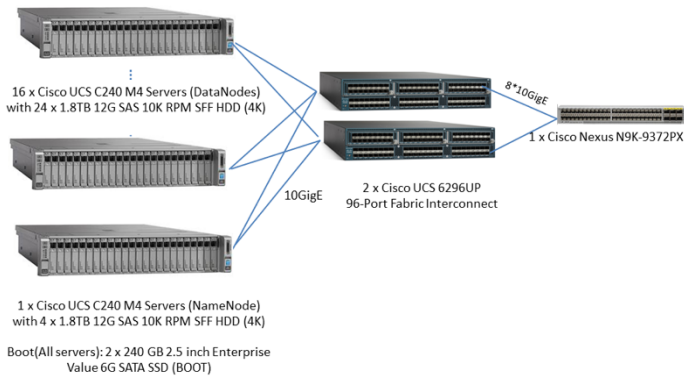
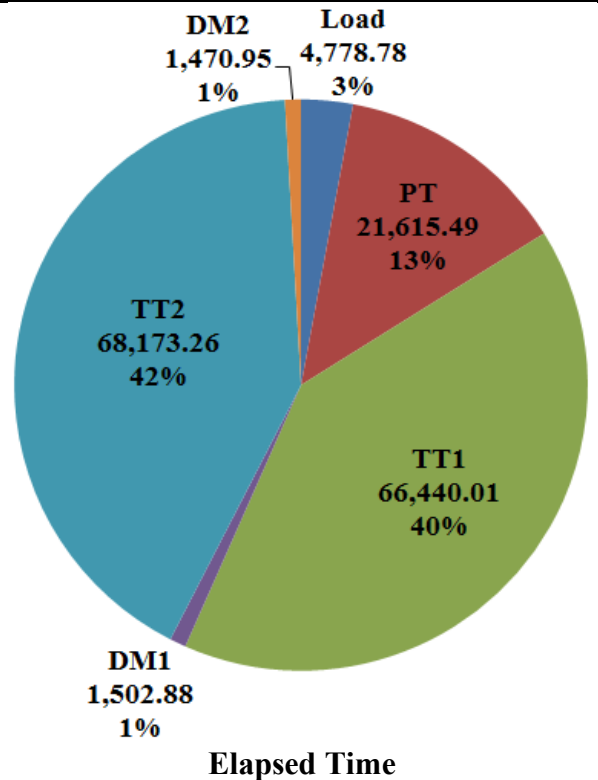

	<h2 style="text-align: center;">Cisco UCS Integrated Infrastructure for Big Data</h2>			TPC-DS 2.7.0 TPC-Pricing 2.1.1	
				Report Date: 05-Mar-2018	
Total System Cost		Composite Query per Hour Metric		Price / Performance	
\$1,008,066 USD		1,580,649 QphDS@10000GB		\$0.64 USD \$ / QphDS@10000GB	
Database Size ¹	Database Manager	Operating System	Other Software	Availability date	Clustered Or Not
10,000GB	Transwarp Data Hub V5.1	Red Hat Enterprise Linux Server Release 6.7	No	05-Mar-2018	Yes



Benchmarked Configuration



Elapsed Time

Load includes backup = No	RAID = No (using HDFS with 3-way replication)	
System Configuration: Cisco UCS Integrated Infrastructure for Big Data		
Servers:	17 x Cisco UCS C240 M4 Server	
Total Processors/Cores/Threads:	34/476/952	
Total Memory:	8704 GB	
Total Storage ² :	723321.6 GB	
Storage Ratio ³ :	72.34	
Connectivity:	1 x Cisco Nexus 9372PX Switch 2 x Cisco UCS 6296UP 96-Port Fabric Interconnect	
Server Configuration: Per node		
Processors:	2 x Intel® Xeon® Processor E5-2680 v4, 2.40 GHz, 35 MB L3	
Memory:	512 GB	
Network:	1 x Cisco VIC 1227 Dual Port 10Gb SFP+	
Storage Device:	24 x 1.8 TB 12G SAS 10K RPM SFF HDD (data nodes) 4 x 1.8 TB 12G SAS 10K RPM SFF HDD (name node) 2 x 240 GB 2.5" 6G SATA SSD (all nodes, boot disk)	
<small>¹ Database Size includes only raw data (i.e., no temp, index, redundant storage space, etc). ² Total Storage = 16 x DataNode + 1 x NameNode + 17 x BootDisk (i.e. 16 x 24 x 1.8 x 1024 GB + 1 x 4 x 1.8 x 1024 GB + 17 x 2 x 240 GB) ³ Storage Ratio = TotalStorage / SF (i.e. 723321.6 GB / 10000 GB)</small>		
	Cisco UCS Integrated Infrastructure for Big Data	TPC-DS 2.7.0 TPC-Pricing 2.1.1
		Report Date: 05-Mar-2018

