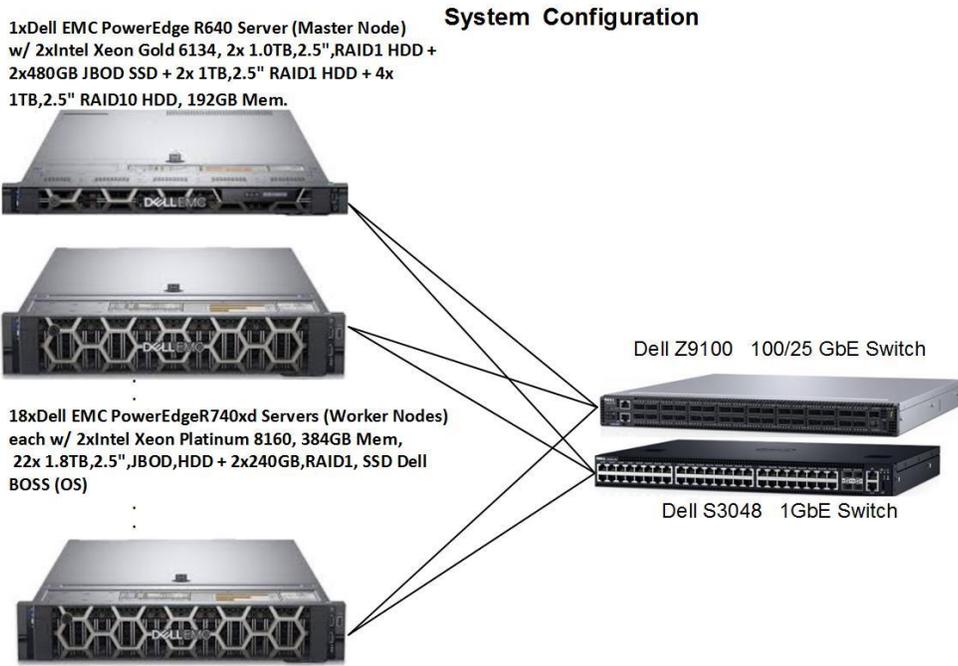


	<b>Dell PowerEdge 14G R640/R740xd</b>	TPCx-BB Rev. v1.2.0 TPC-Pricing Rev. v2.2.0
		Report Date: March 20, 2018
Total System Cost	TPCx-BB Performance Metric	Price/Performance
<b>908,125 USD</b>	<b>1,660.75</b> BBQpm@10000	<b>546.82 USD</b> \$/BBQpm@10000

Framework	Operating System	Other Software	Availability Date	Scale Factor	Streams
Cloudera CDH 5.13.1	Red Hat Enterprise Linux Server 7.3	None	March 20, 2018	10000	8

### System Configuration



Physical Storage/Scale Factor: 73.04	Scale Factor/Physical Memory: 1.41
--------------------------------------	------------------------------------

Servers:	19x R640/R740xd	
Total Processors/Cores/Threads	38/880/1,760	
Server Configuration:	<b>R640 (Master Node)</b> 2x Intel Xeon Gold 6134 @3.20GHz 192GB PERC H730P 12Gbps RAID Controller 2x 480GB SSD 8x 1TB HDD Mellanox ConnectX-4 Lx DP 25Gbe	<b>18x R740xd (Worker Nodes):</b> 2x Intel Xeon Platinum 8160 @2.10GHz 384GB HBA 330+ 12Gbps SAS Controller 2x 240GB SSD 22x 1.8TB HDD Mellanox ConnectX-4 Lx DP 25Gbe
Connectivity:	Dell Z9100 100/25 GbE Switch Dell S3048 1GbE Switch	



