

## VMmark® 3.1 Results

**Server Vendor & Model:** Fujitsu Server PRIMERGY RX4770 M5  
**Storage Vendor & Model:** 6 x Fujitsu Server PRIMERGY RX2540 M4  
**Hypervisor:** VMware ESXi 6.7 EP08 Build 13473784  
**Datacenter Management Software:** VMware vCenter Server Appliance 6.7.0d Build 9451876

**VMmark 3.1 Score =**  
**17.23 @ 18 Tiles**

Number of Hosts: 2	Uniform Hosts [yes/no]: yes	Total sockets/cores/threads in test: 8/224/448
Tested By: Fujitsu		Test Date: 08-05-2019
<b>Performance Section</b> <a href="#">Performance</a>	<b>Configuration Section</b> <a href="#">Configuration</a>	<b>Notes Section</b> <a href="#">Notes for Workload</a>

### Performance

	weathervane			weathervaneE			dvdstoreA			dvdstoreB			dvdstoreC			
TILE_0	Actual	Ratio	QoS(nRTI MaxPctF)	Actual	Ratio	QoS(nRTI MaxPctF)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	GM
p0	3572.20	0.99	0.42   0.00	561.59	0.98	0.68   0.40	950.77	1.29	844.41	654.55	1.31	1015.23	443.65	1.28	1180.94	1.16
p1	3557.11	0.99	0.46   0.11	560.08	0.98	0.57   0.16	948.40	1.29	851.21	669.15	1.34	1042.49	465.75	1.34	1166.04	1.18
p2	3540.45	0.98	0.43   0.00	559.09	0.98	0.71   0.32	945.08	1.29	864.57	625.95	1.25	1049.98	436.43	1.26	1227.47	1.14
TILE_1	Actual	Ratio	QoS(nRTI MaxPctF)	Actual	Ratio	QoS(nRTI MaxPctF)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	GM
p0	3560.71	0.99	0.52   0.00	570.34	1.00	1.29   0.85	967.35	1.32	764.23	705.27	1.41	888.62	489.88	1.41	1026.87	1.21
p1	3542.36	0.98	0.56   0.12	561.57	0.98	0.52   0.22	960.38	1.31	782.55	668.45	1.34	944.27	458.30	1.32	1089.11	1.17
p2	3541.18	0.98	0.52   0.00	558.72	0.98	0.73   0.37	973.62	1.33	758.88	685.45	1.37	879.07	491.65	1.42	1023.54	1.20
TILE_2	Actual	Ratio	QoS(nRTI MaxPctF)	Actual	Ratio	QoS(nRTI MaxPctF)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	GM
p0	3570.54	0.99	0.39   0.00	569.60	1.00	0.99   0.81	955.70	1.30	833.40	679.55	1.36	1004.97	490.93	1.42	1159.99	1.20
p1	3553.36	0.99	0.41   0.10	569.22	0.99	0.88   0.54	970.17	1.32	776.28	666.67	1.33	945.84	437.57	1.26	1096.87	1.17
p2	3546.87	0.99	0.40   0.00	565.52	0.99	0.71   0.31	931.17	1.27	887.88	671.98	1.34	1028.86	485.55	1.40	1186.58	1.18
TILE_3	Actual	Ratio	QoS(nRTI MaxPctF)	Actual	Ratio	QoS(nRTI MaxPctF)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	GM
p0	3573.81	0.99	0.42   0.00	561.32	0.98	0.57   0.27	866.52	1.18	1122.36	573.02	1.14	1384.00	401.93	1.16	1600.08	1.09
p1	3557.60	0.99	0.44   0.15	560.50	0.98	0.58   0.22	865.65	1.18	1139.56	574.50	1.15	1378.95	383.20	1.10	1603.08	1.08
p2	3538.31	0.98	0.42   0.00	555.82	0.97	0.57   0.28	846.50	1.15	1192.77	578.90	1.16	1450.75	391.25	1.13	1690.72	1.08
TILE_4	Actual	Ratio	QoS(nRTI MaxPctF)	Actual	Ratio	QoS(nRTI MaxPctF)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	GM
p0	3572.18	0.99	0.42   0.00	565.15	0.99	0.61   0.31	983.48	1.34	741.36	685.70	1.37	896.75	469.02	1.35	1042.78	1.19
p1	3550.22	0.99	0.44   0.09	561.65	0.98	0.37   0.19	968.08	1.32	780.76	705.80	1.41	907.28	489.70	1.41	1051.82	1.21
p2	3534.12	0.98	0.45   0.00	561.73	0.98	0.63   0.27	976.35	1.33	774.19	678.90	1.36	934.59	483.80	1.40	1075.25	1.19
TILE_5	Actual	Ratio	QoS(nRTI MaxPctF)	Actual	Ratio	QoS(nRTI MaxPctF)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	GM

