VMware® VMmark® V2.5.2 Results

Vendor and Hardware Platform: HPE ProLiant DL380 Gen10 Virtualization Platform: VMware ESXi 6.0.0 U3 Build 5224934 VMware vCenter Server : VMware vCenter Server 6.0.0 U2 Build 3634793	VMmark V2.5.2 Score = 25.86 @ 22 Tiles

Number of Hosts: 2	Uniform Hosts [yes/no]: yes	Total sockets/cores/threads in test: 4/64/128

Tested By: Hewlett-Packard Enterprise	Test Date: 08-12-2017

Performance Section	Configuration Section	Notes Section
Performance	Configuration	Notes for Workload

Performance

	mailserver			olio			dvdstoreA			dvdstoreB			dvdstoreC			
TILE_0	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	GM
p0	332.25	1.01	100.75	4574.35	0.99	268.64	3830.70	1.74	70.42	2901.35	1.91	73.63	2098.28	1.98	77.39	1.46
p1	327.90	0.99	111.50	4589.90	0.99	261.28	3810.75	1.73	71.09	2781.70	1.83	75.28	2117.05	2.00	76.02	1.44
p2	329.90	1.00	108.00	4560.43	0.98	305.01	3755.97	1.71	73.62	2729.25	1.80	78.12	1969.90	1.86	80.33	1.41
TILE_1	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	GM
p0	326.38	0.99	105.83	4611.32	0.99	237.30	3799.03	1.73	71.99	2841.70	1.87	77.01	2141.75	2.02	74.22	1.45
p1	324.15	0.98	99.00	4605.00	0.99	264.98	3926.05	1.79	66.88	2828.10	1.86	72.21	2135.10	2.02	74.80	1.46
p2	323.75	0.98	104.00	4566.48	0.98	285.48	3865.15	1.76	69.26	2779.32	1.83	75.46	1992.78	1.88	78.99	1.42
TILE_2	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	GM
p0	328.23	0.99	84.00	4612.07	0.99	227.93	3944.12	1.79	67.32	3065.60	2.02	71.05	2232.30	2.11	75.47	1.50
p1	322.60	0.98	88.25	4625.35	1.00	206.17	3919.80	1.78	68.17	2841.15	1.87	72.83	2110.72	1.99	77.91	1.45
p2	327.70	0.99	94.00	4587.38	0.99	264.59	3905.40	1.78	68.48	2840.88	1.87	72.93	2017.88	1.91	78.38	1.44
TILE_3	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	GM
p0	327.48	0.99	131.75	4601.80	0.99	246.96	2403.03	1.09	54.40	3062.38	2.02	65.05	2217.00	2.10	75.62	1.35
p1	324.55	0.98	126.75	4617.30	0.99	232.63	2120.70	0.96	55.00	2925.90	1.93	67.23	2040.30	1.93	75.07	1.28
p2	330.77	1.00	124.00	4598.95	0.99	259.35	2088.30	0.95	57.03	2998.10	1.97	68.46	2116.45	2.00	76.30	1.30
TILE_4	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	GM
p0	323.75	0.98	104.00	4581.93	0.99	255.30	3851.12	1.75	69.34	2906.28	1.91	72.98	2271.45	2.15	71.46	1.47
p1	326.48	0.99	104.00	4578.93	0.99	264.90	3837.95	1.75	69.77	2705.03	1.78	73.76	1940.70	1.83	75.44	1.41
p2	324.00	0.98	109.00	4569.38	0.98	283.77	3740.70	1.70	74.21	2929.60	1.93	77.02	2226.38	2.10	74.85	1.46
TILE_5	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	GM

