



Cisco UCS C480 M5 Server

TPC-H Rev. 2.18.0
 TPC-Pricing Rev. 2.4.0

Report Date: 4-Nov-2019

Total System Cost

Composite Query per Hour Metric

Price / Performance

1,197,396.28 USD

1,278,277.8
 QphH@30000GB

0.94 USD
 \$ / QphH@30000GB

Database Size

Database Manager

Operating System

Other Software

Availability Date

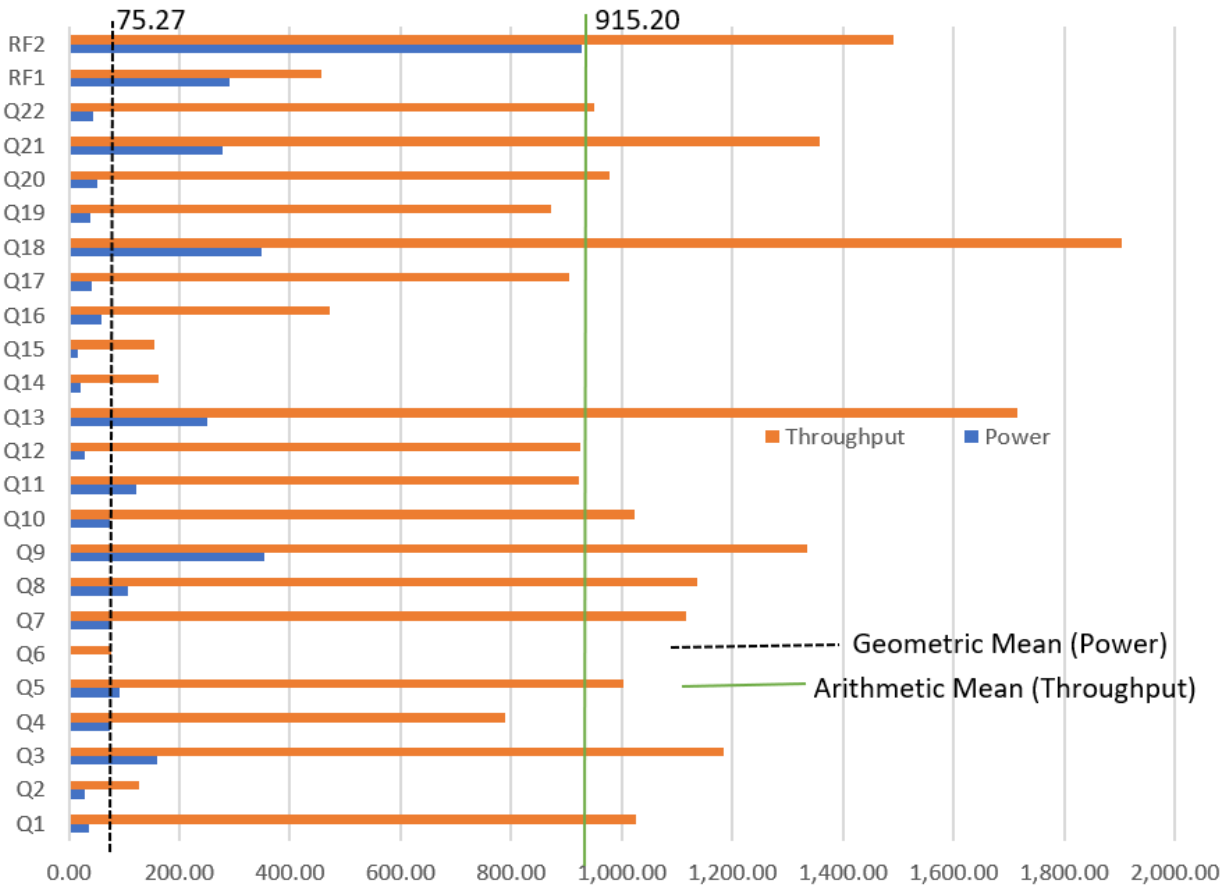
30000GB

**Microsoft SQL Server 2019
 Enterprise Edition for Linux**

**Red Hat
 Enterprise Linux
 8.0**

None

4-Nov-2019



Database Load Time = 18h 1m 9s

Storage Redundancy Level

Load Includes Backup: Y

Base Tables and Auxiliary Data Structures

0

Total Data Storage / Database Size = 2.81

DBMS Temporary Space

0

Percentage Memory / Database Size = 20.48%

OS and DBMS Software

1

System Configuration:

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Processors/Cores/Threads/Model:

4/112/224 Intel 2nd Gen Xeon Scalable 8280M (2.7GHz, 38.5MB cache)

Memory:

6 TB (48x 128G)

Storage:

10 x 1.9TB 2.5-inch Enterprise Value 12G SAS SSDs, 4x 3.8TB 2.5-inch Enterprise Value 6G SATA SSD, 4 x Cisco 2.5-inch U.2 7.6TB HGST SN200 NVMe High Perf. Value Endurance, 8 x Cisco HHHL AIC 3.2T HGST SN260 NVMe Extreme Perf High Endurance

Table Storage:

82.44 TB



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Description	Part Number	Source	Qty	Unit Net Price	Extended Net Price	3 Year Maint. Price	
UCS C480 M5 Std base chassis w/o CPU, mem, HDD, PCIe, PSU	UCSC-C480-M5		1	1	18,237.00	18,237.00	
UCS C480 M5 CPU Module w/o CPU, mem	UCSC-C480-CM		1	2	3,500.00	7,000.00	
Cisco UCS 1600W AC Power Supply for Rack Server	UCSC-PSU1-1600W		1	4	929.00	3,716.00	
Power Cord Jumper, C13-C14 Connectors, 2 Meter Length	CAB-C13-C14-2M		1	4	0.00	0.00	
Cable Management Arm for UCS C480 M4	UCSC-CMA-4U-M5		1	1	150.00	150.00	
IMC SW (Recommended) latest release for C-Series Servers.	CIMC-LATEST		1	1	0.00	0.00	
Other Infrastructure	UCS-SID-INFR-OI		1	1	0.00	0.00	
Rail Kit for UCS C480 M5	UCSC-RAIL-4U-M5		1	1	0.00	0.00	
Super Cap for UCSC-RAID-M5, UCSC-MRAID1GB-KIT	UCSC-SCAP-M5		1	1	0.00	0.00	
Super Cap cable for UCSC-RAID-M5HD	CBL-SC-MR12GM5P		1	1	0.00	0.00	
CPU Heat Sink for UCS C480 M5 Rack Server	UCSC-HS-02-EX		1	4	0.00	0.00	
Cisco 12G Modular RAID controller with 4GB cache	UCSC-RAID-M5HD		1	1	2,900.00	2,900.00	
Cisco HHHL AIC 3.2T HGST SN260 NVMe Extreme Perf High Endrnc	UCSC-NVME-H32003		1	8	10,391.00	83,128.00	
UCS C480 M5 Drive Module for 8x HDD	UCSC-C480-8HDD		1	1	800.00	800.00	
UCS C480 M5 Drive Module for 8x HDD	UCSC-C480-8HDD		1	1	800.00	800.00	
128GB DDR4-2933-MHz LRDIMM4Rx4/1.2v	UCS-ML-128G4RT-H		1	48	11,600.00	556,800.00	
Intel 8280M 2.7GHz/205W 28C/38.50MB DCP DDR4 2TB 2933 MHz	UCS-CPU-I8280M		1	4	43,000.00	172,000.00	
1.9TB 2.5 inch Enterprise Value 12G SAS SSD	UCS-SD19TB121X-EV		1	6	8,064.00	48,384.00	
3.8TB 2.5 inch Enterprise Value 6G SATA SSD	UCS-SD38TB61X-EV		1	4	9,888.00	39,552.00	
1.9TB 2.5 inch Enterprise Value 12G SAS SSD	UCS-SD19TB121X-EV		1	4	8,064.00	32,256.00	
UCS C480 M5 Drive Module for 8x HDD	UCSC-C480-8HDD		1	1	800.00	800.00	
UCS C-Series M5 SFF drive blanking panel	UCSC-BBLKD-S2		1	6	0.00	0.00	
Cisco VIC 1385 Dual Port 40Gb QSFP+ CNA w/RDMA	UCSC-PCIE-C40Q-03		1	1	2,428.00	2,428.00	
7.6TB 2.5in U.2 HGST SN200 NVMe High Perf. Value Endurance	UCSC-NVMEHW-H7680		1	2	22,484.00	44,968.00	
7.6TB 2.5in U.2 HGST SN200 NVMe High Perf. Value Endurance	UCSC-NVMEHW-H7680		1	2	22,484.00	44,968.00	
Cisco R42612 standard rack, w/side panels	RACK2-UCS2		1	1	6,241.00	6,241.00	
3YR SNTC 24X7X4DS UCS C480 M5 Std base chassis w/o CPU, mem,	CON-3CSP-SCC480M5		1	1	7,189.50	0.00	7,189.50
Subtotal					1,065,128.00	7,189.50	
Large Purchase discount: 61% for hardware and 35% for service				1	Discounted Price	-649,728.08	-2,516.33
IOGEAR GKM513Spill Proof Keyboard & Mouse Combo	GKM513		3	1	19.95	19.95	
ASUS 19.5" VS207D-P Widescreen LED 1600x900 VGA	VS207D-P		3	1	74.61	74.61	
Hardware Subtotal					415,494.48	4,673.17	
Software							
SQL Server2019 Enterprise Edition for Linux	NA		2	56	13,748.00	769,888.00	
Red Hat Enterprise Linux Server, 2 Sockets w/ Premium 24x7 support, with 23% discount on 4,598.46	NA		1	2	3,540.81	7,081.63	
Microsoft Problem Resolution Services	NA		2	1	259	259.00	
Software Subtotal					776,969.63	259.00	
Total					1,192,464.11	4,932.17	
Source: 1-Cisco, 2-Microsoft, 3-Privantage		Three-Year Cost of Ownership			1,197,396.28	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		1,278,277.80		
			\$/QpH		0.94		
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 pricing specifications. If you find that the stated prices are not available according to these terms, please inform the TPC at pricing@tpc.org. Thank you.							