<b>p0</b>	3565.84	0.99	0.39   0.00	568.11	0.99	1.10   0.66	978.27	1.33	752.61	677.38	1.35	909.10	459.73	1.33	1068.79	1.19
<b>p1</b>	3559.00	0.99	0.38   0.00	562.25	0.98	0.62   0.26	976.23	1.33	761.44	699.42	1.40	910.70	507.05	1.46	1044.81	1.21
<b>p2</b>	3537.10	0.98	0.39   0.00	559.72	0.98	0.64   0.30	964.30	1.31	802.41	663.50	1.33	969.85	425.52	1.23	1149.89	1.15
<b>TILE_6</b>	Actual	Ratio	QoS(nRTI MaxPctF)	Actual	Ratio	QoS(nRTI MaxPctF)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	GM
<b>p0</b>	3584.35	1.00	0.53   0.00	564.70	0.99	0.55   0.32	967.80	1.32	769.97	706.17	1.41	895.78	487.45	1.41	1035.80	1.21
<b>p1</b>	3563.96	0.99	0.50   0.00	564.91	0.99	0.64   0.32	981.95	1.34	736.08	682.17	1.36	897.61	492.07	1.42	1018.95	1.20
<b>p2</b>	3563.63	0.99	0.53   0.00	561.49	0.98	0.70   0.31	980.90	1.34	752.22	690.17	1.38	862.17	474.68	1.37	996.34	1.20
<b>TILE_7</b>	Actual	Ratio	QoS(nRTI MaxPctF)	Actual	Ratio	QoS(nRTI MaxPctF)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	GM
<b>p0</b>	3580.68	1.00	0.39   0.00	564.58	0.99	0.41   0.24	937.10	1.28	866.85	666.35	1.33	1044.57	485.88	1.40	1183.52	1.19
<b>p1</b>	3561.35	0.99	0.38   0.00	564.87	0.99	0.65   0.36	945.80	1.29	866.50	647.15	1.29	1044.43	433.38	1.25	1241.46	1.15
<b>p2</b>	3539.10	0.98	0.37   0.00	560.66	0.98	0.64   0.34	922.73	1.26	919.30	662.20	1.32	1065.41	453.95	1.31	1239.96	1.16
<b>TILE_8</b>	Actual	Ratio	QoS(nRTI MaxPctF)	Actual	Ratio	QoS(nRTI MaxPctF)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	GM
<b>p0</b>	3565.67	0.99	0.48   0.00	563.53	0.98	0.51   0.19	986.02	1.34	728.90	685.83	1.37	879.78	496.73	1.43	992.95	1.21
<b>p1</b>	3562.31	0.99	0.46   0.00	562.17	0.98	0.62   0.32	984.02	1.34	730.31	691.70	1.38	871.81	475.05	1.37	995.04	1.20
<b>p2</b>	3542.18	0.98	0.47   0.00	562.84	0.98	0.65   0.39	978.75	1.33	761.23	705.30	1.41	898.06	514.20	1.48	1011.80	1.22
<b>TILE_9</b>	Actual	Ratio	QoS(nRTI MaxPctF)	Actual	Ratio	QoS(nRTI MaxPctF)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	GM
<b>p0</b>	3571.52	0.99	0.49   0.00	570.53	1.00	0.79   0.41	983.90	1.34	754.30	682.33	1.36	886.16	468.45	1.35	1030.50	1.20
<b>p1</b>	3550.30	0.99	0.53   0.10	565.99	0.99	0.63   0.29	970.75	1.32	763.93	702.83	1.40	893.10	490.43	1.41	1026.04	1.21
<b>p2</b>	3543.98	0.98	0.51   0.00	563.67	0.99	0.45   0.11	975.55	1.33	759.83	674.23	1.35	919.18	488.48	1.41	1042.71	1.20
<b>TILE_10</b>	Actual	Ratio	QoS(nRTI MaxPctF)	Actual	Ratio	QoS(nRTI MaxPctF)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	GM
<b>p0</b>	3575.81	0.99	0.40   0.00	571.60	1.00	0.99   0.71	980.12	1.33	762.88	680.33	1.36	913.19	464.23	1.34	1068.98	1.19
<b>p1</b>	3559.28	0.99	0.41   0.00	570.88	1.00	1.10   0.75	974.75	1.33	763.37	703.27	1.41	909.22	510.65	1.47	1040.07	1.22
<b>p2</b>	3546.52	0.99	0.41   0.00	562.37	0.98	0.76   0.45	981.42	1.34	775.14	675.55	1.35	932.91	459.38	1.32	1094.79	1.18
<b>TILE_11</b>	Actual	Ratio	QoS(nRTI MaxPctF)	Actual	Ratio	QoS(nRTI MaxPctF)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	GM
<b>p0</b>	3579.59	0.99	0.41   0.00	564.69	0.99	0.80   0.49	921.80	1.26	913.05	659.30	1.32	1072.17	449.52	1.30	1244.47	1.16
<b>p1</b>	3566.59	0.99	0.41   0.10	562.56	0.98	0.57   0.20	944.88	1.29	844.43	647.65	1.29	1026.26	461.25	1.33	1178.30	1.17
<b>p2</b>	3557.08	0.99	0.40   0.00	562.44	0.98	0.57   0.28	937.05	1.28	876.18	639.52	1.28	1053.25	437.35	1.26	1218.23	1.15
<b>TILE_12</b>	Actual	Ratio	QoS(nRTI MaxPctF)	Actual	Ratio	QoS(nRTI MaxPctF)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	GM
<b>p0</b>	3578.44	0.99	0.39   0.00	565.21	0.99	0.67   0.41	953.20	1.30	820.65	684.23	1.37	969.49	495.27	1.43	1117.19	1.20
<b>p1</b>	3565.35	0.99	0.39   0.09	563.04	0.98	0.46   0.25	965.62	1.31	795.22	665.10	1.33	963.11	453.12	1.31	1130.38	1.17
<b>p2</b>	3541.83	0.98	0.41   0.00	562.75	0.98	0.61   0.26	945.77	1.29	840.81	681.35	1.36	988.94	470.60	1.36	1142.81	1.18
<b>TILE_13</b>	Actual	Ratio	QoS(nRTI MaxPctF)	Actual	Ratio	QoS(nRTI MaxPctF)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	GM
<b>p0</b>	3568.38	0.99	0.38   0.00	569.31	0.99	0.95   0.53	875.10	1.19	1076.85	584.50	1.17	1320.89	412.70	1.19	1512.86	1.10
<b>p1</b>	3545.02	0.99	0.41   0.10	563.32	0.98	0.50   0.20	892.40	1.22	1018.83	606.75	1.21	1231.44	405.45	1.17	1444.42	1.11
<b>p2</b>	3530.65	0.98	0.40   0.00	560.11	0.98	0.53   0.28	881.70	1.20	1060.25	612.62	1.22	1275.10	438.65	1.26	1456.10	1.12