p0	334.35	1.01	74.00	4656.60	1.00	204.59	3925.70	1.79	67.78	2973.80	1.96	71.11	2303.18	2.18	70.68	1.51
p1	326.18	0.99	74.00	4606.57	0.99	247.29	4059.28	1.85	62.75	2976.90	1.96	65.92	2091.15	1.98	72.23	1.48
p2	323.95	0.98	74.00	4590.98	0.99	248.73	3935.00	1.79	67.50	3009.57	1.98	69.39	2197.03	2.08	71.38	1.48
TILE_6	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	GM
p0	327.27	0.99	114.00	4596.82	0.99	250.26	3820.10	1.74	70.80	2844.25	1.87	71.31	2132.78	2.02	74.63	1.45
p1	328.55	0.99	104.50	4561.05	0.98	285.00	3738.57	1.70	74.12	2822.07	1.86	72.75	2042.80	1.93	74.70	1.43
p2	328.10	0.99	106.00	4567.05	0.98	288.83	3735.70	1.70	74.44	2903.20	1.91	73.36	2176.97	2.06	78.08	1.46
TILE_7	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	GM
p0	325.38	0.99	104.00	4563.38	0.98	280.24	3796.57	1.73	71.57	2926.78	1.93	67.04	2184.62	2.06	70.96	1.46
p1	323.45	0.98	104.00	4582.18	0.99	272.72	3419.25	1.55	62.92	2882.50	1.90	69.44	2119.65	2.00	68.75	1.42
p2	328.05	0.99	102.00	4603.85	0.99	253.12	3250.80	1.48	61.29	2956.50	1.95	70.65	2261.45	2.14	72.37	1.43
TILE_8	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	GM
p0	320.23	0.97	124.97	4631.75	1.00	220.71	3957.90	1.80	65.90	2902.12	1.91	69.60	2180.00	2.06	72.41	1.47
p1	328.02	0.99	110.75	4582.35	0.99	260.74	3934.82	1.79	66.92	2876.15	1.89	70.57	2094.45	1.98	71.90	1.46
p2	327.98	0.99	104.00	4600.68	0.99	239.25	3848.03	1.75	70.42	2898.38	1.91	74.75	2214.75	2.09	76.80	1.47
TILE_9	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	GM
p0	325.32	0.99	94.25	4650.80	1.00	206.83	4061.68	1.85	62.28	2910.22	1.92	69.32	2159.28	2.04	67.10	1.48
p1	329.02	1.00	84.00	4635.88	1.00	221.01	4056.15	1.84	62.51	3109.68	2.05	64.18	2259.78	2.14	66.80	1.52
p2	329.70	1.00	84.00	4617.88	0.99	230.35	3952.47	1.80	66.54	3029.28	1.99	68.34	2289.93	2.16	71.69	1.50
TILE_10	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	GM
p0	325.88	0.99	85.75	4606.40	0.99	233.07	3874.70	1.76	69.18	2938.57	1.94	67.66	2155.07	2.04	67.53	1.47
p1	329.27	1.00	88.50	4627.25	1.00	236.73	3901.70	1.77	68.17	3019.10	1.99	68.30	2228.12	2.11	69.62	1.49
p2	318.90	0.97	94.00	4597.18	0.99	250.34	3794.60	1.73	72.51	2922.43	1.92	68.25	2219.62	2.10	69.82	1.46
TILE_11	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	GM
p0	326.12	0.99	112.50	4629.12	1.00	211.93	3952.72	1.80	66.18	3044.70	2.01	62.33	2196.95	2.08	64.75	1.49
p1	324.18	0.98	104.00	4625.60	1.00	203.65	3974.03	1.81	65.46	3052.57	2.01	66.62	2293.22	2.17	65.12	1.50
p2	329.62	1.00	97.50	4594.40	0.99	255.38	3884.43	1.77	68.98	2927.07	1.93	68.30	2274.12	2.15	65.91	1.49
TILE_12	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	GM
p0	327.45	0.99	113.00	4568.40	0.98	283.30	3883.57	1.77	67.84	2856.55	1.88	70.62	2148.43	2.03	66.81	1.46
p1	326.48	0.99	113.65	4597.30	0.99	269.66	3831.62	1.74	69.94	2941.10	1.94	70.99	2300.00	2.17	69.53	1.48
p2	325.35	0.99	114.00	4605.65	0.99	255.21	3838.03	1.75	69.79	2774.10	1.83	75.16	2093.22	1.98	70.47	1.44
TILE_13	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	GM
p0	330.43	1.00	107.97	4613.02	0.99	229.41	3278.53	1.49	59.83	2871.30	1.89	69.68	2163.47	2.04	65.77	1.42
p1	327.30	0.99	104.00	4590.95	0.99	274.65	3273.18	1.49	60.35	3050.47	2.01	65.40	2364.12	2.23	65.56	1.46

