONENTS						
PowerEdge R730xd Server	210-ADBC	1	\$25,520.00	12	\$306,240.00	
PowerEdge R730/R730xd Motherboard	591-BBCH	1	\$0.00	12		
R730/xd PCIe Riser 2, Center	330-BBCO	1	\$0.00	12		
R730/xd PCIe Riser 1, Right	330-BBCR	1	\$0.00	12		
Intel X520 DP 10Gb DA/SFP+, + I350 DP 1Gb Ethernet, Network Daughter Card	540-BBBB	1	\$0.00	12		
Chassis with up to 24, 2.5 Hard Drives and 2, 2.5" Flex Bay Hard Drives	350-BBFE	1	\$0.00	12		
Performance BIOS Settings	384-BBBL	1	\$0.00	12		
UEFI BIOS	800-BBDM	1	\$0.00	12		
No RAID for H330/H730/H730P including Flex Bay Drives (1-24 HDDs or SSDs)	780-BBLS	1	\$0.00	12		
PERC H730 Integrated RAID Controller, 1GB Cache	405-AAEG	1	\$0.00	12		
Intel Xeon E5-2690 v3 2.6GHz,30M Cache,9.60GT/s QPI,Turbo,HT,12C/24T (135W) Max Mem 2133MHz	338-BFFL	1	\$0.00	12		
Upgrade to Two Intel Xeon E5-2690 v3 2.6GHz,30M Cache,9.60GT/s QPI,Turbo,HT,12C/24T (135W)	374-BBGS	1	\$0.00	12		
16GB RDIMM, 2133 MT/s, Dual Rank, x4 Data Width	370-ABUG	1	\$0.00	96		
2133MT/s RDIMMs	370-ABUF	1	\$0.00	12		
Performance Optimized	370-AAIP	1	\$0.00	12		
300GB 10K RPM SAS 6Gbps 2.5in Flex Bay Hard Drive,13G	400-AEOC	1	\$0.00	24		
1.2 TB 10K RPM SAS 6Gbps 2.5in Hot-plug Hard Drive,13G	400-AEFO	1	\$0.00	288		
Electronic System Documentation and OpenManage DVD Kit, PowerEdge R730/xd	631-AAJG	1	\$0.00	12		
ReadyRails Sliding Rails With Cable Management Arm	770-BBBR	1	\$0.00	12		
Dual, Hot-plug, Redundant Power Supply (1+1), 750W	450-ADWS	1	\$0.00	12		
C13 to C14, PDU Style, 12 AMP, 2 Feet (.6m) Power Cord, North America	492-BBDH	1	\$0.00	12		
DIMM Blanks for System with 2 Processors	370-ABWE	1	\$0.00	12		
Standard Heat sink for PowerEdge R730/R730xd	374-BBHM	1	\$0.00	12		
Standard Heat sink for PowerEdge R730/R730xd	374-BBHM	1	\$0.00	12		