TILE_14	Actual	Ratio	QoS(nRT MaxPctF)	Actual	Ratio	QoS(nRT MaxPctF)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	GM
p0	3583.56	1.00	0.37   0.00	565.52	0.99	0.72   0.43	977.20	1.33	762.81	652.58	1.30	938.65	460.68	1.33	1087.39	1.18
p1	3556.68	0.99	0.36   0.10	563.34	0.98	0.52   0.18	957.08	1.30	810.93	697.33	1.39	945.78	476.40	1.37	1116.99	1.19
p2	3544.85	0.99	0.37   0.00	564.73	0.99	0.52   0.34	943.80	1.29	847.98	648.55	1.30	1035.15	463.93	1.34	1183.42	1.17
TILE_15	Actual	Ratio	QoS(nRT MaxPctF)	Actual	Ratio	QoS(nRT MaxPctF)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	GM
p0	3577.35	0.99	0.40   0.00	565.67	0.99	0.83   0.56	992.80	1.35	709.52	690.00	1.38	854.12	476.23	1.37	992.98	1.20
p1	3566.07	0.99	0.41   0.10	561.20	0.98	0.54   0.25	972.92	1.32	758.01	702.38	1.40	890.18	512.65	1.48	1025.31	1.22
p2	3557.90	0.99	0.41   0.00	562.04	0.98	0.68   0.38	989.67	1.35	726.53	685.95	1.37	873.81	466.60	1.35	1031.28	1.19
TILE_16	Actual	Ratio	QoS(nRT MaxPctF)	Actual	Ratio	QoS(nRT MaxPctF)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	GM
p0	3581.19	1.00	0.57   0.10	564.79	0.99	0.65   0.41	944.85	1.29	840.72	677.92	1.35	996.20	470.25	1.36	1146.78	1.18
p1	3562.60	0.99	0.57   0.00	560.03	0.98	0.57   0.30	943.02	1.28	843.73	652.02	1.30	1002.42	465.35	1.34	1157.05	1.17
p2	3558.49	0.99	0.57   0.03	560.30	0.98	0.61   0.25	935.77	1.27	871.67	644.23	1.29	1042.52	434.95	1.25	1227.17	1.15
TILE_17	Actual	Ratio	QoS(nRT MaxPctF)	Actual	Ratio	QoS(nRT MaxPctF)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	GM
p0	3577.18	0.99	0.47   0.09	562.75	0.98	0.60   0.28	967.98	1.32	780.15	722.85	1.44	917.15	503.95	1.45	1053.37	1.22
p1	3567.95	0.99	0.45   0.00	561.75	0.98	0.45   0.23	992.80	1.35	713.26	666.90	1.33	865.87	472.57	1.36	992.08	1.19
p2	3553.72	0.99	0.47   0.08	558.73	0.98	0.74   0.37	982.23	1.34	745.74	710.02	1.42	885.03	491.52	1.42	1019.60	1.21
p0_score:	21.28															
p1_score:	21.21															
p2_score:	21.07															

Infrastructure_Operations_Scores:	vMotion	SVMotion	XVMotion	Deploy
Completed_Ops_PerHour	28.00	27.00	21.00	11.50
Avg_Seconds_To_Complete	8.88	75.09	110.43	268.97
Failures	0.00	0.00	0.00	0.00
Ratio	1.08	1.50	1.17	1.44
Number_Of_Threads	1	1	1	1

Summary	Run_Is_Compliant	Turbo_Setting:0
	Number_Of_Compliance_Issues(0)*	Median_Phase(p1)
Unreviewed_VMmark3_Applications_Score	21.21	
Unreviewed_VMmark3_Infrastructure_Score	1.28	
Unreviewed_VMmark3_Score	17.23	

