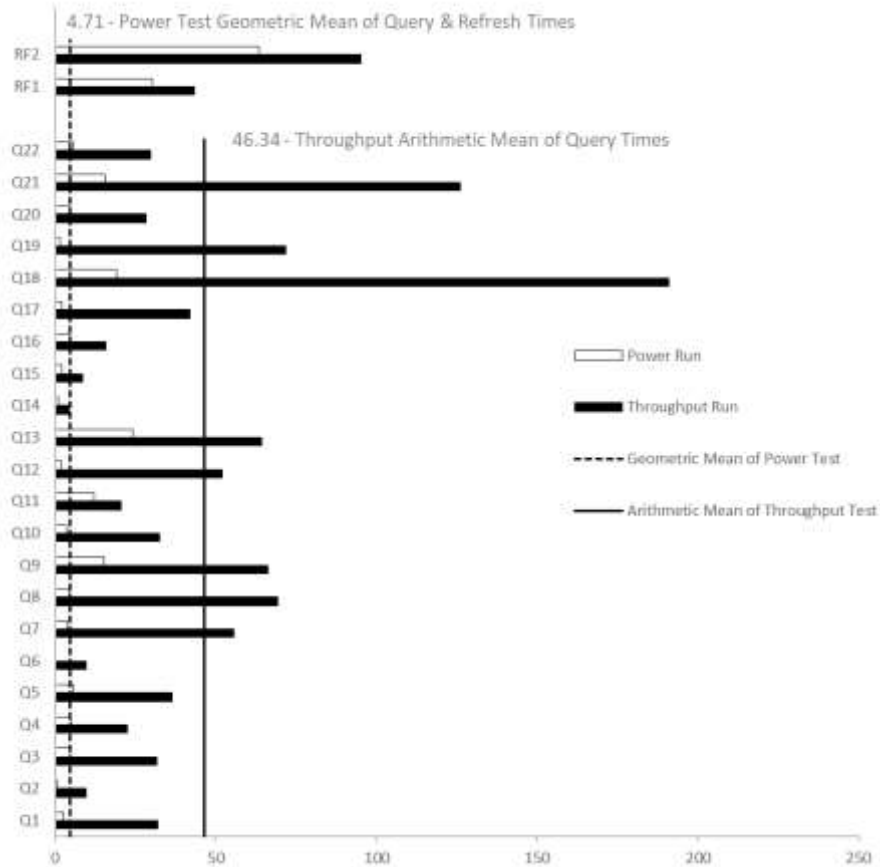



<b>Hewlett Packard Enterprise</b>		<b>HPE ProLiant DL345 Gen11</b> (with AMD EPYC 9554P Processor)		TPC-H Rev. 3.0.1 TPC Pricing Rev. 2.9.0	
Total System Cost		Composite Query per Hour Rating		Report Date: August 22, 2024	
<b>\$621,928 USD</b>		<b>1,979,877.6</b> QphH @ 3,000GB		<b>\$314.13 USD</b> \$/kQphH @ 3,000GB	
Database Size	Database Manager	Operating System	Other Software	Availability Date	
<b>3,000GB</b>	<b>Microsoft® SQL Server 2022 Enterprise Edition</b>	<b>Microsoft Windows Server 2022</b>	<b>None</b>	<b>August 22,2024</b>	



Database Load Time = 0d 1h 43m 49s	<b>Storage Redundancy Level</b>	
Load included backup: <b>Y</b>	Base Tables and Auxiliary Data Structures	<b>No RAID</b>
Total Data Storage / Database Size = <b>12.22</b>	DBMS Temporary Space and DBMS Software	<b>No RAID</b>
Memory/Database Size = 51.2%	OS, transaction logs	<b>Software RAID 1</b>

System Components	System Total
Nodes:	1
AMD® EPYC 9554P @ 3.1GHz:	1
Cores/Threads:	64/128
Memory:	1536 GiB
3.84TB NVMe Drives	10
RAID1 Boot Controller with 480GB M.2 NVMe	2
<b>Total Storage:</b>	<b>36,656.86 GiB</b>