INFO QS, 13G HADOOP BUNDLE	379-BBWM	1	\$0.00	12		
4hr Response, 24x7 Maintenance Package, R730xd			\$2,529.00	12		\$30,348.00
- Thank you choosing Dell ProSupport. For tech support, visit http://support.dell.com/ProSupport	911-6619	1	\$0.00	12		
- Dell Limited Hardware Warranty Plus Service, Initial Year	978-4029	1	\$0.00	12		
- ProSupport Mission Critical Package: Enhanced Services,3 Year	978-4042	1	\$0.00	12		
- ProSupport Mission Critical: 7X24 HW / SW Tech Support and Assistance,3 Year	978-4043	1	\$0.00	12		
- Mission Critical Package: 4-Hours 7X24 On-Site Service with Emergency Dispatch, 3 Year	978-4044	1	\$0.00	12		
- On-Site Installation Declined	900-9997	1	\$0.00	12		
- US Order	332-1286	1	\$0.00	12		
PowerEdge R730 Server	210-ACXU	1	\$13,026.00	1	\$13,026.00	
PowerEdge R730/R730xd Motherboard	591-BBCH	1	\$0.00	1		
R730/xd PCIe Riser 2, Center	330-BBCO	1	\$0.00	1		
R730 PCIe Riser 3, Left	330-BBCQ	1	\$0.00	1		
R730/xd PCIe Riser 1, Right	330-BBCR	1	\$0.00	1		
Intel X520 DP 10Gb DA/SFP+ Server Adapter, Low Profile	540-BBHY	1	\$0.00	1		
Intel X520 DP 10Gb DA/SFP+, + I350 DP 1Gb Ethernet, Network Daughter Card	540-BBBB	1	\$0.00	1		
Chassis with up to 8, 3.5" Hard Drives	350-BBEO	1	\$0.00	1		
Performance BIOS Settings	384-BBBL	1	\$0.00	1		
UEFI BIOS	800-BBDM	1	\$0.00	1		
No RAID for H330/H730/H730P (1-16 HDDs or SSDs)	780-BBJS	1	\$0.00	1		
PERC H730 Integrated RAID Controller, 1GB Cache	405-AAEG	1	\$0.00	1		
Intel Xeon E5-2650 v3 2.3GHz,25M Cache,9.60GT/s QPI,Turbo,HT,10C/20T (105W) Max Mem 2133MHz	338-BFFF	1	\$0.00	1		
Upgrade to Two Intel Xeon E5-2650 v3 2.3GHz,25M Cache,9.60GT/s QPI,Turbo,HT,10C/20T (105W)	374-BBGM	1	\$0.00	1		
16GB RDIMM, 2133 MT/s, Dual Rank, x4 Data Width	370-ABUG	1	\$0.00	8		
2133MT/s RDIMMs	370-ABUF	1	\$0.00	1		
Performance Optimized	370-AAIP	1	\$0.00	1		
1TB 7.2K RPM SATA 6Gbps 3.5in Hot-plug Hard Drive,13G	400-AEEZ	1	\$0.00	8		
Electronic System Documentation and OpenManage DVD Kit, PowerEdge R730/xd	631-AAJG	1	\$0.00	1		
DVD+/-RW, SATA, Internal	429-AAPS	1	\$0.00	1		
ReadyRails Sliding Rails With Cable Management Arm	770-BBBR	1	\$0.00	1		

Dual, Hot-plug, Redundant Power Supply (1+1), 750W	450-ADWS	1	\$0.00	1		
C13 to C14, PDU Style, 12 AMP, 2 Feet (.6m) Power Cord, North America	492-BBDH	1	\$0.00	2		
DIMM Blanks for System with 2 Processors	370-ABWE	1	\$0.00	1		
Standard Heat sink for PowerEdge R730/R730xd	374-BBHM	1	\$0.00	1		
Standard Heat sink for PowerEdge R730/R730xd	374-BBHM	1	\$0.00	1		
INFO QS, 13G HADOOP BUNDLE	379-BBWM	1	\$0.00	1		
4hr response, 24x7 Maintenance Package, R730		1	\$2,049.00	1		\$2,049.00
- Thank you choosing Dell ProSupport. For tech support, visit http://support.dell.com/ProSupport	911-6619	1	\$0.00	1		
- Dell Limited Hardware Warranty Plus Service, Initial Year	978-3603	1	\$0.00	1		
- ProSupport Mission Critical Package: Enhanced Services,3 Year	978-3617	1	\$0.00	1		
- ProSupport Mission Critical: 7X24 HW / SW Tech Support and Assistance,3 Year	978-3618	1	\$0.00	1		
- Mission Critical Package: 4-Hours 7X24 On-Site Service with Emergency Dispatch, 3 Year	978-3619	1	\$0.00	1		
- On-Site Installation Declined	900-9997	1	\$0.00	1		
- US Order	332-1286	1	\$0.00	1		
Dell Force10 S4810 Switch		1	\$21,156.00	2		\$42,312.00
Force10, S4810P, 1RU, 48 x 10GbE SFP+, 4 x 40GbE QSFP+, 1 x AC PSU, 2 x FM, PSU to IO Panels (Reverse)	225-2479	1	\$0.00	2		
Dell Networking, Jumper Cord, 250V, 12A, 2 Meters, C13/C14, US	450-AASX	1	\$0.00	2		
Force10 Customer not deploying this switch in iSCSI or FCOE environment.	332-0139	1	\$0.00	2		
INFO QS, 13G HADOOP BUNDLE	379-BBWM	1	\$0.00	2		
Dell Networking, Cable, SFP+ to SFP+, 10GbE, Copper Twinax Direct Attach Cable, 3 Meter	470-AAGP	1	\$0.00	30		
4hr response, 24x7 Maintenance Package, S4810		1	\$3,153.99	2		\$6,307.98
- Force10, User Documentation for S4810, DAO/BCC	331-6279	1	\$0.00	2		
- SW Support,Force10 Software ,3 Years	935-0103	1	\$0.00	2		
- ProSupport: 7x24 HW / SW Tech Support and Assistance, 3 Years	935-0143	1	\$0.00	2		
- Thank you choosing Dell ProSupport. For tech support, visit http://www.dell.com/support or call 1-800- 945-3355	989-3439	1	\$0.00	2		
- Dell Hardware Limited Warranty Initial Year	996-2670	1	\$0.00	2		
- Dell Hardware Limited Warranty Extended Year(s)	996-2760	1	\$0.00	2		

