VMmark® 3.1 Results

Vendor and Hardware Platform: Fujitsu Server PRIMERGY RX2540 M5
Virtualization Platform: VMware ESXi 6.7 EP 06 Build 11675023
VMware vCenter Server : VMware vCenter Server Appliance 6.7.0d Build 9451876

VMmark 3.1 Score = 9.02 @ 9 Tiles

Number of Hosts: 2	Uniform Hosts [yes/no]: yes	Total sockets/cores/threads in test: 4/112/224
Tested By: Fujitsu		Test Date: 03-09-2019

Performance Section	Configuration Section	Notes Section
Performance	Configuration	Notes for Workload

Performance

	weathervane			weathervaneE			dvdstoreA			dvdstoreB			dvdstoreC			
TILE_0	Actual	Ratio	QoS(nRT|MaxPctF)	Actual	Ratio	QoS(nRT|MaxPctF)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	GM
p0	3565.20	0.99	0.41 | 0.02	567.12	0.99	1.11 | 0.70	956.27	1.30	812.54	659.50	1.32	976.58	448.95	1.29	1143.13	1.17
p1	3553.13	0.99	0.42 | 0.05	564.17	0.99	0.58 | 0.28	947.10	1.29	833.86	680.50	1.36	981.63	471.93	1.36	1133.35	1.18
p2	3544.70	0.99	0.42 | 0.10	561.62	0.98	0.55 | 0.26	963.55	1.31	806.15	659.45	1.32	978.15	471.98	1.36	1126.49	1.18
TILE_1	Actual	Ratio	QoS(nRT|MaxPctF)	Actual	Ratio	QoS(nRT|MaxPctF)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	GM
p0	3578.14	0.99	0.37 | 0.00	565.33	0.99	0.59 | 0.26	1004.98	1.37	687.76	708.08	1.41	813.51	485.77	1.40	940.90	1.22
p1	3563.20	0.99	0.39 | 0.02	562.44	0.98	0.57 | 0.24	980.08	1.33	733.07	718.85	1.44	841.33	523.38	1.51	959.94	1.23
p2	3552.15	0.99	0.40 | 0.03	563.78	0.99	0.50 | 0.19	1003.77	1.37	683.02	702.15	1.40	815.93	483.52	1.39	949.55	1.21
TILE_2	Actual	Ratio	QoS(nRT|MaxPctF)	Actual	Ratio	QoS(nRT|MaxPctF)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	GM
p0	3572.44	0.99	0.40 | 0.08	566.68	0.99	0.47 | 0.19	966.95	1.32	784.06	698.67	1.40	908.96	485.20	1.40	1049.20	1.20
p1	3558.56	0.99	0.41 | 0.00	567.37	0.99	0.53 | 0.39	977.17	1.33	750.27	677.38	1.35	910.79	488.75	1.41	1038.64	1.20
p2	3541.60	0.98	0.42 | 0.00	563.13	0.98	0.61 | 0.37	974.55	1.33	761.41	683.98	1.37	893.17	466.65	1.35	1035.12	1.19
TILE_3	Actual	Ratio	QoS(nRT|MaxPctF)	Actual	Ratio	QoS(nRT|MaxPctF)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	GM
p0	3573.07	0.99	0.45 | 0.03	566.26	0.99	0.75 | 0.44	1025.95	1.40	621.11	756.10	1.51	710.26	563.77	1.63	789.19	1.28
p1	3553.75	0.99	0.43 | 0.11	560.34	0.98	0.52 | 0.24	1037.10	1.41	597.58	736.23	1.47	704.56	513.38	1.48	802.89	1.24
p2	3535.40	0.98	0.46 | 0.10	556.25	0.97	0.52 | 0.24	1024.70	1.40	613.97	762.92	1.52	702.22	542.83	1.57	783.74	1.26
TILE_4	Actual	Ratio	QoS(nRT|MaxPctF)	Actual	Ratio	QoS(nRT|MaxPctF)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	GM

