

VMmark® 3.1.1 Results

Server Vendor & Model: Dell PowerEdge XR7620
Storage Vendor & Model: VMware vSAN 8.0 - All Flash
Hypervisor: VMware ESXi 8.0b, Build 21203435
Datacenter Management Software: VMware vCenter Server 8.0c, Build 21457384

**VMmark 3.1.1 Server PPKW Score =
6.1093 @ 14 Tiles**

Number of Hosts: 2	Uniform Hosts [yes/no]: yes	Total sockets/cores/threads in test: 4/128/256
Tested By: Dell Technologies		Test Date: 04-30-2023
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	3530.59	0.98	1.88 0.02	569.87	1.00	1.19 0.88	718.50	0.98	1442.01	511.18	1.02	1646.90	356.43	1.03	1820.61	1.00
p1	3505.97	0.97	2.02 0.09	565.89	0.99	1.29 0.70	724.62	0.99	1409.90	492.27	0.98	1641.34	341.23	0.98	1797.41	0.98
p2	3495.71	0.97	1.89 0.04	564.30	0.99	0.73 0.26	717.25	0.98	1433.10	493.62	0.99	1654.74	357.75	1.03	1846.07	0.99
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	3523.05	0.98	2.17 0.02	565.57	0.99	0.58 0.31	746.40	1.02	1337.70	535.38	1.07	1513.91	373.20	1.08	1668.62	1.03
p1	3499.26	0.97	1.91 0.01	565.33	0.99	0.76 0.32	750.27	1.02	1308.61	495.93	0.99	1519.23	355.43	1.02	1659.73	1.00
p2	3490.64	0.97	2.03 0.19	564.27	0.99	0.76 0.33	744.75	1.01	1311.00	532.67	1.06	1515.20	372.15	1.07	1662.26	1.02
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	3544.02	0.99	1.78 0.02	566.83	0.99	1.23 0.71	717.95	0.98	1451.87	510.88	1.02	1664.17	367.70	1.06	1860.44	1.01
p1	3508.58	0.98	1.93 0.03	567.26	0.99	1.26 0.85	722.98	0.98	1431.90	495.27	0.99	1649.69	323.00	0.93	1839.84	0.97
p2	3500.95	0.97	1.93 0.17	560.92	0.98	0.71 0.33	711.35	0.97	1451.66	512.20	1.02	1627.70	372.30	1.07	1798.18	1.00
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	3541.18	0.98	2.17 0.03	568.69	0.99	1.34 0.88	741.90	1.01	1342.29	529.58	1.06	1536.20	388.80	1.12	1676.31	1.03
p1	3513.23	0.98	1.91 0.01	568.36	0.99	1.09 0.83	747.17	1.02	1316.51	500.40	1.00	1512.92	339.02	0.98	1664.94	0.99
p2	3504.15	0.97	2.03 0.04	562.65	0.98	0.96 0.61	732.95	1.00	1371.49	545.67	1.09	1577.30	386.20	1.11	1724.41	1.03
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	3521.57	0.98	2.76 0.17	568.99	0.99	1.26 0.86	723.02	0.98	1421.70	500.10	1.00	1619.37	363.85	1.05	1763.46	1.00
p1	3485.85	0.97	2.84 0.05	564.88	0.99	1.09 0.62	707.45	0.96	1479.28	490.25	0.98	1689.34	338.68	0.98	1840.36	0.98
p2	3472.69	0.97	2.52 0.07	561.25	0.98	0.72 0.24	702.83	0.96	1492.55	507.68	1.01	1671.54	370.50	1.07	1827.26	1.00
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	3546.99	0.99	1.97 0.09	566.35	0.99	0.72 0.44	742.92	1.01	1327.18	517.38	1.03	1519.59	377.57	1.09	1654.36	1.02

p1_score:	13.98
p2_score:	14.08

Infrastructure_Operations_Scores:	vMotion	SVMotion	XVMotion	Deploy
Completed_Ops_PerHour	27.50	20.00	17.00	9.00
Avg_Seconds_To_Complete	10.29	140.68	158.73	356.86
Failures	0.00	0.00	0.00	0.00
Ratio	1.06	1.11	0.94	1.12
Number_Of_Threads	1	1	1	1

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	1879.14	202.46	9.43	0.98	2399.00	0.00
p1	Target	Avg_Watts	Avg_Volts	Avg_Amps	Avg_PF	Samples	UnCert%
ptd0	SERVER	1878.68	202.58	9.43	0.98	2400.00	0.00
p2	Target	Avg_Watts	Avg_Volts	Avg_Amps	Avg_PF	Samples	UnCert%
ptd0	SERVER	1878.63	202.75	9.42	0.98	2400.00	0.00

