



Cisco UCS C460 M4 Server

TPC-H Rev. 2.17.1
 TPC-Pricing Rev. 2.0

Report Date: 28-Nov-2016

Total System Cost

Composite Query per Hour Metric

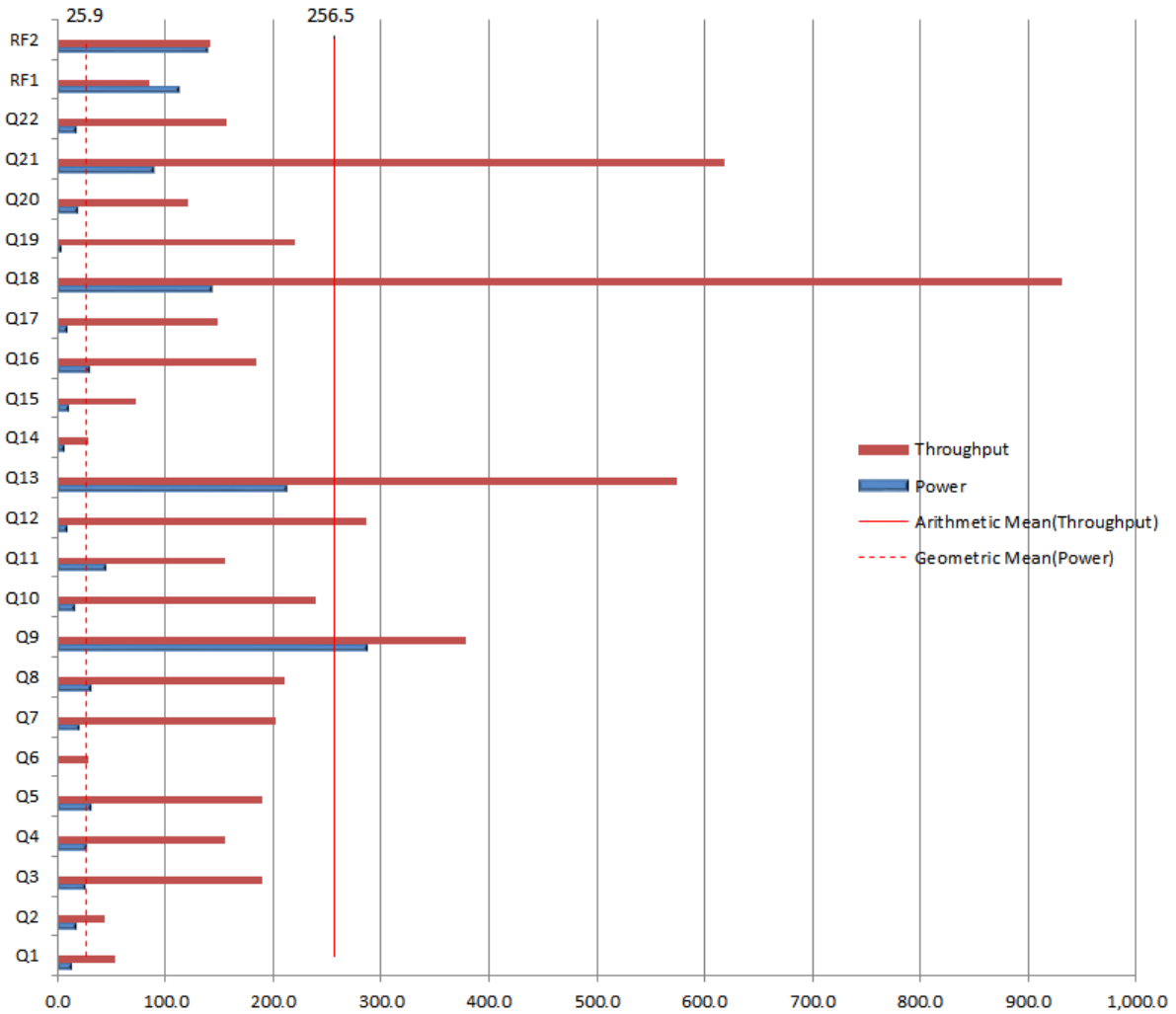
Price / Performance

\$960,172 USD

1,115,298.0
 QphH@10,000GB

\$0.87 USD
 \$ / QphH@10,000GB

Database Size	Database Manager	Operating System	Other Software	Availability Date
10,000GB	Microsoft SQL Server 2016 Enterprise Edition	Windows Server 2016 Standard Edition		28-Nov-2016



