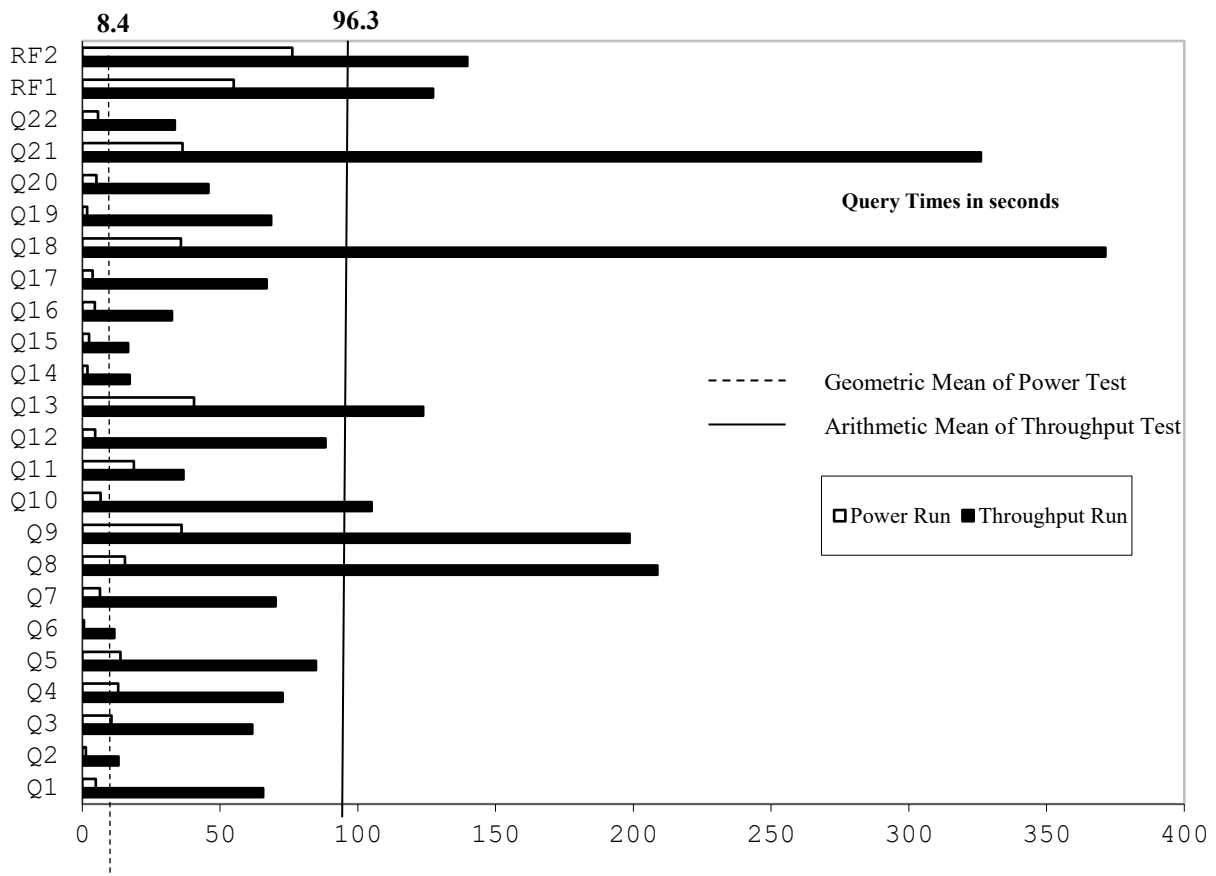
 Hewlett Packard Enterprise		HPE ProLiant DL325 Gen10 Plus		TPC-H Rev. 2.18.0 TPC Pricing Rev. 2.5.0	
Total System Cost		Composite Query per Hour Rating		Report Date: February 11, 2020	
\$503,604 USD		1,057,103.3 QphH @ 3,000GB		\$0.48 USD \$/ QphH @ 3,000GB	
Database Size	Database Manager	Operating System	Other Software	Availability Date	
3000GB	Microsoft® SQL Server 2019 Enterprise Edition	Red Hat® Enterprise Linux® 8	None	April 6, 2020	



