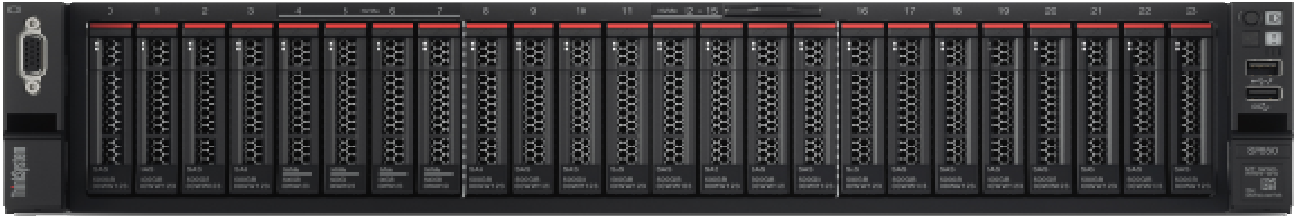


	Lenovo® ThinkSystem™ SR650		TPC-E™ 1.14.0 TPC Pricing 2.3.0
			Report Date: Sept 10, 2018 Revision Date: Sept 10, 2018
TPC-E Throughput 6,779.53 tpsE™	Price/Performance \$92.49 USD per tpsE	Availability Date September 10, 2018	Total System Cost \$626,980 USD
Database Server Configuration			
Operating System Microsoft® Windows Server® 2016 Standard Edition	Database Manager Microsoft SQL Server® 2017 Enterprise Edition	Processors/Cores/Threads 2/56/112	Memory 1536GB
			
 2 x 10Gb Ethernet		 4 x 12Gb SAS x 8	
TIER A (Client) 1 x Lenovo System x3650 M5, with: <ul style="list-style-type: none"> - 2 x Intel® Xeon® Processor E5-2699 v4 2.20GHz (2 Procs/44 Cores/88 Threads) - 64GB Memory - 2 x 600GB SFF SAS (RAID-1) - 1 x ServeRAID M5210 - 1 x Onboard Quad Gb Ethernet - 3 x Intel x540 Dual 10Gb-T Ethernet 	TIER B (Database Server and Storage) 1 x Lenovo ThinkSystem SR650, with: <ul style="list-style-type: none"> - 2 x Intel Xeon Platinum 8180 Processor 2.50GHz (2 Procs/56 Cores/112 Threads) - 1536GB Memory - 2 x 800GB SAS SSD (RAID-1) - 6 x 800GB SAS SSD (RAID-10) - 1 x ThinkSystem RAID 930-8i - 4 x ThinkSystem RAID 930-8e - 1 x Onboard Dual Gb Ethernet - 2 x Intel x550 Dual 10Gb-T Ethernet 	4 x Lenovo Storage D1224 DAS Enclosures, with: <ul style="list-style-type: none"> - 74 x 800GB 2.5" SAS SSD (4 x 17-drive RAID-5) (1 x 6-drive RAID-10) <p style="text-align: right;">74 Total External Drives</p>	
Initial Database Size 29,145 GB	Redundancy Level: 1 RAID-10 Log, tempdb RAID-5 Data	Storage 82 x 800GB 2.5" SAS SSD	



