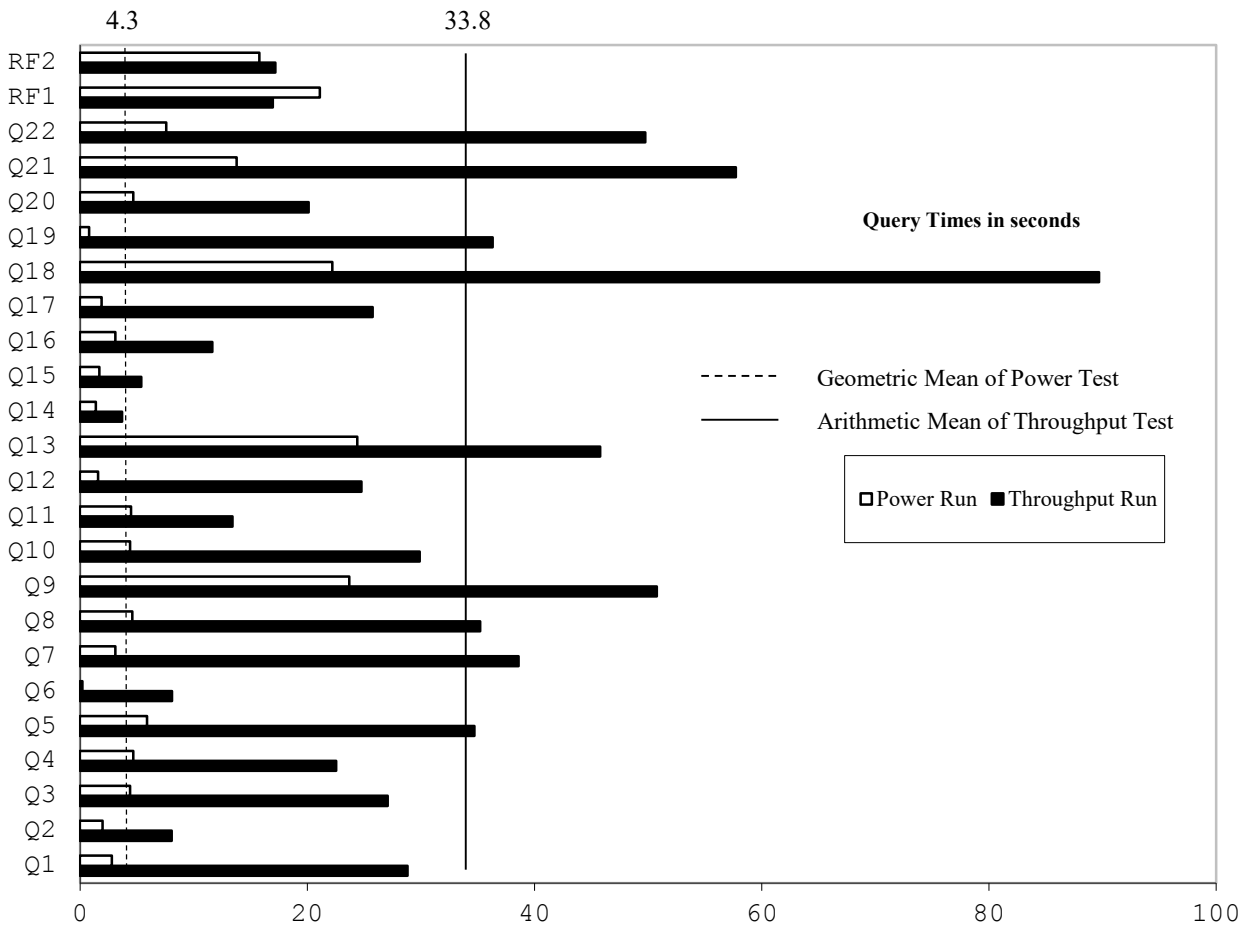


<b>Hewlett Packard Enterprise</b>		<b>HPE ProLiant DL380 Gen9</b>		TPC-H Rev. 2.17.0 TPC Pricing Rev. 1.7.0
Total System Cost		Composite Query per Hour Rating		Report Date: March 31, 2016
<b>\$428,737 USD</b>		<b>678,492.3</b> QphH @ 1000GB		<b>\$0.64 USD</b> \$/ QphH @1000GB
Database Size	Database Manager	Operating System	Other Software	Availability Date
<b>1000GB</b>	<b>SQL Server 2016 Enterprise Edition</b>	<b>Windows Server 2012 R2 Standard Edition</b>	<b>None</b>	<b>July 31, 2016</b>



Database Load Time = 00d 11h 38m 34s	Storage Redundancy Level	
Load included backup: Y	Base Tables and Auxiliary Data Structures	0
Total Data Storage / Database Size = 11.92	DBMS Temporary Space	0
Memory/Database Size = 76.8%	OS and DBMS Software	1

System Components	System Total	Per Node
Nodes:	1	n.a.
Intel(R) Xeon(R) CPU E5-2699 v4 @ 2.20GHz:	2	2
Cores/Threads:	44/88	44/88
Memory:	768GB	768GB
Network Interfaces (on-board GigE):	1	1
(P441 HBA):	5	5
Storage Shelves D3700:	5	5
Storage Subsystem Disk Drives (400GB 12G SAS SSD):	32	n.a.
Total Storage:	11,918 GB	n.a.

