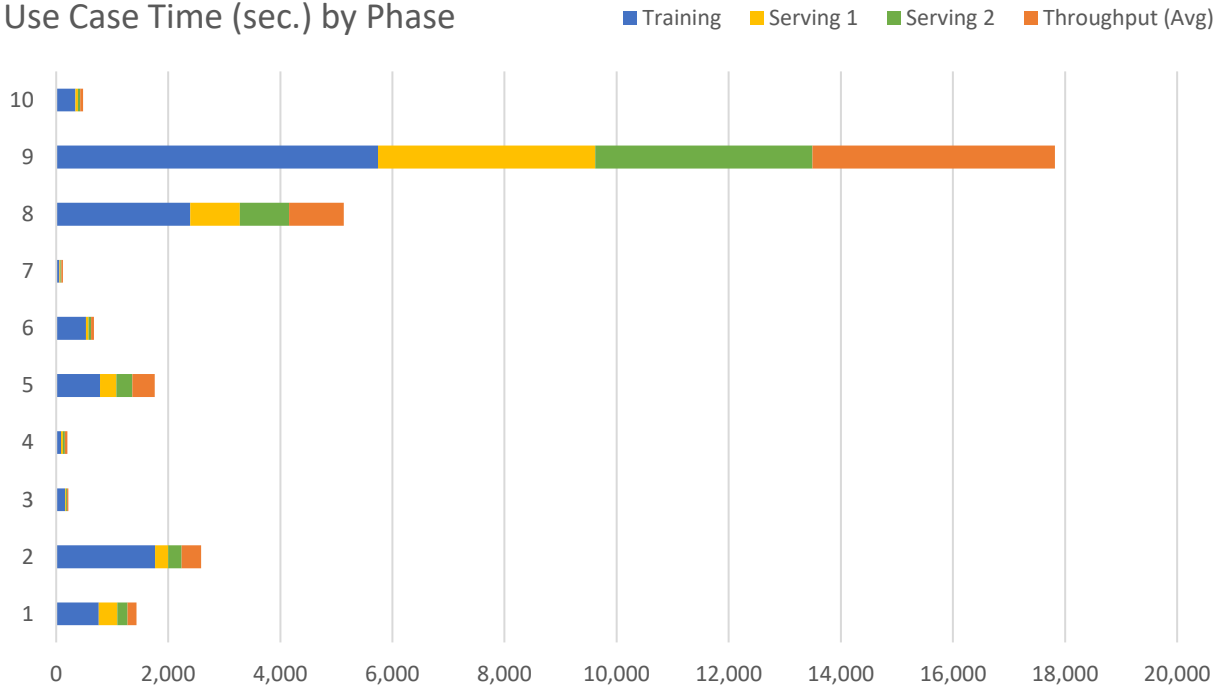




		<h1>PowerEdge R650</h1>		TPCx-AI 1.0.2 TPC Pricing 2.8.0 Report Date Nov. 30, 2022
TPCx-AI Performance 2,375.83 AIUCpm@1000	Total System Cost \$758,223 USD	Price/Performance \$319.15 USD/AIUCpm@1000	Availability Date November 30, 2022	
Framework Cloudera CDP Private Cloud Base v7.1.7	Operating System Red Hat Enterprise Linux 8.4	Other Software N/A	Scale Factor 1,000	Streams 12
<h3>Use Case Time (sec.) by Phase</h3> 				
Physical Storage / Scale Factor 153.92	Scale Factor / Physical Memory 0.19	Main Data Redundancy Model Replication 3 & RAID		
Servers: Total Processors/Cores/Threads	11 22 / 616 / 1,232			
Server Type	1x PowerEdge R650 (Master)	10x PowerEdge R650 (Worker)		
Processors	2x Intel(R) Xeon(R) Gold 6348 CPU @ 2.60GHz	2x Intel(R) Xeon(R) Gold 6348 CPU @ 2.60GHz		
Memory	256 GiB	512 GiB		
Storage Controller	1x PERC H755 RAID Controller	None		
Storage Device	2x 480 GB BOSS; 4x 3.84 TB SAS SSD	2x 480 GB BOSS; 4x 3.2 TB Ent P5600 MU NVMe		
Network Controller	1x Intel Ethernet 25G 2-port E810-XXV OCP NIC	1x Intel Ethernet 25G 2-port E810-XXV OCP NIC		
Connectivity	1x Dell PowerSwitch S5212-ON 100/25 (Cluster Interconnect)			