	TPC-H Rev. 3.0.1
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	<b>HPE ProLiant DL345 Gen11</b>		TPC Pricing Rev. 2.9.0			
			Report Date: August 22, 2024			
Description	Price Key	Part Number	Unit Price	Qty	Extended Price	3 Yr Maint Price
<b>Server Hardware</b>						
HPE DL345 Gen11 8SFF CTO Server	1	P54207-B21	\$4,200	1	\$4,200	
AMD EPYC 9554P CPU for HPE	1	P53848-B21	\$16,179	1	\$16,179	
HPE DL3X5 Gen11 Max Perf 2U Heat Sink Kit	1	P58459-B21	\$256	1	\$256	
HPE DL3X5 2Y Perf FAN KIT	1	P58465-B21	\$160	1	\$160	
HPE 128GB 4Rx4 PC5-4800B-R 3DS Smart Kit	1	P50313-B21	\$10,999	12	\$131,988	
HPE 1600W FS Plat Ht Plug LH PS Kit	1	P38997-B21	\$751	2	\$1,502	
HPE USB US Keyboard/Mouse Kit	1	631341-B21	\$32	3	\$96	
MLX MCX6314 10/25GbE 2p QSFP56 Adptr	1	P25960-B21	\$4,373	1	\$4,373	
Add to Rack 48U 600mmx1075mm G2 Advanced Pallet	1	P9K19A	\$3,023	1	\$3,023	
HPE 3 Year Total Care Essential for DL345 Gen11	1	H78X5E	\$3,445	1		\$3,445
<b>Subtotal</b>					<b>\$161,777</b>	<b>\$3,445</b>
<b>Storage</b>						
HPE 3.2TB NVMe MU SFF BC U.3 PM1735a SSD	1	P50230-B21	\$8,180	10	\$81,860	
NS204i-u Gen11 OS Boot, RAID 1	1	P48183-B21	\$1,994	1	\$1,994	
HPE DL3X5 Gen11 Ht Pg Boot Opt Dev	1	P57013-B21	\$83	1	\$83	
HPE DL345 Gen11 20EDSFF x4 FIO Kit	1	P64383-B21	\$1,192	1	\$1,192	
HPE Gen 11 EI Rail Kit	1	P52351-B21	\$141	1	\$141	
HPE DL345G11 Standard Riser	1	standardDL345G11Riser		1		
<b>Subtotal</b>					<b>\$85,270</b>	<b>\$0</b>
<b>Other</b>						
HP V22v G5 FHD Monitor	3	65P56AA	\$130	3	\$390	
<b>Subtotal</b>					<b>\$390</b>	<b>\$0</b>
<b>Software Components</b>						
SQL Server 2022 Enterprise Edition (2 core license, 32 cores)	2	N/A	\$15,123	32	\$483,936	
Microsoft Problem Resolution Services	2	N/A	\$259	1		\$259
Windows Server 2022 Datacenter Edition (16 processor license)	2	N/A	\$6,155	4	\$24,620	
<b>Subtotal</b>					<b>\$508,556</b>	<b>\$259</b>
Total Extended Price					\$755,993	\$3,704
Total Discounts					\$135,875	\$1,894.00
Price Key: 1 - HPE , 2 - Microsoft, 3 - Hewlett Packard Inc. <b>Audited by Doug Johnson of InfoSizing (www.sizing.com)</b>		<b>Grand Total</b>			<b>\$620,117.97</b>	<b>\$1,810.00</b>
All discounts are based on US list prices and for similar quantities and configurations. A 55% discount was based on the overall specific components pricing from vendor 1 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.		<b>3 year cost of ownership USD:</b>			<b>\$ 621,928</b>	
		<b>QphH @ 3,000GB :</b>			<b>1,979,877.6</b>	
		<b>\$ USD/QphH @ 3,000GB</b>			<b>\$314.13</b>	
Sales contact: HPE WW Headquarters, 3000 Hanover St., Palo Alto, CA 94304-1185 (855)472-5233 / (800)786-7967 / (888)269-4073 (US) Microsoft Corporation, One Microsoft Way, Redmond, WA 98052-6399 (425) 882 8080						
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 pricing@tpc.org. Thank you.						

## Numerical Quantities

### Measurement Results

Database Scale Factor	<b>3,000</b>
Total Data Storage / Database Size	12.22
Percentage Memory / Database Size	51.2%
Start of Database Load	2024-08-05 16:38:54
End of Database Load	2024-08-05 18:22:43
Database Load Time	00d 01h 43m 49s
Query Streams for Throughput Test	<b>8</b>
TPC-H Power	<b>2,292,350.3</b>
TPC-H Throughput	<b>1,709,998.4</b>
TPC-H Composite Query-per-Hour (QphH@3,000GB)	<b>1,979,877.6</b>
Total System Price over 3 Years (\$ USD)	<b>\$621,928</b>
TPC-H Price/Performance Metric (\$ USD / kQphH@3,000GB)	<b>\$314.08</b>