	Actual	Ratio	QoS(nRT|MaxPctF)	Actual	Ratio	QoS(nRT|MaxPctF)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	GM
p0	3566.30	0.99	0.42 | 0.00	566.22	0.99	0.66 | 0.33	1001.50	1.36	680.58	703.45	1.41	810.19	516.38	1.49	906.54	1.23
p1	3560.18	0.99	0.43 | 0.09	560.38	0.98	0.53 | 0.26	1002.25	1.36	684.48	703.70	1.41	813.82	487.80	1.41	929.97	1.21
p2	3549.72	0.99	0.43 | 0.12	558.23	0.98	0.69 | 0.33	990.62	1.35	719.58	719.12	1.44	838.40	529.62	1.53	941.45	1.23
TILE_5	Actual	Ratio	QoS(nRT|MaxPctF)	Actual	Ratio	QoS(nRT|MaxPctF)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	GM
p0	3582.00	1.00	0.39 | 0.07	562.16	0.98	0.55 | 0.21	1028.47	1.40	616.96	703.80	1.41	733.48	504.93	1.46	838.22	1.23
p1	3558.43	0.99	0.39 | 0.00	564.50	0.99	0.57 | 0.23	1023.98	1.39	627.00	753.77	1.51	729.89	535.88	1.55	813.62	1.26
p2	3548.53	0.99	0.39 | 0.00	562.66	0.98	0.46 | 0.23	1023.88	1.39	627.68	723.27	1.45	745.72	532.38	1.54	830.83	1.25
TILE_6	Actual	Ratio	QoS(nRT|MaxPctF)	Actual	Ratio	QoS(nRT|MaxPctF)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	GM
p0	3579.93	0.99	0.42 | 0.10	566.98	0.99	0.83 | 0.46	1003.70	1.37	683.03	704.30	1.41	818.32	483.90	1.40	947.90	1.21
p1	3558.04	0.99	0.47 | 0.08	559.48	0.98	0.53 | 0.22	985.75	1.34	733.97	714.55	1.43	864.19	521.98	1.51	968.69	1.23
p2	3546.70	0.99	0.46 | 0.11	556.20	0.97	0.67 | 0.35	995.12	1.36	707.44	695.08	1.39	846.69	478.52	1.38	987.94	1.20
TILE_7	Actual	Ratio	QoS(nRT|MaxPctF)	Actual	Ratio	QoS(nRT|MaxPctF)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	GM
p0	3582.12	1.00	0.33 | 0.00	564.51	0.99	0.55 | 0.32	993.12	1.35	719.38	728.33	1.46	826.38	503.00	1.45	952.04	1.23
p1	3573.41	0.99	0.37 | 0.02	562.53	0.98	0.57 | 0.30	993.80	1.35	726.52	689.23	1.38	856.72	503.05	1.45	974.30	1.21
p2	3553.69	0.99	0.36 | 0.00	562.78	0.98	0.39 | 0.17	1000.55	1.36	708.30	702.77	1.40	831.36	479.98	1.38	954.98	1.21
TILE_8	Actual	Ratio	QoS(nRT|MaxPctF)	Actual	Ratio	QoS(nRT|MaxPctF)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	GM
p0	3584.75	1.00	0.45 | 0.00	570.00	1.00	1.13 | 0.71	947.67	1.29	815.36	680.92	1.36	958.93	497.27	1.43	1094.43	1.20
p1	3571.65	0.99	0.47 | 0.00	566.38	0.99	0.84 | 0.49	957.45	1.30	792.09	665.50	1.33	949.92	452.95	1.31	1108.55	1.17
p2	3558.60	0.99	0.45 | 0.00	566.04	0.99	0.46 | 0.21	945.20	1.29	822.71	682.52	1.36	973.48	469.48	1.35	1128.72	1.18

p0_score:	10.97
p1_score:	10.94
p2_score:	10.91

Infrastructure_Operations_Scores:	vMotion	SVMotion	XVMotion	Deploy
Completed_Ops_PerHour	28.00	28.00	21.00	12.50
Avg_Seconds_To_Complete	5.85	73.60	106.47	250.61
Failures	0.00	0.00	0.00	0.00
Ratio	1.08	1.56	1.17	1.56
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	10.94	