Database Load Time = 7h 56m 49s	Storage Redundancy Level	
Load Includes Backup: Y	Base Tables and Auxiliary Data Structures	0
Total Data Storage / Database Size = 3.69	DBMS Temporary Space	0
Percentage Memory / Database Size = 61.4%	OS and DBMS Software	1

System Configuration:	Cisco UCS C460 M4 Server
Processors/Cores/Threads/Model:	4/96/192 Intel(R) Xeon(R) CPU E7-8890 v4 Processor (2.20 GHz, 60MB cache, 165W)
Memory:	6 TB
Storage:	8 X 1.6TB 2.5 inch Ent. Performance 6GSATA SSD (3X endurance) 4 X UCS Rack PCIe Storage 6400GB SanDisk SX350 Medium Endurance
Table Storage:	37.80 TB

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Description	Part Number	Brand	Source	Unit Price	Qty	Extended Price	3 Year Maint. Price
Server Hardware							
UCS C460 M4 base chassis w/o CPU/DIMM/HDD	UCSC-C460-M4	Cisco	1	16,500.00	1	\$16,500.00	
2.2 GHz E7-8890 v4/165W 24C/60M Cache/DDR4 1866MHz	UCS-CPU-E78890E	Cisco	1	21,000.00	4	\$84,000.00	
UCS C460 M4 DDR4 Memory Riser with 12 DIMM slots	UCSC-MRBD2-12	Cisco	1	800.00	8	\$6,400.00	
Riser card with 5 PCIe slots	UCSC-PCIE-RSR-05	Cisco	1	500.00	1	\$500.00	
1400W V2 AC Power Supply (200 - 240V) 2U & 4U C Series	UCSC-PSU2V2-1400W	Cisco	1	800.00	4	\$3,200.00	
Power Cord, 200/240V 6A North America	CAB-N5K6A-NA	Cisco	1	0.00	4	\$0.00	
Rail Kit for UCS C460 M4	UCSC-RAIL-4U	Cisco	1	0.00	1	\$0.00	
Bracket and Supercap cable for C460 M4 and 12 drive RAID	UCSC-BRCKT2-C460	Cisco	1	0.00	1	\$0.00	
CPU Heat Sink for UCS C460 M4 Rack Server	UCSC-HS-01-EX	Cisco	1	0.00	4	\$0.00	
Cisco 12G SAS Modular Raid Controller (12 port)	UCSC-MRAIDC460	Cisco	1	1,688.00	1	\$1,688.00	
Cisco ONE Data Center Compute Opt Out Option	C1UCS-OPT-OUT	Cisco	1	0.00	1	\$0.00	
Cisco 12Gbps SAS 4GB FBWC Cache module (Raid 0/1/5/6)	UCSC-MRAID12G-4GB	Cisco	1	1,967.00	1	\$1,967.00	
1.6TB 2.5 inch Ent. Performance 6GSATA SSD(3X endurance)	UCS-SD16TB12S3-EP	Cisco	1	7,875.00	8	\$63,000.00	
64GB DDR4-2133-MHz LRDIMM/PC4-17000/quad rank/x4/1.2v	UCS-ML-1X644RU-G	Cisco	1	3,370.00	96	\$323,520.00	
Cisco M4 - v3 CPU asset tab ID label (Auto-Expand)	UCS-M4-V3-LBL	Cisco	1	0.00	1	\$0.00	
Full Height PCIe slot filler for C Series	UCSC-PCIE-FLR-F	Cisco	1	0.00	1	\$0.00	
PCIe Module Filler Panel for UCS C460 M4	UCSC-PCIE-RSR-FLR	Cisco	1	0.00	1	\$0.00	
UCS 2.5 inch HDD blanking panel	N20-BBLKD	Cisco	1	0.00	4	\$0.00	
UCS Rack PCIe Storage 6400GB SanDisk SX350 Medium Endurance	UCSC-F-S64002	Cisco	1	70,533.00	4	\$282,132.00	
Cisco R42610 standard rack, w/side panels	RACK-UCS2	Cisco	1	3,429.00	1	\$3,429.00	
UCS PSS 24X7X4 OS,UCS C460 M4 Server	CON-PSJ7-C460M4	Cisco	1	3,161.31	1		\$3,161.31
Server Peripherals							
IOGEARGKM513 Spill Proof Keyboard & Mouse Combo	GKM513	Provantage	3	16.47	1	\$16.47	
ASUS 19.5" VS207D-P Widescreen LED 1600x900 VGA	VS207D-P	Provantage	3	74.15	1	\$74.15	
						Subtotal	\$786,427
							\$3,161.31
Large Purchase Discount ¹	61% for hardware and 35% for services	Cisco	1			-479,665	-1,106.46
						Hardware Subtotal	\$306,762
							\$2,054.85
Software							
SQL Server 2016 Enterprise Edition	NA	Microsoft	2	13,472.50	48	\$646,680.00	
Windows Server 2016 Standard Edition (2 Core Pack)	NA	Microsoft	2	92.00	48	\$4,416.00	
Microsoft Problem Resolution Services	NA	Microsoft	2	259.00	1		\$259.00
						Software Subtotal	\$651,096.00
							\$259.00
						Total	\$957,857.66
							\$2,313.85