## Configuration

Virtualization Software
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Hypervisor Vendor, Product, Version, and Build / Availability Date (MM-DD-YYYY)	VMware ESXi 6.7 EP 08, Build 13473784 / 04-30-2019
Datacenter Management Software Vendor, Product, Version, and Build / Availability Date (MM-DD-YYYY)	VMware vCenter Server Appliance 6.7.0d, Build 9451876 / 08-14-2018
Supplemental Software	None
<b>Servers</b>	
Number of Servers in System Under Test (all subsequent fields in this section are per server)	2
Server Manufacturer and Model	Fujitsu Server PRIMERGY RX4770 M5
Processor Vendor and Model	Intel Xeon Platinum 8280
Processor Speed (GHz) / Turbo Boost Speed (GHz)	2.7 / 4
Total Sockets/Total Cores/Total Threads	4 Sockets / 112 Cores / 224 Threads
Primary CPU Cache	32KB I+32KB D on chip per core
Secondary CPU Cache	1MB I+D on chip per core
Other CPU Cache	38.5MB I+D on chip per chip
BIOS Version	V5.0.0.14 R1.8.0 for D3753-C1x
Memory Size (in GB, Number of DIMMs)	1536, 48
Memory Type and Speed	32GB 2Rx4 DDR4 2933MHz RDIMM
Disk Subsystem Type	FC SAN
Number of Disk Controllers	1
Disk Controller Vendors and Models	Fujitsu PRAID EP420i
Total Number of Physical Disks for Hypervisor	1
Disk Vendors, Models, Capacities, and Speeds	Micron MTFDDAK480TDC 480GB SATA-SSD 6GB/S
Number of Host Bus Adapters	2
Host Bus Adapter Vendors and Models	Emulex LightPulse LPe31002-M6 2-Port 16Gb
Number of Network Controllers	3

Network Controller Vendors and Models	2 x Intel(R) Ethernet Controller X710 for 10GbE SFP+ Intel(R) Ethernet Connection X722 for 1GbE
Other Hardware	None
Other Software	None
Hardware Availability Date (MM-DD-YYYY)	04-26-2019
BIOS Availability Date (MM-DD-YYYY)	06-06-2019
Software Availability Date (MM-DD-YYYY)	04-30-2019
<b>Network</b>	
Network Switch Vendors and Models	1 x Fujitsu SR-X340TR1 1 x Fujitsu ET-7648BFERA-FOS
Network Speed	1Gbps for SUT management, 10Gbps for VMotion, 3 x 10Gbps for Clients and VMs
<b>Primary Storage</b>	
Storage Category	SCSI Target
Storage Vendors, Models, and Firmware Versions	6 x Fujitsu Server PRIMERGY RX2540 M4
Storage Configuration Summary	for Storage Server OS: 8 x Micron MTFDDAK480TDC 480GB SATA-SSD 2 x Micron, MTFDDAK960TDC, 960GB, SATA 3.0 6Gb/S SSD for Workload Storage: 18 x Intel P4800X 750GB PCIe SSD 2 x Intel P4600 2TB PCIe SSD 4 x Intel P4600 4TB PCIe SSD
<b>Datacenter Management Server</b>	
System Model	Fujitsu Server PRIMERGY RX2530 M2
Processor Vendor and Model	Intel Xeon E5-2698 v4
Processor Speed (GHz)	2.2
Total Sockets/Total Cores/Total Threads	1 Sockets / 20 Cores / 40 Threads
Memory Size (in GB, Number of DIMMs)	Hypervisor: 64GB, 8
Network Controller(s) Vendors and Models	Emulex OneConnect Oce14000 1GbE Dual Port Adapter
Operating System, Version, Bitness, and Service Pack	Hypervisor: VMware ESXi 6.7 EP 02a Build 9214924
Virtual Center VM Number of vCPUs	4
Virtual Center VM Virtual Memory (in GB)	16

Virtual Center VM Operating System, Version, Bitness, and Service Pack	VMware vCenter Server Appliance 6.7.0d Build 9451876
Other Hardware	None
Other Software	None

#### Clients

Total Number of Virtual Clients / Virtual Client Hosts	19 / 5
System Model(s)	ClientHost1-5: Fujitsu PRIMERGY RX2530 M2
Processor Vendor(s) and Model(s)	ClientHost1-3: Intel Xeon E5-2699 v4 ClientHost4-5: Intel Xeon E5-2699A v4
Processor Speed(s) (GHz)	ClientHost1-3: 2.2 ClientHost4-5: 2.4
Total Sockets/Total Cores/Total Threads	ClientHost1-5: 2 Sockets / 44 Cores / 88 Threads
Memory per Virtual Client Host	ClientHost1-5: 256GB
Network Controller(s) Vendors and Models	ClientHost1-5: Emulex OneConnect Oce14000 1GbE Dual Port Adapter Emulex OneConnect Oce14000 10GbE Dual Port Adapter
Virtual Client Networking Notes	1 virtual adapter for management, 2 virtual adapter for workload traffic
Virtual Client Storage Notes	1 x 300GB SAS 10K TOSHIBA AL14SEB03EN HDD with RAID 0 for Client Host OS ClientHost1-5: 2 x 400GB SAS 12G TOSHIBA PX02SMF040 SSD with RAID 0 for Client VMs
Other Hardware	None
Other Software	VMware ESXi 6.7U1 Build 10302608

#### Security Mitigations

Vulnerability	CVE	Exploit Name	Public Vulnerability Name	Mitigated		
				Server Firmware	ESXi	Guest OS
Spectre	2017-5753	Variant 1	Bounds Check Bypass	N/A	Yes	Yes
Spectre	2017-5715	Variant 2	Branch Target Injection	Yes	Yes	Yes
Meltdown	2017-5754	Variant 3	Rogue Data Cache Load	N/A	Yes	Yes
Spectre-NG	2018-3640	Variant 3a	Rogue System Register Read	Yes	N/A	N/A
Spectre-NG	2018-3639	Variant 4	Speculative Store Bypass	N/A	Yes	Yes
Foreshadow	2018-3615	Variant 5	L1 Terminal Fault - SGX	N/A	N/A	N/A
Foreshadow-NG	2018-3620	Variant 5	L1 Terminal Fault - OS	N/A	N/A	Yes
Foreshadow-NG	2018-3646	Variant 5	L1 Terminal Fault - VMM	N/A	Yes	N/A