Summary	Run_Is_Compliant	Turbo_Setting:0
	Number_Of_Compliance_Issues(0)*	Median_Phase(p2)
Unreviewed_VMmark3_Avg_Watts	1878.63	
Unreviewed_VMmark3_Applications_Score	14.08	
Unreviewed_VMmark3_Infrastructure_Score	1.06	
Unreviewed_VMmark3_Score	11.48	
Unreviewed_VMmark3_PPKW	6.1093	

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	1 x Future Technology Devices International, LTD FT232 Serial(UART) IC
Other Software	None

Configuration

Virtualization Software	
Hypervisor Vendor, Product, Version, and Build / Availability Date (MM-DD-YYYY)	VMware ESXi 8.0b, Build 21203435 / 02-14-2023
Datacenter Management Software Vendor, Product, Version, and Build / Availability Date (MM-DD-YYYY)	VMware vCenter Server 8.0c, Build 21457384 / 03-30-2023
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 PowerEdge XR7620
Processor Vendor and Model	Intel Xeon Gold 6448Y

Processor Speed (GHz) / Turbo Boost Speed (GHz)	2.10GHz / 4.10GHz
Total Sockets/Total Cores/Total Threads	2 Sockets / 64 Cores / 128 Threads
Primary CPU Cache	32 KB I + 48 KB D on chip per core
Secondary CPU Cache	2 MB I+D on chip per core
Other CPU Cache	60 MB I+D on chip per chip
BIOS Version	1.0.1
Memory Size (in GB, Number of DIMMs)	2048GB,16
Memory Type and Speed	128GB DDR5 4Rx4 4800 MT/s RDIMMs
Disk Subsystem Type	vSAN, iSCSI SAN
Number of Disk Controllers	1
Disk Controller Vendors and Models	VMware iSCSI Software Adapter
Total Number of Physical Disks for Hypervisor	1
Disk Vendors, Models, Capacities, and Speeds	Dell NVMe PE8010 RI U.2 960GB - 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 Ethernet 100G 2P E810-C Adapter
Other Hardware	None
Other Software	None
Hardware Availability Date (MM-DD-YYYY)	05-24-2023
BIOS Availability Date (MM-DD-YYYY)	05-24-2023
Software Availability Date (MM-DD-YYYY)	03-07-2023
Network	
Network Switch Vendors and Models	1xDell EMC Z9432F-ON switch
Network Speed	1x100Gbps for Management,vMotion and Elastic*0-Elastic*13,DS3*0-DS*13,Standby*0-Standby*13 and Deploy workload VMs 1x100Gbps for iSCSI,vSAN and Auction*0-Auction*13 workload VMs
Primary Storage	

Storage Category	VMware vSAN
Storage Vendors, Models, and Firmware Versions	2xDell PowerEdge XR7620 servers with VMware vSAN 8.0
Storage Configuration Summary	VMware vSAN <ul style="list-style-type: none"> • 1 Disk group per host • 1xDell NVMe v2 AGN MU U.2 1.6TB for vSAN cache tier • 2xDell NVMe v2 AGN RI U.2 7.68TB for vSAN capacity tier

Datacenter Management Server

System Model	Dell PowerEdge R750
Processor Vendor and Model	Intel Xeon Platinum 8380
Processor Speed (GHz)	2.30
Total Sockets/Total Cores/Total Threads	2 Sockets / 80 Cores / 160 Threads
Memory Size (in GB, Number of DIMMs)	2048 GB
Network Controller(s) Vendors and Models	Mellanox ConnectX-5 EN 25GbE Dual-port Adapter
Operating System, Version, Bitness, and Service Pack	VMware ESXi 8.0b Build 21203435
Virtual Center VM Number of vCPUs	4
Virtual Center VM Virtual Memory (in GB)	21
Virtual Center VM Operating System, Version, Bitness, and Service Pack	VMware vCenter Server 8.0c, Build 21457384
Other Hardware	None
Other Software	None

Clients

Total Number of Virtual Clients / Virtual Client Hosts	15 / 2
System Model(s)	2xDell PowerEdge R750(ClientHost1,ClientHost2)
Processor Vendor(s) and Model(s)	Intel Xeon Platinum 8380
Processor Speed(s) (GHz)	2.3GHz
Total Sockets/Total Cores/Total Threads	2 Sockets/80 Cores/160 Threads
Memory per Virtual Client Host	2048GB

Network Controller(s) Vendors and Models	Mellanox ConnectX-5EN 25GbE Dual-port Adapter(1 port each used for vmnic2 and vmnic3)
Virtual Client Networking Notes	<ul style="list-style-type: none"> vSwitch0 on vmnic2 for Management and Client VMs at 25Gbps vSwitch1 on vmnic3 used for iSCSI,Prime Client and vCenter Server at 25Gbps
Virtual Client Storage Notes	All Virtual Clients are stored on Dell PowerVault ME4024 storage
Other Hardware	None
Other Software	All the client hosts used VMware ESXi 8.0b Build 21203435 for operating system

