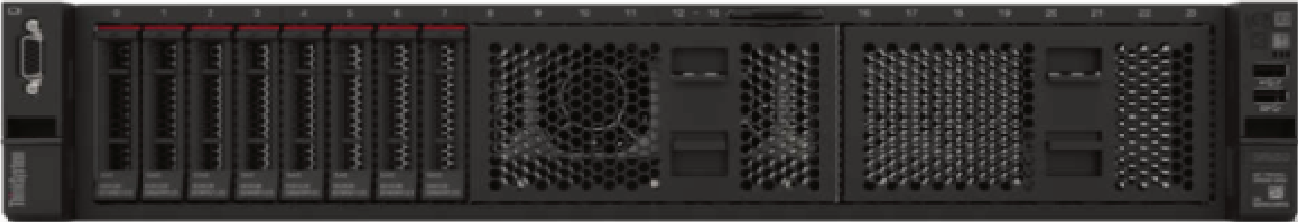

	Lenovo® ThinkSystem™ SR655		TPC-E™ 1.14.0 TPC Pricing 2.4.0
			Report Date: Aug 7, 2019 Revision Date: Aug 7, 2019
TPC-E Throughput 6,716.88 tpsE™	Price/Performance \$99.99 USD per tpsE	Availability Date December 31, 2019	Total System Cost \$671,576 USD
Database Server Configuration			
Operating System Microsoft® Windows Server® 2016 Standard Edition	Database Manager Microsoft SQL Server® 2017 Enterprise Edition	Processors/Cores/Threads 1/64/128	Memory 1024GB
			
			
TIER A (Client) 1 x Lenovo ThinkSystem SR650, with: <ul style="list-style-type: none"> - 2 x Intel® Xeon® Platinum 8168 Processor 2.70GHz (2 Procs/48 Cores/96 Threads) - 96GB Memory - 2 x 300GB 10K SAS HDD (RAID-1) - 1 x ThinkSystem RAID 930-8i - 1 x Onboard Dual Gb Ethernet - 1 x Intel x550 Dual 10Gb-T Ethernet - 2 x Broadcom NX-E Dual 10Gb-T Enet 		TIER B (Database Server and Storage) 1 x Lenovo ThinkSystem SR655, with: <ul style="list-style-type: none"> - 1 x AMD EPYC™ 7742 64-Core Processor 2.25GHz (1 Proc/64 Cores/128 Threads) - 1024GB Memory - 2 x 300GB 10K SAS HDD (RAID-1) - 6 x 800GB SAS SSD (RAID-10) - 1 x ThinkSystem RAID 930-8i - 4 x ThinkSystem RAID 930-8e - 1 x Onboard Quad Gb Ethernet - 2 x Intel x550 Dual 10Gb-T Ethernet 	
		4 x Lenovo Storage D1224 DAS Enclosures, with: <ul style="list-style-type: none"> - 80 x 800GB 2.5" SAS SSD (4 x 19-drive RAID-5) (1 x 4-drive RAID-10) 	
		80 Total External Drives	
Initial Database Size 29,145 GB	Redundancy Level: 1 RAID-10 Log, tempdb RAID-5 Data	Storage 86x 800GB 2.5" SAS SSD 2x 300GB 2.5" 10K SAS HDD	



