

VMmark® 3.1.1 Results

Server Vendor & Model: Dell EMC PowerEdge R6525
Storage Vendor & Model: VMware vSAN - All Flash
Hypervisor: VMware ESXi 7.0 U2a build 17867351
Datacenter Management Software: VMware vCenter Server 7.0 U2 Build 17694817

VMmark 3.1.1 Score =
6.07 @ 6 Tiles

Number of Hosts: 4	Uniform Hosts [yes/no]: yes	Total sockets/cores/threads in test: 8/64/128
Tested By: Dell Inc.		Test Date: 07-17-2021
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	3563.40	0.99	2.44 0.58	566.37	0.99	0.34 0.02	858.92	1.17	1142.58	610.15	1.22	1381.40	418.15	1.21	1608.30	1.11
p1	3546.11	0.99	2.18 0.91	563.18	0.98	0.36 0.04	901.75	1.23	1002.78	576.98	1.15	1261.78	400.98	1.16	1449.23	1.10
p2	3535.13	0.98	1.78 0.14	562.26	0.98	0.41 0.02	915.02	1.25	905.96	647.33	1.29	1084.57	449.20	1.30	1227.64	1.15
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	3560.55	0.99	1.99 0.24	564.89	0.99	0.31 0.02	941.60	1.28	831.19	690.55	1.38	990.08	487.05	1.40	1123.12	1.19
p1	3547.47	0.99	1.45 0.06	564.73	0.99	0.37 0.04	936.40	1.28	855.88	607.83	1.21	1065.14	426.95	1.23	1234.91	1.13
p2	3532.73	0.98	2.00 0.36	563.49	0.98	0.44 0.03	927.08	1.26	865.32	652.20	1.30	1050.31	449.20	1.30	1206.46	1.16
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	3563.66	0.99	1.51 0.11	563.93	0.99	0.34 0.05	899.15	1.22	1009.22	626.83	1.25	1229.05	446.45	1.29	1427.72	1.14
p1	3547.82	0.99	1.60 0.21	564.55	0.99	0.38 0.03	955.67	1.30	792.62	654.12	1.31	965.74	440.75	1.27	1142.56	1.16
p2	3535.82	0.98	1.70 0.28	564.32	0.99	0.40 0.13	958.73	1.31	774.04	686.67	1.37	928.35	473.62	1.37	1085.11	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	3565.40	0.99	2.34 0.36	565.85	0.99	0.40 0.04	912.88	1.24	900.36	647.65	1.29	1073.43	469.27	1.35	1220.28	1.16
p1	3552.40	0.99	1.59 0.08	563.90	0.99	0.33 0.00	942.25	1.28	821.75	643.50	1.29	992.60	441.85	1.27	1149.24	1.15
p2	3530.67	0.98	2.51 0.44	562.32	0.98	0.44 0.00	928.25	1.26	850.70	665.62	1.33	1008.09	460.07	1.33	1146.93	1.17
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	3558.31	0.99	2.80 0.88	565.20	0.99	0.34 0.02	972.67	1.32	735.16	697.00	1.39	883.71	510.48	1.47	987.74	1.22
p1	3547.57	0.99	1.70 0.09	565.07	0.99	0.32 0.00	970.48	1.32	751.58	666.62	1.33	922.87	457.27	1.32	1058.95	1.18
p2	3536.25	0.98	2.67 0.50	563.18	0.98	0.34 0.02	917.02	1.25	873.77	653.17	1.31	1048.62	461.80	1.33	1133.68	1.16
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	3563.06	0.99	1.74 0.23	563.86	0.99	0.37 0.02	912.95	1.24	902.61	647.85	1.29	1070.38	469.50	1.35	1225.68	1.16