Pricing: 1=Cisco 2=Microsoft 3=Provantage;	Three-Year Cost of Ownership:	\$960,172 USD
Audited by Francois Raab from InfoSizing. (sizing.com)		
All discounts are based on US list prices and for similar quantities and configurations. The discounts are based on the overall specific components pricing from respective vendors 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:	1,115,298.0
	\$ / QpH:	\$0.87 USD

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.

Cisco**Cisco UCS C460 M4 Server****TPC-H Rev. 2.17.1****TPC-Pricing Rev. 2.0****Report Date: 28-Nov-2016****Measurement Results**

Database Scaling (SF/Size)	10,000
Total Data Storage/Database Size	3.69
Percentage Memory/Database Size	61.4
Start of Database Load Time	11/05/2016 12:36:34
End of Database Load Time	11/05/2016 20:33:22
Database Load Time	00d 07h 56m 49s
Query Streams for Throughput Test (S)	9
TPC-H Power	1,391,173.9
TPC-H Throughput	894,129.5
TPC-H Composite	1,115,298.0
Total System Price Over 3 Years	\$960,172
TPC-H Price/Performance Metric (\$/QpH@10000GB)	\$0.87

Measurement Interval

Measurement Interval in Throughput Test (Ts)	7,972
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Duration of stream execution:

Power Run	Seed	Query Start Time	Duration	RF1 Start Time	RF2 Start Time
		Query End Time	(sec)	RF1 End Time	RF2 End Time
	1105203322	2016-11-05 21:47:05	1,072	2016-11-05 21:45:12	2016-11-05 22:04:57
		2016-11-05 22:04:57		2016-11-05 21:47:04	2016-11-05 22:07:16

Throughput Stream	Seed	Query Start Time	Duration	RF1 Start Time	RF2 Start Time
		Query End Time	(sec)	RF1 End Time	RF2 End Time
1	1105203323	2016-11-05 22:07:15	5,960	2016-11-05 23:46:34	2016-11-05 23:48:12
		2016-11-05 23:46:35		2016-11-05 23:48:12	2016-11-05 23:50:30
2	1105203324	2016-11-05 22:07:15	5,325	2016-11-05 23:50:31	2016-11-05 23:51:54
		2016-11-05 23:36:00		2016-11-05 23:51:54	2016-11-05 23:54:09
3	1105203325	2016-11-05 22:07:15	4,899	2016-11-05 23:54:09	2016-11-05 23:55:29
		2016-11-05 23:28:54		2016-11-05 23:55:29	2016-11-05 23:57:46
4	1105203326	2016-11-05 22:07:15	5,937	2016-11-05 23:57:47	2016-11-05 23:59:05
		2016-11-05 23:46:12		2016-11-05 23:59:05	2016-11-06 00:01:27
5	1105203327	2016-11-05 22:07:15	5,767	2016-11-06 00:01:27	2016-11-06 00:02:45
		2016-11-05 23:43:22		2016-11-06 00:02:45	2016-11-06 00:05:06
6	1105203328	2016-11-05 22:07:15	5,716	2016-11-06 00:05:06	2016-11-06 00:06:40
		2016-11-05 23:42:31		2016-11-06 00:06:40	2016-11-06 00:09:10
7	1105203329	2016-11-05 22:07:15	5,906	2016-11-06 00:09:11	2016-11-06 00:10:28
		2016-11-05 23:45:41		2016-11-06 00:10:28	2016-11-06 00:12:48
8	1105203330	2016-11-05 22:07:15	5,850	2016-11-06 00:12:49	2016-11-06 00:14:04
		2016-11-05 23:44:45		2016-11-06 00:14:04	2016-11-06 00:16:29
9	1105203331	2016-11-05 22:07:15	5,432	2016-11-06 00:16:30	2016-11-06 00:17:46
		2016-11-05 23:37:47		2016-11-06 00:17:46	2016-11-06 00:20:07