Description	Part Number	Brand	Src	Unit Price (\$)	Qty	Extended Price (\$)	3 Year Maint. Price(\$)
UCS C240 M4 SFF 24 HD w/o CPU,mem,HD,PCIe,PS,railkt w/expndr	UCSC-C240-M4SX	Cisco	1	3,995.00	16	63,920.00	
2.40 GHz E5-2680 v4/120W 14C/35MB Cache/DDR4 2400MHz	UCSC-CPU-E52680E	Cisco	1	5,259.00	32	168,288.00	
32GB DDR4-2400-MHz RDIMM/PC4-19200/dual rank/x4/1.2v	UCSC-MR-1X322RV-A	Cisco	1	2,160.00	256	552,960.00	
240 GB 2.5 inch Enterprise Value 6G SATA SSD (boot)	UCSC-SD240GBKS4-EB	Cisco	1	917.00	32	29,344.00	
Right PCI Riser Bd (Riser 1) 2onbd SATA bootdrvs+ 2PCI slts	UCSC-PCI-1C-240M4	Cisco	1	148.00	16	2,368.00	
1.8 TB 12G SAS 10K RPM SFF HDD (4K)	UCSC-HD18TB10KS4K	Cisco	1	1,918.00	384	736,512.00	
Cisco UCS VIC1227 VIC MLOM - Dual Port 10Gb SFP+	UCSC-MLOM-CSC-02	Cisco	1	1,499.00	16	23,984.00	
1200W / 800W V2 AC Power Supply for 2U C-Series Servers	UCSC-PSU2V2-1200W	Cisco	1	749.00	32	23,968.00	
AC Power Cord - 250V, 10A - PRC	CAB-250V-10A-CN	Cisco	1	0.00	32	0.00	
Ball Bearing Rail Kit for C220 & C240 M4 & M5 rack servers	UCSC-RAILB-M4	Cisco	1	220.00	16	3,520.00	
IMC SW (Recommended) latest release for C-Series Servers.	CIMC-LATEST	Cisco	1	0.00	16	0.00	
Cisco M4 - v4 CPU asset tab ID label (Auto-Expand)	UCS-M4-V4-LBL	Cisco	1	0.00	16	0.00	
Supercap cable 250mm	UCSC-SCCBL240	Cisco	1	0.00	16	0.00	
Heat sink for UCS C240 M4 rack servers	UCSC-HS-C240M4	Cisco	1	0.00	32	0.00	
Cisco 12G SAS Modular Raid Controller	UCSC-MRAID12G	Cisco	1	656.00	16	10,496.00	
Cisco 12Gbps SAS 2GB FBWC Cache module (Raid 0/1/5/6)	UCSC-MRAID12G-2GB	Cisco	1	1,405.00	16	22,480.00	
Cisco ONE Data Center Compute Opt Out Option	C1UCS-OPT-OUT	Cisco	1	0.00	16	0.00	
UCS SP Select 6296 FI w/18p LIC 2Pk	UCS-SP-FI96-2X	Cisco	1	0.00	1	0.00	
(Not sold Standalone)UCS SP Select 6296 FI w/18p LIC	UCS-SP-FI96P	Cisco	1	18,575.00	2	37,150.00	
Power Cord, 125VAC 13A NEMA 5-15 Plug, North America	CAB-9K12A-NA	Cisco	1	0.00	4	0.00	
10GBASE-SR SFP Module	SFP-10G-SR	Cisco	1	0.00	8	0.00	
10GBASE-CU SFP+ Cable 3 Meter	SFP-H10GB-CU3M	Cisco	1	0.00	8	0.00	
8 Gbps Fibre Channel SW SFP+, LC	DS-SFP-FC8G-SW	Cisco	1	0.00	8	0.00	
UCS 6296UP Chassis Accessory Kit	UCS-ACC-6296UP	Cisco	1	0.00	2	0.00	
UCS 6200 Series Expansion Module Blank	UCS-BLKE-6200	Cisco	1	0.00	6	0.00	
UCS 6296UP Fan Module	UCS-FAN-6296UP	Cisco	1	0.00	8	0.00	
UCS Manager v3.1	N10-MGT014	Cisco	1	0.00	2	0.00	
UCS 6296UP Power Supply/100-240VAC	UCSC-PSU-6296UP-AC	Cisco	1	0.00	4	0.00	
UCS C240 M4 SFF 24 HD w/o CPU,mem,HD,PCIe,PS,railkt w/expndr	UCSC-C240-M4SX	Cisco	1	3,995.00	1	3,995.00	
2.40 GHz E5-2680 v4/120W 14C/35MB Cache/DDR4 2400MHz	UCSC-CPU-E52680E	Cisco	1	5,259.00	2	10,518.00	
32GB DDR4-2400-MHz RDIMM/PC4-19200/dual rank/x4/1.2v	UCSC-MR-1X322RV-A	Cisco	1	2,160.00	16	34,560.00	
240 GB 2.5 inch Enterprise Value 6G SATA SSD (boot)	UCSC-SD240GBKS4-EB	Cisco	1	917.00	2	1,834.00	
Right PCI Riser Bd (Riser 1) 2onbd SATA bootdrvs+ 2PCI slts	UCSC-PCI-1C-240M4	Cisco	1	148.00	1	148.00	
1.8 TB 12G SAS 10K RPM SFF HDD (4K)	UCSC-HD18TB10KS4K	Cisco	1	1,918.00	4	7,672.00	
Cisco UCS VIC1227 VIC MLOM - Dual Port 10Gb SFP+	UCSC-MLOM-CSC-02	Cisco	1	1,499.00	1	1,499.00	
1200W / 800W V2 AC Power Supply for 2U C-Series Servers	UCSC-PSU2V2-1200W	Cisco	1	749.00	2	1,498.00	
AC Power Cord - 250V, 10A - PRC	CAB-250V-10A-CN	Cisco	1	0.00	2	0.00	
Ball Bearing Rail Kit for C220 & C240 M4 & M5 rack servers	UCSC-RAILB-M4	Cisco	1	220.00	1	220.00	
IMC SW (Recommended) latest release for C-Series Servers.	CIMC-LATEST	Cisco	1	0.00	1	0.00	
Cisco M4 - v4 CPU asset tab ID label (Auto-Expand)	UCS-M4-V4-LBL	Cisco	1	0.00	1	0.00	
Supercap cable 250mm	UCSC-SCCBL240	Cisco	1	0.00	1	0.00	
Heat sink for UCS C240 M4 rack servers	UCSC-HS-C240M4	Cisco	1	0.00	2	0.00	
Cisco 12G SAS Modular Raid Controller	UCSC-MRAID12G	Cisco	1	656.00	1	656.00	
Cisco 12Gbps SAS 2GB FBWC Cache module (Raid 0/1/5/6)	UCSC-MRAID12G-2GB	Cisco	1	1,405.00	1	1,405.00	
Cisco ONE Data Center Compute Opt Out Option	C1UCS-OPT-OUT	Cisco	1	0.00	1	0.00	
UCS 2.5 inch HDD blanking panel	N20-BBLKD	Cisco	1	0.00	20	0.00	
Cisco Smart Net 24X7X4 3Y UCS C240 M4S BD SP Server	CON-OSP-C240V4SP	Cisco	1	1,284.99	17		21,845
2rd Gen FI License to connect C-direct only	UCS-L-6200-10G-C	Cisco	1	925.00	30	27,750.00	
10GBASE-CU SFP+ Cable 3 Meter	SFP-H10GB-CU3M	Cisco	1	100.00	16	1,600.00	
Cisco R42610 standard rack w/side panels	RACK-UCS2	Cisco	1	3,429.00	1	3,429.00	
Cisco Smart Net 24X7X4 3Y UCS 6296UP 2RU Fabre Int/2 PSU/4 Fans	CON-SNTP-FI6296UP	Cisco	1	5,781.00	2		11,562
Cisco Nexus 9372PX Switch	N9K-C9372PX	Cisco	1	22,500.00	1	22,500.00	
Cisco SNTP Cisco Nexus 9372PX Switch, 36 24x7	CON-SNTP-9372PX	Cisco	1	5,256.00	1		5,256
Red Hat Enterprise Linux Server, 3Y 24x7	CON-ISV1-EL2S2V3A	Cisco	1	3,897.00	17	66,249.00	
					Total	1,860,523.00	38,663
Large Purchase Discount ¹	61% for products and 35% for service	Cisco	1			-1,134,919.03	-13,532
Acer V206HQL-LED monitor - 20" (Inc 2 spares)	UM.1V6AA.A02	CDW	2	78.99	3	236.97	
Logitech USB Corded Keyboard/Mouse Combo MK120 (Inc 2 spares)	920-002565	CDW	2	17.99	3	53.97	
Transwarp Data Hub Professional Version 5.1 with 3 years 24x7 support	TDH-BD-SUITE-P	Transwarp	3	21,600.00	17	367,200.00	
Large Purchase Discount ¹	30% for Transwarp Data Hub	Transwarp	3			-110,160.00	