p1	3555.12	0.99	1.33 0.03	565.55	0.99	0.34 0.02	937.20	1.28	833.73	641.10	1.28	1011.98	432.60	1.25	1180.08	1.15
p2	3538.35	0.98	1.66 0.17	563.54	0.98	0.40 0.04	931.23	1.27	846.83	662.15	1.32	1005.60	457.48	1.32	1144.15	1.16
p0_score:	6.99															
p1_score:	6.87															
p2_score:	6.98															
Infrastructure_Operations_Scores:							vMotion	SVMotion	XVMotion	Deploy						
Completed_Ops_PerHour							57.00	50.00	40.00	20.00						
Avg_Seconds_To_Complete							5.38	95.80	113.98	331.06						
Failures							0.00	0.00	0.00	0.00						
Ratio							2.19	2.78	2.22	2.50						
Number_Of_Threads							2	2	2	2						
Summary							Run_Is_Compliant				Turbo_Setting:0					
							Number_Of_Compliance_Issues(0)*				Median_Phase(p2)					
Unreviewed_VMmark3_Applications_Score							6.98									
Unreviewed_VMmark3_Infrastructure_Score							2.41									
Unreviewed_VMmark3_Score							6.07									

Configuration

Virtualization Software	
Hypervisor Vendor, Product, Version, and Build / Availability Date (MM-DD-YYYY)	VMware ESXi 7.0 U2a Build 17867351 / 04-29-2021
Datacenter Management Software Vendor, Product, Version, and Build / Availability Date (MM-DD-YYYY)	VMware vCenter Server 7.0 U2 Build 17694817 / 03-09-2021
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 R6525
Processor Vendor and Model	AMD EPYC 72F3

Processor Speed (GHz) / Turbo Boost Speed (GHz)	3.7 / 4.1
Total Sockets/Total Cores/Total Threads	2 Sockets / 16 Cores / 32 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, 32 MB shared / 1 core
BIOS Version	2.0.3
Memory Size (in GB, Number of DIMMs)	2048, 32
Memory Type and Speed	64 GB 2Rx4 PC4-3200
Disk Subsystem Type	vSAN, iSCSI SAN
Number of Disk Controllers	1
Disk Controller Vendors and Models	Dell BOSS-S1
Total Number of Physical Disks for Hypervisor	2
Disk Vendors, Models, Capacities, and Speeds	Dell, SSDSCKKB240G8R, 240GB SSD, RAID 1
Number of Host Bus Adapters	None
Host Bus Adapter Vendors and Models	None
Number of Network Controllers	3
Network Controller Vendors and Models	Broadcom Gigabit Ethernet BCM5720 (Disabled) Mellanox ConnectX-5 EN 25GbE Dual-port Adapter Mellanox ConnectX-5 EN 100GbE Dual-port Adapter
Other Hardware	None
Other Software	None
Hardware Availability Date (MM-DD-YYYY)	03-15-2021
BIOS Availability Date (MM-DD-YYYY)	02-10-2021
Software Availability Date (MM-DD-YYYY)	04-29-2021
Network	
Network Switch Vendors and Models	Mellanox SN2700 32-port 100GbE Open Ethernet Switch
Network Speed	1 x 100 Gbps for Management, vSAN, and Standby and Template VM traffic 1 x 100 Gbps for vMotion and iSCSI traffic 2 x 25 Gbps for all Auction, Elastic, and DS3 VM traffic

Primary Storage	
Storage Category	VMware vSAN
Storage Vendors, Models, and Firmware Versions	4 x Dell EMC PowerEdge R6525 servers, with VMware vSAN 7.0 U2
Storage Configuration Summary	VMware vSAN <ul style="list-style-type: none"> • 2 x Disk Groups per host • 2 x Dell Express Flash PM1735 1.6TB SFF FW 2.0.2, for vSAN Cache • 8 x Dell Express Flash PM1725b 3.2TB SFF FW 1.1.0, for vSAN Capacity
Datacenter Management Server	
System Model	Dell EMC PowerEdge R6415
Processor Vendor and Model	AMD EPYC 7551P
Processor Speed (GHz)	2.0 GHz
Total Sockets/Total Cores/Total Threads	1 Sockets / 32 Cores / 64 Threads
Memory Size (in GB, Number of DIMMs)	256 GB, 8
Network Controller(s) Vendors and Models	Mellanox ConnectX-5 EN 25GbE Dual-port Adapter
Operating System, Version, Bitness, and Service Pack	VMware ESXi 7.0 U2 Build 17630552
Virtual Center VM Number of vCPUs	8
Virtual Center VM Virtual Memory (in GB)	28
Virtual Center VM Operating System, Version, Bitness, and Service Pack	VMware vCenter Server 7.0 U2 Build 17694817
Other Hardware	Details in Notes for Workload
Other Software	None
Clients	
Total Number of Virtual Clients / Virtual Client Hosts	7 / 6
System Model(s)	Dell EMC PowerEdge R6525
Processor Vendor(s) and Model(s)	AMD EPYC 7742
Processor Speed(s) (GHz)	2.25 GHz
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 EN 25GbE Dual-port Adapter
Virtual Client Networking Notes	Management and VM workload all connected to vSwitch with two uplinks
Virtual Client Storage Notes	All Clients on local Dell Express Flash PM1725b 3.2TB SFF LUN
Other Hardware	1 x Dell Express Flash PM1725b 3.2TB SFF FW 1.1.0 1 x Dell BOSS-S1 2 x Dell SSDSCKKB240G8R 240GB SSD, RAID 1
Other Software	VMware ESXi 7.0 U2, Build 17630552