### Measurement Interval

Measurement Interval in Throughput Test **1111.58 seconds**

### Duration of Stream Execution

Power Run	Seed	Query Start Time	Total Time	RF1 Start Time	RF2 Start Time
		Query End Time	(hh:mm:ss)	RF1 End Time	RF2 End Time
	805182243	2024-08-05 18:54:16	00:02:21	2024-08-05 18:53:43	2024-08-05 18:56:40
		2024-08-05 18:56:37		2024-08-05 18:54:13	2024-08-05 18:57:43
Throughput Stream	Seed	Query Start Time	Total Time	RF1 Start Time	RF2 Start Time
		Query End Time	(hh:mm:ss)	RF1 End Time	RF2 End Time
1	805182244	2024-08-05 18:57:42	00:16:58	2024-08-05 18:57:42	2024-08-05 18:58:26
		2024-08-05 19:14:40		2024-08-05 18:58:26	2024-08-05 19:00:00
2	805182245	2024-08-05 18:57:42	00:17:19	2024-08-05 19:00:01	2024-08-05 19:00:42
		2024-08-05 19:15:01		2024-08-05 19:00:42	2024-08-05 19:02:15
3	805182246	2024-08-05 18:57:42	00:15:46	2024-08-05 19:02:15	2024-08-05 19:02:59
		2024-08-05 19:13:28		2024-08-05 19:02:59	2024-08-05 19:04:33
4	805182247	2024-08-05 18:57:42	00:16:24	2024-08-05 19:04:33	2024-08-05 19:05:19
		2024-08-05 19:14:06		2024-08-05 19:05:19	2024-08-05 19:06:56
5	805182248	2024-08-05 18:57:42	00:18:00	2024-08-05 19:06:57	2024-08-05 19:07:41
		2024-08-05 19:15:42		2024-08-05 19:07:41	2024-08-05 19:09:16
6	805182249	2024-08-05 18:57:42	00:17:23	2024-08-05 19:09:17	2024-08-05 19:10:01
		2024-08-05 19:15:05		2024-08-05 19:10:01	2024-08-05 19:11:47
7	805182250	2024-08-05 18:57:42	00:17:25	2024-08-05 19:11:48	2024-08-05 19:12:27
		2024-08-05 19:15:07		2024-08-05 19:12:27	2024-08-05 19:14:07
8	805182251	2024-08-05 18:57:42	00:16:50	2024-08-05 19:14:07	2024-08-05 19:14:51
		2024-08-05 19:14:32		2024-08-05 19:14:51	2024-08-05 19:16:15

**TPC-H Timing Intervals (in seconds):**

Stream ID	Stream 0	Stream 1	Stream 2	Stream 3	Stream 4	Stream 5	Stream 6	Stream 7	Stream 8	QI Min	QI Avg	QI Max
Q1	2.66	4.08	10.14	29.24	50.16	53.94	30.19	59.69	18.74	2.66	28.76	59.69
Q2	0.77	14.94	9.19	8.41	4.00	6.52	18.41	2.81	12.17	0.77	8.58	18.41
Q3	4.69	27.74	33.82	17.39	31.13	76.13	28.96	26.05	12.41	4.69	28.70	76.13
Q4	4.92	12.78	12.91	28.30	32.78	8.45	50.08	15.03	20.47	4.92	20.64	50.08
Q5	5.78	50.39	30.83	11.75	24.86	25.36	93.96	33.83	19.30	5.78	32.90	93.96
Q6	0.20	21.78	2.78	11.35	12.99	7.60	9.24	6.02	6.03	0.20	8.67	21.78
Q7	3.91	50.07	25.08	76.57	84.62	76.69	31.72	27.52	72.57	3.91	49.86	84.62
Q8	4.41	89.63	118.34	51.00	28.63	72.47	32.30	96.23	65.07	4.41	62.01	118.34
Q9	15.35	61.61	64.04	52.04	43.96	29.05	88.65	134.26	55.58	15.35	60.50	134.26
Q10	3.53	25.52	51.77	57.49	26.66	3.77	57.80	19.27	17.94	3.53	29.31	57.80
Q11	12.22	25.80	19.72	18.33	22.10	16.99	26.66	22.06	12.50	12.22	19.60	26.66
Q12	1.78	94.01	38.89	81.90	65.19	70.68	21.25	13.24	30.58	1.78	46.39	94.01
Q13	24.05	98.37	57.65	79.22	80.79	68.50	53.72	34.83	40.94	24.05	59.79	98.37
Q14	0.98	2.47	3.59	5.84	4.39	2.31	7.67	4.34	4.83	0.98	4.05	7.67
Q15	2.14	19.17	10.24	5.75	5.72	6.03	5.58	5.13	9.78	2.14	7.73	19.17
Q16	4.55	10.19	8.20	9.88	40.64	17.96	19.52	9.56	9.55	4.55	14.45	40.64
Q17	2.20	21.49	54.29	60.75	40.72	3.34	67.65	27.58	60.05	2.20	37.56	67.65
Q18	19.27	136.49	263.33	45.00	181.36	231.64	198.37	174.98	296.88	19.27	171.92	296.88
Q19	1.69	65.50	94.96	88.66	52.86	28.33	79.16	109.49	54.99	1.69	63.96	109.49
Q20	4.64	29.16	26.21	26.63	19.30	37.58	16.24	14.94	56.24	4.64	25.66	56.24
Q21	15.44	149.84	74.16	128.20	114.82	140.96	86.55	191.12	122.98	15.44	113.79	191.12
Q22	5.70	6.13	27.55	50.83	15.50	94.12	18.27	16.22	9.34	5.70	27.07	94.12
RF1	30.28	42.67	41.75	44.43	45.89	44.80	44.16	39.35	44.44	30.28	41.97	45.89
RF2	63.36	94.80	92.16	93.38	97.57	94.96	106.30	99.77	83.13	63.36	91.71	106.30