1= Cisco, 2 = DW.com, 3 = TDH

¹All 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.

Audited by Francois Raab, InfoSizing

Three-Year Cost of Ownership: \$1,008,066 USD

QphDS@10000GB: 1,580,649

\$/ QphDS@10000GB: \$0.64 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 UCS Integrated

**TPC-DS 2.7.0
TPC-Pricing 2.1.1**

Infrastructure for Big Data

Report Date:
05-Mar-2018

Metrics Details:

Name	Value	Unit
Scale Factor (SF)	10,000	GB
Streams	4	Stream
Queries (Q)	396	Queries
T_load	4,778.8	Second
T_ld	0.0531	Hour
T_pt	24.0173	Hour
T_tt1	66,440.1	Second
T_tt2	68,173.3	Second
T_dm1	1,502.9	Second
T_dm2	1,471.0	Second
T_tt	37.3927	Hour
T_dm	0.8261	Hour

Load Step	Start	End	(sec.)	(hh:mm:ss)
Build	01/23/18 19:22:46.21	01/23/18 20:38:19.77	4,533.56	1:15:34
Audit	01/23/18 20:38:19.77	01/23/18 22:12:48.93	5,669.16	1:34:29
Get Stats	01/23/18 22:12:48.93	01/23/18 22:16:54.15	245.22	0:04:05
Reported	01/23/18 19:22:46.21	01/23/18 22:16:54.15	4,778.78	1:19:39

Test	Start	End	(sec.)	(hh:mm:ss)
Power	01/23/18 22:28:21.92	01/24/18 04:28:37.41	21,615.49	6:00:15
Thruput-1	01/24/18 04:28:37.41	01/24/18 22:55:57.42	66,440.01	18:27:20
Thruput-2	01/24/18 23:21:00.31	01/25/18 18:17:13.57	68,173.26	18:56:13
DM-1	01/24/18 22:55:57.42	01/24/18 23:21:00.30	1,502.88	0:25:03
DM-2	01/25/18 18:17:13.57	01/25/18 18:41:44.52	1,470.95	0:24:31