## Dell PowerEdge 14G R640/R740xd

TPCx-BB Rev. v1.2.0  
TPC-Pricing Rev. v2.2.0

Report Date:  
March 20, 2018

Description	Part Number	Key	Unit Price	Qty	ExtendedPrice	3 yr. Maint.Price
<b>HARDWARE COMPONENTS</b>						
<b>PowerEdge R740XD Server</b>	210-AKZR	1	\$25,520.00	\$63,779.47	18	\$1,148,030.46
Chassis with Up to 24 x 2.5" Hard Drives for 2CPU	321-BCPY	1	\$0.00	\$0.00	18	
No Trusted Platform Module	461-AADZ	1	1	\$0.00	18	
PowerEdge R740XD Shipping	340-BLBE	1	1	\$0.00	18	
Intel® Xeon® Platinum 8160 2.1G,24C/48T,10.4GT/s, 33M Cache,Turbo,HT (150W) DDR4-2666	338-BLMR	1	1	\$0.00	18	
Intel® Xeon® Platinum 8160 2.1G,24C/48T,10.4GT/s, 33M Cache,Turbo,HT (150W) DDR4-2666	374-BBOM	1	1	\$0.00	18	
2 Standard Heatsinks for greater than 125W CPUs (no MB or GPU)	412-AAIR	1	1	\$0.00	18	
6 Performance Fans forR740/740XD	384-BBPZ	1	1	\$0.00	18	
2666MT/s RDIMMs	370-ADNU	1	1	\$0.00	18	
Performance Optimized	370-AAIP	1	1	\$0.00	18	
32GB RDIMM, 2666MT/s, Dual Rank	370-ADNF	1	1	\$0.00	216	
C7, Unconfigured RAID for HDDs or SSDs (Mixed Drive Types Allowed)	780-BCDS	1	1	\$0.00	18	
HBA330+ Controller, 12Gbps Mini card	405-AANV	1	1	\$0.00	18	
1.8TB 10K RPM SAS 12Gbps 512e 2.5in Hot-plug Hard Drive	400-ARXC	1	1	\$0.00	396	
iDRAC9,Enterprise	385-BBKT	1	1	\$0.00	18	
ReadyRails™ Sliding Rails Without Cable Management Arm	770-BBBQ	1	1	\$0.00	18	
PowerEdge 2U Standard Bezel	325-BCHU	1	1	\$0.00	18	
Power Saving Dell Active Power Controller	750-AABF	1	1	\$0.00	18	
NEMA 5-15P to C13 Wall Plug, 125 Volt, 15 AMP, 10 Feet (3m), Power Cord, North America	450-AALV	1	1	\$0.00	36	
Dual, Hot-plug, Redundant Power Supply (1+1), 1100W	450-ADWWM	1	1	\$0.00	18	
No Systems Documentation, No OpenManage DVD Kit	631-AACK	1	1	\$0.00	18	
Red Hat Enterprise Linux Non Factory Install,x64,Req Lic&Sub Selection	421-4727	1	1	\$0.00	18	
No Media Required	421-5736	1	1	\$0.00	18	
Red Hat Enterprise Linux,2SKT,1 Physical OR 2Guest,3Yr PREMIUM SUB,No Media	634-BJBO	1	1	\$0.00	18	
UEFI BIOS Boot Mode with GPT Partition	800-BBDM	1	1	\$0.00	18	
BOSS controller card + with 2 M.2 Sticks 240G (RAID 1),FH	403-BBPT	1		\$0.00	18	
PowerEdge R740 Shipping Material	343-BBFU	1		\$0.00	18	
iDRAC Group Manager, Enabled	379-BCQV	1		\$0.00	18	
iDRAC,Legacy Password	379-BCSG	1		\$0.00	18	
Riser Config 2, 3 x8, 1 x16 slots	330-BBHB	1		\$0.00	18	
Mellanox ConnectX-4 Lx Dual Port 25GbE DA/SFP rNDC	406-BBLG	1		\$0.00	18	
Quick Sync 2 (At-the-box mgmt)	350-BBJU	1		\$0.00	18	
INFO QS, DATA ANALYTICS BUNDLE	379-BBWM	1		\$0.00	18	
3 Years ProSupport and Mission Critical 24x7, 4Hr Onsite Service	813-6068, 813-9295, 813-9296, 951-2015	1		\$2,677.44	18	\$48,193.92