p2	324.02	0.98	110.75	4571.75	0.98	280.43	3275.68	1.49	59.89	2883.60	1.90	69.41	2150.65	2.03	66.64	1.41
TILE_14	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	GM
p0	324.60	0.98	91.25	4643.85	1.00	212.04	3888.97	1.77	69.27	2878.80	1.90	70.61	2114.78	2.00	70.67	1.46
p1	325.45	0.99	84.00	4606.00	0.99	242.97	3834.47	1.74	71.25	2980.28	1.96	70.49	2337.35	2.21	68.42	1.49
p2	327.52	0.99	88.50	4609.40	0.99	243.98	3823.20	1.74	71.68	2880.40	1.90	70.52	2085.88	1.97	72.58	1.45
TILE_15	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	GM
p0	326.75	0.99	84.50	4591.85	0.99	248.80	3878.95	1.76	69.62	3087.07	2.03	65.26	2286.25	2.16	65.31	1.50
p1	328.23	0.99	84.00	4604.73	0.99	222.52	3942.75	1.79	67.20	2998.95	1.97	69.44	2392.97	2.26	64.77	1.51
p2	322.55	0.98	84.00	4610.77	0.99	242.65	3910.32	1.78	68.40	2884.45	1.90	70.62	2137.53	2.02	69.15	1.46
TILE_16	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	GM
p0	323.70	0.98	110.20	4625.18	1.00	227.29	3959.30	1.80	66.15	2905.50	1.91	74.68	2123.65	2.01	76.70	1.47
p1	326.15	0.99	99.75	4615.27	0.99	248.44	3939.30	1.79	66.88	2798.68	1.84	75.16	2160.28	2.04	74.07	1.46
p2	327.55	0.99	94.00	4581.77	0.99	264.13	3890.15	1.77	68.86	2748.18	1.81	78.28	2024.25	1.91	77.43	1.43
TILE_17	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	GM
p0	324.30	0.98	100.50	4659.55	1.00	189.50	4065.45	1.85	62.41	2887.18	1.90	75.90	2177.15	2.06	73.08	1.48
p1	329.50	1.00	94.00	4639.48	1.00	212.67	4083.90	1.86	61.55	2877.25	1.89	70.97	2182.55	2.06	72.71	1.49
p2	322.80	0.98	91.50	4604.65	0.99	250.10	3979.97	1.81	65.57	2835.15	1.87	73.82	2050.38	1.94	76.02	1.45
TILE_18	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	GM
p0	326.98	0.99	108.28	4574.77	0.99	271.78	3790.43	1.72	71.87	2934.22	1.93	71.66	2197.38	2.08	76.83	1.47
p1	327.07	0.99	104.00	4572.25	0.99	269.27	3833.97	1.74	69.81	2823.93	1.86	72.38	1975.30	1.87	80.17	1.43
p2	329.32	1.00	112.50	4564.05	0.98	281.99	3720.38	1.69	74.83	2895.00	1.91	73.65	2063.03	1.95	80.08	1.44
TILE_19	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	GM
p0	322.15	0.98	118.97	4619.02	1.00	225.37	3923.50	1.78	67.86	3055.05	2.01	66.83	2202.28	2.08	77.86	1.49
p1	322.50	0.98	106.00	4635.60	1.00	210.28	3963.32	1.80	66.54	2877.53	1.89	71.24	2005.38	1.90	79.06	1.45
p2	326.80	0.99	102.50	4603.32	0.99	246.81	3849.18	1.75	71.31	2934.57	1.93	73.34	2083.28	1.97	80.48	1.46
TILE_20	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	GM
p0	328.45	0.99	100.00	4625.82	1.00	223.58	3927.10	1.79	67.64	2981.10	1.96	70.49	2288.57	2.16	71.49	1.50
p1	325.05	0.98	94.00	4597.85	0.99	243.09	3894.30	1.77	68.88	2861.50	1.88	71.63	2061.97	1.95	74.23	1.45
p2	327.00	0.99	94.00	4601.75	0.99	245.45	3862.80	1.76	70.24	2897.40	1.91	74.98	2176.15	2.06	72.75	1.47
TILE_21	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	GM
p0	328.27	0.99	80.75	4655.23	1.00	196.68	3954.70	1.80	66.84	2956.03	1.95	72.04	2275.47	2.15	72.31	1.50
p1	322.62	0.98	74.00	4617.77	0.99	222.22	3997.40	1.82	65.26	2973.97	1.96	65.99	2119.40	2.00	69.97	1.47
p2	327.57	0.99	82.50	4580.30	0.99	248.10	3957.25	1.80	66.70	2999.28	1.98	69.96	2206.72	2.09	70.62	1.49
p0_score:	32.28															

p1_score:	32.02
p2_score:	31.81

Infrastructure_Operations_Scores:	vmotion	svmotion	deploy
Completed_Ops_PerHour	17.50	11.00	5.50
Avg_Seconds_To_Complete	21.62	8.40	327.11
Failures	0.00	0.00	0.00
Ratio	1.09	1.22	1.38
Number_Of_Threads	1	1	1