Description	Price Key	Part Number	Unit Price	Qty	Extended Price	3 Yr Maint Price	
<b>Server Hardware</b>							
HPE ProLiant DL380 G9 8SFF CTO Server (Customer to Order)	1	719064-B21	\$1,867	1	\$1,867		
HPE DL380 Gen9 Intel® Xeon® E5-2699 v4 (2.20GHz/22-core)	1	817967-B21	\$6,529	1	\$6,529		
HPE DL380 Gen9 Intel® Xeon® E5-2699 v4 (2.20GHz/22-core)	1	817967-L21	\$6,529	1	\$6,529		
HPE 32GB 2Rx4 PC4-2400T-L Kit	1	805353-B21	\$999	24	\$23,976		
HPE DL380 Gen9 Secondary 3 Slot GPU Ready Riser Kit	1	719073-B21	\$99	1	\$99		
HPE DL380 Gen9 8SFF Bay1 Cage/Backplane Kit	1	719067-B21	\$349	1	\$349		
HPE DL380 Gen9 Additional 8SFF Bay2 Cage/Backplane Kit	1	768857-B21	\$299	1	\$299		
HPE 12Gb SAS Expander Card with Cables for DL380 Gen9	1	727250-B21	\$699	1	\$699		
HPE DL380 Gen9 High Performance Temperature Fan Kit	1	719079-B21	\$239	1	\$239		
HPE 1400W Flex Slot Platinum Plus Hot Plug Power Supply	1	720620-B21	\$429	2	\$858		
HPE 3y 4h 24x7 ProLiant D380 Gen9 FC SVC HW Support	1	U7AE5E	\$1,821	1		\$1,821	
HP 17" FlatPanel Monitor	1	GV537A8	\$130	3	\$390		
HP PS/2 Keyboard And Mouse Bundle	1	RC464AA	\$39	3	\$117		
			<b>Subtotal</b>		<b>\$41,951</b>	<b>\$1,821</b>	
<b>Storage</b>							
HPE Universal Rack 11642 1075mm Shock Rack	1	H6J66A	\$1,699	1	\$1,699		
HPE 24A High Voltage Core Only Corded PDU	1	252663-D74	\$259	2	\$518		
HPE StorageWorks D3700 Disk Enclosure	1	QW967A	\$3,399	5	\$16,995		
HPE StorageWorks D3700 Disk Enclosure (10% Spares)	1	QW967A	\$3,399	2	\$6,798		
HPE 400GB 12G SAS ME 2.5in SC EM SSD	1	741142-B21	\$3,099	32	\$99,168		
HPE 400GB 12G SAS ME 2.5in SC EM SSD (10% Spares)	1	741142-B21	\$3,099	4	\$12,396		
HPE Smart Array P441/4GB FBWC 8-Port Ext SAS	1	726825-B21	\$899	5	\$4,495		
HPE Smart Array P441/4GB FBWC 8-Port Ext SAS (10% spares)	1	726825-B21	\$899	2	\$1,978		
			<b>Subtotal</b>		<b>\$143,867</b>	<b>\$0</b>	
<b>Server Software</b>							
SQL Server 2016 Enterprise Edition (2 core license, 36 cores)	2	7JQ-00256	\$13,472.50	22	\$296,395		
Windows Server 2012 R2 Standard Edition (2 processor license)	2	P73-06284	\$735	1	\$735		
Microsoft Problem Resolution Services	2	N/A	\$259	1		\$259	
			<b>Subtotal</b>		<b>\$297,130</b>	<b>\$259</b>	
			<b>Total Extended Price</b>		<b>\$482,948</b>	<b>\$2,080</b>	
			<b>Total Discounts</b>		<b>\$55,745</b>	<b>\$546</b>	
Price Key: 1 - HPE , 2 - Microsoft <b>Audited by Francois Raab of InfoSizing, Inc. (www.sizing.com)</b>					<b>Grand Total</b>	<b>\$427,203</b>	<b>\$1,534</b>