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 Lazy

Virtualization Software Notes

- vSphere DRS Migration Threshold level set to 1
- vSphere DRS Advanced Option AggressiveCPUActive set to 1
- Logging was disabled for all VMs (Default is Enabled)
- CDROM & Floppy removed for all SUT VMs, except Template VMs (Default is Enabled)
- CPU and Memory shares set to high for all DS3DB VMs (Default is Normal)
- All Memory Reserved for DS3DB VMs (Default is Not reserved)
- sched.mem.pin set to TRUE for all DS3DB VMs (Default FALSE)
- CPU shares set to Low for all Standby VMs (Default is Normal)
- Third virtual disk removed from DS3DB0 before cloning DS3DB VMs for other tiles.

Advanced Settings:

- /adv/Numa/LocalityWeightActionAffinity = 0 (default 130)
- /adv/Cpu/HTWholeCoreThreshold = 0 (default 800)
- /adv/Mem/ShareScanGHz = 0 (default 4)
- /adv/UserVars/SuppressShellWarning = 1 (default 0)

Server Notes

Server BIOS Settings

- NUMA Nodes Per Socket set to 1 (default 1)
- L2 Stream HW Prefetcher set to Disabled (default Enabled)
- L2 Up Down Prefetcher set to Disabled (default Enabled)
- System Profile set to Custom (default Performance Per Watt)
- PCI ASPM L1 Link Power Management set to Disabled (default Enabled)
- Determinism set to Power Determinism (default Performance)
- ApbDis Fixed Socket P-State set to P0 (default Disabled)
- DLWM set to x16 (default Unforced)
- xGMI Max Speed set to 18GB (default 16GB)

Networking Notes

vSwitch Configuration

- vSwitch0 used for Management, vSAN traffic, and VM traffic for Standby and Template VMs
 - vmnic5 configured as uplink at 100 Gbps
 - MTU 9000 configured on vSwitch0, vmnic5, and vmk0 (default 1500)
- vSwitch1 used for vMotion and iSCSI traffic
 - vmnic4 configured as uplink at 100 Gbps
 - MTU 9000 configured on vSwitch1, vmnic4, and vmk1 (default 1500)
- vSwitch2 used for all DS3, Auction, and Elastic VM traffic
 - Both vmnic2 and vmnic3 configured as uplinks at 25 Gbps each
 - MTU 9000 configured on vSwitch2, vmnic2, and vmnic3 (default 1500)

Priority Flow Control enabled on the Mellanox switch

Storage Notes

Host OS installed on Dell BOSS-S1 virtual disk for each host

- 2 x Dell SSDSCKKB240G8R 240GB SSDs configured in RAID1 for virtual disk boot LUN

VMware vSAN (Primary Storage)

- VMware vSAN 7.0 U2
- Capacity: 102.4 TB
- Cache: 12.8 TB

- Hardware Configuration:
 - Each host had two disk groups. Each disk group used:
 - Caching drive: 1 x Dell Express Flash PM1735 1.6 TB SFF FW 2.0.2
 - Capacity drive: 4 x Dell Express Flash PM1725b 3.2 TB SFF FW 1.1.0
- Software Configuration:
 - Custom vSAN Storage Policy applied: Disable object checksum set to ON (Default: OFF)
 - vSAN-over-RDMA enabled
- SUT vSAN datastore was used for all SUT VMs and template VMs

