

VMmark® 3.1.1 Results

Server Vendor & Model: Dell EMC PowerEdge R740xd
Storage Vendor & Model: VMware vSAN - All Flash
Hypervisor: VMware ESXi 6.7.0 P04 Build 17167734
Datacenter Management Software: VMware vCenter Server 6.7 U3g

VMmark V3.1.1 Score =
8.70 @ 9 Tiles

Number of Hosts: 4	Uniform Hosts: Yes	Total sockets/cores/threads in test: 8/144/288
Tested By: Sirius Computer Solutions		Test Date: 02-23-2021
Performance Section Performance	Configuration Section Configuration	Notes Section 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	3579.34	0.99	0.54 0.00	565.25	0.99	0.42 0.09	956.80	1.30	754.57	674.33	1.35	874.18	469.95	1.36	974.85	1.19
p1	3557.00	0.99	0.48 0.01	563.99	0.99	0.43 0.12	955.83	1.30	750.86	690.30	1.38	881.82	514.35	1.48	966.19	1.21
p2	3542.55	0.98	0.56 0.00	561.15	0.98	0.44 0.05	958.00	1.30	741.11	672.00	1.34	879.36	472.40	1.36	971.83	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	3581.90	1.00	0.48 0.00	567.51	0.99	0.57 0.06	940.85	1.28	837.09	678.98	1.36	979.07	465.75	1.34	1153.50	1.18
p1	3570.72	0.99	0.53 0.00	565.36	0.99	0.38 0.04	924.27	1.26	872.88	633.90	1.27	1061.35	452.25	1.30	1216.01	1.15
p2	3552.49	0.99	0.53 0.00	563.71	0.99	0.43 0.03	908.67	1.24	932.93	621.88	1.24	1124.07	416.85	1.20	1329.12	1.12
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	3578.90	0.99	0.43 0.00	561.96	0.98	0.41 0.10	892.35	1.22	952.94	638.02	1.27	1120.40	461.02	1.33	1276.88	1.15
p1	3562.02	0.99	0.46 0.01	559.68	0.98	0.51 0.09	897.40	1.22	941.35	617.60	1.23	1122.33	421.75	1.22	1297.32	1.12
p2	3551.82	0.99	0.45 0.00	556.89	0.97	0.42 0.05	887.77	1.21	956.71	636.17	1.27	1114.27	445.48	1.28	1241.09	1.14
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	3576.17	0.99	0.49 0.00	560.72	0.98	0.45 0.03	926.40	1.26	873.50	639.42	1.28	1045.69	455.98	1.31	1205.13	1.16
p1	3561.03	0.99	0.51 0.00	559.21	0.98	0.43 0.09	958.33	1.31	764.78	667.38	1.33	912.84	461.40	1.33	1045.77	1.17
p2	3558.10	0.99	0.48 0.00	556.65	0.97	0.37 0.04	938.90	1.28	820.12	677.38	1.35	963.34	495.20	1.43	1091.61	1.19
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
p0	3572.29	0.99	0.40 0.00	568.25	0.99	0.41 0.12	891.70	1.21	968.25	607.40	1.21	1165.13	411.20	1.19	1361.05	1.11
p1	3556.35	0.99	0.38 0.00	562.08	0.98	0.42 0.05	906.95	1.24	887.77	653.80	1.31	1038.89	457.30	1.32	1174.13	1.16
p2	3545.24	0.99	0.39 0.00	561.77	0.98	0.47 0.08	907.45	1.24	878.62	633.30	1.27	1040.41	454.23	1.31	1181.35	1.15
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	3577.05	0.99	0.49 0.00	574.61	1.00	0.66 0.12	944.17	1.29	785.02	661.60	1.32	932.23	460.18	1.33	1050.52	1.18