Cisco**Cisco UCS C460 M4
Server****TPC-H Rev. 2.17.1
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Stream ID	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12
0	13.2	18.2	26.4	27.8	31.8	0.8	20.4	31.1	286.8	16.8	45.7	9.2
1	23.8	40.7	171.0	29.4	225.4	9.9	438.5	181.2	181.7	251.3	148.2	443.9
2	30.7	62.4	218.7	114.6	249.3	22.8	136.9	287.1	284.3	252.1	145.7	374.9
3	37.7	49.7	154.0	131.0	188.7	4.6	239.0	190.1	309.1	264.7	164.2	400.8
4	20.9	50.8	47.6	165.3	191.8	56.7	141.8	248.0	455.4	270.5	136.8	414.7
5	37.5	47.5	182.1	327.0	182.8	79.2	147.3	170.4	311.6	173.9	239.5	361.5
6	33.0	39.5	167.2	125.7	220.0	51.8	329.2	378.2	499.0	202.1	204.9	570.3
7	274.4	37.2	337.0	167.7	217.4	22.5	206.0	232.4	501.6	254.3	126.4	55.3
8	32.0	38.6	203.3	299.1	215.9	29.0	160.7	198.1	660.2	451.2	115.1	132.4
9	30.3	47.4	388.7	167.6	175.5	5.3	198.4	185.8	299.4	258.3	220.3	101.6
Minimum	13.2	18.2	26.4	27.8	31.8	0.8	20.4	31.1	181.7	16.8	45.7	9.2
Average	53.4	43.2	189.6	155.5	189.9	28.3	201.8	210.2	378.9	239.5	154.7	286.5
Maximum	274.4	62.4	388.7	327.0	249.3	79.2	438.5	378.2	660.2	451.2	239.5	570.3

Stream ID	Q13	Q14	Q15	Q16	Q17	Q18	Q19	Q20	Q21	Q22	RF1	RF2
0	212.0	7.1	11.1	30.3	9.6	143.3	4.4	19.0	88.9	17.5	112.5	138.4
1	795.7	21.7	90.4	218.9	333.4	1,223.1	261.6	121.3	710.8	36.8	97.3	138.0
2	435.5	39.1	29.8	243.1	83.0	866.2	211.7	164.1	810.1	261.4	82.9	135.3
3	510.9	33.8	127.9	267.3	65.2	730.3	301.4	132.3	459.6	135.7	79.8	137.0
4	584.3	33.1	58.2	97.6	88.7	1,429.9	520.7	38.1	767.7	116.6	78.4	141.4
5	488.8	31.1	99.7	281.3	96.5	1,245.2	168.1	165.9	768.8	160.6	77.7	141.2
6	637.5	35.9	79.0	220.3	139.3	658.6	34.5	158.1	666.6	263.7	93.3	150.6
7	741.1	17.9	30.4	149.3	240.7	1,286.0	284.4	164.0	418.7	140.8	77.2	140.5
8	518.9	33.4	99.9	167.7	226.3	856.9	203.3	143.9	762.4	300.6	75.1	145.4
9	814.6	34.3	94.1	168.7	198.1	869.6	207.1	100.6	725.2	139.8	76.2	141.2
Minimum	212.0	7.1	11.1	30.3	9.6	143.3	4.4	19.0	88.9	17.5	75.1	135.3
Average	573.9	28.7	72.1	184.5	148.1	930.9	219.7	120.7	617.9	157.4	85.0	140.9
Maximum	814.6	39.1	127.9	281.3	333.4	1,429.9	520.7	165.9	810.1	300.6	112.5	150.6