		<h1 style="text-align: center;">PowerEdge R650</h1>			TPCx-AI	1.0.2
					TPC Pricing	2.8.0
					Report Date	Nov. 30, 2022
Description	Part Number	Source	List Price	Qty	Extended Price	1-Yr. Maintenance
Hardware						
PowerEdge R650 Server	210-AYJZ	1	\$87,099.92	10	\$870,999.20	
10x2.5 Front Storage	379-BEID	1	\$0.00	10		
NVMe Backplane	379-BDSX	1	\$0.00	10		
2x2.5 Rear Storage	379-BDTD	1	\$0.00	10		
Trusted Platform Module 2.0 V3	461-AAIG	1	\$0.00	10		
2.5" Chassis with up to 10 NVMe Drives, 2x2.5" Rear NVMe Drive	321-BGHK	1	\$0.00	10		
Intel® Xeon® Gold 6348 2.6G, 28C/56T, 11.2GT/s, 42M Cache, Tu	338-CBCI	1	\$0.00	10		
Intel® Xeon® Gold 6348 2.6G, 28C/56T, 11.2GT/s, 42M Cache, Tu	338-CBCI	1	\$0.00	10		
Heatsink for 2 CPU configuration (CPU more than 165W)	412-AAVM	1	\$0.00	10		
Performance Optimized	370-AAIP	1	\$0.00	10		
App DirectMode Intel Optane Persistent Memory 200 series	370-AGJF	1	\$0.00	10		
32GB RDIMM, 3200MT/s, Dual Rank, 16Gb BASE x8	370-AGDS	1	\$0.00	160		
128GB Optane Persistent Memory 200 Series, 3200MT/s	370-AGEX	1	\$0.00	20		
C30, No RAID for NVME chassis	780-BCDO	1	\$0.00	10		
No Controller	405-AAAD	1	\$0.00	10		
No Hard Drive	400-ABHL	1	\$0.00	10		
3.2TB, Enterprise, NVMe, Mixed Use, U2, G4, P5600 with carrier	400-BLKF	1	\$0.00	20		
3.2TB, Enterprise, NVMe, Mixed Use, U2, G4, P5600 Flex Bay	400-BLKI	1	\$0.00	20		
Power Saving Dell Active Power Controller	750-AABF	1	\$0.00	10		
UEFI BIOS Boot Mode with GPT Partition	800-BBDM	1	\$0.00	10		
4 Very High Performance Fans for 2 CPU	384-BCUJ	1	\$0.00	10		
Dual, Hot-plug, Power Supply Fault Tolerant Redundant (1+1),	450-AIQX	1	\$0.00	10		
C13 to C14, PDU Style, 12 AMP, 6.5 Feet (2m) Power Cord, Nort	492-BBDI	1	\$0.00	20		
Riser Config 6, Half Length, Low Profile, 1 x16 Slot With R1 Pad	330-BBTE	1	\$0.00	10		
PowerEdge R650 Motherboard, Barlow Pass Enabled, with Bro	329-BGKP	1	\$0.00	10		
iDRAC9 Datacenter 15G with OpenManage Enterprise Advance	528-CRVW	1	\$0.00	10		
Intel E810-XXV Dual Port 10/25GbE SFP28, OCP NIC 3.0	540-BCXW	1	\$0.00	10		
Standard Bezel for x8 and x10 Chassis	325-BCHH	1	\$0.00	10		
BOSS-S2 controller card + with 2 M.2 480GB (RAID 1)	403-BCMB	1	\$0.00	10		
No Quick Sync	350-BBXM	1	\$0.00	10		
iDRAC, Factory Generated Password	379-BCSF	1	\$0.00	10		
iDRAC Group Manager, Disabled	379-BCQY	1	\$0.00	10		
No Operating System, No Utility Partition, BOSS	611-BBBX	1	\$0.00	10		
No Media Required	605-BBFN	1	\$0.00	10		
ReadyRails Sliding Rails With Cable Management Arm	770-BDMT	1	\$0.00	10		
No Systems Documentation, No OpenManage DVD Kit	631-AAACK	1	\$0.00	10		
PowerEdge R650 Shipping	340-CUQR	1	\$0.00	10		
R650 Ship 4x3.5, 10x2.5, 8x2.5 NVMe	340-CUQN	1	\$0.00	10		
PowerEdge R650 CE CCC Marking, No BIS Marking	389-DYHZ	1	\$0.00	10		
US No Canada Ship Charge	332-1286	1	\$0.00	10		
No FGA	817-BBBB	1	\$0.00	10		
Basic Next Business Day 36 Months, 36 Month(s)	709-BBFM	1	\$200.00	10		\$2,000.00
Prosupport Plus and 4Hr Mission Critical, 36 Month(s)	865-BBNF	1	\$6,285.59	10		\$62,855.90
No Installation	900-9997	1	\$0.00	10		
Red Hat Enterprise Linux, Non Factory Install, Requires License	605-BBFL	1	\$0.00	10		
RHEL, 1-2SKT, Physical Node, 1YR Premium Sub, up to 4 Virtual	528-CHFM	1	\$0.00	10		
(continued on the next page)						