Database Load Time = 00d 7h 36m 56s	Storage Redundancy Level	
Load included backup: Y	Base Tables and Auxiliary Data Structures	No RAID
Total Data Storage / Database Size = 6.68	DBMS Temporary Space	No RAID
Memory/Database Size = 68.3%	OS and DBMS Software	RAID 1
System Components System Total Per Node		
Nodes:	1	n.a.
AMD® EPYC ROME 7742 @ 2.25GHz:	1	1
Cores/Threads:	64/128	64/128
Memory:	2,048 GB	2,048 GB
Network Interfaces (on-board GigE):	10	10
(E208i-a embedded)	1	1
1.6TB NVMe Drives	6	n.a.
1.92TB NVMe Drives	6	n.a.
Disk Drives (240GB 6G SATA SSD):	2	n.a.
Total Storage:	20,046 GB	n.a.

Description	Price Key	Part Number	Unit Price	Qty	Extended Price	3 Yr Maint Price
Server Hardware						
HPE ProLiant DL325 Gen10 Plus CTO Server	1	P18606-B21	\$550	1	\$550	
HPE DL325 Gen10 Plus 8SFF U.3 Smart Carrier FIO Drive Cage Kit	1	P15730-B21	\$400	1	\$400	
P19621-L21 - HPE DL325 Gen10+ AMD EPYC 7742 FIO Kit	1	P19621-L21	\$12,999	1	\$12,999	
HPE 128GB 4Rx4 PC4-3200AA-L Smart	1	P07652-B21	\$3,599	16	\$57,584	
HPE 1600W Flex Slot Platinum HotPlug LowHalogen PowerSupplyKit	1	830272-B21	\$455	1	\$455	
HPE USB US Keyboard/Mouse Kit	1	631341-B21	\$29	1	\$29	
HPE 10GbE 2P SFP+ QL41132 OCP3 Adptr	1	P08452-B21	\$635	1	\$635	
Add to Rack 48U 600mmx1075mm G2 Advanced Pallet	1	P9K19A	\$1,499	1	\$1,499	
HPE C13 - JIS C8303 JP 100V 12Amp 2.0m Power Cord	1	AF572A	\$49	1	\$49	
HPE 3Y FC 24x7 DL325 GEN10 PLUS SVC			\$1,465	1		\$1,465
		Subtotal			\$74,200	\$1,465
Storage						
HPE 1.92TB NVMe x4 Lanes Performance Read Intensive SFF (2.5in) SC U.3 SSD	1	P16501-B21	\$2,449	6	\$14,694	
HPE 1.6TB NVMe High Performance Mixed Use SFF (2.5in) SC 3yr Wty Universal Connect SSD	1	P16497-B21	\$2,449	6	\$14,694	
HPE Smart Array E208i-a SR Gen10 (8 Internal Lanes/No Cache) 12G SAS Modular LH Controller	1	869079-B21	\$285	1	\$285	
HPE 240GB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	1	P05924-B21	\$379	2	\$758	
HPE DL325 Gen10 Plus 2SFF SAS/SATA Smart Carrier Enablement Kit	1	P20417-B21	\$105	1	\$105	
HPE DL325 Gen10 Plus 8SFF U.3/NVMe Direct Attach FIO Cable Kit	1	P17226-B21	\$165	1	\$165	
HPE DL325 Gen10 Plus 2SFF/UFF Smart Array Modular Controller Cable Kit	1	P15907-B21	\$65	1	\$65	
HPE DL325 Gen10 Plus 8SFF to 16SFF U.3 Smart Carrier Drive Cage Upgrade	1	P15725-B21	\$675	1	\$675	
HPE DL325G10 Standard Riser	1	StandardDL325G10Riser		1		
		Subtotal			\$31,441	\$0
Other						
Other HP 23 Inch Monitor 3 HP	3	HP 23f	\$199	1	\$199	
		Subtotal			\$199	\$0
Server Software						
SQL Server 2019 Enterprise Edition for Linux (2 core license, 32 cores)	2	N/A	\$13,472.00	32	\$431,120	Included
Microsoft Problem Resolution Services	2	N/A	\$259.00	1		\$259.00
RHEL Svr 2 Sckt/2 Gst 3yr 24x7 E-LTU	1	G3J30AAE	\$3,702.00	1	\$3,702	
		Subtotal			\$434,822	\$259
		Total Extended Price			\$540,662	\$1,724
		Total Discounts			\$38,270	\$512
Price Key: 1 - HPE , 2 - Microsoft, 3 - Hewlett Packard Inc.		Grand Total			\$491,458	\$1,212
Audited by Francois Raab of InfoSizing (www.sizing.com)		3 year cost of ownership USD:			\$503,604	
All discounts are based on US list prices and for similar quantities and configurations. A 35% 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.		QpH @ 3000GB:			1,057,103.3	
		\$ USD/QpH @ 3000GB			\$0.48	
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	6.68
Percentage Memory / Database Size	68.3%
Start of Database Load	01/29/2020 00:49:39
End of Database Load	01/29/2020 09:19:25
Database Load Time	07h 36m 56s
Query Streams for Throughput Test	8
TPC-H Power	1,291,454.4
TPC-H Throughput	865,278.3
TPC-H Composite Query-per-Hour (QphH@3000GB)	1,057,103.3
Total System Price over 3 Years (\$ USD)	\$503,604
TPC-H Price/Performance Metric (\$ USD / QphH@3000GB)	\$0.48