## Dell PowerEdge 14G R640/R740xd

TPCx-BB Rev. v1.2.0  
TPC-Pricing Rev. v2.2.0

Report Date:  
March 20, 2018

Description	Part Number	Key	Unit Price	Qty	ExtendedPrice	3 yr. Maint.Price
<b>PowerEdge R640 Server</b>	210-AKWU	1	\$31,531.69	1	\$31,531.69	
2.5" Chassis with up to 10 Hard Drives and 3PCIe slots	321-BCQL	1	\$0.00	1		
No Trusted Platform Module	461-AADZ	1	\$0.00	1		
PowerEdge R640 Shipping	340-BKNE	1	\$0.00	1		
Intel® Xeon® Gold 6134 3.2G,8C/16T,10.4GT/s, 24.75M Cache,Turbo,HT (130W) DDR4-2666	338-BLMF	1	\$0.00	1		
Intel® Xeon® Gold 6134 3.2G,8C/16T,10.4GT/s, 24.75M Cache,Turbo,HT (130W) DDR4-2666	374-BBNZ	1	\$0.00	1		
Standard Heatsink for 2 CPU	370-ABWE	1	\$0.00	1		
8 Standard Fans for R640	384-BBQJ	1	\$0.00	1		
2666MT/s RDIMMs	370-ADNU	1	\$0.00	1		
Performance Optimized	370-AAIP	1	\$0.00	1		
16GB RDIMM, 2666MT/s, Dual Rank	370-ADND	1	\$0.00	12		
C7, Unconfigured RAID for HDDs or SSDs (Mixed Drive Types Allowed)	780-BCDS	1	\$0.00	1		
PERC H730P RAID Controller, 2GB NV Cache, Minicard	405-AANT	1	\$0.00	1		
480GB SSD SAS Mix Use 12Gbps 512n 2.5in Hot-plug Drive, PX05SV,3 DWPD,2628 TBW	400-ASEO	1	\$0.00	2		
1TB 7.2K RPM NLSAS 12Gbps 512n 2.5in Hot-plug Hard Drive	400-ASHE	1	\$0.00	8		
iDRAC9 Enterprise with OME Server Configuration Management	385-BBKT	1	\$0.00	1		
No Internal Optical Drive for 10 or 24 HDD Chassis	429-AAIQ	1	\$0.00	1		
ReadyRails™ Sliding Rails Without Cable Management Arm	770-BBBC	1	\$0.00	1		
No Bezel for x10 chassis	350-BBBW	1	\$0.00	1		
Power Saving Dell Active Power Controller	750-AABF	1	\$0.00	1		
NEMA 5-15P to C13 Wall Plug, 125 Volt, 15 AMP, 10 Feet (3m), Power Cord, North America	450-AALV	1	\$0.00	2		
Dual, Hot-plug, Redundant Power Supply (1+1), 750W	450-ADWS	1	\$0.00	1		
No Systems Documentation, No OpenManage DVD Kit	631-AACK	1	\$0.00	1		
Red Hat Enterprise Linux Non Factory Install,x64,Req Lic&Sub Selection	421-4727	1	\$0.00	1		
No Media Required	421-5736	1	\$0.00	1		
Red Hat Enterprise Linux,2SKT,1 Physical OR 2Guest,3Yr PREMIUM SUB,No Media	634-BJBO	1	\$0.00	1		
UEFI BIOS Boot Mode with GPT Partition	800-BBDM	1	\$0.00	1		
Energy Star	387-BBMK	1	\$0.00	1		
PowerEdge R640 x4 and x10 Drive Shipping Material	340-BLUC	1	\$0.00	1		
iDRAC Group Manager, Enabled	379-BCQV	1	\$0.00	1		
iDRAC,Legacy Password	379-BCSG	1	\$0.00	1		
Riser Config 4, 2x16 LP	330-BBGY	1	\$0.00	1		
Mellanox ConnectX-4 Lx Dual Port 25GbE DA/SFP rNDC	406-BBLG	1	\$0.00	1		
Quick Sync 2 (At-the-box mgmt)	350-BBKC	1	\$0.00	1		
INFO QS, DATA ANALYTICS BUNDLE	379-BBWM	1	\$0.00	1		
Dell Netshelter SX 42U Rack - 600mm Wide x 1070mm Deep	A7545497	1	\$1,299.99	1	\$1,299.99	
Logitech MK120 Keyboard and Mouse	A6999510	1	\$13.99	1	\$13.99	
Dell 24 Monitor	210-AIWG	1	\$169.99	1	\$169.99	
3 Years ProSupport and Mission Critical 24x7, 4Hr Onsite Service	813-9255, 813-9259, 813-9265, 989-3439	1	\$2,505.31	1		\$2,505.31



