

VMmark® 3.1.1 Results

Server Vendor & Model: Dell EMC PowerEdge R7515
Storage Vendor & Model: VMware vSAN - All Flash
Hypervisor: VMware ESXi 6.7.0 P01 Build 15160138
Datacenter Management Software: VMware vCenter Server 6.7.0 U3b Build 15132721

VMmark 3.1.1 Score =
15.18 @ 16 Tiles

Number of Hosts: 4

Uniform Hosts [yes/no]: yes

Total sockets/cores/threads in test: 4/256/512

Tested By: Dell Inc.

Test Date: 09-20-2020

Performance Section

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Performance

	weathervane			weathervaneE			dvdstoreA			dvdstoreB			dvdstoreC			
TILE_0	Actual	Ratio	QoS(nRTIMaxPctF)	Actual	Ratio	QoS(nRTIMaxPctF)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	GM
p0	3572.28	0.99	0.52 0.00	567.90	0.99	0.46 0.16	919.88	1.25	890.30	633.10	1.26	1061.29	436.65	1.26	1187.15	1.14
p1	3551.57	0.99	0.62 0.00	567.92	0.99	0.63 0.31	925.25	1.26	856.66	666.67	1.33	992.69	493.57	1.42	1091.12	1.19
p2	3540.32	0.98	0.56 0.00	562.08	0.98	0.44 0.10	928.80	1.26	843.66	499.85	1.00	982.37	444.77	1.28	1142.87	1.09
TILE_1	Actual	Ratio	QoS(nRTIMaxPctF)	Actual	Ratio	QoS(nRTIMaxPctF)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	GM
p0	3584.43	1.00	0.61 0.00	569.05	0.99	0.83 0.43	930.17	1.27	845.10	647.67	1.29	1002.39	449.80	1.30	1121.57	1.16
p1	3569.76	0.99	0.57 0.00	566.93	0.99	0.66 0.15	915.17	1.25	895.88	656.33	1.31	1050.95	481.15	1.39	1169.78	1.17
p2	3551.61	0.99	0.59 0.02	565.82	0.99	0.64 0.26	944.45	1.29	808.93	661.17	1.32	950.33	457.93	1.32	1069.11	1.17
TILE_2	Actual	Ratio	QoS(nRTIMaxPctF)	Actual	Ratio	QoS(nRTIMaxPctF)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	GM
p0	3583.29	1.00	0.54 0.00	566.86	0.99	0.42 0.13	910.42	1.24	915.86	627.60	1.25	1089.19	428.35	1.24	1241.95	1.14
p1	3564.91	0.99	0.52 0.00	566.87	0.99	0.47 0.10	901.92	1.23	922.38	650.52	1.30	1071.94	473.05	1.36	1206.96	1.16
p2	3545.18	0.99	0.55 0.00	565.29	0.99	0.50 0.10	916.95	1.25	899.41	632.05	1.26	1062.53	433.77	1.25	1216.25	1.14
TILE_3	Actual	Ratio	QoS(nRTIMaxPctF)	Actual	Ratio	QoS(nRTIMaxPctF)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	GM
p0	3579.99	1.00	0.48 0.00	568.81	0.99	0.71 0.32	946.08	1.29	807.97	658.02	1.31	959.10	454.43	1.31	1087.88	1.17
p1	3562.64	0.99	0.45 0.00	565.26	0.99	0.47 0.12	920.55	1.25	863.29	666.25	1.33	1010.74	488.75	1.41	1111.04	1.18
p2	3552.70	0.99	0.51 0.00	564.04	0.99	0.44 0.15	931.98	1.27	838.50	646.50	1.29	995.06	449.25	1.30	1111.63	1.16
TILE_4	Actual	Ratio	QoS(nRTIMaxPctF)	Actual	Ratio	QoS(nRTIMaxPctF)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	GM
p0	3580.00	1.00	0.48 0.00	570.29	1.00	0.76 0.32	912.20	1.24	906.47	634.80	1.27	1054.67	434.43	1.25	1213.54	1.14
p1	3564.19	0.99	0.49 0.00	569.52	1.00	0.58 0.12	913.30	1.24	906.61	646.80	1.29	1093.17	450.05	1.30	1230.28	1.16
p2	3544.56	0.99	0.47 0.00	562.00	0.98	0.49 0.12	914.55	1.25	898.90	637.83	1.27	1059.18	428.75	1.24	1235.81	1.14
TILE_5	Actual	Ratio	QoS(nRTIMaxPctF)	Actual	Ratio	QoS(nRTIMaxPctF)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	GM