Dell EMC Compellent Storage Array (Secondary Storage)

- Dell EMC Compellent CT-SC7020
- Physical Configuration
 - Unisphere 7.3.11.28
 - 2 x Compellent Storage Controllers
 - 4 x Compellent 25 Gbps iSCSI ports
 - 24 x Dell Compellent PM1633 1.92TB SFF SAS
 - Deduplication with compression was enabled across the entire array
 - Each volume was configured with RAID10 striped across all SSDs
 - The Compellent Storage Array is VAAI enabled
- Virtual Configuration
 - 2 x 1024 GB LUNs were used for Storage vMotion, XvMotion, and VM deploy infrastructure operation targets

Datacenter Management Server Notes

VMware vCenter Server 7.0 U2 Build 17694817 was hosted on a Dell EMC R6415 system that was separate from the SUTs and clients.

Operating System Notes

All Client and SUT hosts were installed with the VMware ESXi 7.0 U2, Build 17630552

Image used to install ESXi: VMware-VMvisor-Installer-7.0.0.update02-17630552.x86_64-DellEMC_Customized-A00.iso

All SUT hosts were upgraded to VMware ESXi 7.0 U2a, Build 17867351

Image used to upgrade ESXi: VMware-VMvisor-Installer-7.0U2a-17867351.x86_64.iso

Software Notes

None

Client Notes

Advanced Settings

- UserVars.SuppressShellWarning = 1 (default 0)

Client Host Storage

- VMware ESXi 7.0 U2 was installed on 2 x Dell SSDSCKKB240G8R 240GB SSDs configured in RAID1 on the Dell BOSS-S1 storage controller

- A VMFS datastore was created on the Dell Express Flash PM1725b 3.2TB for the Prime Client and all Client VMs
 - All Client VMs on Client Host 1 were stored on VMFS datastore client1
 - All Client VMs on Client Host 2 were stored on VMFS datastore client2
 - All Client VMs on Client Host 3 were stored on VMFS datastore client3
 - All Client VMs on Client Host 4 were stored on VMFS datastore client4
 - All Client VMs on Client Host 5 were stored on VMFS datastore client5
 - All Client VMs and Prime Client on Client Host 6 were stored on VMFS datastore client6

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

- Client Host 1: Client0
- Client Host 2: Client1
- Client Host 3: Client2
- Client Host 4: Client3
- Client Host 5: Client4
- Client Host 6: Client5 and PrimeClient

Client host vSwitch configuration

- All client VMs were connected to the same VM Network portgroup on vSwitch0
- Two 25 Gbps redundant uplinks, vmnic2 and vmnic3, were configured for vSwitch0
- The management interface was connected to vSwitch0
- MTU 9000 configured on vSwitch0, vmnic2 and vmnic3, and vmk0 (default 1500)

Other Notes

Changes to VMmark3.properties file:

- TileDelay set to 5 (default 60)
- ScrubConfigFile was set to true (default false)
- ErrorImmediate was set to true (default false)
- VCscratchDir was set to /root/VMmark3/results/scratch/ (default /root/VMmark3/samples/)

The PrimeClient VM STAF.cfg was modified as follows:

- "CONNECTTIMEOUT=10000" was added as follows:
 - "interface ssl library STAFTCP option Secure=Yes option CONNECTTIMEOUT=10000 option Port=6550"
 - default: "interface ssl library STAFTCP option Secure=Yes option Port=6550"
- "SET CONNECTATTEMPTS 5 CONNECTRETRYDELAY 2s" was added as a new line to STAF.cfg

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.

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

VMware and VMmark are trademarks or registered trademarks of VMware, Inc. VMmark is a product of [VMware, Inc.](http://www.vmware.com) VMmark utilizes the SPEC Power and Temperature Daemon (SPEC PTDaemon), which is available from the Standard Performance Evaluation Corporation (SPEC®). VMmark results are not SPEC metrics and cannot be compared to SPEC metrics in any way.