Stream	Start	End	(sec.)	(hh:mm:ss)
Pt - 0	01/23/18 22:28:21.92	01/24/18 04:28:37.41	21,615.49	6:00:15
Tt1 - 1	01/24/18 04:28:37.41	01/24/18 22:43:57.06	65,719.65	18:15:20
Tt1 - 2	01/24/18 04:28:37.42	01/24/18 22:55:57.42	66,440.00	18:27:20
Tt1 - 3	01/24/18 04:28:37.42	01/24/18 22:35:12.92	65,195.50	18:06:35
Tt1 - 4	01/24/18 04:28:37.41	01/24/18 22:34:14.87	65,137.46	18:05:37
Tt2 - 5	01/24/18 23:21:00.31	01/25/18 18:09:14.08	67,693.77	18:48:14
Tt2 - 6	01/24/18 23:21:00.31	01/25/18 18:15:04.29	68,043.98	18:54:04
Tt2 - 7	01/24/18 23:21:00.31	01/25/18 18:13:57.73	67,977.42	18:52:57
Tt2 - 8	01/24/18 23:21:00.31	01/25/18 18:17:13.57	68,173.26	18:56:13
DMt1 - 1	01/24/18 22:55:57.42	01/24/18 23:09:58.30	840.88	0:14:01
DMt1 - 2	01/24/18 23:09:58.30	01/24/18 23:21:00.30	662.00	0:11:02
DMt2 - 3	01/25/18 18:17:13.57	01/25/18 18:29:41.85	748.28	0:12:28
DMt2 - 4	01/25/18 18:29:41.85	01/25/18 18:41:44.52	722.67	0:12:03

Timing Intervals for Each Query (In Seconds)