p0	3573.75	0.99	0.50 0.00	571.34	1.00	0.89 0.46	936.15	1.27	834.73	656.75	1.31	968.37	448.45	1.29	1110.92	1.16
p1	3556.74	0.99	0.63 0.12	572.08	1.00	0.83 0.37	926.33	1.26	852.43	643.15	1.28	1014.20	464.80	1.34	1137.15	1.17
p2	3548.35	0.99	0.47 0.00	571.21	1.00	0.71 0.45	940.27	1.28	825.33	654.10	1.31	971.49	449.00	1.29	1116.87	1.16
TILE_6	Actual	Ratio	QoS(nRTIMaxPctF)	Actual	Ratio	QoS(nRTIMaxPctF)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	GM
p0	3576.74	0.99	0.50 0.00	573.36	1.00	0.76 0.33	948.48	1.29	791.65	688.60	1.38	923.18	479.62	1.38	1044.87	1.20
p1	3568.97	0.99	0.50 0.00	571.82	1.00	0.76 0.41	924.90	1.26	869.55	640.02	1.28	1034.09	463.70	1.34	1149.67	1.16
p2	3551.58	0.99	0.47 0.00	568.52	0.99	0.64 0.35	924.30	1.26	868.64	638.35	1.28	1038.73	438.15	1.26	1178.16	1.15
TILE_7	Actual	Ratio	QoS(nRTIMaxPctF)	Actual	Ratio	QoS(nRTIMaxPctF)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	GM
p0	3577.55	0.99	0.64 0.00	568.71	0.99	0.61 0.20	914.60	1.25	892.29	657.33	1.31	1053.93	456.10	1.32	1197.86	1.16
p1	3557.90	0.99	0.67 0.00	561.63	0.98	0.55 0.19	918.98	1.25	885.75	635.08	1.27	1050.77	455.57	1.31	1198.83	1.15
p2	3546.67	0.99	0.53 0.00	557.15	0.97	0.55 0.31	929.60	1.27	870.77	639.55	1.28	1036.63	434.82	1.25	1188.60	1.14
TILE_8	Actual	Ratio	QoS(nRTIMaxPctF)	Actual	Ratio	QoS(nRTIMaxPctF)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	GM
p0	3586.83	1.00	0.58 0.00	569.74	1.00	0.73 0.26	934.98	1.27	835.60	674.88	1.35	975.42	469.38	1.35	1120.43	1.18
p1	3572.69	0.99	0.48 0.01	567.39	0.99	0.94 0.45	934.92	1.27	840.37	648.95	1.30	996.30	463.98	1.34	1143.92	1.17
p2	3556.81	0.99	0.48 0.00	561.62	0.98	0.60 0.22	936.85	1.28	824.41	652.25	1.30	981.04	446.32	1.29	1132.77	1.16
TILE_9	Actual	Ratio	QoS(nRTIMaxPctF)	Actual	Ratio	QoS(nRTIMaxPctF)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	GM
p0	3581.05	1.00	0.48 0.00	569.01	0.99	0.54 0.27	918.58	1.25	889.28	658.20	1.32	1045.97	450.25	1.30	1219.12	1.16
p1	3571.67	0.99	0.51 0.00	567.01	0.99	0.60 0.21	922.40	1.26	872.06	636.35	1.27	1042.82	456.35	1.32	1183.63	1.16
p2	3547.26	0.99	0.49 0.00	561.11	0.98	0.57 0.22	931.80	1.27	844.25	645.92	1.29	1012.04	438.30	1.26	1161.98	1.15
TILE_10	Actual	Ratio	QoS(nRTIMaxPctF)	Actual	Ratio	QoS(nRTIMaxPctF)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	GM
p0	3564.63	0.99	0.48 0.00	570.08	1.00	0.75 0.33	906.90	1.24	916.41	658.85	1.32	1057.00	449.95	1.30	1221.36	1.16
p1	3551.95	0.99	0.51 0.00	569.65	1.00	0.74 0.30	924.08	1.26	866.47	635.65	1.27	1055.66	452.12	1.30	1196.99	1.15
p2	3540.37	0.98	0.63 0.00	563.91	0.99	0.50 0.07	912.08	1.24	908.32	634.55	1.27	1061.01	429.40	1.24	1235.23	1.14
TILE_11	Actual	Ratio	QoS(nRTIMaxPctF)	Actual	Ratio	QoS(nRTIMaxPctF)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	GM
p0	3582.15	1.00	0.49 0.00	570.18	1.00	0.54 0.20	932.12	1.27	842.44	682.27	1.36	955.61	470.10	1.36	1108.86	1.18
p1	3566.56	0.99	0.48 0.00	564.08	0.99	0.50 0.22	923.58	1.26	866.54	634.40	1.27	1050.77	453.18	1.31	1206.54	1.15
p2	3559.58	0.99	0.48 0.00	564.42	0.99	0.42 0.11	912.85	1.24	914.10	633.77	1.27	1062.23	427.60	1.23	1232.53	1.14
TILE_12	Actual	Ratio	QoS(nRTIMaxPctF)	Actual	Ratio	QoS(nRTIMaxPctF)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	GM
p0	3569.43	0.99	0.49 0.00	566.89	0.99	0.35 0.06	910.52	1.24	918.20	662.42	1.32	1042.98	473.10	1.36	1212.20	1.17
p1	3556.73	0.99	0.48 0.00	567.49	0.99	0.38 0.05	912.02	1.24	911.42	605.75	1.21	1097.86	426.20	1.23	1266.30	1.13
p2	3547.00	0.99	0.44 0.00	563.96	0.99	0.47 0.16	915.73	1.25	899.26	658.73	1.32	1048.48	449.80	1.30	1220.99	1.16
TILE_13	Actual	Ratio	QoS(nRTIMaxPctF)	Actual	Ratio	QoS(nRTIMaxPctF)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	GM
p0	3581.55	1.00	0.48 0.00	572.13	1.00	0.72 0.26	883.80	1.20	981.87	632.40	1.26	1162.46	456.12	1.32	1312.51	1.15
p1	3560.60	0.99	0.51 0.00	570.38	1.00	0.77 0.31	904.50	1.23	929.78	625.42	1.25	1104.54	418.27	1.21	1294.11	1.13

