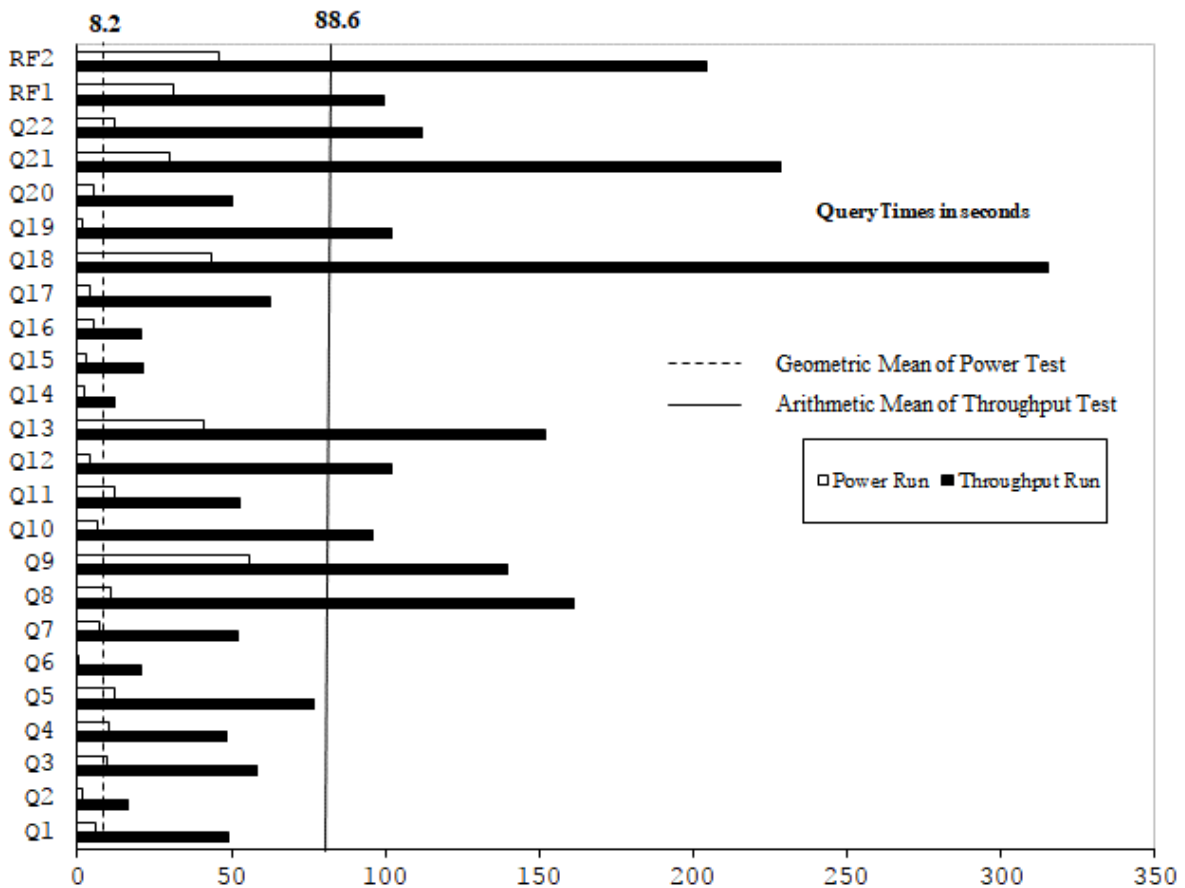

 <b>Hewlett Packard Enterprise</b>	<b>HPE ProLiant DL380 Gen10</b>		TPC-H Rev. 2.17.3 TPC Pricing Rev. 2.1.1	
			Report Date: October 30, 2017	
Total System Cost		Composite Query per Hour Rating		Price/Performance
<b>\$528,454 USD</b>		<b>1,014,374.1</b> QphH @ 3000GB		<b>\$0.53 USD</b> \$ / QphH @3000GB
Database Size	Database Manager	Operating System	Other Software	Availability Date
3000GB	SQL Server 2017 Enterprise Edition	Windows Server 2016 Standard Edition	None	Now



Database Load Time = 00d 5h 51m 15s	Storage Redundancy Level	
Load included backup: Y	Base Tables and Auxiliary Data Structures	0
Total Data Storage / Database Size = 6.6	DBMS Temporary Space	0
Memory/Database Size = 51.2%	OS and DBMS Software	1

System Components	System Total	Per Node
Nodes:	1	n.a.
Intel(R) Xeon(R) Platinum 8180 @ 2.50GHz:	2	2
Cores/Threads:	56/112	56/112
Memory:	1,536GB	1,536GB
Network Interfaces (on-board GigE):	1	1
(P408e-p HBA):	4	4
Storage Shelves D3700:	7	7
Storage Subsystem Disk Drives (400GB 12G SAS SSD):	36	n.a.
Storage Subsystem Disk Drives (300GB 15K SAS HDD):	19	n.a.
Storage Subsystem Disk Drives (600GB 10K SAS HDD):	2	n.a.