	<h1 style="text-align: center;">PowerEdge R650</h1>				TPCx-AI	1.0.2
					TPC Pricing	2.8.0
					Report Date	Nov. 30, 2022
(continued from the previous page)						
Description	Part Number	Source	List Price	Qty	Extended Price	1-Yr. Maintenance
PowerEdge R650 Server	210-AYJZ	1	\$66,799.76	1	\$66,799.76	
8x2.5 Front Storage	379-BEIC	1	\$0.00	1		
SAS/SATA Backplane	379-BDSS	1	\$0.00	1		
No Rear Storage	379-BDTE	1	\$0.00	1		
Trusted Platform Module 2.0 V3	461-AAIG	1	\$0.00	1		
2.5" Chassis with up to 8 Hard Drives (SAS/SATA), 3 PCIe Slots, 321-BGHH	321-BGHH	1	\$0.00	1		
Intel® Xeon® Gold 6348 2.6G, 28C/56T, 11.2GT/s, 42M Cache, Tu 338-CBCI	338-CBCI	1	\$0.00	1		
Intel® Xeon® Gold 6348 2.6G, 28C/56T, 11.2GT/s, 42M Cache, Tu 338-CBCI	338-CBCI	1	\$0.00	1		
Heatsink for 2 CPU configuration (CPU more than 165W)	412-AAVM	1	\$0.00	1		
Performance Optimized	370-AAIP	1	\$0.00	1		
3200MT/s RDIMMs	370-AEVR	1	\$0.00	1		
16GB RDIMM, 3200MT/s, Dual Rank	370-AEQ	1	\$0.00	16		
C7, Unconfigured RAID for HDDs or SSDs (Mixed Drive Types AI	780-BCDS	1	\$0.00	1		
Front PERC H755 Front Load	405-AAZB	1	\$0.00	1		
3.84TB SSD SAS Read Intensive 12Gbps 512 2.5in Hot-plug AG D	400-AXPE	1	\$0.00	4		
Power Saving Dell Active Power Controller	750-AABF	1	\$0.00	1		
UEFI BIOS Boot Mode with GPT Partition	800-BBDM	1	\$0.00	1		
4 Very High Performance Fans for 2 CPU	384-BCUJ	1	\$0.00	1		
Dual, Hot-plug, Power Supply Fault Tolerant Redundant (1+1), 450-AIQX	450-AIQX	1	\$0.00	1		
C13 to C14, PDU Style, 12 AMP, 6.5 Feet (2m) Power Cord, Nort	492-BBDI	1	\$0.00	2		
Riser Config 0, 2CPU, Half Length, Low Profile, 3 x16 Slots, SW (330-BBRP	1	\$0.00	1		
PowerEdge R650 Motherboard with Broadcom 5720 Dual Port 1329-BFGW	1329-BFGW	1	\$0.00	1		
iDRAC9 Datacenter 15G with OpenManage Enterprise Advance 528-CRVW	528-CRVW	1	\$0.00	1		
Intel E810-XXV Dual Port 10/25GbE SFP28, OCP NIC 3.0	540-BCXW	1	\$0.00	1		
Standard Bezel for x8 and x10 Chassis	325-BCHH	1	\$0.00	1		
BOSS-S2 controller card + with 2 M.2 480GB (RAID 1)	403-BCMB	1	\$0.00	1		
No Quick Sync	350-BBXM	1	\$0.00	1		
iDRAC, Factory Generated Password	379-BCSF	1	\$0.00	1		
iDRAC Group Manager, Disabled	379-BCQY	1	\$0.00	1		
No Media Required	605-BBFN	1	\$0.00	1		
ReadyRails Sliding Rails With Cable Management Arm	770-BDMT	1	\$0.00	1		
No Systems Documentation, No OpenManage DVD Kit	631-AACK	1	\$0.00	1		
PowerEdge R650 Shipping	340-CUQR	1	\$0.00	1		
R650 Ship 8x2.5	340-CUQO	1	\$0.00	1		
PowerEdge R650 CE CCC Marking, No BIS Marking	389-DYHZ	1	\$0.00	1		
US No Canada Ship Charge	332-1286	1	\$0.00	1		
No FGA	817-BBBB	1	\$0.00	1		
Basic Next Business Day 36 Months, 36 Month(s)	709-BBFM	1	\$200.00	1		\$200.00
No Installation	900-9997	1	\$0.00	1		
Prosupport Plus and 4Hr Mission Critical, 36 Month(s)	865-BBMY	1	\$4,823.98	1		\$4,823.98
Red Hat Enterprise Linux, Non Factory Install, Requires License	605-BBFL	1	\$0.00	1		
RHEL, 1-2SKT, Physical Node, 1YR Premium Sub, up to 4 Virtual	528-CHFM	1	\$0.00	1		
(continued on the next page)						

