VMmark® 3.1.1 Results

Server Vendor & Model: Dell PowerEdge XR4510c **Storage Vendor & Model: VMware vSAN 8.0 - All Flash** **Hypervisor: VMware ESXi 8.0 GA, Build 20513097** **Datacenter Management Software: VMware vCenter Server 8.0 GA, Build 20519528**	**VMmark 3.1.1 Server PPKW Score = 4.0285 @ 4 Tiles**

Number of Hosts: 4	**Uniform Hosts [yes/no]: yes**	**Total sockets/cores/threads in test: 4/64/128**
Tested By: Dell Technologies	**Test Date: 11-14-2022**	

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	3584.47	1.00	0.41 | 0.00	573.88	1.00	1.17 | 0.80	999.90	1.36	659.97	730.67	1.46	768.37	515.50	1.49	867.07	1.24
p1	3563.29	0.99	0.51 | 0.09	566.76	0.99	1.09 | 0.73	1017.77	1.39	614.57	723.02	1.44	712.54	530.45	1.53	793.38	1.25
p2	3553.78	0.99	0.41 | 0.00	565.53	0.99	1.04 | 0.93	1005.90	1.37	635.05	713.95	1.43	750.20	497.62	1.43	849.83	1.22
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	3578.43	0.99	0.44 | 0.00	570.80	1.00	1.24 | 0.96	1004.90	1.37	648.19	736.80	1.47	746.12	519.02	1.50	853.51	1.25
p1	3566.77	0.99	0.44 | 0.00	568.60	0.99	1.17 | 0.87	1002.85	1.37	652.86	709.05	1.42	756.22	517.33	1.49	851.99	1.23
p2	3555.30	0.99	0.44 | 0.00	564.96	0.99	0.86 | 0.84	1006.55	1.37	637.86	715.12	1.43	745.81	494.15	1.42	850.36	1.22
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	3574.92	0.99	0.48 | 0.18	571.59	1.00	0.90 | 0.74	1004.50	1.37	647.69	768.77	1.54	729.04	550.30	1.59	824.17	1.27
p1	3567.01	0.99	0.30 | 0.00	566.72	0.99	1.09 | 0.76	1016.98	1.38	623.67	694.20	1.39	739.85	499.52	1.44	847.06	1.22
p2	3554.32	0.99	0.31 | 0.07	565.33	0.99	1.12 | 0.92	999.85	1.36	664.68	733.58	1.47	772.66	511.93	1.48	883.29	1.24
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	3574.92	0.99	0.48 | 0.07	570.82	1.00	1.08 | 0.84	1009.02	1.37	629.05	746.83	1.49	720.92	554.58	1.60	804.41	1.27
p1	3566.25	0.99	0.59 | 0.15	568.09	0.99	1.11 | 0.70	1009.42	1.37	629.87	718.85	1.44	732.66	498.30	1.44	830.71	1.23
p2	3552.75	0.99	0.44 | 0.00	566.33	0.99	1.01 | 0.83	999.67	1.36	653.15	735.62	1.47	753.51	516.83	1.49	852.46	1.24

p0_score:	5.02
p1_score:	4.93
p2_score:	4.92

Infrastructure_Operations_Scores:	vMotion	SVMotion	XVMotion	Deploy
Completed_Ops_PerHour	57.00	44.00	34.00	17.00
Avg_Seconds_To_Complete	5.50	124.16	161.80	373.76
Failures	0.00	0.00	0.00	0.00

