VMmark® 3.1.1 Results

Server Vendor & Model: Dell EMC PowerEdge R750 **Storage Vendor & Model: Dell EMC PowerMax 8000** **Hypervisor: VMware ESXi 7.0 U2 Build 17630552** **Datacenter Management Software: VMware vCenter Server 7.0 U1c Build 17327586**	**VMmark 3.1.1 Score = 13.95 @ 14 Tiles**

Number of Hosts: 2	**Uniform Hosts [yes/no]: yes**	**Total sockets/cores/threads in test: 4/160/320**
Tested By: Dell EMC	**Test Date: 06-08-2021**	

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	3572.29	0.99	0.64 | 0.00	570.07	1.00	1.19 | 0.93	936.77	1.28	859.33	673.67	1.35	1016.74	463.98	1.34	1170.93	1.18
p1	3548.61	0.99	0.66 | 0.00	570.48	1.00	1.07 | 0.69	955.30	1.30	816.85	658.42	1.32	971.43	472.62	1.36	1122.61	1.18
p2	3537.31	0.98	0.66 | 0.00	562.45	0.98	0.65 | 0.46	950.08	1.29	813.43	664.17	1.33	959.34	452.00	1.30	1124.02	1.17
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	3576.60	0.99	0.59 | 0.00	572.69	1.00	1.11 | 0.84	1023.70	1.39	620.22	758.30	1.52	709.15	543.08	1.57	778.58	1.27
p1	3561.69	0.99	0.58 | 0.00	568.89	0.99	0.80 | 0.58	1034.80	1.41	596.62	737.15	1.47	692.09	551.30	1.59	751.31	1.27
p2	3542.22	0.98	0.57 | 0.00	568.44	0.99	1.06 | 0.88	1031.20	1.40	600.77	739.52	1.48	690.23	520.20	1.50	768.75	1.25
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	3579.78	0.99	0.61 | 0.00	566.89	0.99	0.55 | 0.23	962.02	1.31	792.01	694.40	1.39	930.23	502.10	1.45	1060.70	1.21
p1	3559.87	0.99	0.61 | 0.00	567.21	0.99	0.64 | 0.31	969.05	1.32	764.68	675.23	1.35	912.17	461.57	1.33	1069.89	1.18
p2	3547.23	0.99	0.62 | 0.00	565.62	0.99	0.61 | 0.40	957.23	1.30	802.83	692.40	1.38	936.42	480.23	1.38	1085.92	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	3561.32	0.99	0.58 | 0.00	563.38	0.98	0.56 | 0.24	1011.15	1.38	651.30	744.83	1.49	750.68	550.20	1.59	833.94	1.26
p1	3547.11	0.99	0.60 | 0.00	561.57	0.98	0.45 | 0.19	1024.62	1.40	625.60	720.92	1.44	741.24	483.18	1.39	834.05	1.22
p2	3536.60	0.98	0.59 | 0.00	560.01	0.98	0.56 | 0.41	1006.45	1.37	661.26	743.75	1.49	757.46	549.05	1.58	855.10	1.25
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	3576.00	0.99	0.59 | 0.00	565.44	0.99	1.08 | 0.78	954.00	1.30	809.45	661.45	1.32	954.29	478.90	1.38	1082.15	1.18
p1	3566.72	0.99	0.59 | 0.00	562.28	0.98	0.75 | 0.43	960.95	1.31	798.83	667.95	1.33	952.26	455.05	1.31	1098.51	1.17
p2	3544.71	0.99	0.60 | 0.00	556.09	0.97	0.56 | 0.25	946.83	1.29	819.28	687.65	1.37	945.52	501.55	1.45	1083.92	1.20
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	3583.49	1.00	0.61 | 0.00	562.81	0.98	0.58 | 0.34	1024.33	1.39	616.99	729.55	1.46	718.86	541.10	1.56	777.33	1.25