All discounts are based on US list prices and for similar quantities and configurations. A 30% 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>\$428,737</b>	
					<b>QphH @ 1000GB:</b>	<b>678,492.3</b>	
					<b>\$ USD/QphH @ 1000GB</b>	<b>\$0.64</b>	
Sales contact: HPE WW Headquarters, 3000 Hanover St., Palo Alto, CA 94304-1185 (650) 857-1501 or H-P direct: 800-203-6748 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	1,000
Total Data Storage / Database Size	11.92
Percentage Memory / Database Size	76.8
Start of Database Load	2016-03-15 14:40:21
End of Database Load	2016-03-16 07:51:46
Database Load Time	00d 11h 38m 34s
Query Streams for Throughput Test	7
TPC-H Power	840,324.7
TPC-H Throughput	547,826.1
TPC-H Composite Query-per-Hour (QphH@1000GB)	678,492.3
Total System Price over 3 Years (\$ USD)	\$428,737
TPC-H Price/Performance Metric (\$ USD / QphH@1000GB)	\$0.64

### Measurement Interval

Measurement Interval in Throughput Test	1,012 seconds
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### Duration of Stream Execution

Power Run	Seed	Query Start Time	Duration (sec)	RF1 Start Time	RF2 Start Time
		Query End Time		RF1 End Time	RF2 End Time
	316075146	2016-03-16 8:17:37	144	2016-03-16 8:17:15	2016-03-16 8:20:01
		2016-03-16 8:20:01		2016-03-16 8:17:38	2016-03-16 8:20:17
Throughput Stream	Seed	Query Start Time	Duration (sec)	RF1 Start Time	RF2 Start Time
		Query End Time		RF1 End Time	RF2 End Time
1	316075147	2016-03-16 8:20:16	737	2016-03-16 8:33:08	2016-03-16 8:33:22
		2016-03-16 8:32:33		2016-03-16 8:33:22	2016-03-16 8:33:38
2	316075148	2016-03-16 8:20:16	760	2016-03-16 8:33:39	2016-03-16 8:33:56
		2016-03-16 8:32:56		2016-03-16 8:33:56	2016-03-16 8:34:13
3	316075149	2016-03-16 8:20:16	708	2016-03-16 8:34:13	2016-03-16 8:34:30
		2016-03-16 8:32:04		2016-03-16 8:34:30	2016-03-16 8:34:46
4	316075150	2016-03-16 8:20:16	763	2016-03-16 8:34:46	2016-03-16 8:35:06
		2016-03-16 8:32:59		2016-03-16 8:35:05	2016-03-16 8:35:24
5	316075151	2016-03-16 8:20:16	773	2016-03-16 8:35:24	2016-03-16 8:35:40
		2016-03-16 8:33:09		2016-03-16 8:35:39	2016-03-16 8:35:57
6	316075152	2016-03-16 8:20:16	729	2016-03-16 8:35:58	2016-03-16 8:36:14
		2016-03-16 8:32:25		2016-03-16 8:36:14	2016-03-16 8:36:30
7	316075153	2016-03-16 8:20:16	740	2016-03-16 8:36:30	2016-03-16 8:36:47
		2016-03-16 8:32:36		2016-03-16 8:36:47	2016-03-16 8:37:08