# Notes for Workload

Template deployed with disk type: Thick Lazy

## Virtualization Software Notes

- CPU and Memory shares set to high for all DS3DB VMs (default normal)
- sched.mem.pin = "TRUE" is set on all DS3DB VMs
- Logical CPU configuration changed for multi-cpu VMs to 1 socket with multiple cores (default: Single core per socket)
- All memory reserved for DS3DB VMs (default non-reserved)
- CPU shares set to low for all Standby VMs (default normal)
- vSphere DRS Migration Threshold set to Fully Automated level 2

Changes in esx.conf:

- /adv/Cpu/CreditAgePeriod = 1000 (default 3000)
- /adv/Cpu/HTWholeCoreThreshold = 0 (default 800)
- /adv/DataMover/HardwareAcceleratedInit = 0 (default 1)
- /adv/DataMover/HardwareAcceleratedMove = 0 (default 1)
- /adv/Mem/CtlMaxPercent = 0 (default 65)
- /adv/Mem/ShareScanGHz = 0 (default 4)
- /adv/UserVars/HostClientCEIPOptIn = 1
- /adv/Numa/LTermFairnessInterval = 0 (default 5)
- /adv/Numa/MigImbalanceThreshold = 57 (default 10)
- /adv/Numa/PageMigEnable = 0 (default 1)
- /adv/Numa/RebalancePeriod = 60000 (default 2000)
- /adv/Numa/SwapLoadEnable = 0 (default 1)
- /adv/Numa/SwapLocalityEnable = 0 (default 1)
- /adv/Disk/ReqCallThreshold = 1 (default 8)
- /adv/Disk/IdleCredit = 64 (default 32)
- /adv/Power/CpuPolicy = High Performance (default balanced)
- /adv/VMFS3/HardwareAcceleratedLocking = 0 (default 1)
- /vmkernel/hyperthreadingMitigation = TRUE (default FALSE)

## Server Notes

- Server/Partition BIOS settings:
  - Turbo Mode: Enabled (Intel Turbo Boost up to 4.0GHz, default Enabled)
  - DCU Streamer Prefetcher = Disabled (default Enabled)
  - Sub NUMA Clustering = Enabled (default: Disabled)
  - Stale AtoS = Enabled (default: Disabled)
  - LLC Dead Line Alloc = Disabled (default: Enabled)
  - Fan Control = Full (default: Auto)

## Networking Notes

- vSwitch Configuration:
  - vSwitch0 for Service Console on vmnic3 at 1Gb/s
  - vSwitch1 for all workload on vmnic4, vmnic5, vmnic6 at 10Gb/s
  - vSwitch2 for vMotion connection on vmnic7 at 10Gb/s

- 9000 MTU (default 1500)

## Storage Notes

- First Fujitsu Server PRIMERGY RX2540 M4 configured as a Fibre Channel Target:
  - Hardware details:
    - 2 x Intel Xeon Gold 6134M@3.2GHz processors
    - 64GB RAM (2 x 32 GB dual rank PC4-2666 Registered DDR4 / 2666 MHz DIMMs)
    - 2 x QLogic QLE2742 Dual Port 32Gb FC HBA used as FC target controller
    - 1 x Fujitsu RAID SAS Controller with 1GB Cache (D3108)
    - 2 x 480GB SATA-SSD Micron MTFDDAK480TDC
    - 3 x Intel P4800X 750GB PCIe SSD
    - 1 x Intel P4600 4TB PCIe SSD
  - Software details:
    - Operating System: SUSE Linux Enterprise Server 12 SP3 - 4.4.162-94.72-default (64-bit)
    - Fibre Channel Target SW: LIO (part of SUSE Linux Enterprise Server 12 SP3)

### RAID configuration:

- SATA-SSD 1,2 (RAID 1):
  - LUN 1: Storage system OS (480GB, this LUN is not counted in the Storage section)
- First PCIe-SSD:
  - LUN 1: DS3DB, DS3WebA, DS3WebB, DS3WebC for tile 0 (600GB)
- Second PCIe-SSD:
  - LUN 1: DS3DB, DS3WebA, DS3WebB, DS3WebC for tile 1 (600GB)
- Third PCIe-SSD:
  - LUN 1: DS3DB, DS3WebA, DS3WebB, DS3WebC for tile 2 (600GB)
- Fourth PCIe-SSD:
  - LUN 1: AuctionNoSQL, ElasticDB for tile 0 (300GB)
  - LUN 2: AuctionNoSQL, ElasticDB for tile 1 (300GB)
  - LUN 3: AuctionNoSQL, ElasticDB for tile 2 (300GB)
  - LUN 4: AuctionDB, ElasticLB for tile 0 (300GB)
  - LUN 5: AuctionDB, ElasticLB for tile 1 (300GB)
  - LUN 6: AuctionDB, ElasticLB for tile 2 (300GB)
  - LUN 7: AuctionWebA, AuctionWebB, AuctionAppA, AuctionAppB, AuctionLB, AuctionMSQ, Standby, ElasticWebA, ElasticWebB, ElasticAppA, ElasticAppB for tile 0 (300GB)
  - LUN 8: AuctionWebA, AuctionWebB, AuctionAppA, AuctionAppB, AuctionLB, AuctionMSQ, Standby, ElasticWebA, ElasticWebB, ElasticAppA, ElasticAppB for tile 1 (300GB)
  - LUN 9: AuctionWebA, AuctionWebB, AuctionAppA, AuctionAppB, AuctionLB, AuctionMSQ, Standby, ElasticWebA, ElasticWebB, ElasticAppA, ElasticAppB for tile 2 (300GB)
  - LUN 10: AuctionNoSQL, ElasticDB for tile 14 (300GB)
  - LUN 11: AuctionDB, ElasticLB for tile 14 (300GB)
  - LUN 12: SvMotion TargetLun (300GB)
- Second Fujitsu Server PRIMERGY RX2540 M4 configured as a Fibre Channel Target:
  - Hardware details:
    - 2 x Intel Xeon Gold 6134M@3.2GHz processors