p2	3551.87	0.99	0.47 0.00	569.19	0.99	0.62 0.25	892.62	1.22	963.77	639.45	1.28	1130.85	437.57	1.26	1312.02	1.14
TILE_14	Actual	Ratio	QoS(nRTIMaxPctF)	Actual	Ratio	QoS(nRTIMaxPctF)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	GM
p0	3575.12	0.99	0.51 0.00	568.73	0.99	0.77 0.38	918.15	1.25	872.15	666.05	1.33	1012.53	484.18	1.40	1144.23	1.18
p1	3555.87	0.99	0.54 0.00	561.85	0.98	0.47 0.16	929.10	1.27	849.71	645.25	1.29	1013.33	441.85	1.27	1162.77	1.15
p2	3543.06	0.98	0.57 0.00	561.68	0.98	0.52 0.16	924.45	1.26	874.61	667.20	1.33	1019.65	459.95	1.33	1174.33	1.17
TILE_15	Actual	Ratio	QoS(nRTIMaxPctF)	Actual	Ratio	QoS(nRTIMaxPctF)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	GM
p0	3575.77	0.99	0.49 0.00	564.78	0.99	0.43 0.14	913.12	1.24	910.77	655.88	1.31	1062.15	474.93	1.37	1202.79	1.17
p1	3568.20	0.99	0.47 0.00	564.26	0.99	0.43 0.12	922.10	1.26	879.40	643.40	1.29	1035.62	434.73	1.25	1214.50	1.15
p2	3539.11	0.98	0.53 0.00	556.65	0.97	0.50 0.18	908.30	1.24	910.58	659.05	1.32	1059.45	447.68	1.29	1239.93	1.15
p0_score:	18.63															
p1_score:	18.52															
p2_score:	18.34															

Infrastructure_Operations_Scores:	vMotion	SVMotion	XVMotion	Deploy
Completed_Ops_PerHour	55.00	38.00	34.00	10.00
Avg_Seconds_To_Complete	9.06	150.50	174.10	673.49
Failures	0.00	0.00	0.00	0.00
Ratio	2.12	2.11	1.89	1.25
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	18.52	
Unreviewed_VMmark3_Infrastructure_Score	1.80	
Unreviewed_VMmark3_Score	15.18	

