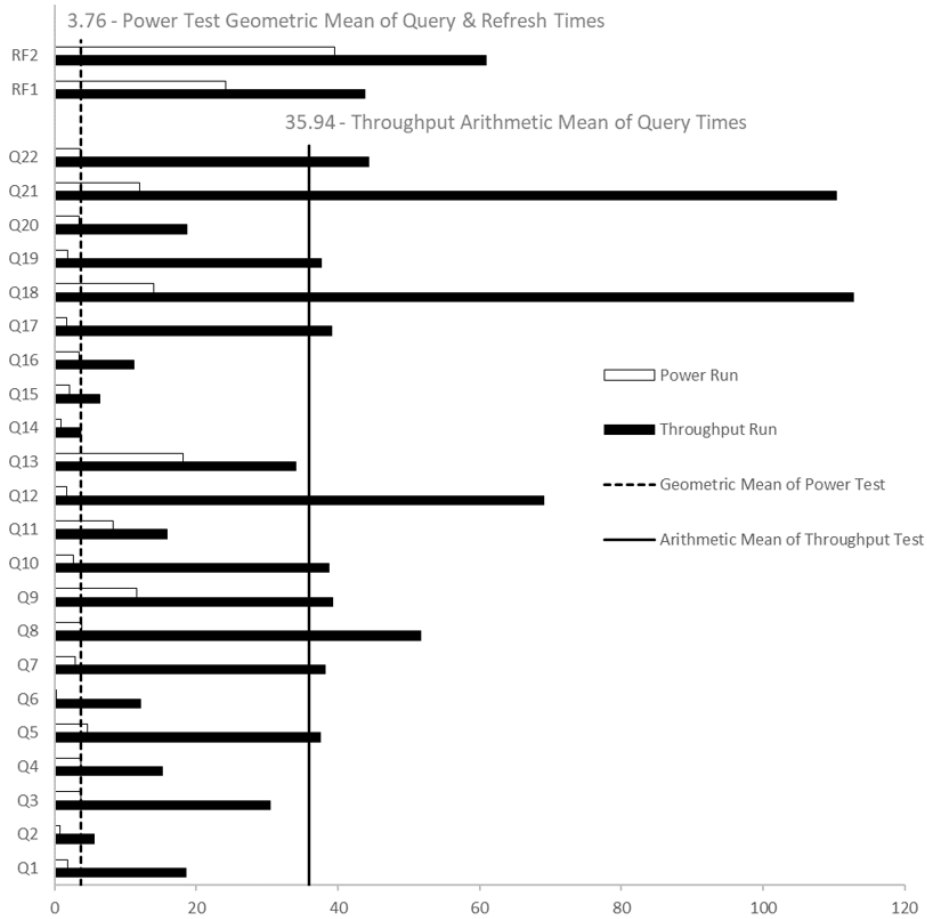


Hewlett Packard Enterprise		HPE ProLiant DL345 Gen11 (with AMD EPYC 9655P Processor)		TPC-H Rev. 3.0.1 TPC Pricing Rev. 2.9.0
Total System Cost		Composite Query per Hour Rating		Report Date: October 2, 2024
\$851,016 USD		2,549,209.10 QphH @ 3,000GB		\$333.84 USD \$/kQphH @ 3,000GB
Database Size	Database Manager	Operating System	Other Software	Availability Date
3,000GB	Microsoft® SQL Server 2022 Enterprise Edition	Microsoft Windows Server 2022	None	October 10,2024



Database Load Time = 0d 01h 10m 24s	Storage Redundancy Level	
Load included backup: Y	Base Tables and Auxiliary Data Structures	No RAID
Total Data Storage / Database Size = 12.22	DBMS Temporary Space and DBMS Software	No RAID
Memory/Database Size = 51.2%	OS, transaction logs	Software RAID 1

System Components	System Total
Nodes:	1
AMD® EPYC 9655P @ 2.6GHz:	1
Cores/Threads:	96/192
Memory:	1536 GiB
3.84TB NVMe Drives	10
RAID1 Boot Controller with 480GB M.2 NVMe	2
Total Storage:	36,656.86 GiB