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

Query	Stream 0	Stream 1	Stream 2	Stream 3	Stream 4	Stream 5	Stream 6	Stream 7	Min Qi	Max Qi	Avg. Qi
Q1	2.8	11.1	29.7	14.9	36.1	37.7	68.3	30.1	2.8	68.3	28.8
Q2	2.0	6.5	6.2	8.5	6.1	18.1	8.7	8.5	2.0	18.1	8.1
Q3	4.4	23.1	6.6	6.5	4.8	78.3	56.1	36.8	4.4	78.3	27.1
Q4	4.7	8.3	8.1	38.0	30.0	12.0	60.2	19.0	4.7	60.2	22.5
Q5	5.9	63.9	20.6	18.3	61.2	27.9	38.3	41.6	5.9	63.9	34.7
Q6	0.2	7.8	0.3	4.7	18.1	18.4	6.2	9.0	0.2	18.4	8.1
Q7	3.1	34.3	55.0	16.6	69.3	69.7	29.3	31.6	3.1	69.7	38.6
Q8	4.6	31.2	23.9	62.6	31.9	62.9	31.8	33.0	4.6	62.9	35.2
Q9	23.7	60.4	94.0	38.5	50.9	22.5	32.5	83.7	22.5	94.0	50.8
Q10	4.4	77.8	36.2	18.6	46.4	15.6	12.8	27.5	4.4	77.8	29.9
Q11	4.5	17.1	13.6	13.2	7.6	16.6	17.5	17.2	4.5	17.5	13.4
Q12	1.6	35.3	21.3	35.5	28.8	16.9	56.0	2.7	1.6	56.0	24.8
Q13	24.4	43.4	40.9	63.5	54.1	49.5	43.4	47.2	24.4	63.5	45.8
Q14	1.4	5.7	2.8	4.5	3.7	5.2	4.1	2.3	1.4	5.7	3.7
Q15	1.7	5.5	4.0	4.3	7.8	8.3	4.9	6.6	1.7	8.3	5.4
Q16	3.1	17.4	14.9	12.8	6.7	20.2	9.5	8.5	3.1	20.2	11.6
Q17	1.9	7.4	70.0	31.6	25.9	24.5	40.3	4.5	1.9	70.0	25.8
Q18	22.2	105.1	145.6	32.6	109.2	138.3	41.0	123.6	22.2	145.6	89.7
Q19	0.8	42.0	68.7	78.0	29.3	7.3	32.3	32.2	0.8	78.0	36.3
Q20	4.7	29.1	18.2	15.7	18.1	21.7	21.3	32.2	4.7	32.2	20.1
Q21	13.8	63.4	44.7	105.7	62.0	55.1	49.9	67.2	13.8	105.7	57.7
Q22	7.6	40.1	33.7	82.2	53.3	44.6	63.2	73.3	7.6	82.2	49.8
RF1	21.1	13.6	17.4	16.8	19.2	15.5	15.9	16.3	13.6	21.1	17.0
RF2	15.8	15.8	16.5	16.3	17.9	17.9	16.5	20.8	15.8	20.8	17.2