Unreviewed_VMmark3_Infrastructure_Score	1.32
Unreviewed_VMmark3_Score	9.02

Configuration

Virtualization Software	
Hypervisor Vendor, Product, Version, and Build / Availability Date (MM-DD-YYYY)	VMware ESXi 6.7 EP 06, Build 11675023 / 01-17-2019
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
Servers	
Number of Servers in System Under Test (all subsequent fields in this section are per server)	2
Server Manufacturer and Model	Fujitsu Server PRIMERGY RX2540 M5
Processor Vendor and Model	Intel Xeon Platinum 8280
Processor Speed (GHz)	2.7
Total Sockets/Total Cores/Total Threads	2 Sockets / 56 Cores / 112 Threads
Primary CPU Cache	32 KB I + 32 KB D on chip per core
Secondary CPU Cache	1 MB I+D on chip per core
Other CPU Cache	38.5 MB I+D on chip per chip
BIOS Version	V5.0.0.14 R1.2.0 for D3384-B1x
Memory Size (in GB, Number of DIMMs)	768, 24
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, MTFDDAK960TDC, 960GB, SATA 3.0 6Gb/S SSD
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 I350 Dual Port 1GbE Adapter
Other Hardware	None
Other Software	None
Hardware Availability Date (MM-DD-YYYY)	04-30-2019
BIOS Availability Date (MM-DD-YYYY)	02-28-2019
Software Availability Date (MM-DD-YYYY)	04-09-2019
Network	
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, 30Gbps for Clients and VMs
Storage	
Array Vendors, Models, and Firmware Versions	4 x Fujitsu Server PRIMERGY RX2540 M4, Firmware V5.0.0.12 R1.22.0 for D3384-A1x
Fibre Channel Switch Vendors and Models	Brocade 6510
Disk Space Used	14.7TB
Array Cache Size	1GB for storage server OS; no cache used for SUT datastores
Total Number of Physical Disks Used	8 x SAS-SSD(2 per Storage Server OS), 16 x PCIe-SSD
Total Number of Enclosures/Pods/Shelves Used	4
Number of Physical Disks Used per Enclosure/Pod/Shelf	4 x Enclosure(PRIMERGY RX2540 M4): 2 x SAS-SSD and 4 x PCIe-SSD
Total Number of Storage Groups Used	0
Number of LUNs Used	40
LUN Size and Number of Disks Per LUN	Details in section Storage Notes
RAID Type	RAID 1 for OS drives
Number of Members per RAID Set	2
Disk Vendors, Models, and Speeds	8 x Micron MTFDDAK480TDC 480GB SATA-SSD 8 x Intel P4800X 750GB PCIe SSD 4 x Intel P4600 2TB PCIe SSD 4 x Intel P4600 4TB PCIe SSD
Datacenter Management Server	
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	10 / 3
System Model(s)	Fujitsu PRIMERGY RX2530 M2
Processor Vendor(s) and Model(s)	Intel Xeon E5-2699 v4
Processor Speed(s) (GHz)	2.2
Total Sockets/Total Cores/Total Threads	2 Sockets / 44 Cores / 88 Threads
Memory per Virtual Client Host	256 GB
Network Controller(s) Vendors and Models	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	1x300GB SAS 10K TOSHIBA AL14SEB03EN HDD with RAID 0 for Client Host OS 2x400GB SAS 12G TOSHIBA PX02SMF040 SSD with RAID 0 for Client VMs
Other Hardware	None
Other Software	VMware ESXi 6.7 U1 Build 10302608

Notes for Workload

Virtualization Software Notes

- CDROM removed for all VMs (default enabled)
- CPU and Memory shares set to high for all DS3DB VMs (default normal)
- 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
- CPU set to high for all ElasticDB VMs (default normal)
- CPU shares set to low for all Standby VMs (default normal)

- vSphere DRS Migration Threshold set to Fully Automated level 1

  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/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)
- /adv/UserVars/HostClientCEIPOptIn = 1 (default 0)
- /vmkernel/hyperthreadingMitigation = TRUE (default FALSE)

Server Notes

- Server BIOS settings:
  - Turbo Boost Technology: enabled (Intel Turbo Boost up to 4.0GHz, default enabled)
  - DCU Streamer Prefetcher: Disabled (default Enabled)
  - DCU Ip Prefetcher: Disabled (default Enabled)
  - Stale AtoS: Enabled (default Disabled)
  - Patrol Scrub: Disabled (default Enabled)
  - WR CRC feature Control: Disabled (default Enabled)
  - Fan Control: Full (default Auto)