Summary	Run_Is_Compliant	Turbo_Setting:0
	Number_Of_Compliance_Issues(0)*	Median_Phase(p1)
Unreviewed_VMmark2_Applications_Score	32.02	
Unreviewed_VMmark2_Infrastructure_Score	1.22	
Unreviewed_VMmark2_Score	25.86	

Configuration

Virtualization Software	
Hypervisor Vendor, Product, Version, and Build / Availability Date (MM-DD-YYYY)	VMware ESXi 6.0.0 U3 Build 5224934 / 07-11-2017
Datacenter Management Software Vendor, Product, Version, and Build / Availability Date (MM-DD-YYYY)	VMware vCenter Server 6.0.0 U2 Build 3634793 / 03-15-2016
Supplemental Software	none
Servers	
Quantity	2
Server Manufacturer and Model	HPE ProLiant DL380 Gen10
Processor Vendor and Model	Intel Xeon Gold 6143
Processor Speed (GHz)	2.8
Total Sockets/Total Cores/Total Threads	2 Sockets / 32 Cores / 64 Threads
Primary Cache	32KB I + 32KB D on chip per core
Secondary Cache	1 MB I+D on chip per core

Other Cache	22 MB I+D on chip per chip L3
BIOS Version	U30 v1.20 (07/01/2017)
Memory Size (in GB, Number of DIMMs)	768, 24
Memory Type and Speed	32 GB 2Rx4 DDR4 2666 MHz RDIMM
Disk Subsystem Type	FC SAN
Number of Disk Controllers	1
Disk Controller Vendors and Models	HPE Smart Array P408i-a SR Gen10
Number of Host Bus Adapters	1
Host Bus Adapter Vendors and Models	QLogic QLE2662 16 Gb Dual Port FC HBA
Number of Network Controllers	2
Network Controller Vendors and Models	HPE Ethernet 1 Gb 4-port 331i, HPE Ethernet 10Gb 2-port 562SFP+
Other Hardware	none
Other Software	none
Hardware Availability Date (MM-DD-YYYY)	09-25-2017
Software Availability Date (MM-DD-YYYY)	07-11-2017
Network	
Network Switch Vendors and Models	1 x H3C S5820X-28S
Network Speed	H3C S5820X-28S - 24 x 10 GbE ports, 4 x 1 GbE ports
Storage	
Array Vendors, Models, and Firmware Versions	SanDisk ION Data Accelerator, FW versions 2.5.0 and 2.5.5
Fibre Channel Switch Vendors and Models	HPE SN3000B 16Gb 24-port Fibre Channel Switch
Disk Space Used	23.4 TB
Array Cache Size	N/A
Total Number of Physical Disks Used	10 (2 per SUT OS, 2 for SanDisk ION OS per storage system), 9 x PCI-e flash
Total Number of Enclosures/Pods/Shelves Used	3
Number of Physical Disks Used per Enclosure/Pod/Shelf	Internal: 2 disks per host Enclosure: 2 disks and 2 x PCI-e flash per storage system (3 systems total)

Total Number of Storage Groups Used	0
Number of LUNs Used	39
LUN Size and Number of Disks Per LUN	All LUNs used a single PCI-e flash card in Direct Access Mode under the control of the SanDisk ION Data Accelerator software 3 LUNs: 10 GB 4 LUNs: 330 GB 2 LUNs: 390 GB 20 LUNs: 420 GB 10 LUNs: 520 GB
RAID Type	RAID 0 for enclosures, RAID 1 for OS drives
Number of Members per RAID Set	RAID 1: 2 RAID 0: 1
Disk Vendors, Models, and Speeds	4 x HPE 400GB SFF SAS SSD (P/N 872374-B21) 4 x HPE 146GB 15K RPM SAS SFF (P/N 652605-B21) 2 x HPE 500GB 7.2K RPM SAS SFF (P/N 655708-B21) 9 x HPE 2.6TB HH/HL Light Endurance (LE) PCIe Workload Accelerator

