

# VMmark® 3.1.1 Results

**Server Vendor & Model: HPE ProLiant DL320 Gen11**  
**Storage Vendor & Model: HPE ProLiant DL385 Gen10 Plus v2**  
**Hypervisor: VMware ESXi 8.0a Patch Build 20842819**  
**Datacenter Management Software: VMware vCenter Server 8.0 GA Build 20519528**

**VMmark 3.1.1 Score =  
12.63 @ 12 Tiles**

Number of Hosts: 4	Uniform Hosts [yes/no]: yes	Total sockets/cores/threads in test: 4/128/256
Tested By: Hewlett Packard Enterprise		Test Date: 12-28-2022
Performance Section <a href="#">Performance</a>	Configuration Section <a href="#">Configuration</a>	Notes Section <a href="#">Notes for Workload</a>

## 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	3579.12	0.99	0.42   0.00	568.77	0.99	0.36   0.13	975.42	1.33	754.13	711.38	1.42	868.75	507.82	1.46	1033.92	1.22
p1	3567.37	0.99	0.45   0.00	567.76	0.99	0.50   0.35	990.15	1.35	728.16	661.83	1.32	882.81	458.45	1.32	1063.36	1.18
p2	3556.62	0.99	0.42   0.00	563.75	0.99	0.41   0.17	982.42	1.34	742.04	709.33	1.42	886.16	480.07	1.38	1061.99	1.21
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	3578.54	0.99	0.44   0.00	568.22	0.99	0.43   0.17	966.48	1.32	782.43	692.05	1.38	933.73	501.05	1.44	1071.52	1.21
p1	3575.03	0.99	0.43   0.00	565.85	0.99	0.47   0.22	985.05	1.34	736.34	678.65	1.36	907.46	463.38	1.34	1053.48	1.19
p2	3555.47	0.99	0.44   0.00	562.17	0.98	0.37   0.08	974.40	1.33	766.32	699.62	1.40	921.38	484.95	1.40	1054.62	1.20
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	3577.05	0.99	0.49   0.00	562.59	0.98	0.39   0.20	1062.17	1.45	551.09	790.05	1.58	623.09	589.80	1.70	698.72	1.31
p1	3559.96	0.99	0.47   0.00	559.52	0.98	0.55   0.29	1080.88	1.47	510.47	776.23	1.55	580.50	546.95	1.58	662.26	1.28
p2	3546.43	0.99	0.49   0.00	555.42	0.97	0.40   0.12	1066.58	1.45	534.61	797.55	1.59	606.00	566.67	1.63	685.87	1.29
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	3578.16	0.99	0.40   0.00	567.91	0.99	0.39   0.12	1033.67	1.41	603.81	763.23	1.52	702.49	563.02	1.62	789.07	1.28
p1	3567.74	0.99	0.41   0.00	567.34	0.99	0.49   0.29	1043.65	1.42	587.85	744.17	1.49	682.21	516.27	1.49	778.73	1.25
p2	3556.76	0.99	0.40   0.00	561.74	0.98	0.31   0.18	1038.85	1.41	595.87	762.85	1.52	690.76	539.02	1.55	785.67	1.27
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	3577.34	0.99	0.71   0.00	567.49	0.99	0.46   0.18	1105.17	1.51	449.53	827.58	1.65	520.03	625.33	1.80	553.38	1.35
p1	3559.94	0.99	0.73   0.00	566.95	0.99	0.37   0.08	1104.80	1.50	455.25	794.15	1.59	529.91	569.02	1.64	580.04	1.31
p2	3557.65	0.99	0.73   0.00	562.75	0.98	0.48   0.18	1092.38	1.49	480.95	810.45	1.62	572.36	581.88	1.68	624.64	1.31
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	3563.03	0.99	1.90   0.26	568.72	0.99	0.64   0.52	1041.17	1.42	604.58	755.73	1.51	719.40	554.27	1.60	821.45	1.27