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Measurement Results

Database Scaling (SF/Size)	30,000
Total Data Storage/Database Size	2.81
Percentage Memory/Database Size	20.48
Start of Database Load Time	10/22/2019 08:03:30
End of Database Load Time	10/23/2019 02:04:48
Database Load Time	00d 18h 01m 19s
Query Streams for Throughput Test (S)	10
TPC-H Power	1,434,669.1
TPC-H Throughput	1,138,910.7
TPC-H Composite	1,278,277.8
Total System Price Over 3 Years	\$1,197,396.28
TPC-H Price/Performance Metric (\$/QphH@30000GB)	\$0.94

Measurement Interval

Measurement Interval in Throughput Test (Ts) 20,862.04

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
	1023020448	2019-10-23 10:44:43	00:38:23	2019-10-23 10:39:51	2019-10-23 11:23:09
		2019-10-23 11:23:06		2019-10-23 10:44:41	2019-10-23 11:38:37

Throughput Stream	Seed	Query Start Time	Duration (sec)	RF1 Start Time	RF2 Start Time
		Query End Time		RF1 End Time	RF2 End Time
1	1023020449	2019-10-23 11:38:36	05:47:42	2019-10-23 11:38:36	2019-10-23 11:47:14
		2019-10-23 17:26:18		2019-10-23 11:47:14	2019-10-23 12:13:16
2	1023020450	2019-10-23 11:38:36	05:47:43	2019-10-23 12:13:16	2019-10-23 12:21:05
		2019-10-23 17:26:19		2019-10-23 12:21:05	2019-10-23 12:43:42
3	1023020451	2019-10-23 11:38:36	05:37:39	2019-10-23 12:43:43	2019-10-23 12:51:33
		2019-10-23 17:16:15		2019-10-23 12:51:33	2019-10-23 13:16:18
4	1023020452	2019-10-23 11:38:36	05:34:15	2019-10-23 13:16:18	2019-10-23 13:22:31
		2019-10-23 17:12:51		2019-10-23 13:22:31	2019-10-23 13:47:30
5	1023020453	2019-10-23 11:38:36	05:28:39	2019-10-23 13:47:30	2019-10-23 13:55:41
		2019-10-23 17:07:15		2019-10-23 13:55:41	2019-10-23 14:17:39
6	1023020454	2019-10-23 11:38:36	05:05:46	2019-10-23 14:17:39	2019-10-23 14:24:15
		2019-10-23 16:44:22		2019-10-23 14:24:15	2019-10-23 14:48:01
7	1023020455	2019-10-23 11:38:36	05:39:02	2019-10-23 14:48:01	2019-10-23 14:55:47
		2019-10-23 17:17:38		2019-10-23 14:55:47	2019-10-23 15:19:10
8	1023020456	2019-10-23 11:38:36	05:40:58	2019-10-23 15:19:10	2019-10-23 15:26:08
		2019-10-23 17:19:34		2019-10-23 15:26:08	2019-10-23 15:50:02
9	1023020457	2019-10-23 11:38:36	05:30:30	2019-10-23 15:50:02	2019-10-23 15:58:24
		2019-10-23 17:09:06		2019-10-23 15:58:24	2019-10-23 16:22:54
10	1023020458	2019-10-23 11:38:36	05:43:38	2019-10-23 16:22:54	2019-10-23 16:30:38
		2019-10-23 17:22:14		2019-10-23 16:30:38	2019-10-23 17:03:18