Datacenter Management Server	
System Model	HPE ProLiant BL685c
Processor Vendor and Model	AMD Opteron 6380
Processor Speed (GHz)	2.50
Total Sockets/Total Cores/Total Threads	4 Sockets / 64 Cores / 64 Threads
Memory	256 GB
Network Controller(s) Vendors and Models	2 x Integrated NC551i Dual Port FlexFabric 10Gb Converged Network Adapter
Operating System, Version, Bitness, and Service Pack	VMware ESXi 5.1.0 U2 Build 1483097
Other Hardware	none
Other Software	Microsoft Windows Server 2016 Datacenter

Clients	
Total Number of Clients / Total Physical Clients / Total Virtual Client Hosts	22 / 1 / 11
System Model(s)	Prime Client: HPE ProLiant DL360 G5 Client Hosts 1-2, 6-7: HPE ProLiant BL465c G7 Client Hosts 3-5, 8-11: HPE ProLiant BL460c G6
Processor Vendor(s) and Model(s)	Prime Client: Intel Xeon 5160 Client Hosts 1-2, 6-7: AMD Opteron 6174 Client Hosts 3-4, 8-10: Intel Xeon X5570 Client Hosts 5, 11: Intel Xeon X5670

Processor Speed(s) (GHz)	Prime Client: 3.0 GHz Client Hosts 1-2, 6-7: 2.2 GHz Client Hosts 3-11: 2.93 GHz
Total Sockets/Total Cores/Total Threads	Prime Client: 2 Sockets / 4 Cores / 4 Threads Client Hosts 1-2, 6-7: 2 Sockets / 24 Cores / 24 Threads Client Hosts 3-4, 8-10: 2 Sockets / 8 Cores / 16 Threads Client Hosts 5, 11: 2 Sockets / 12 Cores / 24 Threads
Memory per Physical Client	Prime Client: 8 GB Client Hosts 1-2, 5-7, 11: 64 GB Client Hosts 3-4, 8-10: 32 GB
Network Controller(s) Vendors and Models	Prime Client: HPE NC373i Dual Port Gigabit Adapter Client Hosts: HPE NC542m Dual Port Flex-10 10GbE BL-c Adapter
Operating System, Version, Bitness, and Service Pack	Prime Client: Microsoft® Windows® 2008 R2 (64-bit) Client Hosts: VMware ESXi 5.5 U1 Build 1623387
Number of Virtual Clients	22
Number of vCPUs Per Virtual Client	4
Number of vMem (GB) Per Virtual Client	4
Virtual Client Networking Notes	All client VMs attached to port 1 of NC542m card running at speed of 10 Gb/s
Virtual Client Storage Notes	Virtual client hosts used: • 2 x 146 GB SFF SAS drives in RAID1 for OS. • Shared storage on 4 x HPE P2000 G3 MSA array systems. Each HPE P2000 G3 MSA array system had: • 2 volumes ◦ Each volume used 11 x 146 GB SFF SAS drives in RAID5 with 1 x 146 GB SFF SAS drive configured as online spare
Other Hardware	HPE BladeSystem c7000 Enclosure 4 x HPE VC Flex-10 Ethernet Modules 4 x HPE B-series 8/24c SAN Switch BladeSystem c-Class 4 x HPE P2000 G3 MSA array system
Other Software	HPE BladeSystem c7000 Onboard Administrator Version 4.30 HPE Virtual Connect Manager Version 4.10 Microsoft® Windows® 2008 R2 Enterprise (64-bit)

Notes for Workload

Virtualization Software Notes

- All VMs except for deploy template used virtual hardware V8.
- Deploy template used virtual hardware V7.