Lenovo ThinkSystem SR650

TPC-E 1.14.0 TPC Pricing 2.3.0

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Description	Part Number	Price Source	Unit Price	Quantity	Extended Price	3-Yr. Maint. Price
Server Hardware						
ThinkSystem SR650 Configure-To-Order, includes:	7X06CT01WW	1	136,604	1	136,604	
ThinkSystem SR650 2.5" Chassis with 8, 16 or 24 bays	AUVV			1		
Intel Xeon Platinum 8180 28C 205W 2.5GHz Processor	AWDF			2		
ThinkSystem 64GB TruDDR4 2666 MHz (4Rx4 1.2V) LRDIMM	AUNE			24		
ThinkSystem 2U/Twr 2.5" SATA/SAS 8-Bay Backplane	AURA			1		
ThinkSystem RAID 930-8i 2GB Flash PCIe 12Gb Adapter	AUNJ			1		
ThinkSystem 2.5" PM1635a 800GB Mainstream SAS 12Gb Hot Swap SSD	AUMD			2		
ThinkSystem 2.5" HUSMM32 800GB Performance SAS 12Gb Hot Swap SSD	AUMH			6		
ThinkSystem 2U x8/x8/x8 PCIe FH Riser 1	AUR4			1		
ThinkSystem SR550/SR590/SR650 (x16/x8)(x16/x16) PCIe FH Riser 2 Kit	AURC			1		
ThinkSystem 1Gb 2-port RJ45 LOM	AUKG			1		
Intel X550-T2 Dual Port 10GBase-T Adapter	ATPX			2		
ThinkSystem RAID 930-8e 4GB Flash PCIe 12Gb Adapter	AUNQ			4		
ThinkSystem Toolless Slide Rail	AXCA			1		
ThinkSystem 2U left EIA Latch Standard	AURD			1		
ThinkSystem 1100W (230V/115V) Platinum Hot-Swap Power Supply	AVWF			2		
2.8m, 13A/100-250V, C13 to C14 Jumper Cord	6400			2		
Lenovo ThinkSystem 2U 3FH Riser Bracket	AURQ			1		
Lenovo ThinkSystem 2U 2FH Riser Bracket	AURP			1		
FBU345 SuperCap	ALNP			5		
Lenovo ThinkSystem Mainstream MB - 2U	AUQB			1		
Essential Service - 3Yr 24x7 4Hr Response + YourDrive YourData (SR650)	5PS7A01558	1	699	1		699
				Subtotal	136,604	699
Server Storage						
Lenovo Storage D1224 SFF Chassis, Dual ESM	4587A31	1	2,999	4	11,996	
External MiniSAS HD 8644/MiniSAS HD 8644 1M Cable	00YL848	1	59	8	472	
Lenovo Storage 800GB 10 DWD 2.5" SAS SSD	01DC452	1	2,999	74	221,926	
Essential Service - 3Yr 24x7 4Hr Response (D1224)	01JR577	1	1,169	4		4,676
				Subtotal	234,394	4,676
Server Software						
SQL Server 2017 Enterprise Edition (2 Core License)	N/A	2	13,472.50	28	377,230	
Windows Server 2016 Standard Edition (2 Core License)	N/A	2	92	28	2,576	
Microsoft Problem Resolution Services (1 Incident)	N/A	2	259	1		259
				Subtotal	379,806	259
Client Hardware						
System x3650 M5 Configure-To-Order, includes:	8871AC1	1	21,273	1	21,273	
System x3650 M5 Base + Planar + Power Paddle Card	ATDY, ATE4, A5FT			1		
System x 750W High Efficiency Platinum AC Power Supply	A5EU			2		
Intel Xeon Processor E5-2699 v4 22C 2.2GHz 55MB Cache 2400MHz 145W	ATF2, ATFT			2		
System x3650 M5 PCIe Risers 1 & 2 + Thermal Kit	A5FQ, A5R6, ASQD			1		
System x Gen-II Universal Slides Kit	A5FW			1		
600GB 10K 12Gbps SAS 2.5" G3HS HDD	AT8A			2		
x3650 M5 8x 2.5" HS HDD Assembly Kit (Single RAID)	A5G6			1		
8GB TruDDR4 Memory (2Rx8, 1.2V) PC4-19200 CL17 2400MHz LP RDIMM	ATC9			8		
Power Cable	6311			2		
ServeRAID M5210 SAS/SATA Controller	A3YZ			1		
Intel X540-T2 Dual Port 10GBaseT Adapter	A2ED			2		
Intel X540 ML2 Dual Port 10GbaseT Adapter	A40P			1		
System x3650 M5 Riser Bracket	A5G5			2		
System x3650 M5 EIA L- Blank, Right EIA, & EIA Plate	ATEA, A5V5, A5G1			1		
System x3650 M5 Single Rotor Fan	ATEC			4		
Essential Service - 3Yr 24x7 4Hr Response + YourDrive YourData (x3650 M5)	01GX547	1	790	1		790
				Subtotal	21,273	790
Client Software						
Windows Server 2016 Standard Edition (2 Core License)	N/A	2	92	22	2,024	
				Subtotal	2,024	0
Infrastructure						
S2 42U Standard Rack	93074RX	1	1,565	1	1,565	
0U 36 C13/6 C19 24A/200-240V 1 Phase PDU with NEMA L6-30P line cord	00YJ776	1	479	1	479	
ThinkSystem Pref. Pro II USB Keyboard - US English	AXTL	1	29	1	29	
ThinkSystem Optical Wheel Mouse - USB	BOLN	1	19	1	19	
ThinkVision E2054 19.5-inch LED Backlit LCD Monitor	60DFAAR1US	1	119	1	119	
1.0m CAT6 Green Cable	00WE127	1	19	2	38	
Essential Service - 3Yr 24x7 4Hr Response (Rack)	41L2760	1	315	1		315
				Subtotal	2,249	315
				Total	776,350	6,739
Dollar Volume Discount (See Note 1)	38.93%	1			156,109	

Pricing: 1 - Lenovo 1-877-782-7134; 2 - Microsoft
 Note 1: Discount applies to all line items where Pricing=1; pricing is for these or similar quantities.
 Discounts for similarly sized configurations will be similar to what is quoted here, but may vary based on the specific components priced.

Benchmark results and test methodology audited by Doug Johnson for 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 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.

Three-Year Cost of Ownership USD: \$626,980
TPC-E Throughput: 6,779.53
\$ USD/tpsE: \$92.49



Lenovo ThinkSystem SR650

TPC-E 1.14.0
TPC Pricing 2.3.0

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Numerical Quantities Summary

Reported Throughput:
6,779.53 tpsE

Configured Customers:
3,550,000

Response Time (in seconds)	Minimum	Average	90 th Percentile	Maximum
Broker-Volume	0.01	0.01	0.02	0.23
Customer-Position	0.01	0.01	0.02	0.23
Market-Feed	0.01	0.01	0.04	0.38
Market-Watch	0.01	0.01	0.01	0.23
Security-Detail	0.01	0.01	0.01	0.22
Trade-Lookup	0.01	0.04	0.06	0.29
Trade-Order	0.01	0.03	0.06	0.37
Trade-Result	0.01	0.03	0.05	0.30
Trade-Status	0.01	0.01	0.01	0.23
Trade-Update	0.01	0.05	0.07	0.31
Data-Maintenance	0.01	0.02	N/A	0.05

Transaction Mix	Transaction Count	Mix %
Broker-Volume	23,918,991	4.900%
Customer-Position	63,458,054	13.000%
Market-Feed	4,881,271	1.000%
Market-Watch	87,865,290	18.000%
Security-Detail	68,339,774	14.000%
Trade-Lookup	39,051,044	8.000%
Trade-Order	49,302,135	10.100%
Trade-Result	48,812,645	10.000%
Trade-Status	92,746,539	19.000%
Trade-Update	9,762,676	2.000%
Data-Maintenance	120	N/A

Test Duration and Timings

Ramp-up Time (hh:mm:ss)	02:02:47
Measurement Interval (hh:mm:ss)	02:00:00
Business Recovery Time (hh:mm:ss)	00:25:35
Total Number of Transactions Completed in Measurement Interval	488,138,419