Networking Notes

- vSwitch Configuration:
  - vSwitch0 for Service Console on vmnic1 at 1Gb/s
  - vSwitch1 for all workload on vmnic3,vmnic4,vmnic5 at 10Gb/s
  - vSwitch2 for vMotion connection on vmnic6 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)
    - 1 x QLogic QLE2672 Dual Port 16Gb FC HBA used as FC target controller
    - 1 x Fujitsu RAID SAS Controller with 1GB Cache (D3108)
    - 2 x 480GB SATA-SSD Micron MTFDDAK480TDC
    - 2 x Intel P4800X 750GB PCIe SSD
    - 1 x Intel P4600 2TB 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 for tiles 0 (600GB)

  - Second PCIe-SSD:
    - LUN 1: DS3DB for tiles 1 (600GB)

  - Third PCIe-SSD:
    - LUN 1: AuctionNoSQL, ElasticDB for tile 0 (300GB)
    - LUN 2: AuctionNoSQL, ElasticDB for tile 1 (300GB)
    - LUN 3: AuctionDB, ElasticLB for tile 0 (300GB)
    - LUN 4: AuctionDB, ElasticLB for tile 1 (300GB)
    - LUN 5: AuctionNoSQL, ElasticDB for tile 8 (300GB)

  - Fourth PCIe-SSD:
    - LUN 1: AuctionWebA, AuctionWebB, AuctionAppA, AuctionAppB, AuctionLB, AuctionMSQ, Standby, ElasticWebA, ElasticWebB, ElasticAppA, ElasticAppB for tile 0 (300GB)
    - LUN 2: AuctionWebA, AuctionWebB, AuctionAppA, AuctionAppB, AuctionLB, AuctionMSQ, Standby, ElasticWebA, ElasticWebB, ElasticAppA, ElasticAppB for tile 1 (300GB)
    - LUN 3: vmmark3.1-template-020419 (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)
    - 1 x QLogic QLE2672 Dual Port 16Gb FC HBA used as FC target controller
    - 1 x Fujitsu RAID SAS Controller with 1GB Cache (D3108)
    - 2 x 480GB SATA-SSD Micron MTFDDAK480TDC
    - 2 x Intel P4800X 750GB PCIe SSD
    - 1 x Intel P4600 2TB 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 for tiles 2 (600GB)

  - Second PCIe-SSD:
    - LUN 1: DS3DB for tiles 3 (600GB)

  - Third PCIe-SSD:
    - LUN 1: AuctionNoSQL, ElasticDB for tile 2 (300GB)
    - LUN 2: AuctionNoSQL, ElasticDB for tile 3 (300GB)
    - LUN 3: AuctionDB, ElasticLB for tile 2 (300GB)
    - LUN 4: AuctionDB, ElasticLB for tile 3 (300GB)

  - Fourth PCIe-SSD:
    - LUN 1: AuctionWebA, AuctionWebB, AuctionAppA, AuctionAppB, AuctionLB, AuctionMSQ, Standby, ElasticWebA, ElasticWebB, ElasticAppA, ElasticAppB for tile 2 (300GB)
    - LUN 2: AuctionWebA, AuctionWebB, AuctionAppA, AuctionAppB, AuctionLB, AuctionMSQ, Standby, ElasticWebA, ElasticWebB, ElasticAppA, ElasticAppB for tile 3 (300GB)
    - LUN 3: Deploy Lun (300GB)
    - LUN 4: AuctionWebA, AuctionWebB, AuctionAppA, AuctionAppB, AuctionLB, AuctionMSQ, Standby, ElasticWebA, ElasticWebB, ElasticAppA, ElasticAppB for tile 8 (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)
  - 1 x QLogic QLE2672 Dual Port 16Gb FC HBA used as FC target controller
  - 1 x Fujitsu RAID SAS Controller with 1GB Cache (D3108)
  - 2 x 480GB SATA-SSD Micron MTFDDAK480TDC
  - 2 x Intel P4800X 750GB PCIe SSD
  - 1 x Intel P4600 2TB 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 for tiles 5 (600GB)

  - Second PCIe-SSD:
    - LUN 1: DS3DB for tiles 4 (600GB)

  - Third PCIe-SSD:
    - LUN 1: AuctionNoSQL, ElasticDB for tile 4 (300GB)
    - LUN 2: AuctionNoSQL, ElasticDB for tile 5 (300GB)
    - LUN 3: AuctionDB, ElasticLB for tile 4 (300GB)
    - LUN 4: AuctionDB, ElasticLB for tile 5 (300GB)
    - LUN 5: AuctionDB, ElasticLB for tile 8 (300GB)