p1	3572.15	0.99	0.62 | 0.00	555.94	0.97	0.48 | 0.17	1033.15	1.41	587.98	739.60	1.48	677.84	521.62	1.50	756.88	1.25
p2	3556.21	0.99	0.63 | 0.00	555.37	0.97	0.51 | 0.25	1023.67	1.39	607.21	762.65	1.52	696.27	572.77	1.65	756.54	1.27
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	3573.93	0.99	0.66 | 0.00	568.22	0.99	0.63 | 0.38	981.27	1.34	717.88	695.55	1.39	839.68	483.82	1.40	945.58	1.21
p1	3554.04	0.99	0.65 | 0.00	566.70	0.99	0.49 | 0.20	977.80	1.33	734.75	715.40	1.43	848.30	503.35	1.45	952.38	1.22
p2	3547.56	0.99	0.65 | 0.00	562.04	0.98	0.62 | 0.31	978.92	1.33	734.53	683.50	1.37	866.97	500.48	1.44	979.52	1.21
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	3562.01	0.99	0.65 | 0.00	571.60	1.00	1.02 | 0.73	1034.95	1.41	599.80	738.35	1.48	693.04	517.20	1.49	786.20	1.25
p1	3549.66	0.99	0.68 | 0.00	570.08	1.00	1.06 | 0.76	1038.83	1.41	591.06	768.58	1.54	669.39	548.45	1.58	752.52	1.28
p2	3538.57	0.98	0.64 | 0.00	570.78	1.00	1.02 | 0.71	1033.95	1.41	595.00	742.30	1.48	683.44	521.77	1.50	769.17	1.25
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	3573.50	0.99	0.61 | 0.00	565.69	0.99	0.76 | 0.58	960.20	1.31	801.66	666.35	1.33	958.56	453.98	1.31	1102.02	1.17
p1	3556.16	0.99	0.61 | 0.00	559.13	0.98	0.60 | 0.30	947.73	1.29	809.30	689.40	1.38	936.23	500.02	1.44	1072.98	1.20
p2	3536.12	0.98	0.61 | 0.00	562.15	0.98	0.54 | 0.33	966.25	1.32	768.67	672.45	1.34	926.08	461.25	1.33	1068.10	1.18
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	3589.91	1.00	0.47 | 0.00	568.36	0.99	0.51 | 0.31	1031.55	1.40	611.90	733.58	1.47	712.68	514.55	1.48	797.82	1.25
p1	3574.14	0.99	0.48 | 0.00	562.13	0.98	0.61 | 0.36	1014.85	1.38	640.72	752.30	1.50	731.74	558.30	1.61	813.81	1.27
p2	3566.70	0.99	0.48 | 0.00	560.53	0.98	0.43 | 0.28	1022.38	1.39	631.04	727.80	1.45	736.93	483.57	1.39	833.78	1.22
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	3582.81	1.00	0.68 | 0.01	570.56	1.00	1.14 | 0.80	968.50	1.32	750.03	706.15	1.41	871.38	497.77	1.44	984.70	1.22
p1	3563.79	0.99	0.71 | 0.00	563.10	0.98	0.64 | 0.32	973.17	1.33	740.12	682.40	1.36	875.87	496.55	1.43	991.24	1.20
p2	3544.34	0.99	0.69 | 0.00	561.21	0.98	0.58 | 0.37	972.88	1.32	750.08	682.40	1.36	887.33	469.40	1.35	1013.15	1.19
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	3582.42	1.00	0.45 | 0.00	571.04	1.00	0.96 | 0.71	1026.42	1.40	624.42	756.25	1.51	720.91	533.58	1.54	819.10	1.26
p1	3554.85	0.99	0.45 | 0.00	565.64	0.99	0.97 | 0.59	1026.15	1.40	620.22	727.23	1.45	724.84	533.73	1.54	821.17	1.25
p2	3530.73	0.98	0.45 | 0.00	560.11	0.98	0.60 | 0.36	1020.80	1.39	624.24	725.08	1.45	736.43	502.07	1.45	849.86	1.23
TILE_12	Actual	Ratio	QoS(nRT|MaxPctF)	Actual	Ratio	QoS(nRT|MaxPctF)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	GM
p0	3577.75	0.99	0.64 | 0.00	562.15	0.98	0.50 | 0.26	962.90	1.31	784.83	697.15	1.39	917.73	504.75	1.46	1062.85	1.21
p1	3566.17	0.99	0.63 | 0.00	559.86	0.98	0.50 | 0.25	975.23	1.33	756.58	652.90	1.30	913.64	462.10	1.33	1049.08	1.17
p2	3550.81	0.99	0.63 | 0.00	558.16	0.98	0.63 | 0.35	961.80	1.31	791.48	694.50	1.39	927.39	479.15	1.38	1086.34	1.19
TILE_13	Actual	Ratio	QoS(nRT|MaxPctF)	Actual	Ratio	QoS(nRT|MaxPctF)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	GM
p0	3578.58	0.99	0.51 | 0.00	568.78	0.99	0.73 | 0.46	1016.88	1.38	634.02	754.17	1.51	727.38	557.33	1.61	817.44	1.27
p1	3554.30	0.99	0.48 | 0.00	563.06	0.98	0.33 | 0.19	1033.97	1.41	598.97	739.02	1.48	691.61	515.95	1.49	787.21	1.25
p2	3551.09	0.99	0.51 | 0.00	558.67	0.98	0.55 | 0.38	1028.55	1.40	612.11	761.95	1.52	701.44	538.92	1.55	788.95	1.26
p0_score:	17.20															