Query	Stream0	Stream1	Stream2	Stream3	Stream4	Min	25%tile	Median	75%tile	Max	Stream5	Stream6	Stream7	Stream8	Min	25%tile	Median	75%tile	Max
1	29.5	454.2	551.4	482.5	769.8	454.2	475.4	517.0	606.0	769.8	585.8	666.6	732.1	468.1	468.1	556.4	626.2	683.0	732.1
2	374.5	465.7	528.9	541.2	978.4	465.7	513.1	535.1	650.5	978.4	662.5	1,141.3	1,434.4	680.9	662.5	676.3	911.1	1,214.6	1,434.4
3	96.4	611.1	128.1	390.3	172.5	128.1	161.4	281.4	445.5	611.1	175.8	418.8	130.2	528.5	130.2	164.4	297.3	446.2	528.5
4	1,111.7	2,472.0	2,234.9	1,843.1	1,625.7	1,625.7	1,788.8	2,039.0	2,294.2	2,472.0	1,856.4	1,562.3	1,460.8	1,673.4	1,460.8	1,536.9	1,617.9	1,719.2	1,856.4
5	89.0	118.1	253.1	113.5	252.9	113.5	117.0	185.5	253.0	253.1	328.4	668.3	472.7	431.4	328.4	405.7	452.1	521.6	668.3
6	10.4	135.8	256.8	127.5	568.7	127.5	133.7	196.3	334.8	568.7	648.0	30.7	225.4	923.6	30.7	176.7	436.7	716.9	923.6
7	61.6	80.4	139.7	89.0	349.0	80.4	86.9	114.4	192.0	349.0	88.5	598.6	508.1	307.4	88.5	252.7	407.8	530.7	598.6
8	12.3	83.5	402.2	33.9	260.0	33.9	71.1	171.8	295.6	402.2	690.3	396.9	80.5	201.8	80.5	171.5	299.4	470.3	690.3
9	1,079.2	3,876.2	3,307.6	4,324.8	4,512.5	3,307.6	3,734.1	4,100.5	4,371.7	4,512.5	5,277.3	4,382.1	4,312.2	5,028.8	4,312.2	4,364.6	4,705.5	5,090.9	5,277.3
10	13.7	25.2	68.6	27.2	25.8	25.2	25.7	26.5	37.6	68.6	122.9	546.6	358.4	290.1	122.9	248.3	324.3	405.5	546.6
11	436.5	821.1	921.5	1,608.9	544.6	544.6	752.0	871.3	1,093.4	1,608.9	933.1	659.1	507.3	1,072.6	507.3	621.2	796.1	968.0	1,072.6
12	4.2	551.2	32.5	672.9	566.8	32.5	421.5	559.0	593.3	672.9	15.5	7.9	15.4	31.3	7.9	13.5	15.5	19.5	31.3
13	101.9	209.6	153.5	346.9	183.1	153.5	175.7	196.4	243.9	346.9	203.8	256.6	346.9	330.5	203.8	243.4	293.6	334.6	346.9
14	1,094.0	2,865.6	4,468.6	4,071.4	3,224.8	2,865.6	3,135.0	3,648.1	4,170.7	4,468.6	2,592.8	2,915.7	5,077.0	4,139.3	2,592.8	2,835.0	3,527.5	4,373.7	5,077.0
15	11.3	224.1	115.8	72.3	36.0	36.0	63.2	94.1	142.9	224.1	106.9	136.2	55.4	201.0	55.4	94.0	121.6	152.4	201.0
16	186.5	195.7	570.6	491.0	755.2	195.7	417.2	530.8	616.8	755.2	488.3	236.2	301.1	1,267.1	236.2	284.9	394.7	683.0	1,267.1
17	67.6	529.8	346.7	98.0	350.5	98.0	284.5	348.6	395.3	529.8	359.7	100.5	290.0	88.4	88.4	97.5	195.3	307.4	359.7
18	104.3	1,518.2	391.4	168.6	598.7	168.6	335.4	495.1	828.6	1,518.2	293.4	329.8	325.4	634.2	293.4	317.4	327.6	405.9	634.2
19	23.3	520.6	1,542.3	76.2	781.6	76.2	409.5	651.1	971.8	1,542.3	49.0	173.3	141.2	614.5	49.0	118.2	157.3	283.6	614.5
20	5.9	216.0	613.1	138.3	89.0	89.0	126.0	177.2	315.3	613.1	14.7	92.0	849.4	333.3	14.7	72.7	212.7	462.3	849.4
21	4.1	152.6	4.3	135.0	79.1	4.3	60.4	107.1	139.4	152.6	174.5	607.9	365.6	100.0	100.0	155.9	270.1	426.2	607.9
22	20.3	19.3	94.7	340.2	443.5	19.3	75.9	217.5	366.0	443.5	791.6	409.6	107.9	48.0	48.0	92.9	258.8	505.1	791.6
23	1,608.9	3,752.8	3,588.1	5,314.3	2,467.6	2,467.6	3,308.0	3,670.5	4,143.2	5,314.3	4,146.5	3,171.6	4,205.5	3,299.2	3,171.6	3,267.3	3,722.9	4,161.3	4,205.5
24	460.3	2,092.8	769.1	1,041.1	644.6	644.6	738.0	905.1	1,304.0	2,092.8	1,568.0	2,554.0	1,076.6	2,128.3	1,076.6	1,445.2	1,848.2	2,234.7	2,554.0
25	43.9	83.4	333.0	1,066.1	145.0	83.4	129.6	239.0	516.3	1,066.1	778.0	470.1	460.9	441.8	441.8	456.1	465.5	547.1	778.0
26	35.9	147.8	412.7	57.1	186.0	57.1	125.1	166.9	242.7	412.7	300.9	158.4	228.5	427.9	158.4	211.0	264.7	332.7	427.9
27	69.7	982.5	923.3	340.7	203.8	203.8	306.5	632.0	938.1	982.5	373.7	164.9	250.4	632.7	164.9	229.0	312.1	438.5	632.7
28	976.4	2,248.0	1,790.1	1,413.7	2,079.9	1,413.7	1,696.0	1,935.0	2,121.9	2,248.0	2,357.1	1,792.2	1,359.4	1,129.2	1,129.2	1,301.9	1,575.8	1,933.4	2,357.1