 <b>Hewlett Packard Enterprise</b>	<b>HPE ProLiant DL380 Gen10</b>		TPC-H Rev. 2.17.3 TPC Pricing Rev. 2.1.1			
			Report Date: October 30, 2017			
Description	Price Key	Part Number	Unit Price	Qty	Extended Price	3 Yr Maint Price
<b>Server Hardware</b>						
HPE DL380 Gen10 8SFF CTO Server (Customer to Order)	1	868703-B21	\$2,359	1	\$2,359	
HPE DL380 Gen10 Intel® Xeon® Platinum 8180 (2.50GHz/28-core) Kit	1	871619-B21	\$18,089	1	\$18,089	
HPE DL380 Gen10 Intel® Xeon® Platinum 8180 (2.50GHz/28-core) FIO Kit	1	871619-L21	\$18,089	1	\$18,089	
HPE 64GB 4Rx4 PC4-2666V-L Kit LRDIMM	1	815101-091	\$2,499	24	\$59,976	
HPE DL Gen10 x16 x16 GPU Rsr Kit	1	826694-B21	\$119	1	\$119	
HPE DL38X Gen10 12Gb SAS Expander	1	870549-B21	\$699	1	\$699	
HPE DL38X Gen10 High Perf Fan	1	867810-B21	\$239	1	\$239	
HPE 800W FS Univ Ht Plg LH Pwr Sply Kit	1	865428-B21	\$429	2	\$858	
HPE 3Y FC 24x7 DL380 Gen10 SVC	1	H8QP7E	\$2,127	1		\$2,127
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>\$100,935</b>	<b>\$2,127</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 3yr warranty	1	QW967A	\$3,399	7	\$23,793	
HPE StorageWorks D3700 Disk Enclosure (10% Spares)	1	QW967A	\$3,399	2	\$6,798	
HPE 400GB 12G SAS ME 2.5in SC EM SSD 3yr warranty	1	872374-B21	\$1,399	36	\$50,364	
HPE 400GB 12G SAS ME 2.5in SC EM SSD (10% Spares)	1	872374-B21	\$1,399	4	\$5,596	
HPE 300GB SAS 15K SFF SC DS HDD 3-yr warranty	1	652611-B21	\$599	19	\$11,381	
HPE 300GB SAS 15K SFF SC DS HDD (10% spares)	1	652611-B21	\$599	2	\$1,198	
HPE 600GB SAS 10K SFF SC DS HDD 3-yr warranty	1	872477-B21	\$545	2	\$1,090	
HPE 600GB SAS 10K SFF SC DS HDD (10% spares)	1	872477-B21	\$545	2	\$1,090	
HPE Smart Array P408e-p SR Gen10 Controller	1	804405-B21	\$899	4	\$3,596	
HPE Smart Array P408e-p SR Gen10 Controller (10% spares)	1	804405-B21	\$899	2	\$1,798	
<b>Subtotal</b>					<b>\$108,921</b>	<b>\$0</b>
<b>Server Software</b>						
SQL Server 2017 Enterprise Edition for Windows (2 core license, 28 cores)	2	N/A	\$13,472.50	28	\$377,230	Included
Windows Server 2016 Red Stone 3	2	N/A	\$92.00	28	\$2,576	Included
Microsoft Problem Resolution Services	2	N/A	\$259	1		\$259
<b>Subtotal</b>					<b>\$379,806</b>	<b>\$259</b>
<b>Total Extended Price</b>					<b>\$589,662</b>	<b>\$2,386</b>
<b>Total Discounts</b>					<b>\$62,956</b>	<b>\$638</b>
Price Key: 1 - HPE , 2 - Microsoft		<b>Grand Total</b>			<b>\$526,706</b>	<b>\$1,748</b>
<b>Audited by Francois Raab of InfoSizing (www.sizing.com)</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>\$528,454</b>	
		<b>QpH @ 3000GB:</b>			<b>1,014,374.1</b>	
		<b>\$ USD/QpH @ 3000GB</b>			<b>\$0.53</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.						
Total Storage: 19,840 GB					n.a.	

## Numerical Quantities

### Measurement Results

Database Scale Factor	3,000
Total Data Storage / Database Size	6.6
Percentage Memory / Database Size	51.2%
Start of Database Load	2017-10-16 11:14:25
End of Database Load	2017-10-17 06:03:08
Database Load Time	00d 05h 51m 15s
Query Streams for Throughput Test	8
TPC-H Power	1,319,214.5
TPC-H Throughput	779,975.4
TPC-H Composite Query-per-Hour (QphH@3000GB)	1,014,374.1
Total System Price over 3 Years (\$ USD)	\$528,454
TPC-H Price/Performance Metric (\$ USD / QphH@3000GB)	\$0.53

