VMmark® 3.1.1 Results

Server Vendor & Model: Dell EMC PowerEdge R7515 **Storage Vendor & Model: Dell EMC PowerMax 8000** **Hypervisor: VMware ESXi 7.0 U2a, Build 17867351** **Datacenter Management Software: VMware vCenter Server 7.0 U1c Build 17327586**	**VMmark 3.1.1 Score = 11.34 @ 12 Tiles**

Number of Hosts: 2	**Uniform Hosts [yes/no]: yes**	**Total sockets/cores/threads in test: 2/128/256**
Tested By: Dell EMC		**Test Date: 02-16-2022**

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	3568.84	0.99	1.44 | 0.06	566.82	0.99	0.70 | 0.41	853.62	1.16	1125.74	603.30	1.21	1335.18	433.95	1.25	1494.67	1.11
p1	3556.13	0.99	1.42 | 0.05	562.12	0.98	0.48 | 0.13	877.17	1.19	1066.50	594.80	1.19	1289.46	400.77	1.16	1485.10	1.10
p2	3538.71	0.98	1.24 | 0.06	561.99	0.98	0.46 | 0.24	859.33	1.17	1122.27	609.35	1.22	1313.01	419.68	1.21	1478.88	1.11
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	3574.87	0.99	0.47 | 0.00	568.18	0.99	0.55 | 0.28	975.27	1.33	766.38	677.92	1.35	910.58	493.38	1.42	1013.72	1.20
p1	3560.27	0.99	0.51 | 0.00	562.50	0.98	0.41 | 0.11	965.88	1.32	782.12	677.75	1.35	922.69	469.45	1.35	1043.05	1.19
p2	3544.60	0.99	0.50 | 0.00	562.74	0.98	0.45 | 0.16	956.80	1.30	797.45	696.05	1.39	928.59	513.52	1.48	1035.88	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	3571.38	0.99	1.59 | 0.07	571.80	1.00	0.75 | 0.41	898.52	1.22	980.57	615.08	1.23	1181.04	440.77	1.27	1330.14	1.14
p1	3560.24	0.99	1.42 | 0.06	565.14	0.99	0.33 | 0.08	899.58	1.23	989.45	616.60	1.23	1188.38	416.30	1.20	1385.01	1.12
p2	3539.27	0.98	1.75 | 0.08	560.41	0.98	0.60 | 0.20	884.02	1.20	1028.91	629.55	1.26	1201.71	454.12	1.31	1366.92	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	3567.81	0.99	1.84 | 0.09	566.28	0.99	0.46 | 0.12	970.65	1.32	769.53	678.45	1.36	923.59	470.52	1.36	1028.58	1.19
p1	3556.53	0.99	1.49 | 0.07	559.48	0.98	0.35 | 0.06	957.55	1.30	810.42	670.20	1.34	938.58	485.45	1.40	1057.57	1.19
p2	3541.94	0.98	1.65 | 0.08	554.24	0.97	0.39 | 0.11	956.85	1.30	815.17	664.23	1.33	973.75	478.90	1.38	1091.34	1.18
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	3564.06	0.99	1.77 | 0.08	562.60	0.98	0.44 | 0.12	903.25	1.23	958.92	617.50	1.23	1157.17	425.80	1.23	1300.13	1.13
p1	3546.67	0.99	1.46 | 0.04	560.39	0.98	0.54 | 0.24	891.67	1.21	1009.19	632.55	1.26	1185.58	442.02	1.27	1330.72	1.14
p2	3532.73	0.98	1.67 | 0.07	558.95	0.98	0.41 | 0.10	893.23	1.22	989.88	614.33	1.23	1180.49	440.75	1.27	1327.51	1.13
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	3565.83	0.99	0.64 | 0.00	561.51	0.98	0.39 | 0.16	959.52	1.31	791.76	658.62	1.32	903.08	448.38	1.29	1031.56	1.17