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Pricing: 1 = Dell * Discount applies to all line items where Key = 1. Discount based upon total system cost as purchased by a regular customer. Audited by Doug Johnson, InfoSizing			Total System Cost (USD): \$758,223 AIUCpm@1000: 2,375.83 \$/AIUCpm@1000: \$319.15																																																																																																																																																								
<i>Prices used in TPC benchmarks reflect the actual prices a customer would pay for a one-time purchase of the stated Line Items. 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 Line Items. For complete details, see the pricing section of the TPC Benchmark Standard. If you find that the stated prices are not available according to these terms, please inform the TPC at pricing@tpc.org. Thank you.</i>																																																																																																																																																											

	<h2 style="text-align: center;">PowerEdge R650</h2>		TPCx-AI	1.0.2
			TPC Pricing	2.8.0
			Report Date	Nov. 30, 2022
<u>Numerical Quantities</u>				
AIUCpm@1000	2,375.83	T_{Load}	1,051.29	
Scale Factor	1,000	T_{LD}	1,051.29	
Streams	12	T_{PTT}	539.33	
Kit Version	1.0.2	T_{PST1}	132.23	
Execution Status	Pass	T_{PST2}	125.34	
Accuracy Status	Pass	T_{PST}	132.23	
		T_{TT}	54.26	
Test Times				
Overall Run Start Time	2022-11-13 20:48:57.882			
Overall Run End Time	2022-11-14 06:47:52.912			
Overall Run Elapsed Time	35,935.030			
Load Test Start Time	2022-11-13 21:49:52.611			
Load Test End Time	2022-11-13 22:07:26.619			
Load Test Elapsed Time	1,054.008			
Power Training Start Time	2022-11-13 22:07:26.622			
Power Training End Time	2022-11-14 01:38:09.123			
Power Training Elapsed Time	12,642.501			
Power Serving 1 Start Time	2022-11-14 01:38:09.126			
Power Serving 1 End Time	2022-11-14 03:14:33.394			
Power Serving 1 Elapsed Time	5,784.268			
Power Serving 2 Start Time	2022-11-14 03:14:33.397			
Power Serving 2 End Time	2022-11-14 04:48:31.998			
Power Serving 2 Elapsed Time	5,638.601			
Scoring Start Time	2022-11-14 04:53:08.070			
Scoring End Time	2022-11-14 04:59:06.741			
Scoring Elapsed Time	358.671			
Throughput Start Time	2022-11-14 04:59:06.748			
Throughput End Time	2022-11-14 06:47:52.911			
Throughput Elapsed Time	6,526.163			



PowerEdge R650

TPCx-AI 1.0.2
 TPC Pricing 2.8.0
 Report Date Nov. 30, 2022

Numerical Quantities (continued)

Use Case Times & Accuracy

Use Case	Training (sec)	Serving 1 (sec)	Serving 2 (sec)	Throughput (avg)	Accuracy
UC01	760.126	330.202	183.356	162.179	0.000
UC02	1,767.185	233.195	236.392	349.423	0.447
UC03	163.555	16.290	17.075	20.986	4.566
UC04	85.620	35.504	34.891	43.331	0.712
UC05	781.675	291.996	286.369	401.790	0.045
UC06	534.701	42.902	44.247	52.262	0.214
UC07	56.118	19.731	19.508	23.678	1.649
UC08	2,392.557	885.664	880.609	972.694	0.750
UC09	5,743.970	3,871.879	3,878.694	4,323.962	1.000
UC10	343.443	43.284	43.874	51.555	0.817

Use Case Serving Times (sec.)