p1	3565.13	0.99	0.55 0.00	571.48	1.00	0.69 0.15	909.33	1.24	877.75	659.65	1.32	1004.87	485.32	1.40	1125.37	1.18
p2	3549.69	0.99	0.55 0.00	566.76	0.99	0.59 0.18	908.60	1.24	893.01	623.58	1.25	1069.84	433.20	1.25	1193.59	1.13
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	3581.77	1.00	0.40 0.00	562.75	0.98	0.47 0.08	902.55	1.23	919.09	643.48	1.29	1080.19	449.55	1.30	1215.64	1.15
p1	3561.16	0.99	0.47 0.00	561.43	0.98	0.52 0.08	899.50	1.22	945.42	616.50	1.23	1125.10	440.98	1.27	1278.20	1.13
p2	3551.82	0.99	0.43 0.00	559.58	0.98	0.39 0.04	905.50	1.23	909.26	622.80	1.24	1084.21	427.98	1.23	1243.21	1.13
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	3576.97	0.99	0.52 0.00	572.89	1.00	0.74 0.26	919.52	1.25	888.56	660.30	1.32	1027.66	478.40	1.38	1184.13	1.18
p1	3561.77	0.99	0.56 0.01	566.65	0.99	0.44 0.02	927.85	1.26	849.39	618.88	1.24	1024.78	442.12	1.27	1164.47	1.14
p2	3553.20	0.99	0.44 0.00	562.40	0.98	0.47 0.13	926.80	1.26	856.17	668.60	1.34	1001.09	465.10	1.34	1146.91	1.17
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	3571.18	0.99	0.53 0.00	566.43	0.99	0.57 0.16	839.98	1.14	1156.15	581.60	1.16	1399.16	396.23	1.14	1613.72	1.08
p1	3557.16	0.99	0.46 0.00	563.60	0.98	0.42 0.06	850.00	1.16	1119.52	548.90	1.10	1376.22	383.73	1.11	1578.25	1.06
p2	3540.02	0.98	0.46 0.00	560.31	0.98	0.48 0.09	824.12	1.12	1204.77	593.48	1.19	1418.78	412.88	1.19	1619.66	1.09
p0_score:	10.37															
p1_score:	10.33															
p2_score:	10.30															

Infrastructure_Operations_Scores:	vMotion	SVMotion	XVMotion	Deploy
Completed_Ops_PerHour	55.00	46.00	36.00	16.00
Avg_Seconds_To_Complete	9.15	106.24	144.90	388.47
Failures	0.00	0.00	0.00	0.00
Ratio	2.12	2.56	2.00	2.00
Number_Of_Threads	2	2	2	2

Summary	Run_Is_Compliant	Turbo_Setting:0
	Number_Of_Compliance_Issues(0)*	Median_Phase(p1)
Unreviewed_VMmark3_Applications_Score	10.33	
Unreviewed_VMmark3_Infrastructure_Score	2.16	
Unreviewed_VMmark3_Score	8.70	

Configuration

Virtualization Software	
Hypervisor Vendor, Product, Version, and Build / Availability Date (MM-DD-YYYY)	VMware ESXi 6.7.0 P04 Build 17167734 / 11-19-2020

Datacenter Management Software Vendor, Product, Version, and Build / Availability Date (MM-DD-YYYY)	VMware vCenter Server 6.7 U3g / 04-28-2020
Supplemental Software	None
Servers	
Number of Servers in System Under Test (all subsequent fields in this section are per server)	4
Server Manufacturer and Model	Dell EMC PowerEdge R740xd
Processor Vendor and Model	Intel® Xeon® Gold 6240
Processor Speed (GHz) / Turbo Boost Speed (GHz)	2.60GHz / 3.90GHz
Total Sockets/Total Cores/Total Threads	2 Sockets / 36 Cores / 72 Threads
Primary CPU Cache	32KB instruction + 32KB data on chip per core
Secondary CPU Cache	1MB instruction + data on chip per core
Other CPU Cache	24.75MB instruction + data on chip per chip
BIOS Version	2.10.0
Memory Size (in GB, Number of DIMMs)	384 GB, 12
Memory Type and Speed	32GB DDR4 3200MHz
Disk Subsystem Type	vSAN
Number of Disk Controllers	1
Disk Controller Vendors and Models	BOSS-S1 Adapter
Total Number of Physical Disks for Hypervisor	1
Disk Vendors, Models, Capacities, and Speeds	MICRON, MTFDDAV240TDU, 240GB M.2 SSD
Number of Host Bus Adapters	1
Host Bus Adapter Vendors and Models	QLogic 32Gb 2P QLE2772 Dual-Port FC HBA
Number of Network Controllers	2
Network Controller Vendors and Models	Intel® Ethernet 10G 2P X710/I350 Dual-Port Adapter Intel® Ethernet 25G 2P XXV710 Dual-Port Adapter
Other Hardware	None
Other Software	None