29	86.7	104.2	745.3	171.9	336.7	104.2	155.0	254.3	438.9	745.3	115.3	390.3	127.6	152.9	115.3	124.5	140.3	212.3	390.3
30	23.0	486.3	439.1	841.2	108.7	108.7	108.7	356.5	462.7	570.8	455.6	379.4	52.2	153.1	52.2	122.9	266.3	398.5	455.6
31	72.3	1,670.9	297.2	320.4	330.4	297.2	314.6	325.4	665.5	1,670.9	789.5	1,009.9	1,124.8	76.4	76.4	611.2	899.7	1,038.6	1,124.8
32	15.4	23.6	48.0	22.3	51.5	22.3	23.3	35.8	48.9	51.5	334.2	969.3	55.8	573.9	55.8	264.6	454.1	672.8	969.3
33	13.3	1,089.7	467.5	220.4	763.3	220.4	405.7	615.4	844.9	1,089.7	191.0	347.6	274.0	15.8	15.8	147.2	232.5	292.4	347.6
34	106.3	118.2	887.8	187.0	277.9	118.2	169.8	232.5	430.4	887.8	289.6	385.3	276.3	257.7	257.7	271.7	283.0	313.5	385.3
35	36.5	302.6	1,037.9	110.7	382.5	110.7	254.6	342.6	546.4	1,037.9	100.1	79.9	316.5	282.4	79.9	95.1	191.3	290.3	316.5
36	73.0	336.2	353.0	300.5	456.8	300.5	327.3	344.6	379.0	456.8	429.3	200.2	393.6	429.5	200.2	345.3	411.5	429.4	429.5
37	48.6	164.1	305.0	78.9	62.9	62.9	74.9	121.5	193.3	305.0	173.5	207.8	217.6	206.3	173.5	198.1	207.1	210.3	217.6
38	147.1	185.3	485.1	411.9	268.3	185.3	247.6	340.1	430.2	485.1	206.8	1,063.1	447.9	200.1	200.1	205.1	327.4	601.7	1,063.1
39	21.4	163.9	775.8	453.2	527.4	163.9	380.9	490.3	589.5	775.8	155.8	137.9	526.6	345.1	137.9	151.3	250.5	390.5	526.6
40	21.9	642.6	62.6	136.8	285.8	62.6	118.3	211.3	375.0	642.6	57.4	527.9	549.2	449.4	57.4	351.4	488.7	533.2	549.2
41	3.3	219.8	39.8	106.3	5.8	5.8	31.3	73.1	134.7	219.8	375.2	4.0	79.0	206.9	4.0	60.3	143.0	249.0	375.2
42	15.3	177.8	199.6	50.5	205.1	50.5	146.0	188.7	201.0	205.1	36.2	53.7	50.3	282.1	36.2	46.8	52.0	110.8	282.1
43	79.1	521.1	100.1	231.3	486.1	100.1	198.5	358.7	494.9	521.1	884.2	102.1	77.9	239.2	77.9	96.1	170.7	400.5	884.2
44	349.7	1,106.3	581.9	1,198.8	836.8	581.9	773.1	971.6	1,129.4	1,198.8	609.3	771.4	798.2	587.3	587.3	603.8	690.4	778.1	798.2
45	10.7	12.2	68.7	85.3	322.6	12.2	54.6	77.0	144.6	322.6	416.5	124.5	245.7	157.1	124.5	149.0	201.4	288.4	416.5
46	125.6	325.6	122.9	518.9	221.4	122.9	196.8	273.5	373.9	518.9	429.3	184.5	403.4	182.2	182.2	183.9	294.0	409.9	429.3
47	215.5	713.0	218.1	492.1	355.5	218.1	321.2	423.8	547.3	713.0	888.7	838.0	546.0	515.3	515.3	538.3	692.0	850.7	888.7
48	100.8	20.0	99.1	781.1	2,176.7	99.1	174.9	490.6	1,130.0	2,176.7	785.5	223.8	412.6	124.4	124.4	199.0	312.8	505.8	785.5
49	68.4	457.3	132.6	287.0	97.0	97.0	123.7	209.8	329.6	457.3	141.5	398.7	1,144.3	449.7	141.5	334.4	424.2	623.4	1,144.3
50	669.2	1,107.6	1,210.4	1,212.3	1,275.4	1,107.6	1,184.7	1,211.4	1,228.1	1,275.4	1,874.9	883.0	926.3	1,826.2	883.0	915.5	1,376.3	1,838.4	1,874.9
51	116.4	188.2	217.0	426.2	273.1	188.2	209.8	245.1	311.4	426.2	260.8	498.9	174.7	548.9	174.7	239.3	379.9	511.4	548.9
52	16.0	976.3	188.7	411.4	88.4	88.4	163.6	300.1	552.6	976.3	22.7	94.5	185.6	621.4	22.7	76.6	140.1	294.6	621.4
53	41.8	57.9	356.0	337.2	337.9	57.9	267.4	337.6	342.4	356.0	371.0	615.4	485.7	179.7	179.7	323.2	428.4	518.1	615.4
54	14.9	641.7	182.2	16.1	206.7	16.1	140.7	194.5	315.5	641.7	1,265.3	24.6	226.3	406.6	24.6	175.9	316.5	621.3	1,265.3
55	14.3	54.6	691.8	72.7	217.1	54.6	68.2	144.9	335.8	691.8	235.2	548.5	397.8	45.5	45.5	187.8	316.5	435.5	548.5
56	11.3	751.9	166.0	265.0	260.8	166.0	237.1	262.9	386.7	751.9	50.6	40.0	411.1	352.1	40.0	48.0	201.4	366.9	411.1
57	105.9	478.0	309.9	313.2	212.5	212.5	285.6	311.6	354.4	478.0	677.9	255.6	279.3	285.0	255.6	273.4	282.2	383.2	677.9
58	257.4	337.5	602.6	487.2	579.9	337.5	449.8	533.6	585.6	602.6	377.6	502.2	1,055.1	615.1	377.6	471.1	558.7	725.1	1,055.1
59	435.5	543.1	667.9	766.4	932.9	543.1	636.7	717.2	808.0	932.9	1,166.8	790.0	1,262.0	593.7	593.7	740.9	978.4	1,190.6	1,262.0
60	22.3	126.7	383.5	255.8	193.4	126.7	176.7	2											