p1	3546.29	0.99	0.63 | 0.00	561.56	0.98	0.50 | 0.26	945.23	1.29	822.20	718.08	1.43	929.26	507.57	1.46	1066.74	1.21
p2	3532.77	0.98	0.62 | 0.00	554.64	0.97	0.54 | 0.19	956.58	1.30	791.98	656.40	1.31	911.72	471.25	1.36	1036.72	1.17
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	3577.41	0.99	0.79 | 0.00	565.46	0.99	0.37 | 0.22	906.60	1.23	952.86	626.65	1.25	1126.08	428.10	1.23	1288.07	1.13
p1	3564.25	0.99	0.78 | 0.00	562.22	0.98	0.49 | 0.21	907.35	1.24	938.24	656.77	1.31	1081.88	476.57	1.37	1221.67	1.17
p2	3552.09	0.99	0.82 | 0.00	559.63	0.98	0.61 | 0.34	923.55	1.26	890.56	637.58	1.27	1064.89	440.43	1.27	1191.89	1.14
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	3574.05	0.99	0.90 | 0.02	570.46	1.00	0.68 | 0.29	951.20	1.30	822.72	670.35	1.34	952.27	463.62	1.34	1078.04	1.18
p1	3553.01	0.99	0.87 | 0.02	564.15	0.99	0.59 | 0.18	956.50	1.30	797.96	692.67	1.38	942.74	488.20	1.41	1055.57	1.20
p2	3540.61	0.98	1.00 | 0.02	523.79	0.92	0.42 | 0.04	963.25	1.31	789.25	655.50	1.31	921.51	467.50	1.35	1042.65	1.16
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	3570.74	0.99	0.91 | 0.01	571.53	1.00	0.90 | 0.48	880.98	1.20	1037.53	606.62	1.21	1220.97	433.85	1.25	1392.49	1.13
p1	3554.10	0.99	0.83 | 0.01	566.55	0.99	0.60 | 0.32	892.25	1.22	1012.30	605.95	1.21	1207.21	435.70	1.26	1368.96	1.13
p2	3538.02	0.98	0.89 | 0.01	564.50	0.99	0.36 | 0.12	892.48	1.22	999.69	607.60	1.21	1208.11	416.65	1.20	1371.48	1.11
TILE_9	Actual	Ratio	QoS(nRT|MaxPctF)	Actual	Ratio	QoS(nRT|MaxPctF)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	GM
p0	3570.45	0.99	1.03 | 0.09	571.12	1.00	0.70 | 0.30	952.77	1.30	807.53	693.65	1.39	929.61	491.10	1.42	1045.96	1.20
p1	3550.47	0.99	0.99 | 0.03	566.44	0.99	0.50 | 0.19	962.35	1.31	791.62	670.75	1.34	941.96	465.40	1.34	1052.45	1.18
p2	3536.90	0.98	1.05 | 0.04	565.79	0.99	0.29 | 0.09	952.42	1.30	806.98	671.02	1.34	932.86	486.32	1.40	1054.27	1.19
TILE_10	Actual	Ratio	QoS(nRT|MaxPctF)	Actual	Ratio	QoS(nRT|MaxPctF)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	GM
p0	3571.88	0.99	0.83 | 0.00	566.54	0.99	0.58 | 0.46	879.88	1.20	1040.14	627.98	1.25	1214.71	452.73	1.31	1387.11	1.14
p1	3560.95	0.99	0.81 | 0.00	562.72	0.98	0.44 | 0.16	898.85	1.22	991.59	594.12	1.19	1198.39	415.25	1.20	1378.37	1.11
p2	3542.21	0.98	0.86 | 0.00	560.94	0.98	0.49 | 0.16	899.23	1.22	995.99	632.45	1.26	1179.34	437.20	1.26	1355.38	1.13
TILE_11	Actual	Ratio	QoS(nRT|MaxPctF)	Actual	Ratio	QoS(nRT|MaxPctF)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	GM
p0	3580.49	1.00	0.53 | 0.00	569.36	1.00	0.69 | 0.28	970.88	1.32	766.35	701.67	1.40	897.51	517.00	1.49	1000.61	1.22
p1	3559.47	0.99	0.55 | 0.00	562.41	0.98	0.40 | 0.12	980.98	1.34	744.95	660.27	1.32	882.57	458.38	1.32	986.39	1.18
p2	3544.36	0.99	0.51 | 0.00	559.52	0.98	0.41 | 0.17	967.40	1.32	778.05	723.15	1.44	904.82	517.77	1.49	1002.61	1.22

p0_score:	13.94
p1_score:	13.90
p2_score:	13.90

Infrastructure_Operations_Scores:	vMotion	SVMotion	XVMotion	Deploy
Completed_Ops_PerHour	28.50	26.00	21.00	6.50
Avg_Seconds_To_Complete	5.63	85.91	106.83	520.40
Failures	0.00	0.00	0.00	0.00
Ratio	1.10	1.44	1.17	0.81
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	13.90	
Unreviewed_VMmark3_Infrastructure_Score	1.11	
Unreviewed_VMmark3_Score	11.34	

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 U1c Build 17327586 / 12-17-2020
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	Dell EMC PowerEdge R7515
Processor Vendor and Model	AMD EPYC 7763
Processor Speed (GHz) / Turbo Boost Speed (GHz)	2.45 / 3.5
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, 32 MB shared / 8 cores
BIOS Version	2.5.5
Memory Size (in GB, Number of DIMMs)	1024,16
Memory Type and Speed	64 GB 2Rx4 DDR4-3200
Disk Subsystem Type	FC SAN
Number of Disk Controllers	1

Disk Controller Vendors and Models	Dell HBA330 Mini(Embedded)
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	2
Network Controller Vendors and Models	2x Mellanox ConnectX-5 Ex 100 GbE Dual-port
Other Hardware	None
Other Software	None
Hardware Availability Date (MM-DD-YYYY)	03-15-2021
BIOS Availability Date (MM-DD-YYYY)	10-07-2021
Software Availability Date (MM-DD-YYYY)	04-29-2021
Network	
Network Switch Vendors and Models	1x Dell EMC PowerSwitch Z9100-ON 100GbE Switch
Network Speed	1 x 100Gbps for vMotion Traffic 1 x 100Gbps for VM traffic
Primary Storage	
Storage Category	FC SAN
Storage Vendors, Models, and Firmware Versions	Dell EMC PowerMax 8000
Storage Configuration Summary	• 1x 50TB LUN for VMs, Deploy Source and Infrastructure Operations
Datacenter Management Server	
System Model	Dell EMC PowerEdge R7525
Processor Vendor and Model	AMD EPYC 7763
Processor Speed (GHz)	2.45 /3.50
Total Sockets/Total Cores/Total Threads	2 Sockets/ 128 Cores/ 256 Threads