- All VMs (except for Deploy Template) had VMware tools version 9536 installed and running.
- Ethernet adapter type set to vmxnet3 for all VMs (default vmxnet2)
- Logging was disabled for all VMs (default enabled)
- CD and floppy devices were removed on all VMs (default enabled)
- All VMs except for deploy template and standby VMs: Paravirtual Controller (default LSI Logic)
- Cluster DRS Automation Level set to Fully Automated
- DrsMigrationThreshold set to level 2
- Logical CPU layout changed for all Linux VMs to 1 socket w/ multiple cores. (default Single core per socket)
- All DS2DB VMs had CPU shares set to 11500 (default Normal)
- All mailserver VMs had CPU shares set to 3300 (default Normal)
- All OlioWeb VMs had CPU shares set to 3000 (default Normal)
- All standby VMs had CPU shares set to 10 (default Normal)
- All DS2DB VMs had disk shares set to high (default Normal)
- sched.mem.min and sched.mem.minsize were set to the VM's memory size for all VMs except deploy template (default 0)
- sched.mem.maxmemctl set to 0 for all VMs except deploy template (default enabled)
- sched.mem.pin set to TRUE for all VMs except deploy template (default FALSE)
- ethernet0.coalescingScheme = static for all OlioWeb VMs

Advanced Settings:

- Config.HostAgent.log.level = warning (default info)
- Cpu.CreditAgePeriod = 1961 (default 3000)
- Cpu.HTWholeCoreThreshold = 0 (default 200)
- DataMover.HardwareAcceleratedInit = 0 (default 1)
- DataMover.HardwareAcceleratedMove = 0 (default 1)
- Disk.IdleCredit = 64 (default 32)
- Disk.ReqCallThreshold = 1 (default 8)
- Mem.CtlMaxPercent = 0 (default 65)
- Mem.ShareScanGHz = 0 (default 4)
- Mem.VMOverheadGrowthLimit = 0 (default 4294967295)
- Misc.TimerMaxHardPeriod = 4000 (default 100000)
- Net.MaxNetifRxQueueLen = 1000 (default 100)
- Net.MaxPortRxQueueLen = 160 (default 80)
- Numa.LTermFairnessInterval = 0 (default 5)
- Numa.MigImbalanceThreshold = 57 (default 10)
- Numa.PageMigEnable = 0 (default 1)
- Numa.PreferHT = 1 (default 0)
- Numa.RebalancePeriod = 60000 (default 2000)
- Numa.SwapLoadEnable = 0 (default 1)
- Numa.SwapLocalityEnable = 0 (default 1)
- Power.CpuPolicy = static (default balanced)
- Syslog.global.defaultSize = 112 (default 1024)
- VMFS3.HardwareAcceleratedLocking = 0 (default 1)
- Vpx.Vpxa.config.log.level = warning (default verbose)

Server OS was installed using VMware-ESXi-6.0.0-Update3-5224934-HPE-600.10.1.0.73-Jul2017.iso. This is a publicly available HPE customized ISO that is based on ESXi 6.0 U3 that is bundled with the following items:

- VMware ESXi 6.0 Express Patch 7a Build 5224934
- HPE specific drivers and management software for HPE ProLiant servers

No driver upgrades were made after the OS was installed.

Server Notes

Server BIOS settings:

- Workload Profile set to Virtualization - Max Performance (default: General Power Efficient Compute)
- Thermal Configuration set to Maximum Cooling (default: Optimal Cooling)
- Intel Turbo Boost Enabled (frequency boost to 3.7 GHz) (default: Enabled)
- Core Boosting set to Enabled (default Disabled)

Networking Notes

- vSwitch0 for the Service Console on vmnic0 at 1Gb/s
- vSwitch1 defined as vmkernel vMotion connection on vmnic1 at 1Gb/s
- vSwitch2 for the Olio* workload on vmnic4 at 10Gb/s
- vSwitch3 for the DS2* and mailserver workloads on vmnic5 at 10Gb/s
- vSwitch4 for the standby and deploy workloads on vmnic2 at 1 Gb/s