91	7.3	9.5	547.6	20.0	96.5	9.5	17.4	58.3	209.3	547.6	50.7	8.8	364.3	552.3	8.8	40.2	207.5	411.3	552.3
92	8.9	229.1	10.6	176.4	23.3	10.6	20.1	99.9	189.6	229.1	330.1	320.1	619.4	239.1	239.1	299.9	325.1	402.4	619.4
93	292.7	843.5	344.7	378.4	332.5	332.5	341.7	361.6	494.7	843.5	693.2	544.9	457.5	924.7	457.5	523.1	619.1	751.1	924.7
94	108.4	311.0	503.4	153.3	259.2	153.3	232.7	285.1	359.1	503.4	329.3	132.8	248.4	470.8	132.8	219.5	288.9	364.7	470.8
95	720.2	1,280.9	2,588.6	1,029.2	1,770.5	1,029.2	1,218.0	1,525.7	1,975.0	2,588.6	1,814.8	892.4	1,091.9	1,707.3	892.4	1,042.0	1,399.6	1,734.2	1,814.8
96	82.9	416.1	298.2	376.7	254.7	254.7	287.3	337.5	386.6	416.1	538.0	206.6	519.1	102.5	102.5	180.6	362.9	523.8	538.0
97	317.9	972.7	784.5	480.6	585.8	480.6	559.5	685.2	831.6	972.7	603.6	655.0	817.5	563.3	563.3	593.5	629.3	695.6	817.5
98	15.7	214.5	85.1	488.2	748.6	85.1	182.2	351.4	553.3	748.6	366.6	306.2	296.3	1,054.9	296.3	303.7	336.4	538.7	1,054.9
99	128.0	428.3	627.9	229.8	438.3	229.8	378.7	433.3	485.7	627.9	341.1	285.7	258.9	159.3	159.3	234.0	272.3	299.6	341.1