Security Mitigations

Vulnerability	CVE	Exploit Name	Public Vulnerability Name	Mitigated		
				Server Firmware	ESXi	Guest OS
				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, ElasticDB and ElasticLB VMs (default normal)
- CDROM removed from all VMs except PrimeClient and template VMs
- All memory reserved for DS3DB and AuctionWebB 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)
- Third virtual disk removed from DS3DB0 before cloning DS3DB VMs for other tiles
- Logging disabled for all VMs except PrimeClient and template VMs

Advanced Settings:

- Cpu.CreditAgePeriod = 1000 (default 3000)
- Cpu.CoschedCrossCall = 0 (default 1)

- 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)
- Numa.LTermFairnessInterval = 0 (default 5)
- Numa.LargeInterleve = 0 (default 1)
- Numa.LocalityWeightActionAffinity = 0 (default 130)
- Numa.MigImbalanceThreshold = 57 (default 10)
- Numa.MigPreventLTermThresh = 20 (default 0)
- Numa.MigThreshold = 0 (default 2)
- Numa.MonMigEnable = 0 (default 1)
- Numa.PageMigEnable = 0 (default 1)
- Numa.PreferHT = 1 (default 0)
- Numa.RebalancePeriod = 60000 (default 2000)
- Numa.SwapLoadEnable = 0 (default 1)
- Numa.SwapLocalityEnable = 0 (default 1)
- 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)
- Workload Profile = Virtualization Optimized Performance per Watt Profile (default Not Configured)
- Fan Speed Offset = Medium (default Off)

Networking Notes

vSwitch Configuration

SUT cluster

- vSwitch0 for Management, vMotion, Elastic*0-Elastic*13,DS3*0-DS*13,Standby*0-Standby*13 and Deploy workload VMs on vmnic2 at 100Gbps
- vSwitch1 for vSAN, iSCSI and Auction*0-Auction*13 workload VMs on vmnic3 at 100Gbps
- vSwitch0 and vSwitch1 on both SUT Hosts had MTU set to 9000 (default 1500)
- vmnic2 and vmnic3 on both SUT Hosts had MTU set to 9000 (default 1500)

Client Cluster

- vSwitch0 for Management and all client VMs on vmnic2 at 25Gbps
- vSwitch1 for iSCSI, Prime Client and VMware vCenter Server on vmnic3 at 25Gbps
- vSwitch0 and vSwitch1 on both Client Hosts had MTU set to 9000 (default 1500)
- vmnic2 and vmnic3 on both Client Hosts had MTU set to 9000 (default 1500)

Storage Notes

- Host OS installed on Dell NVMe PE8010 RI U.2 960GB
- Path Selection Policy used for all SUT and Client Host iSCSI connectivity is Round Robin (default Most Recently Used)

Primary Storage - VMware vSAN

- VMware vSAN 8.0 OSA
- Capacity : 27.95TB
- Cache : 2.92TB

Hardware Configuration:

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

- Caching device : 1xDell NVMe v2 AGN MU U.2 1.6TBGB for vSAN Caching tier
- Capacity device : 2xDell NVMe v2 AGN RI U.2 7.68TB for vSAN capacity tier
- 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 using RAID 10

- 10x Toshiba Model KPM5XRUG3T84 3.84TB SSD
- 14x SAMSUNG Model MZILG3T8HCLSAD3 3.8TB SSD
- ME4024 Storage Controller(hardware version 8.1,firmware version GTS280R10-10)
- Volume - Client used for all Client VMs for tiles 0-13 and Prime Client
- Volume - Deploy0 used for deploy VM

Second Dell EMC PowerVault ME4024 configured with Fiber Channel connectivity using RAID 10

- 24x SAMSUNG Model MZILT3T8HBLS0D3 3.8TB SSD
- ME4024 Storage Controller(hardware version 8.1,firmware version GTS280R10-10)
- Volume - LUN0 used for VMware vCenter Server and VMware Witness Host
- Volume - svMotion used for svMotion and xvMotion infrastructure operations

Datacenter Management Server Notes

VMware vCenter Server - Increased the size of hard disk (Hard Disk 5) used for logs to 30GB (default 10GB)

Operating System Notes

All SUT and Client Hosts used VMware-VMvisor-Installer-8.0.0-21203435.x86_64-Dell_Customized-A03.iso available from <https://customerconnect.vmware.com/downloads/details?downloadGroup=OEM-ESXI80-DELLEMC&productId=1345>

Software Notes

None

Client Notes

The VMs were distributed across the client hosts as follows:

- ClientHost1: Client2, Client4, Client6, Client8, Client10, Client12, Prime Client and VMware vCenter Server
- ClientHost2: Client0, Client1, Client3, Client5, Client7, Client9, Client11, Client13 and VMware-VirtualSAN-Witness

Client Host Advanced Settings

- UserVars.HostClientCEIPOptIn = 1 (default 0)
- Power.CpuPolicy = High Performance (default Balanced)

Other Notes

Changes to VMmark3.properties file:

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

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