Lenovo ThinkSystem SR655

TPC-E 1.14.0 TPC Pricing 2.4.0

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Description	Part Number	Price Source	Unit Price	Quantity	Extended Price	3-Yr. Maint. Price
Server Hardware						
ThinkSystem SR655 Configure-To-Order, includes:	7Z01CTO1WW	1	96,166	1	96,166	
ThinkSystem SR655 24x2.5" Chassis	B5VJ			1		
ThinkSystem AMD EPYC 7742 64C 225W 2.25 GHz Processor	B5XF			1		
ThinkSystem 64GB TruDDR4 3200MHz (2Rx4 1.2V) RDIMM-A	B5XC			16		
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" 300GB 10K SAS 12Gb Hot Swap 512n HDD	AULY			2		
ThinkSystem SR635/SR655 x8 PCIe Internal Riser	B5VW			1		
ThinkSystem SR655 x16/x8/x8 PCIe Riser1 & Riser 2	B5VX, B5VU			1		
ThinkSystem Broadcom 5719 1GbE RJ45 4-port OCP Ethernet Adapter	B5T1			1		
ThinkSystem RAID 930-8e 4GB Flash PCIe 12Gb Adapter	AUNQ			4		
ThinkSystem 1100W (230V/115V) Platinum Hot-Swap Power Supply	AVWF			2		
2.8m, 13A/100-250V, C13 to C14 Jumper Cord	6400			2		
ThinkSystem Toolless Slide Rail	AXCA			1		
ThinkSystem 2U EIA Latches	AURD, B5WR			1		
FBU345 SuperCap	AUNP			5		
ThinkSystem SR655 Performance Fan Module	B5W3			6		
ThinkSystem AMD 1P 2U High Performance Heatsink	B5UQ			1		
ThinkSystem SR655 Fan Board	B5UL			1		
ThinkSystem SR635/SR655 Motherboard & PIB	B5VH, B5UM			1		
ThinkSystem 2.5" S5530 800GB Performance SAS 12Gb Hot Swap SSD	B4Y5			6		
Intel X550-T2 Dual Port 10GBase-T Adapter	ATPX			2		
Essential Service - 3Yr 24x7 4Hr Response + YourDrive YourData (SR655)	5PS7A34674	1	1,559	1		1559
				Subtotal	96,166	1,559
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 3DWD 2.5" SAS SSD	01DC477	1	2,499	80	199,920	
Essential Service - 3Yr 24x7 4Hr Response (D1224)	01JR577	1	1,169	4		4,676
				Subtotal	212,388	4,676
Server Software						
SQL Server 2017 Enterprise Edition (2 Core License)	N/A	2	13,472.50	32	431,120	
Windows Server 2016 Standard Edition (2 Core License)	N/A	2	92	32	2,944	
Microsoft Problem Resolution Services (1 Incident)	N/A	2	259	1		259
				Subtotal	434,064	259
Client Hardware						
ThinkSystem SR650 Configure-To-Order, includes:	7X06CTO1WW	1	32,215	1	32,215	
ThinkSystem SR650 2.5" Chassis with 8, 16 or 24 bays	AUVV			1		
Intel Xeon Platinum 8168 24C 205W 2.7GHz Processor	AWDJ			2		
ThinkSystem 8GB TruDDR4 2666 MHz (1Rx8 1.2V) RDIMM	AUJ1			12		
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" 300GB 10K SAS 12Gb Hot Swap 512n HDD	AULY			2		
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		
ThinkSystem Broadcom 57416 10GBASE-T 2-Port PCIe Ethernet Adapter	AUKP			2		
Intel X550-T2 Dual Port 10GBase-T Adapter	ATPX			1		
ThinkSystem 1100W (230V/115V) Platinum Hot-Swap Power Supply	AVWF			2		
2.8m, 13A/100-250V, C13 to C14 Jumper Cord	6400			2		
ThinkSystem Toolless Friction Rail	AXFM			1		
ThinkSystem 2U Left EIA Latch Standard	AURD			1		
Lenovo ThinkSystem Mainstream MB - 2U	AUQB			1		
Lenovo ThinkSystem 2U 3FH & 2FH Riser Brackets	AURQ, AURP			1		
FBU345 SuperCap	AUNP			1		
Essential Service - 3Yr 24x7 4Hr Response + YourDrive YourData (SR650)	5PS7A01558	1	2,079	1		2,079
				Subtotal	32,215	2,079
Client Software						
Windows Server 2019 Standard Edition (2 Core License)	N/A	2	123	24	2,952	
				Subtotal	2,952	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	B0LN	1	19	1	19	
Lenovo D22-10 21.5-inch LED Backlit LCD Monitor	61D3KCR6US	1	89	1	89	
1.0m CAT6 Green Cable	00WE127	1	19	2	38	
Essential Service - 3Yr 24x7 4Hr Response (Rack)	41L2760	1	315	1		315
				Subtotal	2,219	315
				Total	780,004	8,888

Dollar Volume Discount (See Note 1) 33.36% 1 117,316

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:	\$671,576
TPC-E Throughput:	6,716.88
\$ USD/tpsE:	\$99.99



Lenovo ThinkSystem SR655

TPC-E 1.14.0
TPC Pricing 2.4.0

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Numerical Quantities Summary

Reported Throughput:
6,716.88 tpsE

Configured Customers:
3,550,000

Response Time (in seconds)	Minimum	Average	90 th Percentile	Maximum
Broker-Volume	0.01	0.02	0.03	0.98
Customer-Position	0.01	0.01	0.02	4.87
Market-Feed	0.01	0.01	0.04	4.87
Market-Watch	0.01	0.01	0.02	0.92
Security-Detail	0.01	0.01	0.01	0.77
Trade-Lookup	0.01	0.04	0.06	0.84
Trade-Order	0.01	0.03	0.04	0.83
Trade-Result	0.01	0.03	0.05	0.92
Trade-Status	0.01	0.01	0.01	0.76
Trade-Update	0.01	0.05	0.07	0.85
Data-Maintenance	0.01	0.04	N/A	0.14

Transaction Mix	Transaction Count	Mix %
Broker-Volume	23,698,299	4.900%
Customer-Position	62,872,584	13.000%
Market-Feed	4,836,169	1.000%
Market-Watch	87,054,230	18.000%
Security-Detail	67,708,942	14.000%
Trade-Lookup	38,690,646	8.000%
Trade-Order	48,847,251	10.100%
Trade-Result	48,361,592	10.000%
Trade-Status	91,891,059	19.000%
Trade-Update	9,672,627	2.000%
Data-Maintenance	120	N/A

Test Duration and Timings

Ramp-up Time (hh:mm:ss)	00:21:59
Measurement Interval (hh:mm:ss)	02:00:00
Business Recovery Time (hh:mm:ss)	00:35:01
Total Number of Transactions Completed in Measurement Interval	483,633,399