Memory Size (in GB, Number of DIMMs)	2048, 32
Network Controller(s) Vendors and Models	2 x Mellanox ConnectX-5 Ex 100 GbE Dual-port
Virtual Center VM Operating System, Version, Bitness, and Service Pack	VMware ESXi 7.0 U2a, Build 17867351
Virtual Center VM Number of vCPUs	4
Virtual Center VM Virtual Memory (in GB)	19
Virtual Center VM Operating System, Version, Bitness, and Service Pack	VMware vCenter Server 7.0 U1c Build 17327586
Other Hardware	None
Other Software	None

Clients

Total Number of Virtual Clients / Virtual Client Hosts	13 / 2
System Model(s)	2x Dell EMC PowerEdge R7525
Processor Vendor(s) and Model(s)	Client-Host1: AMD EPYC 7763 Client-Host2: AMD EPYC 7763
Processor Speed(s) (GHz)	Client-Host1: 2.45 GHz Client-Host2: 2.45 GHz
Total Sockets/Total Cores/Total Threads	Client-Host1: 2 Sockets / 128 Cores / 256 Threads Client-Host2: 2 Sockets / 128 Cores / 256 Threads
Memory per Virtual Client Host	Client-Host1: 2048 GB Client-Host2: 2048 GB
Network Controller(s) Vendors and Models	Client-Host1:1x Mellanox ConnectX-5 Ex 100 GbE Dual-port Client-Host2:1x Mellanox ConnectX-5 Ex 100 GbE Dual-port
Virtual Client Networking Notes	vSwitch0 on vmnic2 for VMs and Management (100Gbps) vSwitch2 on vmnic3 for vMotion (100Gbps)
Virtual Client Storage Notes	All Virtual Clients storage on PowerMax 8000 FC SAN storage and used the same FC storage LUNs as SUT hosts
Other Hardware	None
Other Software	All client hosts used VMware ESXi 7.0 U2a Build 17867351 for operating system

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 1
- Logical CPU configuration changed for all multi-CPU VMs except for PrimeClient to 1 socket with multiple cores (default: Single core per socket)
- Logging disabled for all VMs except for the template VMs (default: Enabled)
- CPU and Memory shares set to high for all DS3DB, ElasticDB, and ElasticLB VMs (default: Normal)
- CDROM removed from all VMs except for PrimeClient, and template VMs (default: Present)
- All memory reserved for DS3DB VMs (default: Non-reserved)
- sched.mem.pin set to TRUE for all DS3DB VMs (default: FALSE)
- sched.mem.lpage.enable1GPage 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 DS3DB VMs for other tiles

Advanced Settings

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

Server Notes

Server BIOS Settings

- L2 Stream HW Prefetcher disabled (default: Enabled)
- L2 Up Down Prefetcher disabled (default: Enabled)

Networking Notes

- vSwitch0 on vmnic2 for Management and VMs (100Gbps)
    - vSwitch0 and vmnic2 MTU set to 9000 (default:1500)
- vSwitch3 on vmnic5 for vMotion (100Gbps)
    - vSwitch3 and vmnic5 MTU set to 9000 (default:1500)

Storage Notes

Host OS installed on 2x900GB(RAID1)WD SSDs
Dell EMC PowerMax 8000

- Number of Directors:2
- Dell EMC PowerMax OS 5978.479.479
- 1x 50TB LUN used for VMmark (for VMs, Deploy, Storage vMotion and XVmotion)
- Round Robin IOPS limit set to 1 (default:1000)

Datacenter Management Server Notes

None

Operating System Notes

SUT hosts used Dell customized ESXi 7.0 U2 ISO (VMware-VMvisor-Installer-7.0.0.update02-17867351.x86_64-DellEMC_customized-A04.iso) for OS installation.

Software Notes

None

Client Notes

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

- Client-Host1: Client1, Client3, Client4, Client5, Client7, Client9, Client11, VMware vCenter Server
- Client-Host2: Client0, Client2, Client6, Client8, Client10,PrimeClient

Client host advanced settings:

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

Client host vSwitch settings:

- vSwitch0 on vmnic2 for VMs and Management (100Gbps)
    - vSwitch0 and vmnic2 MTU set to 9000 (default:1500)
- vSwitch2 on vmnic3 for vMotion (100Gbps)
    - vSwitch2 and vmnic3 MTU set to 9000 (default:1500)

Other Notes

Changes to VMmark3.properties file:

- TileDelay=30 (default:60)
- EsxtopCollection=true (default:false)
- EsxtopLUN=Datastore (default:empty)
- VCscratchDir=/root/VMmark3/results/scratch (default: /root/VMmark3/samples)

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