Ratio	2.19	2.44	1.89	2.12
Number_Of_Threads	2	2	2	2

PTD_Summary:							
Number_of_PTD_Daemons	1						
Number_of_PTD_Phases	3						
PTD_Phase_Timing	2400secs						
PtdTiming:	ptd0						
p0	0						
p1	0						
p2	0						
PTD_Results:							
p0	Target	Avg_Watts	Avg_Volts	Avg_Amps	Avg_PF	Samples	UnCert%
ptd0	SERVER	1086.58	202.59	5.43	0.99	2399.00	0.00
p1	Target	Avg_Watts	Avg_Volts	Avg_Amps	Avg_PF	Samples	UnCert%
ptd0	SERVER	1085.50	202.58	5.43	0.99	2400.00	0.00
p2	Target	Avg_Watts	Avg_Volts	Avg_Amps	Avg_PF	Samples	UnCert%
ptd0	SERVER	1087.49	202.55	5.44	0.99	2400.00	0.00

Summary	Run_Is_Compliant	Turbo_Setting:0
	Number_Of_Compliance_Issues(0)*	Median_Phase(p1)
Unreviewed_VMmark3_Avg_Watts	1085.50	
Unreviewed_VMmark3_Applications_Score	4.93	
Unreviewed_VMmark3_Infrastructure_Score	2.15	
Unreviewed_VMmark3_Score	4.37	
Unreviewed_VMmark3_PPKW	4.0285	

Configuration

PTD Configuration	
Number of Power Meters	1
Power Meter Vendors and Models	Yokogawa WT210
Power Meter PTD Target(s) (SERVER/EXT_STOR)	SERVER
Power Meter Connection Type(s) (Eth/GPIB/Serial/USB)	Serial
Power Meter Calibration Date(s) (MM-DD-YYYY)	10-25-2022
Power Meter Calibration Info (Calibrated By/Duration)	Tescom / one year / 91KA21979
Power Meter(s) Volt/Amp Range	300 / 10
Power Source Voltage/Frequency/Phase	208V / 60Hz / 3-phase
PTD Client Configuration	

Number of Power Meter Clients	1
System Model(s)	PrimeClient,details in client configuration section
Processor Vendor(s) and Model(s)	PrimeClient,details in client configuration section
Processor Speed(s) (GHz)	PrimeClient,details in client configuration section
Total Sockets/Total Cores/Total Threads	PrimeClient,details in client configuration section
Memory Per Power Meter Client	PrimeClient,details in client configuration section
Network Controller(s) Vendors and Models	PrimeClient,details in client configuration section
Operating System, Version, and Service Pack	PrimeClient,details in client configuration section
Other Hardware	1xProlife Technology,Inc. PL2303
Other Software	None

Configuration

Virtualization Software	
Hypervisor Vendor, Product, Version, and Build / Availability Date (MM-DD-YYYY)	VMware ESXi 8.0 GA, Build 20513097 / 10-11-2022
Datacenter Management Software Vendor, Product, Version, and Build / Availability Date (MM-DD-YYYY)	VMware vCenter Server 8.0 GA, Build 20519528 / 10-11-2022
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 PowerEdge XR4510c
Processor Vendor and Model	Intel Xeon D-2776NT
Processor Speed (GHz) / Turbo Boost Speed (GHz)	2.10GHz / 3.20GHz
Total Sockets/Total Cores/Total Threads	1 Sockets / 16 Cores / 32 Threads
Primary CPU Cache	32 KB I + 48 KB D on chip per core
Secondary CPU Cache	1.25 MB I+D on chip per core
Other CPU Cache	25 MB on chip per chip
BIOS Version	1.0.1
Memory Size (in GB, Number of DIMMs)	512 GB, 4
Memory Type and Speed	128 GB 4Rx4 DDR4-3200 LRDIMM
Disk Subsystem Type	vSAN, iSCSI SAN
Number of Disk Controllers	1
Disk Controller Vendors and Models	Dell BOSS-N1
Total Number of Physical Disks for Hypervisor	1
Disk Vendors, Models, Capacities, and Speeds	Dell NVMe ISE PE8010 RI M.2 480GB - no RAID
Number of Host Bus Adapters	None