p1_score:	17.11
p2_score:	17.07

Infrastructure_Operations_Scores:	vMotion	SVMotion	XVMotion	Deploy
Completed_Ops_PerHour	28.00	27.00	22.00	11.50
Avg_Seconds_To_Complete	7.90	75.82	96.02	279.14
Failures	0.00	0.00	0.00	0.00
Ratio	1.08	1.50	1.22	1.44
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	17.11	
Unreviewed_VMmark3_Infrastructure_Score	1.30	
Unreviewed_VMmark3_Score	13.95	

Configuration

Virtualization Software	
Hypervisor Vendor, Product, Version, and Build / Availability Date (MM-DD-YYYY)	VMware ESXi 7.0 U2, Build 17630552 / 03-09-2021
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 R750
Processor Vendor and Model	Intel Xeon Platinum 8380
Processor Speed (GHz) / Turbo Boost Speed (GHz)	2.3 / 3.4
Total Sockets/Total Cores/Total Threads	2 Sockets / 80 Cores / 160 Threads

Primary CPU Cache	32KB I+48KB D on chip per core
Secondary CPU Cache	1280KB I+D on chip per core
Other CPU Cache	60MB I+D on chip per chip
BIOS Version	1.1.3
Memory Size (in GB, Number of DIMMs)	2048, 32
Memory Type and Speed	64GB 2Rx4 DDR4 3200MHz RDIMM
Disk Subsystem Type	FC SAN
Number of Disk Controllers	1
Disk Controller Vendors and Models	Dell PERC H745
Total Number of Physical Disks for Hypervisor	2
Disk Vendors, Models, Capacities, and Speeds	WDC,WUSTR1596ASS200, 960GB, 12Gb/s SSD
Number of Host Bus Adapters	1
Host Bus Adapter Vendors and Models	QLE2692 Dual Port 16Gb FC Adapter
Number of Network Controllers	2
Network Controller Vendors and Models	Broadcom Gigabit Ethernet BCM5720 Mellanox ConnectX-5 EN 25GbE Dual-port SFP28 Adapter
Other Hardware	None
Other Software	None
Hardware Availability Date (MM-DD-YYYY)	05-12-2021
BIOS Availability Date (MM-DD-YYYY)	05-13-2021
Software Availability Date (MM-DD-YYYY)	03-09-2021
Network	
Network Switch Vendors and Models	1xDell PowerConnect 6248, 1xDell Force10 S4810
Network Speed	1Gbps for SUT management, 10Gbps for vMotion, Clients and VMs
Primary Storage	
Storage Category	FC SAN
Storage Vendors, Models, and Firmware Versions	Dell EMC PowerMax 8000
Storage Configuration Summary	2xVolumes : 1x 50TB LUN for VMs and Deploy Source; 1x1TB LUN for infrastructure operations

Datacenter Management Server	
System Model	Dell EMC PowerEdge R740xd
Processor Vendor and Model	Intel Xeon Gold 6130
Processor Speed (GHz)	2.1
Total Sockets/Total Cores/Total Threads	2 Sockets / 32 Cores / 64 Threads
Memory Size (in GB, Number of DIMMs)	768, 24
Network Controller(s) Vendors and Models	Intel 10GbE 2P X710 Adapter; Broadcom 10GbE 2+2P 57800-t
Operating System, Version, Bitness, and Service Pack	VMware ESXi 7.0 U2 Build 17630552
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	15 / 4
System Model(s)	1xDell EMC PowerEdge R840(Client-Host3) 3x Dell EMC PowerEdge R740xd(Client-Host1,Client-Host2, Client-Host4)
Processor Vendor(s) and Model(s)	Client-Host1: Intel Xeon Gold 6130 Client-Host2: Intel Xeon Gold 6130 Client-Host3: Intel Xeon Gold 6140M Client-Host4: Intel Xeon Platinum 8280
Processor Speed(s) (GHz)	Client-Host1: 2.1 GHz Client-Host2: 2.1 GHz Client-Host3: 2.3 GHz Client-Host4: 2.7 GHz
Total Sockets/Total Cores/Total Threads	Client-Host1: 2 Sockets/ 32 Cores/ 64 Threads Client-Host2: 2 Sockets/ 32 Cores/ 64 Threads Client-Host3: 4 Sockets/ 72 Cores/ 144 Threads Client-Host4: 2 Sockets/ 56 Cores/ 112 Threads