Configuration

Virtualization Software	
Hypervisor Vendor, Product, Version, and Build / Availability Date (MM-DD-YYYY)	VMware ESXi 6.7.0 P01, Build 15160138 / 12-05-2019
Datacenter Management Software Vendor, Product, Version, and Build / Availability Date (MM-DD-YYYY)	VMware vCenter Server 6.7.0 U3b, Build 15132721 / 12-05-2019

YYYY)	
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 R7515
Processor Vendor and Model	AMD EPYC 7742
Processor Speed (GHz) / Turbo Boost Speed (GHz)	2.25 / 3.4
Total Sockets/Total Cores/Total Threads	1 Sockets / 64 Cores / 128 Threads
Primary CPU Cache	32 KB I + 32 KB D on chip per core
Secondary CPU Cache	512 KB I+D on chip per core
Other CPU Cache	256 MB I+D on chip per chip, 16 MB shared / 4 cores
BIOS Version	1.4.8
Memory Size (in GB, Number of DIMMs)	1024, 16
Memory Type and Speed	64 GB 2Rx4 PC4-3200
Disk Subsystem Type	vSAN (primary), FC SAN
Number of Disk Controllers	1
Disk Controller Vendors and Models	HBA330
Total Number of Physical Disks for Hypervisor	1
Disk Vendors, Models, Capacities, and Speeds	Dell, MTFDDAK480TDN, 480GB SSD
Number of Host Bus Adapters	1
Host Bus Adapter Vendors and Models	QLogic QLE2692
Number of Network Controllers	3
Network Controller Vendors and Models	Broadcom Gigabit Ethernet BCM5720 2 x Mellanox ConnectX-5 100 GbE Dual-port
Other Hardware	None
Other Software	None
Hardware Availability Date (MM-DD-YYYY)	08-13-2019

BIOS Availability Date (MM-DD-YYYY)	07-15-2020
Software Availability Date (MM-DD-YYYY)	12-05-2019
Network	
Network Switch Vendors and Models	Dell EMC S6100-ON 10/25/40/50/100GbE Switch
Network Speed	1 x 100 Gbps for Management and vSAN traffic 1 x 100 Gbps for vMotion traffic 1 x 100 Gbps for VM traffic traffic
Primary Storage	
Storage Category	VMware vSAN
Storage Vendors, Models, and Firmware Versions	4 x Dell EMC PowerEdge R7515 servers with VMware vSAN 6.7.0 P01
Storage Configuration Summary	VMware vSAN <ul style="list-style-type: none"> • 2 x Disk Groups per host • 2 x Dell Express Flash PM1725b 1.6TB for vSAN Cache • 8 x Dell Express Flash PM1725b 1.6TB for vSAN Capacity
Datacenter Management Server	
System Model	Dell EMC PowerEdge R7525
Processor Vendor and Model	AMD EPYC 7402
Processor Speed (GHz)	2.8
Total Sockets/Total Cores/Total Threads	2 Sockets / 48 Cores / 96 Threads
Memory Size (in GB, Number of DIMMs)	256, 16
Network Controller(s) Vendors and Models	Mellanox ConnectX-6 100 GbE Dual-port
Operating System, Version, Bitness, and Service Pack	VMware ESXi 7.0 Build 15843807
Virtual Center VM Number of vCPUs	8
Virtual Center VM Virtual Memory (in GB)	24
Virtual Center VM Operating System, Version, Bitness, and Service Pack	VMware vCenter Server 6.7.0 U3b Build 15132721
Other Hardware	None
Other Software	None

Clients	
Total Number of Virtual Clients / Virtual Client Hosts	17 / 2
System Model(s)	Dell EMC PowerEdge R7525
Processor Vendor(s) and Model(s)	AMD EPYC 7H12
Processor Speed(s) (GHz)	2.6
Total Sockets/Total Cores/Total Threads	2 Sockets / 128 Cores / 256 Threads
Memory per Virtual Client Host	1024 GB
Network Controller(s) Vendors and Models	Mellanox ConnectX-5 100GbE Dual-port
Virtual Client Networking Notes	vSwitch0 for Management (100 Gbps) vSwitch1 for VMs (100 Gbps)
Virtual Client Storage Notes	All Clients VMs on FC storage LUN: Clients
Other Hardware	1 x Dell BOSS-S1
Other Software	VMware ESXi 6.7.0 P01, Build 15160138