HPE ProLiant DL345 Gen11

TPC-H Rev. 3.0.1
 TPC Pricing Rev. 2.9.0
 Report Date: October 2, 2024

Description	Price Key	Part Number	Unit Price	Qty	Extended Price	3 Yr Maint Price
Server Hardware						
HPE DL345 Gen11 EDSFF CTO Server	1	P54207-B21	\$4,200	1	\$4,200	
AMD EPYC 9655P 1P CPU for HPE	1	P53697-B21	\$19,892	1	\$19,892	
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 2Rx4 PC5-6400B-R Smart Kit	1	P69730-B21	\$11,676	12	\$140,112	
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
Subtotal					\$173,614	\$3,445
Storage						
HPE 3.84TB NVMe RI E3S EC1 PM1743 SSD	1	P57799-B21	\$8,186	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	standardDL325G11Riser		1		
Subtotal					\$85,270	\$0
Other						
HP V22v G5 FHD Monitor	3	65P56AA	\$130	3	\$390	
Subtotal					\$390	\$0
Software Components						
SQL Server 2022 Enterprise Edition (2 core license)	2	N/A	\$15,123	48	\$725,904	
Microsoft Problem Resolution Services	2	N/A	\$259	1		\$259
Windows Server 2022 Standard Edition (16 processor license)	2	N/A	\$1069	6	\$6,414	
Subtotal					\$732,318	\$259
Total Extended Price					\$991,592	\$3,704
Total Discounts					\$142,386	\$1,894.00
Price Key: 1 - HPE , 2 – Microsoft, 3 – Hewlett Packard Inc. Audited by Doug Johnson of InfoSizing (www.sizing.com)		Grand Total			\$849,205.97	\$1,810.00
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.		3 year cost of ownership USD:			\$851,016	
		QphH @ 3,000GB :			2,549,209.1	
		\$ USD/QphH @ 3,000GB			\$333.84	
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	3,000
Total Data Storage / Database Size	12.22
Percentage Memory / Database Size	51.2%
Start of Database Load	2024-09-12 07:43:38
End of Database Load	2024-09-12 09:04:03
Database Load Time	00d 01h 10m 24s
Query Streams for Throughput Test	8
TPC-H Power	2,870,258.9
TPC-H Throughput	2,264,070.0
TPC-H Composite Query-per-Hour (QphH@3,000GB)	2,549,209.1
Total System Price over 3 Years (\$ USD)	\$851,016
TPC-H Price/Performance Metric (\$ USD / kQphH@3,000GB)	\$333.84

Measurement Interval

Measurement Interval in Throughput Test **839.55 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
	912090403	2024-09-12 09:30:19	00:01:48	2024-09-12 09:29:53	2024-09-12 09:32:09
		2024-09-12 09:32:07		2024-09-12 09:30:17	2024-09-12 09:32:48
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	912090404	2024-09-12 09:32:48	00:12:42	2024-09-12 09:32:48	2024-09-12 09:33:28
		2024-09-12 09:45:30		2024-09-12 09:33:28	2024-09-12 09:34:30
2	912090405	2024-09-12 09:32:48	00:13:51	2024-09-12 09:34:30	2024-09-12 09:35:13
		2024-09-12 09:46:39		2024-09-12 09:35:13	2024-09-12 09:36:11
3	912090406	2024-09-12 09:32:48	00:13:13	2024-09-12 09:36:12	2024-09-12 09:36:58
		2024-09-12 09:46:01		2024-09-12 09:36:58	2024-09-12 09:38:01
4	912090407	2024-09-12 09:32:48	00:11:40	2024-09-12 09:38:01	2024-09-12 09:38:42
		2024-09-12 09:44:28		2024-09-12 09:38:42	2024-09-12 09:39:41
5	912090408	2024-09-12 09:32:48	00:13:41	2024-09-12 09:39:41	2024-09-12 09:40:31
		2024-09-12 09:46:29		2024-09-12 09:40:31	2024-09-12 09:41:28
6	912090409	2024-09-12 09:32:48	00:13:38	2024-09-12 09:41:28	2024-09-12 09:42:15
		2024-09-12 09:46:26		2024-09-12 09:42:15	2024-09-12 09:43:19
7	912090410	2024-09-12 09:32:48	00:12:56	2024-09-12 09:43:20	2024-09-12 09:44:01
		2024-09-12 09:45:44		2024-09-12 09:44:01	2024-09-12 09:45:06
8	912090411	2024-09-12 09:32:48	00:13:50	2024-09-12 09:45:06	2024-09-12 09:45:49
		2024-09-12 09:46:38		2024-09-12 09:45:49	2024-09-12 09:46:48