Host Bus Adapter Vendors and Models	None
Number of Network Controllers	1
Network Controller Vendors and Models	Intel E823-C 25G 4P LOM
Other Hardware	None
Other Software	None
Hardware Availability Date (MM-DD-YYYY)	12-07-2022
BIOS Availability Date (MM-DD-YYYY)	12-07-2022
Software Availability Date (MM-DD-YYYY)	10-11-2022
Network	
Network Switch Vendors and Models	1xDell EMC Z9432F-ON switch
Network Speed	1x25Gbps for Management and all workloads VMs 1x25Gbps for iSCSI 1x25Gbps for vSAN 1x25Gbps for vMotion
Primary Storage	
Storage Category	VMware vSAN
Storage Vendors, Models, and Firmware Versions	4xDell PowerEdge XR4510c servers with VMware vSAN 8.0 - All Flash
Storage Configuration Summary	VMware vSAN • 1 Disk group per host • 1xDell EC NVMe ISE 7400 MU M.2 80 800GB for vSAN cache tier • 1xDell NVMe ISE PE8010 RI M.2 960GB for vSAN capacity tier • 2xDell NVMe ISE PE8110 RI M.2 3.84TB for vSAN capacity tier

Datacenter Management Server	
System Model	Dell PowerEdge R740xd
Processor Vendor and Model	Intel Xeon Platinum 8280 CPU
Processor Speed (GHz)	2.70
Total Sockets/Total Cores/Total Threads	2 Sockets / 56 Cores / 112 Threads
Memory Size (in GB, Number of DIMMs)	768,24
Network Controller(s) Vendors and Models	Broadcom 57414 25GbE Dual Port Adapter
Operating System, Version, Bitness, and Service Pack	VMware ESXi 7.0 U2a Build 17867351
Virtual Center VM Number of vCPUs	2
Virtual Center VM Virtual Memory (in GB)	14
Virtual Center VM Operating System, Version, Bitness, and Service Pack	VMware vCenter Server 8.0 GA, Build 20519528
Other Hardware	Dell PowerEdge XR4510c is the compute sled used within the Dell PowerEdge XR4000 Chassis
Other Software	None

Clients	
Total Number of Virtual Clients / Virtual Client Hosts	5 / 2
System Model(s)	2xDell PowerEdge R740xd(ClientHost7,ClientHost9)
Processor Vendor(s) and Model(s)	• ClientHost7:Intel Xeon Platinum 8280 • ClientHost9:Intel Xeon Platinum 8280
Processor Speed(s) (GHz)	• ClientHost7:2.7GHz

	• ClientHost9:2.7GHz
Total Sockets/Total Cores/Total Threads	• ClientHost7:2 Sockets/56 Cores/112 Threads • ClientHost9:2 Sockets/56 Cores/112 Threads
Memory per Virtual Client Host	• ClientHost7:768GB • ClientHost9:768GB
Network Controller(s) Vendors and Models	• Broadcom 57414 25GbE Dual Port Adapter(1 port used for vmnic5)
Virtual Client Networking Notes	• vSwitch0 on vmnic5 for Management, vMotion,Client VMs, Prime Client and vCenter Server at 25Gbps
Virtual Client Storage Notes	All Virtual Clients are stored on Dell PowerVault ME4024 FC SAN storage
Other Hardware	None
Other Software	All the client hosts used VMware 7.0 U2a Build 17867351 for operating system

Security Mitigations

Vulnerability	CVE	Exploit Name	Public Vulnerability Name	Mitigated		
				Server Firmware	ESXi	Guest OS

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: Thin

Virtualization Software Notes

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

Advanced Settings
- Cpu.CreditAgePeriod = 1000 (default 3000)
- Cpu.HTWholeCoreThreshold = 0 (default 800)
- DataMover.HardwareAcceleratedInit = 0 (default 1)
- DataMover.HardwareAcceleratedMove = 0 (default 1)
- Disk.IdleCredit = 64 (default 32)