- 64GB RAM (2 x 32 GB dual rank PC4-2666 Registered DDR4 / 2666 MHz DIMMs)
  - 2 x QLogic QLE2742 Dual Port 32Gb FC HBA used as FC target controller
  - 1 x Fujitsu RAID SAS Controller with 1GB Cache (D3108)
  - 2 x 480GB SATA-SSD Micron MTFDDAK480TDC
  - 3 x Intel P4800X 750GB PCIe SSD
  - 1 x Intel P4600 4TB PCIe SSD
- Software details:
    - Operating System: SUSE Linux Enterprise Server 12 SP3 - 4.4.162-94.72-default (64-bit)
    - Fibre Channel Target SW: LIO (part of SUSE Linux Enterprise Server 12 SP3)

#### RAID configuration:

- SATA-SSD 1,2 (RAID 1):
  - LUN 1: Storage system OS (480GB, this LUN is not counted in the Storage section)
- First PCIe-SSD:
  - LUN 1: DS3DB, DS3WebA, DS3WebB, DS3WebC for tile 3 (600GB)
- Second PCIe-SSD:
  - LUN 1: DS3DB, DS3WebA, DS3WebB, DS3WebC for tile 4 (600GB)
- Third PCIe-SSD:
  - LUN 1: DS3DB, DS3WebA, DS3WebB, DS3WebC for tile 5 (600GB)
- Fourth PCIe-SSD:
  - LUN 1: AuctionNoSQL, ElasticDB for tile 3 (300GB)
  - LUN 2: AuctionNoSQL, ElasticDB for tile 4 (300GB)
  - LUN 3: AuctionNoSQL, ElasticDB for tile 5 (300GB)
  - LUN 4: AuctionDB, ElasticLB for tile 3 (300GB)
  - LUN 5: AuctionDB, ElasticLB for tile 4 (300GB)
  - LUN 6: AuctionDB, ElasticLB for tile 5 (300GB)
  - LUN 7: AuctionWebA, AuctionWebB, AuctionAppA, AuctionAppB, AuctionLB, AuctionMSQ, Standby, ElasticWebA, ElasticWebB, ElasticAppA, ElasticAppB for tile 3 (300GB)
  - LUN 8: AuctionWebA, AuctionWebB, AuctionAppA, AuctionAppB, AuctionLB, AuctionMSQ, Standby, ElasticWebA, ElasticWebB, ElasticAppA, ElasticAppB for tile 4 (300GB)
  - LUN 9: AuctionWebA, AuctionWebB, AuctionAppA, AuctionAppB, AuctionLB, AuctionMSQ, Standby, ElasticWebA, ElasticWebB, ElasticAppA, ElasticAppB for tile 5 (300GB)
  - LUN 10: AuctionNoSQL, ElasticDB for tile 16 (300GB)
  - LUN 11: AuctionDB, ElasticLB for tile 16 (300GB)
  - LUN 12: vmmark3.1-template-020419 (300GB)
- Third Fujitsu Server PRIMERGY RX2540 M4 configured as a Fibre Channel Target:
  - Hardware details:
    - 2 x Intel Xeon Gold 6134M@3.2GHz processors
    - 64GB RAM (2 x 32 GB dual rank PC4-2666 Registered DDR4 / 2666 MHz DIMMs)
    - 2 x QLogic QLE2742 Dual Port 32Gb FC HBA used as FC target controller
    - 1 x Fujitsu RAID SAS Controller with 1GB Cache (D3108)
    - 2 x 480GB SATA-SSD Micron MTFDDAK480TDC
    - 3 x Intel P4800X 750GB PCIe SSD
    - 1 x Intel P4600 4TB PCIe SSD
  - Software details:

- Operating System: SUSE Linux Enterprise Server 12 SP3 - 4.4.162-94.72-default (64-bit)
- Fibre Channel Target SW: LIO (part of SUSE Linux Enterprise Server 12 SP3)

RAID configuration:

- SATA-SSD 1,2 (RAID 1):
  - LUN 1: Storage system OS (480GB, this LUN is not counted in the Storage section)
- First PCIe-SSD:
  - LUN 1: DS3DB, DS3WebA, DS3WebB, DS3WebC for tile 6 (600GB)
- Second PCIe-SSD:
  - LUN 1: DS3DB, DS3WebA, DS3WebB, DS3WebC for tile 7 (600GB)
- Third PCIe-SSD:
  - LUN 1: DS3DB, DS3WebA, DS3WebB, DS3WebC for tile 8 (600GB)
- Fourth PCIe-SSD:
  - LUN 1: AuctionNoSQL, ElasticDB for tile 6 (300GB)
  - LUN 2: AuctionNoSQL, ElasticDB for tile 7 (300GB)
  - LUN 3: AuctionNoSQL, ElasticDB for tile 17 (300GB)
  - LUN 4: AuctionDB, ElasticLB for tile 6 (300GB)
  - LUN 5: AuctionDB, ElasticLB for tile 7 (300GB)
  - LUN 6: AuctionDB, ElasticLB for tile 17 (300GB)
  - LUN 7: AuctionWebA, AuctionWebB, AuctionAppA, AuctionAppB, AuctionLB, AuctionMSQ, Standby, ElasticWebA, ElasticWebB, ElasticAppA, ElasticAppB for tile 6 (300GB)
  - LUN 8: AuctionWebA, AuctionWebB, AuctionAppA, AuctionAppB, AuctionLB, AuctionMSQ, Standby, ElasticWebA, ElasticWebB, ElasticAppA, ElasticAppB for tile 7 (300GB)
  - LUN 9: AuctionWebA, AuctionWebB, AuctionAppA, AuctionAppB, AuctionLB, AuctionMSQ, Standby, ElasticWebA, ElasticWebB, ElasticAppA, ElasticAppB for tile 17 (300GB)
  - LUN 10: AuctionNoSQL, ElasticDB for tile 15 (300GB)
  - LUN 11: AuctionDB, ElasticLB for tile 15 (300GB)
  - LUN 12: XvMotion TargetLun (300GB)
- Fourth Fujitsu Server PRIMERGY RX2540 M4 configured as a Fibre Channel Target:
  - Hardware details:
    - 2 x Intel Xeon Gold 6134M@3.2GHz processors
    - 64GB RAM (2 x 32 GB dual rank PC4-2666 Registered DDR4 / 2666 MHz DIMMs)
    - 2 x QLogic QLE2742 Dual Port 32Gb FC HBA used as FC target controller
    - 1 x Fujitsu RAID SAS Controller with 1GB Cache (D3108)
    - 2 x 480GB SATA-SSD Micron MTFDDAK480TDC
    - 3 x Intel P4800X 750GB PCIe SSD
    - 1 x Intel P4600 4TB PCIe SSD
  - Software details:
    - Operating System: SUSE Linux Enterprise Server 12 SP3 - 4.4.162-94.72-default (64-bit)
    - Fibre Channel Target SW: LIO (part of SUSE Linux Enterprise Server 12 SP3)

RAID configuration:

- SATA-SSD 1,2 (RAID 1):
  - LUN 1: Storage system OS (480GB, this LUN is not counted in the Storage section)
- First PCIe-SSD:

- LUN 1: DS3DB, DS3WebA, DS3WebB, DS3WebC for tile 9 (600GB)
  - Second PCIe-SSD:
    - LUN 1: DS3DB, DS3WebA, DS3WebB, DS3WebC for tile 10 (600GB)
  - Third PCIe-SSD:
    - LUN 1: DS3DB, DS3WebA, DS3WebB, DS3WebC for tile 11 (600GB)
  - Fourth PCIe-SSD:
    - LUN 1: AuctionNoSQL, ElasticDB for tile 9 (300GB)
    - LUN 2: AuctionNoSQL, ElasticDB for tile 10 (300GB)
    - LUN 3: AuctionNoSQL, ElasticDB for tile 11 (300GB)
    - LUN 4: AuctionDB, ElasticLB for tile 9 (300GB)
    - LUN 5: AuctionDB, ElasticLB for tile 10 (300GB)
    - LUN 6: AuctionDB, ElasticLB for tile 11 (300GB)
    - LUN 7: AuctionWebA, AuctionWebB, AuctionAppA, AuctionAppB, AuctionLB, AuctionMSQ, Standby, ElasticWebA, ElasticWebB, ElasticAppA, ElasticAppB for tile 9 (300GB)
    - LUN 8: AuctionWebA, AuctionWebB, AuctionAppA, AuctionAppB, AuctionLB, AuctionMSQ, Standby, ElasticWebA, ElasticWebB, ElasticAppA, ElasticAppB for tile 10 (300GB)
    - LUN 9: AuctionWebA, AuctionWebB, AuctionAppA, AuctionAppB, AuctionLB, AuctionMSQ, Standby, ElasticWebA, ElasticWebB, ElasticAppA, ElasticAppB for tile 11 (300GB)
    - LUN 10: AuctionNoSQL, ElasticDB for tile 8 (300GB)
    - LUN 11: AuctionDB, ElasticLB for tile 8 (300GB)
    - LUN 12: AuctionWebA, AuctionWebB, AuctionAppA, AuctionAppB, AuctionLB, AuctionMSQ, Standby, ElasticWebA, ElasticWebB, ElasticAppA, ElasticAppB for tile 8 (300GB)
- Fifth Fujitsu Server PRIMERGY RX2540 M4 configured as a Fibre Channel Target:
  - Hardware details:
    - 2 x Intel Xeon Gold 6134M@3.2GHz processors
    - 64GB RAM (2 x 32 GB dual rank PC4-2666 Registered DDR4 / 2666 MHz DIMMs)
    - 2 x QLogic QLE2742 Dual Port 32Gb FC HBA used as FC target controller
    - 1 x Fujitsu RAID SAS Controller with 1GB Cache (D3108)
    - 1 x 960GB SATA-SSD Micron MTFDDAK480TDC
    - 2 x Intel P4800X 750GB PCIe SSD
    - 2 x Intel P4600 2TB PCIe SSD
  - Software details:
    - Operating System: SUSE Linux Enterprise Server 12 SP3 - 4.4.162-94.72-default (64-bit)
    - Fibre Channel Target SW: LIO (part of SUSE Linux Enterprise Server 12 SP3)