## Dell PowerEdge 14G R640/R740xd

TPCx-BB Rev. v1.2.0  
TPC-Pricing Rev. v2.2.0

Report Date:  
March 20, 2018

Description	Part Number	Key	Unit Price	Qty	Extended Price	3 yr. Maint. Price	
<b>Dell Networking Z9100-ON Pod Switch</b>							
Dell Networking Z9100-ON, 32x QSFP28 and 2x SFP+ fixed ports, PSU to IO airflow, 2x AC PSUs, OS9	210-AETC	1	\$51,508.00	1	\$51,508.00		
OS9 installed on Z9100-ON, with entitlement to OS10 Enterprise	634-BPDD	1	\$0.00	1			
Dell Networking, 100GbE Q28 to 4xSFP28 Passive Copper Breakout Cable, 2 Meter	470-ABOS	1	\$0.00	5			
Power Cord, 250V, 12A, 2 Meters, C13/C14, Qty 2	450-AASX, 450-AASX	1	\$0.00	1			
Dell Networking Z9100-ON User Guide	631-AAPO	1	\$21,156.00	1			
Software, Rights to use L3 on OS9, Z9100-ON	634-BEBM	1	\$0.00	1			
No Installation	900-9997	1	\$0.00	1			
INFO QS, DATA ANALYTICS BUNDLE	379-BBWM	1	\$0.00	1			
ProSupport Plus: 3 Year Mission Critical 4HR Onsite Service	803-9323, 803-9474, 803-9483, 803-9503, 951-2015, 975-3461, 997-6306	1	\$0.00	\$9,820.00	1	\$9,820.00	
<b>Dell Networking S3048-ON iDRAC Switch</b>							
Dell Networking S3048-ON, 48x 1GbE, 4x SFP+ 10GbE ports, Stacking, IO to PSU air, 1x AC PSU, DNOS 9	210-AEDM	1	\$11,345.68	1	\$11,345.68		
OS9 installed on S3048-ON, with entitlement to OS10 Enterprise	528-BBSY	1	\$0.00				
Software, Rights to use L3 on OS9, S3048-ON	634-BDXE						
Force10, Power Cord, 250V, 12A, 2 Meters, C13/C14	450-AASX	1	\$0.00				
Dell Networking S3048-ON User Guide	634-BCXR	1	\$0.00				
ProDeploy Dell Networking S Series 3XXX	805-2398, 805-2399	1	\$0.00				
Declined Remote Consulting Service	973-2426	1	\$0.00				
INFO QS, DATA ANALYTICS BUNDLE	379-BBWM	1	\$0.00				
3 year ProSupport 4hr response, 24x7	802-7389, 802-7394, 802-7400, 802-7403, 802-7404, 989-3439, 997-6306	1	\$1,495.33	1		\$1,495.33	
<b>HARDWARE COMPONENTS</b>					<b>Subtotal</b>	\$1,243,899.80	\$62,014.56
<b>SOFTWARE COMPONENTS</b>							
Cloudera Enterprise Basic Edition, Node License, 24x7 3YR	A9081370	1	1	4,800	19	\$91,200.00	
<b>SOFTWARE COMPONENTS</b>					<b>Subtotal</b>	\$91,200.00	\$0.00
<b>Total</b>						<b>\$1,335,099.80</b>	<b>\$62,014.56</b>
Large Purchase Discount (35%)*						-467,284.93	-21,705.10
Pricing: I = Dell					<b>Three-Year Cost of Ownership \$908,125</b>		
<p>(1) All discounts are based on US list prices and for similar quantities and configurations. The discounts are based on the overall specific components pricing from respective vendors in this single quotation. Discounts for similarly sized configurations will be similar to those quoted here, but may vary based on the components in the configuration.</p> <p style="text-align: center;"><b>Audited by Doug Johnson of InfoSizing</b></p>					<b>BBQpm@10000 1,660.75</b>		
					<b>\$/BBQpm@10000 \$ 546.82</b>		
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 at <a href="mailto:pricing@tpc.org">pricing@tpc.org</a> . Thank you.							