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TPC-H Timing Intervals (in seconds)

Stream ID	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12
0	35.91	29.25	160.65	74.10	91.15	2.86	75.56	108.00	353.80	73.34	123.20	28.25
1	97.18	129.61	1,260.04	151.47	1,203.41	74.43	1,219.28	837.67	1,609.52	670.24	1,064.28	1,143.40
2	1,167.32	162.57	1,272.53	789.71	918.45	42.02	1,482.01	1,581.47	1,586.41	1,417.75	1,022.59	520.72
3	1,200.89	133.24	1,045.60	1,146.01	1,665.51	92.06	865.05	1,091.16	948.69	1,005.01	927.11	868.10
4	890.80	65.16	1,223.41	745.89	326.84	178.27	816.42	596.41	1,177.22	1,157.95	634.38	1,360.65
5	593.05	123.42	1,121.44	1,030.92	927.00	71.99	1,136.23	1,398.15	942.58	1,231.36	1,856.49	613.61
6	939.90	125.64	1,498.34	980.13	783.68	41.63	769.51	848.16	1,379.55	314.07	962.08	1,106.60
7	1,526.46	131.77	798.67	1,131.77	1,921.63	83.96	797.35	1,272.89	1,932.25	1,226.64	779.66	976.99
8	1,489.57	101.81	1,096.30	197.49	1,270.87	95.97	1,822.44	1,460.57	1,362.16	1,017.82	439.12	1,140.70
9	1,273.49	191.85	1,179.25	793.01	631.94	81.40	1,099.53	1,090.33	1,429.25	1,206.20	774.40	567.68
10	1,067.44	96.51	1,347.13	927.17	375.92	14.25	1,152.12	1,180.25	995.01	995.65	751.24	939.54
Qi Min	35.91	29.25	160.65	74.10	91.15	2.86	75.56	108.00	353.80	73.34	123.20	28.25
Qi Avg	934.73	117.35	1,091.21	724.33	919.67	70.80	1,021.41	1,042.28	1,246.95	937.82	848.60	842.39
Qi Max	1,526.46	191.85	1,498.34	1,146.01	1,921.63	178.27	1,822.44	1,581.47	1,932.25	1,417.75	1,856.49	1,360.65

Stream ID	Q13	Q14	Q15	Q16	Q17	Q18	Q19	Q20	Q21	Q22	RF1	RF2
0	249.88	22.13	15.39	59.95	40.49	347.66	37.65	52.68	277.13	42.99	289.79	927.93
1	1,940.85	131.02	128.99	445.70	1,084.97	2,393.00	1,093.02	2,991.89	1,050.90	140.61	517.72	1,561.14
2	1,329.83	403.24	155.58	348.86	666.34	1,902.87	1,048.65	659.88	780.07	1,603.15	469.19	1,357.33
3	1,589.18	55.27	163.63	435.31	1,164.57	2,065.13	1,023.99	716.28	1,428.87	627.83	470.02	1,485.22
4	1,827.19	207.11	151.97	1,027.32	564.42	2,067.10	1,156.06	1,186.55	1,886.12	806.70	372.47	1,499.20
5	1,579.46	105.20	259.17	232.09	549.48	2,160.25	997.33	556.54	1,400.04	832.56	490.33	1,317.94
6	1,310.91	103.11	120.41	305.59	727.03	1,037.56	1,166.26	848.00	1,274.79	1,701.94	396.19	1,425.75
7	1,032.87	166.10	114.05	223.12	1,161.06	1,666.59	735.39	742.61	891.65	1,028.03	465.86	1,402.80
8	2,365.17	111.17	210.75	216.65	822.20	1,876.24	161.91	961.50	1,214.22	1,022.52	418.02	1,433.25
9	2,060.36	161.51	143.86	442.68	888.85	1,682.69	1,015.74	424.81	1,958.79	731.52	502.03	1,469.74
10	2,116.46	175.99	105.53	1,046.82	1,422.37	2,201.32	320.84	693.37	1,680.72	1,011.02	464.15	1,960.01
Qi Min	249.88	22.13	15.39	59.95	40.49	347.66	37.65	52.68	277.13	42.99	289.79	927.93
Qi Avg	1,582.01	149.26	142.67	434.92	826.53	1,763.67	796.08	894.01	1,258.48	868.08	441.43	1,440.03
Qi Max	2,365.17	403.24	259.17	1,046.82	1,422.37	2,393.00	1,166.26	2,991.89	1,958.79	1,701.94	517.72	1,960.01