- Disk.ReqCallThreshold = 1 (default 8)
- Mem.CtlMaxPercent = 0 (default 65)
- Mem.ShareScanGHz = 0 (default 4)
- Net.MaxNetifTxQueueLen = 1000 (default 2000)
- Net.MaxPortRxQueueLen = 160 (default 80)
- VMFS3.HardwareAcceleratedLocking = 0 (default 1)
- VMkernel.Boot.hyperthreadingMitigation = true (default false)
- UserVars.HostClientCEIPOptIn = 1 (default 0)
- Power.CpuPolicy = High Performance (default Balanced)

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

SUT cluster

- vSwitch0 for Management and all Auction VMs, Standby3 VM and all Deploy VMs on vmnic0 at 25Gbps
- vmk0 connected to vSwitch0 for Management
- vSwitch1 for vMotion and all DS3DB VMs, DS3WebA VMs, DS3WebB VMs, DS3WebC VMs, ElasticAppA VMs and ElasticAppB VMs on vmnic1 at 25Gbps
- vmk1 connected to vSwitch1 used for vMotion
- vSwitch2 for vSAN and all ElasticDB VMs, ElasticLB VMs, Elastic WebA VMs and Elastic WebB VMs on vmnic2 at 25Gbps
- vmk2 connected to vSwitch2 used for vSAN
- vSwitch3 for iSCSI and Standby0 VM, Standby1 VM and Standby2 VM on vmnic3 at 25Gbps
- vmk3 connected to vSwitch3 used for iSCSI
- vSwitch0,vSwitch1,vSwitch2,vSwitch3 on all SUT Hosts had MTU set to 9000(default 1500)

Client Cluster

- vSwitch0 for Management,vMotion,Prime Client and VMware vCenter Server on vmnic5 at 25Gbps
- vSwitch0 on all client hosts had MTU set to 9000(default 1500)

Storage Notes

Host OS installed on Dell NVMe ISE PE8010 RI M.2 480GB - no RAID

Primary Storage - VMware vSAN 8.0 OSA

- VMware vSAN 8.0 - All Flash
- Capacity : 31.44TB
- Cache : 2.98TB

Hardware Configuration:
Each Host has one disk group. Each disk group used:

- Caching device : 1xDell EC NVMe ISE 7400 MU M.2 80 800GB
- Capacity device :1xDell NVMe ISE PE8010 RI M.2 960GB and 2xDell NVMe ISE PE8110 RI M.2 110 3.84TB
- SUT vSAN Datastore was used for all SUT VMs and template VMs

Secondary Storage - Dell EMC PowerVault ME4024 Array

First Dell EMC PowerVault ME4024 configured with iSCSI connectivity
- 10x Toshiba Model KPM5XRUG3T84 3.84TB SSD
- ME4024 Storage Controller-hardware version 8.1,firmware version GTS280R10-10
- Deploy0 and Deploy5 used for deploy VMs
- Svmotion0 and Svmotion1 used for svMotion and xvMotion infrastructure operations

Second Dell EMC PowerVault ME4024 configured with Fiber Channel connectivity
- 24x SAMSUNG Model MZILT3T8HBLS0D3 3.8TB SSD
- ME4024 Storage Controller(hardware version 8.1,firmware version GTS280R10-10)
- LUN1 used for all Client VMs for tiles 0-3 and Prime Client
- LUN2 used for VMware vCenter Server

Datacenter Management Server Notes

None

Operating System Notes

SUT hosts used Dell customized ESXi 8.0 ISO (VMware-VMvisor-Installer-8.0.0-20513097.x86_64-Dell_Customized-A00.iso) for OS installation

Software Notes

None

Client Notes

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

- ClientHost7:Client2, Prime Client, VMware vCenter Server
- ClientHost9:Client0, Client1, Client3

Client Host Advanced Settings:

- /UserVars/HostClientCEIPOptIn = 1 (default 0)

Other Notes

Changes to VMmark3.properties file:

- TileDelay=30 (default 60)
- PTD = true (default false)