### Measurement Interval

Measurement Interval in Throughput Test	2,437 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
	1017060308	2017-10-17 06:59:20	283	2017-10-17 06:58:48	2017-10-17 07:04:04
		2017-10-17 07:04:03		2017-10-17 06:59:20	2017-10-17 07:04:49
Throughput Stream	Seed	Query Start Time	Duration (sec)	RF1 Start Time	RF2 Start Time
		Query End Time		RF1 End Time	RF2 End Time
1	1017060309	2017-10-17 07:04:48	1,935	2017-10-17 07:04:48	2017-10-17 07:06:31
		2017-10-17 07:37:03		2017-10-17 07:06:29	2017-10-17 07:14:57
2	1017060310	2017-10-17 07:04:48	2,058	2017-10-17 07:14:57	2017-10-17 07:19:02
		2017-10-17 07:39:06		2017-10-17 07:19:02	2017-10-17 07:28:31
3	1017060311	2017-10-17 07:04:48	1,685	2017-10-17 07:28:32	2017-10-17 07:33:13
		2017-10-17 07:32:53		2017-10-17 07:33:13	2017-10-17 07:38:31
4	1017060312	2017-10-17 07:04:48	1,940	2017-10-17 07:38:33	2017-10-17 07:39:13
		2017-10-17 07:37:08		2017-10-17 07:39:13	2017-10-17 07:40:02
5	1017060313	2017-10-17 07:04:49	2,024	2017-10-17 07:40:02	2017-10-17 07:40:35
		2017-10-17 07:38:33		2017-10-17 07:40:35	2017-10-17 07:41:21
6	1017060314	2017-10-17 07:04:49	1,942	2017-10-17 07:41:21	2017-10-17 07:41:53
		2017-10-17 07:37:11		2017-10-17 07:41:53	2017-10-17 07:42:42
7	1017060315	2017-10-17 07:04:49	1,964	2017-10-17 07:42:42	2017-10-17 07:43:14
		2017-10-17 07:37:33		2017-10-17 07:43:14	2017-10-17 07:44:03
8	1017060316	2017-10-17 07:04:49	2,047	2017-10-17 07:44:03	2017-10-17 07:44:36
		2017-10-17 07:38:56		2017-10-17 07:44:36	2017-10-17 07:45:25



**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	5.9	53.9	14.6	25.6	85.6	107.6	63.5	29.6	13.2	5.9	107.6	44.4
Q2	1.5	20.4	13.6	17.1	16.0	18.2	19.6	8.2	19.0	1.5	20.4	14.8
Q3	9.6	65.8	37.7	48.2	87.4	55.5	43.3	88.1	39.8	9.6	88.1	52.8
Q4	10.2	40.5	24.6	77.6	38.0	49.4	44.2	55.6	58.6	10.2	77.6	44.3
Q5	11.8	40.8	69.5	42.5	97.2	92.9	90.7	108.6	70.8	11.8	108.6	69.4
Q6	0.6	15.9	57.1	13.3	10.5	11.0	20.8	18.9	17.8	0.6	57.1	18.4
Q7	6.9	62.8	101.4	58.5	29.4	15.1	36.1	51.9	60.9	6.9	101.4	47.0
Q8	10.5	174.0	228.6	121.2	264.4	151.0	125.8	115.5	108.7	10.5	264.4	144.4
Q9	56.0	177.3	106.0	97.9	148.1	50.1	115.0	119.4	300.9	50.1	177.3	130.1
Q10	6.2	89.9	118.4	32.7	113.9	52.9	115.1	113.5	130.7	6.2	118.4	85.9
Q11	12.0	71.7	49.9	48.1	58.1	56.0	69.6	43.0	24.1	12.0	71.7	48.1
Q12	4.0	27.2	120.2	203.2	104.1	76.6	144.4	55.4	86.9	4.0	203.2	91.3
Q13	40.9	184.8	177.5	151.8	142.5	179.9	93.4	140.9	144.1	40.9	184.8	139.5
Q14	2.3	14.3	5.5	16.3	6.5	10.8	12.8	19.3	8.9	2.3	19.3	10.7
Q15	2.8	28.6	16.1	31.8	16.1	14.2	15.9	21.0	25.2	2.8	31.8	19.1
Q16	5.4	13.2	16.1	22.0	16.4	14.2	30.2	25.2	28.8	5.4	30.2	19.1
Q17	4.3	41.1	46.9	52.6	59.7	110.4	58.1	30.3	103.3	4.3	110.4	56.3
Q18	43.3	200.6	514.0	219.4	288.9	430.6	371.9	282.7	214.3	43.3	514.0	285.1
Q19	1.6	145.7	107.9	58.1	88.2	105.6	105.0	74.2	129.3	1.6	145.7	90.6
Q20	5.1	48.1	46.8	78.7	25.1	26.4	74.7	47.7	51.9	5.1	78.7	44.9
Q21	29.8	279.3	115.2	146.4	189.3	227.8	215.2	400.1	254.9	29.8	400.1	206.4
Q22	12.0	137.8	69.2	120.3	53.6	167.6	76.5	114.5	153.7	12.0	167.6	100.6
RF1	31.4	99.8	245.0	281.4	40.4	32.1	31.8	31.7	32.7	31.4	281.4	91.8
RF2	45.7	505.7	568.8	317.1	49.0	46.6	48.8	49.1	49.2	45.7	568.8	186.7