Storage Notes

- ESXi was installed on two disks configured as RAID1 in the internal server storage bays on each SUT.
- All LUNs were configured as block devices and no system memory was used for write caching.
- Storage box #1
    - Hardware Configuration
        - HPE ProLiant DL380p Gen8
            - 2 x Intel Xeon E5-2690 2.90 GHz processors
            - 256 GB Memory (16 x 16 GB DIMMs dual rank PC3-12800 Registered DDR3)
            - 3 x HPE 2.6TB HH/HL Light Endurance (LE) PCIe Workload Accelerator flash cards
            - 2 x HPE SN1000Q dual port 16 GB fibre HBAs
            - 1 x HPE Smart Array 420i controller for ION OS
            - 2 x 146 GB 15K RPM SAS SFF for ION OS
            - SanDisk ION Accelerator version 2.5.0
    - Software Configuration
        - Each HPE 2.6TB HH/HL Light Endurance (LE) PCIe Workload Accelerator flash card is recognized as a 2600 GB device.
        - Storage Pools were created using Direct Access storage profile.
            - one storage pool per PCI-e flash card
            - each storage pool contains RAID0 LUNs
        - HPE 2.6TB HH/HL Light Endurance (LE) PCIe Workload Accelerator flash card #1
            - LUN1 (440 GB): All DS2 VMs for tiles 0, 12
            - LUN2 (440 GB): All DS2 VMs for tiles 3, 15
            - LUN3 (520 GB): All Olio VMs for tiles 6, 18
            - LUN4 (440 GB): Mailserver and Standby VMs for tiles 9, 21
        - HPE 2.6TB HH/HL Light Endurance (LE) PCIe Workload Accelerator flash card #2
            - LUN1 (440 GB): All DS2 VMs for tiles 9, 21
            - LUN2 (520 GB): All Olio VMs for tiles 0, 12
            - LUN3 (520 GB): All Olio VMs for tiles 3, 15
            - LUN4 (440 GB): Mailserver and Standby VMs for tiles 6, 18
        - HPE 2.6TB HH/HL Light Endurance (LE) PCIe Workload Accelerator flash card #3
            - LUN1 (440 GB): All DS2 VMs for tiles 6, 18

        - LUN2 (520 GB): All Olio VMs for tiles 9, 21
        - LUN3 (440 GB): Mailserver and Standby VMs for tiles 0, 12
        - LUN4 (440 GB): Mailserver and Standby VMs for tiles 3, 15
- Storage box #2
    - Hardware Configuration
        - HPE ProLiant DL380p Gen8
            - 2 x Intel Xeon E5-2690 2.90 GHz processors
            - 256 GB Memory (16 x 16 GB DIMMs dual rank PC3-12800 Registered DDR3)
            - 3 x HPE 2.6TB HH/HL Light Endurance (LE) PCIe Workload Accelerator flash cards
            - 2 x HPE SN1000Q dual port 16 GB fibre HBAs
            - 1 x HPE Smart Array 420i controller for ION OS
            - 2 x 500 GB 7.2K RPM SAS SFF for ION OS
            - SanDisk ION Accelerator version 2.5.5
    - Software Configuration
        - Each HPE 2.6TB HH/HL Light Endurance (LE) PCIe Workload Accelerator flash card is recognized as a 2600 GB device.
        - Storage Pools were created using Direct Access storage profile.
            - one storage pool per PCI-e flash card
            - each storage pool contains RAID0 LUNs
        - HPE 2.6TB HH/HL Light Endurance (LE) PCIe Workload Accelerator flash card #1
            - LUN1 (440 GB): All DS2 VMs for tiles 4, 16
            - LUN2 (440 GB): All DS2 VMs for tiles 7, 19
            - LUN3 (390 GB): All Olio VMs for tiles 10
            - LUN4 (440 GB): Mailserver and Standby VMs for tiles 1, 13
        - HPE 2.6TB HH/HL Light Endurance (LE) PCIe Workload Accelerator flash card #2
            - LUN1 (440 GB): All DS2 VMs for tiles 1, 13
            - LUN2 (520 GB): All Olio VMs for tiles 4, 16
            - LUN3 (520 GB): All Olio VMs for tiles 7, 19
            - LUN4 (330 GB): Mailserver and Standby VMs for tiles 10
        - HPE 2.6TB HH/HL Light Endurance (LE) PCIe Workload Accelerator flash card #3
            - LUN1 (330 GB): All DS2 VMs for tiles 10
            - LUN2 (520 GB): All Olio VMs for tiles 1, 13
            - LUN3 (440 GB): Mailserver and Standby VMs for tiles 4, 16
            - LUN4 (440 GB): Mailserver and Standby VMs for tiles 7, 19
- Storage box #3
    - Hardware Configuration
        - HPE ProLiant DL380 Gen9
            - 2 x Intel Xeon E5-2650 V4 2.20 GHz processors
            - 256 GB Memory (16 x 16 GB 2400 MHz DDR4 RDIMM)
            - 3 x HPE 2.6TB HH/HL Light Endurance (LE) PCIe Workload Accelerator flash cards
            - 2 x HPE SN1000Q dual port 16 GB fibre HBAs
            - 1 x HPE Smart Array 420i controller for ION OS
            - 2 x 146 GB 15K RPM SAS SFF for ION OS
            - SanDisk ION Accelerator version 2.5.0
    - Software Configuration
        - Each HPE 2.6TB HH/HL Light Endurance (LE) PCIe Workload Accelerator flash card is recognized as a 2600 GB device.
        - Storage Pools were created using Direct Access storage profile.
            - one storage pool per PCI-e flash card
            - each storage pool contains RAID0 LUNs
        - HPE 2.6TB HH/HL Light Endurance (LE) PCIe Workload Accelerator flash card #1