Measurement Interval

Measurement Interval in Throughput Test	2,196.75 seconds
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Duration of Stream Execution

Power Run	Seed	Query Start Time	Total Time (hh:mm:ss)	RF1 Start Time	RF2 Start Time
		Query End Time		RF1 End Time	RF2 End Time
	129091925	2020-01-29 10:07:49	00:04:30	2020-01-29 10:06:53	2020-01-29 10:12:20
		2020-01-29 10:12:19		2020-01-29 10:07:48	2020-01-29 10:13:36
Throughput Stream	Seed	Query Start Time	Total Time (hh:mm:ss)	RF1 Start Time	RF2 Start Time
		Query End Time		RF1 End Time	RF2 End Time
1	129091926	2020-01-29 10:13:35	00:35:53	2020-01-29 10:13:35	2020-01-29 10:15:36
		2020-01-29 10:49:28		2020-01-29 10:15:36	2020-01-29 10:17:35
2	129091927	2020-01-29 10:13:35	00:34:55	2020-01-29 10:17:35	2020-01-29 10:20:00
		2020-01-29 10:48:30		2020-01-29 10:20:00	2020-01-29 10:22:41
3	129091928	2020-01-29 10:13:35	00:33:52	2020-01-29 10:22:41	2020-01-29 10:24:41
		2020-01-29 10:47:27		2020-01-29 10:24:41	2020-01-29 10:26:42
4	129091929	2020-01-29 10:13:35	00:36:27	2020-01-29 10:26:42	2020-01-29 10:28:37
		2020-01-29 10:50:02		2020-01-29 10:28:37	2020-01-29 10:30:37
5	129091930	2020-01-29 10:13:35	00:36:05	2020-01-29 10:30:37	2020-01-29 10:32:27
		2020-01-29 10:49:40		2020-01-29 10:32:27	2020-01-29 10:35:14
6	129091931	2020-01-29 10:13:35	00:35:52	2020-01-29 10:35:15	2020-01-29 10:37:33
		2020-01-29 10:49:27		2020-01-29 10:37:33	2020-01-29 10:39:58
7	129091932	2020-01-29 10:13:35	00:33:05	2020-01-29 10:39:58	2020-01-29 10:42:36
		2020-01-29 10:46:40		2020-01-29 10:42:36	2020-01-29 10:44:41
8	129091933	2020-01-29 10:13:35	00:36:38	2020-01-29 10:44:41	2020-01-29 10:46:37
		2020-01-29 10:50:13		2020-01-29 10:46:36	2020-01-29 10:49:17