### Numerical Quantities

Scale Factor	10000
Streams	8
SUT Validation Test	PASS

### Performance Run (Run 2)

Overall Run Start Time	2018-02-21 21:56:35.983
Overall Run End Time	2018-02-22 23:17:50.147
Overall Run Elapsed Time	91,274.164

Load Test Start Time	2018-02-21 21:56:35.983
Load Test End Time	2018-02-21 22:33:06.640
Load Test Elapsed Time	2,190.657

Power Test Start Time	2018-02-21 22:33:06.641
Power Test End Time	2018-02-22 03:48:56.072
Power Test Elapsed Time	18,949.431

Throughput Test Start Time	2018-02-22 03:48:56.073
Throughput Test End Time	2018-02-22 23:17:50.147
Throughput Test Elapsed Time	70,134.074

Performance Metric (BBQpm@ 10000)	1,660.75
-----------------------------------	----------

### Repeatability Run (Run 1)

Overall Run Start Time	2018-02-20 19:25:02.650
Overall Run End Time	2018-02-21 20:47:30.424
Overall Run Elapsed Time	91,347.774

Load Test Start Time	2018-02-20 19:25:02.651
Load Test End Time	2018-02-20 20:01:32.356
Load Test Elapsed Time	2,189.705

Power Test Start Time	2018-02-20 20:01:32.358
Power Test End Time	2018-02-21 01:16:22.830
Power Test Elapsed Time	18,890.472

Throughput Test Start Time	2018-02-21 01:16:22.831
Throughput Test End Time	2018-02-21 20:47:30.424
Throughput Test Elapsed Time	70,267.593

Performance Metric (BBQpm@ 10000)	1,660.79
-----------------------------------	----------



### Performance Run Report (Run 2)

```
*****
TPCx-BB
Result
v1.2
*****
INFO: T_LOAD = 2190.657
INFO: T_LD = 0.1 * T_LOAD: 219.0657
INFO: T_PT = 12863.5069618657
INFO: T_T_PUT = 70134.074
INFO: T_TT = 8766.75925
INFO: === Checking validity of the final result ===
INFO: OK: All required BigBench phases were performed.
INFO: OK: All 30 queries were running in the power test.
INFO: OK: All 30 queries were running in the first throughput test.
INFO: OK: Pretend mode was inactive. All commands were executed.
INFO: === Final result ===
INFO: VALID BBQpm@10000 = 1660.75446611642
```

### Repeatability Run Report (Run 1)

```
*****
TPCx-BB
Result
v1.2
*****
INFO: T_LOAD = 2189.705
INFO: T_LD = 0.1 * T_LOAD: 218.9705
INFO: T_PT = 12838.6663454205
INFO: T_T_PUT = 70267.593
INFO: T_TT = 8783.449125
INFO: === Checking validity of the final result ===
INFO: OK: All required BigBench phases were performed.
INFO: OK: All 30 queries were running in the power test.
INFO: OK: All 30 queries were running in the first throughput test.
INFO: OK: Pretend mode was inactive. All commands were executed.
INFO: === Final result ===
INFO: VALID BBQpm@10000 = 1660.79427640449
```

Summary details of the run reports are shown above. For the complete run reports, see the Support Files Archive.