- On-Site Installation Declined	900-9997	1	\$0.00	2		
- Declined Remote Consulting Service	973-2426	1	\$0.00	2		
Dell Netshelter SX 42U Rack - 600mm Wide x 1070mm Deep	A7545497	1	\$1,279.99	1	\$1,279.99	
Logitech MK120 Keyboard and Mouse	A3974709	1	\$19.99	1	\$19.99	
HARDWARE COMPONENTS				Subtotal	\$362,877.98	\$38,704.98
SOFTWARE COMPONENTS						
Red Hat Enterprise Linux,1-2SKT,3yr Premium Subscription,1 Virtual Guest	421-5721	1	\$3,059.00	13	\$39,767.00	
- Red Hat Enterprise Linux Non Factory Install, x64,Reqs Subscription Selection	421-4727	1	\$0.00		\$0.00	
- Red Hat Enterprise Linux 6.5 Media Only X86_64, No Subscription	421-5737	1	\$0.00		\$0.00	
Cloudera Enterprise Basic Edition, Node License, 24x7 3YR	A8208056	1	6,912	13	\$89,856.00	
SOFTWARE COMPONENTS				Subtotal	\$129,623.00	\$0.00
Total					\$492,500.98	\$38,704.98
Large Purchase Discount (35%)*					-172,375.34	-13,546.74
ViewSonic VA2055Sa LED Monitor 20" (includes spares)	3701841	2	\$94.99	3	284.97	
Pricing: 1 - Dell 2 - CDW (www.cdw.com)					Three-Year Cost of Ownership:	\$345,578
* Discount based upon total system cost as purchased by a regular customer.					HSph@1TB:	7.39
Audited by Doug Johnson, Infosizing Inc. (www.sizing.com)					\$ / HSph@1TB:	46,762.93
<p><i>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.</i></p>						



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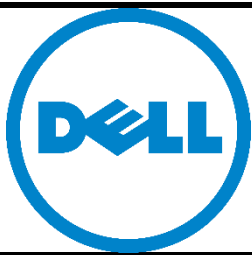
Numerical Quantities Summary

Measurement Results for Performance Run

Scale Factor	1TB
Run Start Time	2015/08/24 15:44:54
Run End Time	2015/08/24 15:52:57
Run Elapsed Time	487.000
Start of HSGen	2015/08/24 15:44:57
End of HSGen	2015/08/24 15:46:57
HSGen Time	123.444
Start of HSSort	2015/08/24 15:47:01
End of HSSort	2015/08/24 15:51:43
HSSort Time	282.430
Start of HSValidate	2015/08/24 15:51:49
End of HSValidate	2015/08/24 15:52:57
HSValidate Time	71.267

Measurement Results for Repeatability Run

Scale Factor	1TB
Run Start Time	2015/08/24 15:54:07
Run End Time	2014/08/24 16:02:06
Run Elapsed Time	482.000
Start of HSGen	2015/08/24 15:54:09
End of HSGen	2015/08/24 15:56:07
HSGen Time	120.380
Start of HSSort	2015/08/24 15:56:12
End of HSSort	2015/08/24 16:00:48
HSSort Time	277.511
Start of HSValidate	2015/08/24 16:00:54
End of HSValidate	2015/08/24 16:02:06
HSValidate Time	74.878



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Run Report

Full run report is provided in the SupportingFiles Archive. Summary lines are shown below.

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Performance Metric (HSph@SF) Report

Test Run 1 details: Total Time = 487
Total Size = 10000000000
Scale-Factor = 1.0000

TPCx-HS Performance Metric (HSph@SF): 7.3964

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Performance Metric (HSph@SF) Report

Test Run 2 details: Total Time = 482
Total Size = 10000000000
Scale-Factor = 1.0000

TPCx-HS Performance Metric (HSph@SF): 7.4738

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