  - Fourth PCIe-SSD:
    - LUN 1: AuctionWebA, AuctionWebB, AuctionAppA, AuctionAppB, AuctionLB, AuctionMSQ, Standby, ElasticWebA, ElasticWebB, ElasticAppA, ElasticAppB for tile 4 (300GB)
    - LUN 2: AuctionWebA, AuctionWebB, AuctionAppA, AuctionAppB, AuctionLB, AuctionMSQ, Standby, ElasticWebA, ElasticWebB, ElasticAppA, ElasticAppB for tile 5 (300GB)
    - LUN 3: SvMotion Target Lun (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)
- 1 x QLogic QLE2672 Dual Port 16Gb FC HBA used as FC target controller
- 1 x Fujitsu RAID SAS Controller with 1GB Cache (D3108)
- 2 x 480GB SATA-SSD Micron MTFDDAK480TDC
- 2 x Intel P4800X 750GB PCIe SSD
- 1 x Intel P4600 2TB 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 for tiles 7 (600GB)

- Second PCIe-SSD:
    - LUN 1: DS3DB for tiles 6 (600GB)

- Third PCIe-SSD:
    - LUN 1: AuctionNoSQL, ElasticDB for tile 6 (300GB)
    - LUN 2: AuctionNoSQL, ElasticDB for tile 7 (300GB)
    - LUN 3: AuctionDB, ElasticLB for tile 6 (300GB)
    - LUN 4: AuctionDB, ElasticLB for tile 7 (300GB)

- Fourth PCIe-SSD:
    - LUN 1: AuctionWebA, AuctionWebB, AuctionAppA, AuctionAppB, AuctionLB, AuctionMSQ, Standby, ElasticWebA, ElasticWebB, ElasticAppA, ElasticAppB for tile 6 (300GB)
    - LUN 2: AuctionWebA, AuctionWebB, AuctionAppA, AuctionAppB, AuctionLB, AuctionMSQ, Standby, ElasticWebA, ElasticWebB, ElasticAppA, ElasticAppB for tile 7 (300GB)
    - LUN 3: XvMotion Target Lun (300GB)
    - LUN 4: DS3DB for tiles 8 (600GB)

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 6.7.1 EP 06 Build 11675023 was installed using 'Fujitsu Custom Image for VMware ESXi 6.7.1 EP 06' named VMware-ESXi-6.7.0-11675023-Fujitsu-v461-1.iso

- VMware ESXi 6.7.1 EP 06 Build 11675023 was released by VMware on 01-17-2019
- The Fujitsu customized ISO image will be released by Fujitsu on 04-09-2019

Software Notes

None

Client Notes

Client Host1: Client0,Client2,Client5,Client8
Client Host2: Client1,Client4,Client7
Client Host3: Client3,Client6,PrimeCient

Changes in esx.conf:

- /adv/Power/CpuPolicy = High Performance (default balanced)
- /adv/UserVars/HostClientCEIPOptIn = 1 (default 0)

Other Notes

None

Security Mitigations

<table>
<tr><th colspan="7">Security Mitigations</th></tr>
<tr><th rowspan="2">Vulnerability</th><th rowspan="2">CVE</th><th rowspan="2">Exploit Name</th><th rowspan="2">Public Vulnerability Name</th><th colspan="3">Mitigated</th></tr>
<tr><th>Server Firmware</th><th>ESXi</th><th>Guest OS</th></tr>
<tr><td>Spectre</td><td>2017-5753</td><td>Variant 1</td><td>Bounds Check Bypass</td><td>N/A</td><td>Yes</td><td>Yes</td></tr>
<tr><td>Spectre</td><td>2017-5715</td><td>Variant 2</td><td>Branch Target Injection</td><td>Yes</td><td>Yes</td><td>Yes</td></tr>
<tr><td>Meltdown</td><td>2017-5754</td><td>Variant 3</td><td>Rogue Data Cache Load</td><td>N/A</td><td>Yes</td><td>Yes</td></tr>
<tr><td>Spectre-NG</td><td>2018-3640</td><td>Variant 3a</td><td>Rogue System Register Read</td><td>Yes</td><td>N/A</td><td>N/A</td></tr>
<tr><td>Spectre-NG</td><td>2018-3639</td><td>Variant 4</td><td>Speculative Store Bypass</td><td>N/A</td><td>Yes</td><td>Yes</td></tr>
</table>

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

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