TPC-H Timing Intervals (in seconds):

Stream ID	0	1	2	3	4	5	6	7	8	QI Min	QI Avg	QI Max
Q1	1.86	27.47	12.05	10.17	24.53	7.00	56.09	8.14	3.00	1.86	16.70	56.09
Q2	0.78	3.97	8.54	2.67	4.06	2.48	8.46	6.88	8.08	0.78	5.10	8.54
Q3	3.66	17.83	6.30	8.00	25.87	59.94	22.48	82.06	21.42	3.66	27.51	82.06
Q4	3.69	11.83	5.76	10.16	23.91	21.06	10.85	17.61	20.18	3.69	13.89	23.91
Q5	4.58	25.80	40.06	11.66	20.70	79.94	35.45	26.25	60.32	4.58	33.86	79.94
Q6	0.22	11.19	9.33	12.44	14.73	9.97	10.50	8.58	19.97	0.22	10.77	19.97
Q7	2.89	43.33	58.11	70.03	17.89	50.59	10.92	26.67	27.91	2.89	34.26	70.03
Q8	3.88	81.64	53.55	35.62	36.00	61.20	48.35	40.30	57.07	3.88	46.40	81.64
Q9	11.63	23.32	60.03	26.42	41.94	37.69	31.98	64.65	28.04	11.63	36.19	64.65
Q10	2.64	19.92	52.41	68.36	21.91	7.83	55.48	34.55	49.53	2.64	34.74	68.36
Q11	8.27	20.95	12.19	9.78	10.91	15.78	32.94	15.53	8.50	8.27	14.98	32.94
Q12	1.64	28.61	101.45	27.60	44.80	83.25	133.59	44.52	89.22	1.64	61.63	133.59
Q13	18.14	46.40	39.77	22.34	40.53	48.50	25.39	27.48	22.16	18.14	32.30	48.50
Q14	0.84	3.02	5.28	2.39	6.67	3.97	2.51	1.56	4.47	0.84	3.41	6.67
Q15	2.16	9.31	6.29	5.30	5.85	5.08	8.38	7.30	3.95	2.16	5.96	9.31
Q16	3.39	14.16	26.50	8.64	5.56	7.72	6.67	7.89	11.95	3.39	10.28	26.50
Q17	1.73	41.97	47.39	56.75	33.12	24.37	31.52	52.89	24.70	1.73	34.94	56.75
Q18	13.94	76.23	173.28	112.40	108.39	80.14	111.78	116.69	123.17	13.94	101.78	173.28
Q19	1.89	59.02	38.43	29.77	58.14	21.70	14.87	49.51	30.05	1.89	33.71	59.02
Q20	3.41	23.92	5.64	13.98	13.91	18.66	29.07	18.94	25.66	3.41	17.02	29.07
Q21	11.93	118.91	38.08	187.08	72.39	122.42	89.92	95.98	158.00	11.93	99.41	187.08
Q22	3.56	52.70	29.75	61.00	67.68	51.12	39.67	21.22	31.81	3.56	39.83	67.68
RF1	24.14	39.73	42.64	46.67	40.42	49.88	46.88	41.69	42.50	24.14	41.62	49.88
RF2	39.58	61.80	58.42	62.88	58.98	57.06	64.28	64.72	59.25	39.58	58.55	64.72