Timing Intervals for Each Refresh Function (In Seconds)

DM Fx	R-Run1	R-Run2	R-Run3	R-Run4	Min	25%tile	Median	75%tile	Max
LF_CR	98.3	105.9	104.5	102.0	98.3	101.1	103.3	104.9	105.9
LF_CS	90.3	81.0	102.0	90.4	81.0	88.0	90.4	93.3	102.0
LF_I	87.2	103.1	125.9	85.1	85.1	86.7	95.2	108.8	125.9
LF_SR	81.1	75.3	76.9	78.4	75.3	76.5	77.7	79.1	81.1
LF_SS	102.9	82.8	77.0	111.3	77.0	81.4	92.9	105.0	111.3
LF_WR	70.1	66.0	90.0	63.0	63.0	65.3	68.1	75.1	90.0
LF_WS	56.5	62.1	71.0	57.7	56.5	57.4	59.9	64.3	71.0
DF_CS	341.2	275.2	331.4	361.1	275.2	317.4	336.3	346.2	361.1
DF_SS	562.8	338.1	379.8	360.8	338.1	355.1	370.3	425.6	562.8
DF_WS	439.1	276.3	332.7	313.3	276.3	304.1	323.0	359.3	439.1
DF_I	31.1	25.9	30.1	30.9	25.9	29.1	30.5	31.0	31.1