Memory per Virtual Client Host	Client-Host1: 768 GB Client-Host2: 768 GB Client-Host3: 768 GB Client-Host4: 768 GB
Network Controller(s) Vendors and Models	Client-Host1: Qlogic 10GbE 2+2P 57800(1 port used for vmnic0), Intel 10G 2P X520 Adapter(1 port used for vmnic4) Client-Host2: Qlogic 10GbE 2+2P 57800(1 port used for vmnic0), Intel 10GbE 2P X710 Adapter(1 port used for vmnic4) Client-Host3: Broadcom Gigabit Ethernet BCM5720(1 port used for vmnic0), Intel 10GbE 2P X710 Adapter(1 port used for vmnic4) Client-Host4: Broadcom Gigabit Ethernet BCM5720(1 port used for vmnic0), Intel 10G 2P X520 Adapter(1 port used for vmnic4)
Virtual Client Networking Notes	vSwitch0 on vmnic0 for Management (1Gbps) vSwitch1 on vmnic4 for VMs(10Gbps)
Virtual Client Storage Notes	All Virtual Clients are stored on PowerMax 8000 FC SAN storage and used the same FC storage LUNs as SUT hosts.
Other Hardware	None
Other Software	None

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 Eager

Virtualization Software Notes

- Logical CPU configuration changed for multi-cpu VMs to 1 socket with multiple cores (except for PrimeClient VM, and Client VMs; default: single core per socket)
- CPU and Memory shares set to high for all DS3DB,ElasticDB and ElasticLB VMs (default normal)
- CDROM removed from all VMs except for PrimeClient, client VMs and template VM.
- All memory reserved for DS3DB VMs (default non-reserved)
- Added sched.mem.lpage.enable1GPage to TRUE for all DS3DB VMs (default normal)
- CPU shares set to low for all Standby VMs (default normal)
- vSphere DRS Migration Threshold set to Fully Automated level 1

Changed 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/VMFS3/HardwareAcceleratedLocking = 0 (default 1)
- /adv/Power/CpuPolicy = "High Performance" (default "Balanced")
- /vmkernel/hyperthreadingMitigation = TRUE (default FALSE)
- /adv/UserVars/HostClientCEIPOptIn = "1" on SUT1 (default 0)

Server Notes

Server BIOS Settings:

- Hardware Prefetcher = Disabled (default Enabled)
- DCU Streamer Prefetcher = Disabled (default Enabled)
- DCU IP Prefetcher = Disabled (default Enabled)
- LLC Dead Line Alloc = Disabled (default Enabled)
- LLC Prefetch = Enabled (default Disabled)

Networking Notes

vSwitch Configuration:

- vSwitch0 for Service Console on vmnic0 at 1Gbps
- vSwitch0 used for template VM and deploy VMs
- vSwitch1 for vMotion and Elastic and Standby workload VMs on vmnic2 at 10Gbps
  - MTU 9000 (default 1500)
- vSwitch2 for Auction and DS3 workload VMs on vmnic3 at 10Gbps
  - MTU 9000 (default 1500)

Storage Notes

Host OS installed on 2x900GB(RAID-1) WD SSDs
Dell EMC PowerMax 8000

- Number of Directors : 2
- Dell EMC PowerMax OS 5978.479.479
- 3 LUNs used for VMmark
  - 1x50TB LUN for VMs and Deploy Source
  - 1x1TB LUN for Deploy

- 1x1TB LUN for Storage vMotion, XvMotion

Datacenter Management Server Notes

None

Operating System Notes

None

Software Notes

None

Client Notes

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

- Client-Host1: Client0
- Client-Host2: Client3, VMware vCenter Server, PrimeClient
- Client-Host3: Client1, Client2, Client5, Client6, Client10, Client13
- Client-Host4: Client4, Client7, Client8, Client9, Client11, Client12

Client host advanced settings :

- /adv/UserVars/HostClientCEIPOptIn = "2" (Client-Host1)
- /adv/UserVars/HostClientCEIPOptIn = "1" (Client-Host2)

Client host vSwitch settings:

- vSwitch1 on all client hosts had MTU set to 9000(default 1500)
- vmnic0/vswitch0 on Client-Host2 had MTU set to 9000(default 1500)

Other Notes

Changes to VMmark3.properties file :

- TileDelay = 30 (default: 60)