TPC-H Timing Intervals (in seconds):

Query	Stream 0	Stream 1	Stream 2	Stream 3	Stream 4	Stream 5	Stream 6	Stream 7	Stream 8	Min Qi	Max Qi	Avg. Qi
Q1	4.94	86.05	95.19	47.69	38.39	50.41	100.29	82.27	25.10	4.94	58.93	100.29
Q2	1.25	4.33	21.91	12.54	11.35	10.97	15.49	14.91	13.77	1.25	11.84	21.91
Q3	10.52	80.19	70.01	142.57	11.94	42.36	54.30	40.23	51.97	10.52	56.01	142.57
Q4	13.05	47.99	63.06	120.74	68.73	116.39	44.25	40.59	80.23	13.05	66.11	120.74
Q5	13.83	104.92	45.13	96.71	86.46	45.47	84.80	77.06	138.15	13.83	76.95	138.15
Q6	0.64	8.49	10.22	9.30	4.41	13.57	13.91	15.71	17.51	0.64	10.42	17.51
Q7	6.38	53.87	52.68	50.65	62.65	86.91	134.15	73.67	46.38	6.38	63.04	134.15
Q8	15.44	220.51	195.73	158.56	111.65	234.95	268.48	235.36	244.89	15.44	187.29	268.48
Q9	36.01	191.83	223.18	182.38	300.55	202.52	114.40	177.44	196.76	36.01	180.56	300.55
Q10	6.58	113.18	137.85	134.37	120.34	88.30	113.47	21.43	110.73	6.58	94.03	137.85
Q11	18.73	48.46	20.09	42.49	33.78	32.64	47.02	39.05	30.17	18.73	34.71	48.46
Q12	4.64	178.30	98.68	34.36	55.57	89.25	69.95	118.69	61.81	4.64	79.03	178.30
Q13	40.55	104.92	209.32	56.62	169.64	143.15	83.67	152.67	70.11	40.55	114.52	209.32
Q14	1.92	13.43	14.65	15.08	7.36	50.27	17.32	6.77	12.54	1.92	15.48	50.27
Q15	2.47	17.35	14.37	15.82	23.17	15.93	8.35	24.73	12.94	2.47	15.01	24.73
Q16	4.53	35.20	37.80	8.58	39.09	34.67	57.24	20.85	27.14	4.53	29.46	57.24
Q17	3.67	88.10	65.79	84.10	52.91	23.31	36.92	85.69	98.41	3.67	59.88	98.41
Q18	35.80	199.75	234.08	342.46	519.56	377.19	512.89	393.17	391.97	35.80	334.10	519.56
Q19	1.77	76.33	110.01	14.32	85.72	17.68	28.51	106.51	109.03	1.77	61.10	110.01
Q20	5.10	53.33	63.76	44.19	7.86	61.04	48.58	31.62	55.82	5.10	41.26	63.76
Q21	36.39	388.67	300.02	351.03	353.73	379.90	284.10	194.11	357.73	36.39	293.96	388.67
Q22	5.71	36.41	10.77	66.78	21.29	47.02	12.38	30.67	43.30	5.71	30.48	66.78
RF1	54.95	119.44	144.32	119.99	115.05	109.06	137.85	157.77	115.26	54.95	119.30	157.77
RF2	76.22	119.36	160.85	120.69	119.61	167.68	145.32	124.44	160.25	76.22	132.71	167.68