        - LUN1 (440 GB): All DS2 VMs for tiles 8, 20
        - LUN2 (330 GB): All DS2 VMs for tiles 11
        - LUN3 (520 GB): All Olio VMs for tiles 2, 14
        - LUN4 (440 GB): Mailserver and Standby VMs for tiles 5, 17
        - LUN5 (10 GB): Deploy Template
    - HPE 2.6TB HH/HL Light Endurance (LE) PCIe Workload Accelerator flash card #2
        - LUN1 (440 GB): All DS2 VMs for tiles 5, 17
        - LUN2 (520 GB): All Olio VMs for tiles 8, 20
        - LUN3 (390 GB): All Olio VMs for tiles 11
        - LUN4 (440 GB): Mailserver and Standby VMs for tiles 2, 14
        - LUN5 (10 GB): Deploy target
    - HPE 2.6TB HH/HL Light Endurance (LE) PCIe Workload Accelerator flash card #3
        - LUN1 (440 GB): All DS2 VMs for tiles 2, 14
        - LUN2 (520 GB): All Olio VMs for tiles 5, 17
        - LUN3 (440 GB): Mailserver and Standby VMs for tiles 8, 20
        - LUN4 (330 GB): Mailserver and Standby VMs for tiles 11
        - LUN5 (10 GB): svMotion target

Datacenter Management Server Notes

- HPE ProLiant BL685c G7 running ESXi 5.1.0 U2 Build 1483097 with one virtual machine for vCenter for SUT
    - vCenter for SUT
        - 2 virtual CPUs
        - 24 GB virtual memory
        - Microsoft® Windows® 2016 Enterprise Datacenter
        - Microsoft SQL Server 2008
        - VMware vCenter Server 6.0.0 U2 Build 3634793

Operating System Notes

- All mailserver VMs running Microsoft® Windows® 2008 R2 Enterprise SP1 (64-bit).
- All standby VMs running Microsoft® Windows® 2003 Enterprise SP2 (32-bit)
- All DS2DB, DS2WebA, DS2WebB, DS2WebC, OlioDB and OlioWeb running SUSE® Linux Enterprise Server 11 SP2 (64-bit)

Software Notes

- Microsoft® Exchange Server 2007 Enterprise SP3 (64-bit) was installed on each mailserver VM

Client Notes

- Prime client functionality was split from the client0 driver and was run on a non-virtualized copy of Microsoft® Windows® 2008 R2 Enterprise (64-bit).
- Prime client was running VMware vSphere PowerCLI 5.5 Release 2 Build 1671586
- All client drivers were run on virtual machines that were each defined with 4 virtual CPUs, 4 GB of memory, 1 vmxnet2 network, and 32 GB of disk space.
- Client VMs were distributed across the client host as follows:
    - Client Host 1: client VMs for tiles 0, 12
    - Client Host 2: client VMs for tiles 1, 13,
    - Client Host 3: client VMs for tiles 2, 14
    - Client Host 4: client VMs for tiles 15
    - Client Host 5: client VMs for tiles 5, 17
    - Client Host 6: client VMs for tiles 6, 18

    - Client Host 7: client VMs for tiles 3, 4, 7
    - Client Host 8: client VMs for tiles 8, 16, 20
    - Client Host 9: client VMs for tiles 9, 21
    - Client Host 10: client VMs for tiles 10, 11
    - Client Host 11: client VMs for tiles 19
- All client operating systems were updated via Windows Update.

Other Notes

- TILEDELAY set to 20 (default 60)