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	Not Vulnerable	Not Vulnerable
Spectre	2017-5715	Variant 2	Branch Target Injection	Not Vulnerable	Not Vulnerable	Not Vulnerable
Meltdown	2017-5754	Variant 3	Rogue Data Cache Load	N/A	Not Vulnerable	Not Vulnerable
Spectre-NG	2018-3640	Variant 3a	Rogue System Register Read	Not Vulnerable	N/A	N/A
Spectre-NG	2018-3639	Variant 4	Speculative Store Bypass	N/A	Not Vulnerable	Not Vulnerable
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	Not Vulnerable
Foreshadow-NG	2018-3646	Variant 5	L1 Terminal Fault - VMM	N/A	Not Vulnerable	N/A

Notes for Workload

Template deployed with disk type: Thick Eager

Virtualization Software Notes

- vSphere DRS Migration Threshold level set to 2
- Logical CPU configuration changed for DS3DB and PrimeClient VMs to 1 socket with multiple cores (Default: Single core per socket)
- Logging disabled for all VMs (Default: Enabled)
- CDROM & Floppy removed for all VMs (Default: Enabled)
- CPU and Memory shares set to high for all DS3DB VMs (Default: Normal)
- All Memory Reserved for DS3DB VMs (Default: Not reserved)
- sched.mem.pin set to TRUE for all DS3DB VMs (Default: FALSE)
- CPU shares set to Low for all Standby VMs (Default: Normal)
- Third virtual disk removed from DS3DB0 before cloning

Advanced Settings:

- /adv/UserVars/SuppressShellWarning = 1 (Default: 0)
- /adv/UserVars/HostClientCEIPOptIn = 2 on host1 (Default: 0)
- /adv/VSAN/SwapThickProvisionDisabled = 0 (Default: 1)
- /adv/Virsto/DedupSpaceReclaim = 2 (Default: 0)

Server Notes

Server BIOS Settings

- NUMA Nodes Per Socket set to 4
- System Profile set to Performance Per Watt

Networking Notes

vSwitch Configuration

- vSwitch0 used for Management and vSAN traffic
 - MTU 9000 configured on vSwitch0, vmk0 and vmnic2
- vSwitch3 used for vMotion traffic
 - MTU 9000 configured on vSwitch3, vmk2 and vmnic5
- vSwitch2 used for VM traffic

Storage Notes

Host OS installed on 1 x Dell 480GB SSD

VMware vSAN (Primary Storage)

- VMware vSAN 6.7 Patch 01
- Capacity: 51.2 TB
- Cache: 12.8 TB
- Hardware Configuration:
 - Each host had two disk groups. Each disk group used:
 - Caching drive: 1 x Dell Express Flash PM1725b 1.6 TB
 - Capacity drive: 4 x Dell Express Flash PM1725b 1.6 TB
- Software Configuration:
 - Custom vSAN Storage Policy applied
 - Disable object checksum: ON (Default: OFF)

- The SUT vSAN datastore was used for all SUT VMs and template VMs

Dell EMC PowerVault ME4012 (Secondary Storage)

- Physical Configuration
 - 2 x Storage Controllers
 - 4 x 16Gb FC ports
 - 8 x Dell 2.4TB SAS 10K
 - Each volume configured with RAID5 striped across all SSDs
- Virtual Configuration
 - 2 x 1 TB LUNs for SvMotion, XvMotion and Deploy operations
 - 1 x 1 TB LUN for Clients VMs

Datcenter Management Server Notes

None

Operating System Notes

None

Software Notes

None

Client Notes

Advanced Settings

- /adv/UserVars/SuppressShellWarning = 1 (Default: 0)
- /adv/UserVars/HostClientCEIPOptIn = 2 (Default: 0)

Client Host Storage

- OS installed on 2 x Dell SSDSCKKB480G8R 480GB SSDs configured in RAID1 on the Dell BOSS-S1 storage controller

The Client VMs were distributed across the client hosts as follows:

- Client Host 1: Even numbered Clients and PrimeClient
- Client Host 2: Odd numbered Clients

Other Notes

Changes to VMmark3.properties file:

- TileDelay = 10 (Default: 60)
- ScrubConfigFile = true (Default: false)
- ErrorImmediate = true (Default: false)

For information about VMmark and the rules regarding its usage visit www.vmware.com/products/vmmark.

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