Hardware Availability Date (MM-DD-YYYY)	04-02-2019
BIOS Availability Date (MM-DD-YYYY)	11-12-2020
Software Availability Date (MM-DD-YYYY)	11-19-2020
Network	
Network Switch Vendors and Models	1 x Cisco Catalyst 3750G 48-port 1GbE for Management 2 x Dell EMC PowerSwitch S4148F-ON 54-port 10/40/100 GbE Switch for Top-of-Rack
Network Speed	10 GbE
Primary Storage	
Storage Category	VMware vSAN (with default vSAN storage policy)
Storage Vendors, Models, and Firmware Versions	4 x Dell EMC PowerEdge R740xd, with VMware vSAN 6.7.0
Storage Configuration Summary	VMware vSAN (caching tier): 8 x Intel® Optane™ DC P4800X Series 375GB SSDs (2 x SSD per host) VMware vSAN (capacity tier): 24 x Intel® SSD DC P4510 Series 2TB SSDs (6 x SSD per host)
Datacenter Management Server	
System Model	Cisco UCS B200 M3
Processor Vendor and Model	Intel® Xeon® CPU E5-2650
Processor Speed (GHz)	2.00GHz
Total Sockets/Total Cores/Total Threads	2 Sockets / 16 Cores / 32 Threads
Memory Size (in GB, Number of DIMMs)	192, 12
Network Controller(s) Vendors and Models	Cisco UCS VIC 1240
Operating System, Version, Bitness, and Service Pack	VMware ESXi 6.5.0 Build 7967591
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 6.7 U3g
Other Hardware	None
Other Software	None
Clients	

Total Number of Virtual Clients / Virtual Client Hosts	10 / 2
System Model(s)	Dell EMC PowerEdge R740xd
Processor Vendor(s) and Model(s)	Intel® Xeon® Gold 6240
Processor Speed(s) (GHz)	2.60GHz / 3.90GHz
Total Sockets/Total Cores/Total Threads	2 Sockets / 36 Cores / 72 Threads
Memory per Virtual Client Host	384 GB
Network Controller(s) Vendors and Models	Intel® Ethernet 10G 2P X710/I350 Dual-Port Adapter Intel® Ethernet 25G 2P XXV710 Dual-Port Adapter
Virtual Client Networking Notes	Details in Networking Notes
Virtual Client Storage Notes	Details in Storage Notes
Other Hardware	None
Other Software	VMware ESXi 6.7.0 P04 Build 17167734

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

- vSphere DRS Migration Threshold set to level 2
- Power Management Settings: High Performance
- /vmkernel/hyperthreadingMitigation = "TRUE" (default false)

Advanced Settings:

- /adv/UserVars/SuppressShellWarning = 1 (default 0)
- /adv/UserVars/HostClientCEIPOptIn = 1 (default 0)
- /adv/Virsto/DedupSpaceReclaim = 2 (default 0)
- /adv/VSAN/ClomBgProRebalanceEnabled = 1

Server Notes

SUT Host BIOS Settings:

- System Profile set to Performance

Networking Notes

SUT Cluster Network:

- Distributed vSwitch with two 10GbE uplinks and two 25GbE uplinks per host (vmnic4 as Uplink1, vmnic5 as Uplink2, vmnic0 as Uplink3, and vmnic1 as Uplink4)
 - Individual port groups for Management, vMotion, vSAN, VMs, and iSCSI traffic
 - Each port group is on a separate VLAN
- VM port group configured with Ephemeral port binding
- MTU set to 1500 on Top-of-Rack switches and vDS

Client Cluster Network:

- Distributed vSwitch with two 10GbE and two 25GbE uplinks per host (vmnic4 as Uplink1, vmnic5 as Uplink2, vmnic0 as Uplink3, and vmnic1 as Uplink4)
 - Individual port groups for Management, vMotion, vSAN, VMs, and iSCSI traffic
 - Each port group is on a separate VLAN
- VM port group configured with Ephemeral port binding
- MTU set to 1500 on Top-of-Rack switches and vDS

Storage Notes

OS storage (Client and SUT hosts) for VMware ESXi 6.7 was installed on 1 x 240GB M.2 SSD

VMware vSAN (Primary Storage):

- Caching Tier: 2.79TB
 - 8 x Intel® Optane™ DC P4800X Series 375GB SSDs
- Capacity Tier: 43.68TB
 - 24 x Intel® SSD DC P4510 Series 2TB SSDs
- Each host was configured with two disk groups; each disk group configured as follows:
 - Cache Drive: 1 x Intel® Optane™ DC P4800X Series 375GB SSDs
 - Capacity Drives: 3 x Intel® SSD DC P4510 Series 2TB SSDs

Dell EMC PowerStore 5000T (Secondary Storage):

- Physical Configuration
 - PowerStore OS v1.0.1.0.5.003
 - 2 x 5000T storage controllers
 - 4 x 10/25 GbE iSCSI per controller

- 4 x 32Gb FC per controller
- 20 x 3.8TB NVMe SED SSDs
- 4 x 8GB NVMe NVRAM
- Inline deduplication and compression enabled by default
- The PowerStore 5000T was cabled to the pair of Dell EMC PowerSwitches
- Virtual Configuration
 - 2 x 1TB LUNs for SUT hosts
 - 1 x 4TB LUN for Client hosts
 - The LUNs were presented to the front-end hosts via iSCSI.
 - Client and SUT Clusters utilized iSCSI Software Adapter to access Secondary Storage. Two VMKs were created and network port bindings added to carry iSCSI traffic.

Datacenter Management Server Notes

VMware vCenter Server 6.7 U3g hosted externally on a separate host that was not part of the Client or SUT clusters.

Operating System Notes

- Dell EMC customized ESXi ISO DellEMC-ESXi-6.7U3-16075168-A05 was used to initially image the SUT cluster.
- Dell EMC customized ESXi ISO DellEMC-ESXi-6.7U3-14320388-A02 was used to initially image the Client cluster.
- VMware package 'vmware-fdm' was installed on 10-05-2020 on the SUT cluster.
- VMware Update Manager was utilized to update hypervisor on all hosts to 6.7.0 P04 Build 17167734.

Software Notes

None

Client Notes

PrimeClient and clients (0-8) were hosted on two Dell EMC PowerEdge R740xd servers. These hosts were added to the same Distributed vSwitch as the SUT cluster.

- vSphere vSphere DRS Migration Threshold set to level 2
- Power Management Settings: High Performance
- /vmkernel/hyperthreadingMitigation = "TRUE" (default false)

Advanced Settings:

- /adv/UserVars/HostClientCEIPOptIn = 1 (default 0) - Client Cluster Host 1
- /adv/UserVars/HostClientCEIPOptIn = 2 (default 0) - Client Cluster Host 2
- /adv/UserVars/SuppressShellWarning = 1 (default 0)

Other Notes

- VCscratchDir in VMmark3.properties was modified to /root/VMmark3/results/scratch

This is a full disclosure report for a VMmark® benchmark result. All published VMmark results must be from fully-compliant tests for which a full disclosure report is publicly available.

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