#### RAID configuration:

- SATA-SSD 1 (RAID 1):
  - LUN 1: Storage system OS (960GB, this LUN is not counted in the Storage section)
- First PCIe-SSD:
  - LUN 1: DS3DB, DS3WebA, DS3WebB, DS3WebC for tile 12 (600GB)
- Second PCIe-SSD:
  - LUN 1: DS3DB, DS3WebA, DS3WebB, DS3WebC for tile 13 (600GB)
- Third PCIe-SSD:
  - LUN 1: AuctionNoSQL, ElasticDB for tile 12 (600GB)
  - LUN 2: AuctionNoSQL, ElasticDB for tile 13 (300GB)

- LUN 3: AuctionDB, ElasticLB for tile 12 (300GB)
  - LUN 4: AuctionDB, ElasticLB for tile 13 (300GB)
  - LUN 5: AuctionWebA, AuctionWebB, AuctionAppA, AuctionAppB, AuctionLB, AuctionMSQ, Standby, ElasticWebA, ElasticWebB, ElasticAppA, ElasticAppB for tile 14 (300GB)
- Fourth PCIe-SSD:
  - LUN 1: AuctionWebA, AuctionWebB, AuctionAppA, AuctionAppB, AuctionLB, AuctionMSQ, Standby, ElasticWebA, ElasticWebB, ElasticAppA, ElasticAppB for tile 12 (300GB)
  - LUN 2: AuctionWebA, AuctionWebB, AuctionAppA, AuctionAppB, AuctionLB, AuctionMSQ, Standby, ElasticWebA, ElasticWebB, ElasticAppA, ElasticAppB for tile 13 (300GB)
  - LUN 3: Deploy Lun(300GB)
  - LUN 4: AuctionWebA, AuctionWebB, AuctionAppA, AuctionAppB, AuctionLB, AuctionMSQ, Standby, ElasticWebA, ElasticWebB, ElasticAppA, ElasticAppB for tile 15 (300GB)
  - LUN 5: AuctionWebA, AuctionWebB, AuctionAppA, AuctionAppB, AuctionLB, AuctionMSQ, Standby, ElasticWebA, ElasticWebB, ElasticAppA, ElasticAppB for tile 16 (300GB)
- Sixth Fujitsu Server PRIMERGY RX2540 M4 configured as a Fibre Channel Target:
  - Hardware details:
    - 2 x Intel Xeon Gold 6134@3.2GHz processors
    - 64GB RAM (4 x 16 GB dual rank PC4-2666 Registered DDR4 / 2666 MHz DIMMs)
    - 1 x QLogic QLE2742 Dual Port 32Gb FC HBA used as FC target controller
    - 1 x 960GB SATA-SSD Micron MTFDDAK480TDC
    - 4 x Intel P4800X 750GB PCIe SSD
  - Software details:
    - Operating System: SUSE Linux Enterprise Server 12 SP3 - 4.4.162-94.72-default (64-bit)
    - Fibre Channel Target SW: LIO (part of SUSE Linux Enterprise Server 12 SP3)

#### RAID configuration:

- SATA-SSD 1:
  - LUN 1: Storage system OS (960GB, this LUN is not counted in the Storage section)
- First PCIe-SSD:
  - LUN 1: DS3DB, DS3WebA, DS3WebB, DS3WebC for tile 14 (600GB)
- Second PCIe-SSD:
  - LUN 1: DS3DB, DS3WebA, DS3WebB, DS3WebC for tile 15 (600GB)
- Third PCIe-SSD:
  - LUN 1: DS3DB, DS3WebA, DS3WebB, DS3WebC for tile 16 (600GB)
- Fourth PCIe-SSD:
  - LUN 1: DS3DB, DS3WebA, DS3WebB, DS3WebC for tile 17 (600GB)
- All LUNs were configured as block devices; no system memory was used for caching

#### **Datacenter Management Server Notes**

- Virtual Center realized as a VM running on a dedicated Hypervisor system:
  - Number of vCPUs: 4 (Four vSocket)
  - Size of vRAM: 16GB
- The host operating system VMware ESXi 6.7.0 EP 02a Build 9214924 was installed using 'Fujitsu Custom Image for VMware ESXi 6.7.0 EP 02a' named VMware-ESXi-6.7.0-9214924-Fujitsu-v451-1.iso

## Operating System Notes

VMware ESXi 6.7.0 EP 08 Build 13473784 was installed using 'Fujitsu Custom Image for VMware ESXi 6.7.0 EP 08' named VMware-ESXi-6.7.0-13473784-Fujitsu-v470-1.iso

## Software Notes

None

## Client Notes

Client Host1: Client3,Client8,Client13

Client Host2: Client4,Client9,Client14

Client Host3: Client0,Client1,Client6,Client11,Client16

Client Host4: Client2,Client7,Client12,Client17

Client Host5: Client5,Client10,Client15,PrimeClient

Changes in esx.conf:

- /adv/Power/CpuPolicy = "High Performance" (default balanced)
- /adv/UserVars/HostClientCEIPOptIn = 1

## Other Notes

- None

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