<b>p1</b>	3555.71	0.99	1.63   0.15	565.78	0.99	0.73   0.47	1057.25	1.44	566.08	742.50	1.48	690.71	508.43	1.47	812.76	1.25
<b>p2</b>	3551.21	0.99	1.49   0.10	562.87	0.98	0.93   0.66	1043.88	1.42	593.18	760.17	1.52	715.08	528.15	1.52	829.49	1.26
<b>TILE_6</b>	Actual	Ratio	QoS(nRT MaxPctF)	Actual	Ratio	QoS(nRT MaxPctF)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	GM
<b>p0</b>	3575.08	0.99	0.58   0.00	564.46	0.99	0.49   0.48	1020.60	1.39	645.61	746.50	1.49	746.33	538.80	1.55	882.44	1.26
<b>p1</b>	3561.99	0.99	0.55   0.00	557.71	0.97	0.40   0.22	1029.83	1.40	631.01	723.08	1.44	752.12	491.65	1.42	904.61	1.23
<b>p2</b>	3547.47	0.99	0.58   0.00	557.48	0.97	0.51   0.20	1023.30	1.39	641.08	744.23	1.49	762.41	511.85	1.48	902.41	1.24
<b>TILE_7</b>	Actual	Ratio	QoS(nRT MaxPctF)	Actual	Ratio	QoS(nRT MaxPctF)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	GM
<b>p0</b>	3576.35	0.99	0.37   0.00	568.08	0.99	0.65   0.40	1060.12	1.44	542.13	792.02	1.58	616.05	589.90	1.70	686.03	1.31
<b>p1</b>	3567.37	0.99	0.39   0.00	567.07	0.99	0.40   0.14	1077.53	1.47	522.31	766.95	1.53	611.58	540.15	1.56	692.54	1.28
<b>p2</b>	3552.60	0.99	0.39   0.00	564.51	0.99	0.46   0.15	1066.33	1.45	530.38	793.20	1.58	612.26	563.38	1.62	687.51	1.29
<b>TILE_8</b>	Actual	Ratio	QoS(nRT MaxPctF)	Actual	Ratio	QoS(nRT MaxPctF)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	GM
<b>p0</b>	3581.00	1.00	0.77   0.00	567.32	0.99	0.40   0.28	1064.12	1.45	529.02	805.42	1.61	585.79	596.52	1.72	661.56	1.32
<b>p1</b>	3564.43	0.99	0.82   0.00	566.79	0.99	0.39   0.17	1072.85	1.46	522.46	772.12	1.54	592.41	542.30	1.56	680.01	1.28
<b>p2</b>	3558.50	0.99	0.81   0.00	564.10	0.99	0.82   0.56	1071.28	1.46	520.72	797.95	1.59	593.66	568.58	1.64	677.01	1.30
<b>TILE_9</b>	Actual	Ratio	QoS(nRT MaxPctF)	Actual	Ratio	QoS(nRT MaxPctF)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	GM
<b>p0</b>	3575.76	0.99	1.16   0.05	568.69	0.99	1.06   0.83	1042.38	1.42	598.78	754.52	1.51	726.17	551.50	1.59	835.29	1.27
<b>p1</b>	3565.50	0.99	0.98   0.03	567.70	0.99	0.74   0.59	1053.08	1.43	572.27	739.25	1.48	702.14	506.40	1.46	826.53	1.25
<b>p2</b>	3552.12	0.99	0.92   0.02	563.58	0.98	0.78   0.61	1037.28	1.41	613.19	760.80	1.52	710.38	529.38	1.53	833.47	1.26
<b>TILE_10</b>	Actual	Ratio	QoS(nRT MaxPctF)	Actual	Ratio	QoS(nRT MaxPctF)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	GM
<b>p0</b>	3579.39	0.99	0.47   0.00	563.14	0.98	0.53   0.43	1017.15	1.39	656.08	740.38	1.48	771.69	531.27	1.53	913.56	1.25
<b>p1</b>	3555.89	0.99	0.46   0.00	561.78	0.98	0.43   0.17	1023.33	1.39	637.73	723.35	1.45	761.84	464.65	1.34	924.65	1.21
<b>p2</b>	3543.83	0.98	0.45   0.00	555.44	0.97	0.82   0.54	1009.48	1.37	668.85	743.50	1.49	761.98	530.88	1.53	926.13	1.24
<b>TILE_11</b>	Actual	Ratio	QoS(nRT MaxPctF)	Actual	Ratio	QoS(nRT MaxPctF)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	GM
<b>p0</b>	3576.77	0.99	0.55   0.00	564.71	0.99	0.41   0.15	1034.75	1.41	609.80	756.52	1.51	727.57	552.17	1.59	835.26	1.27
<b>p1</b>	3568.82	0.99	0.57   0.00	558.58	0.98	0.45   0.14	1045.50	1.42	604.94	730.88	1.46	726.48	477.23	1.38	867.40	1.23
<b>p2</b>	3553.55	0.99	0.56   0.00	558.43	0.98	0.33   0.12	1031.90	1.41	619.58	757.92	1.51	721.81	553.33	1.60	833.47	1.27
<b>p0_score:</b>	15.32															
<b>p1_score:</b>	14.95															
<b>p2_score:</b>	15.15															

<b>Infrastructure_Operations_Scores:</b>	vMotion	SVMotion	XVMotion	Deploy
<b>Completed_Ops_PerHour</b>	55.00	54.00	42.00	23.00
<b>Avg_Seconds_To_Complete</b>	8.09	80.24	99.91	261.02
<b>Failures</b>	0.00	0.00	0.00	0.00
<b>Ratio</b>	2.12	3.00	2.33	2.88
<b>Number_Of_Threads</b>	2	2	2	2

<b>Summary</b>	Run_Is_Compliant	Turbo_Setting:0
	Number_Of_Compliance_Issues(0)*	Median_Phase(p2)
<b>Unreviewed_VMmark3_Applications_Score</b>	15.15	
<b>Unreviewed_VMmark3_Infrastructure_Score</b>	2.55	
<b>Unreviewed_VMmark3_Score</b>	12.63	

## Configuration

Virtualization Software	
Hypervisor Vendor, Product, Version, and Build / Availability Date (MM-DD-YYYY)	VMware ESXi 8.0a Patch Build 20842819 / 12-08-2022
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	HPE ProLiant DL320 Gen11
Processor Vendor and Model	Intel Xeon Gold 6454S
Processor Speed (GHz) / Turbo Boost Speed (GHz)	2.2 / 3.4
Total Sockets/Total Cores/Total Threads	1 Sockets / 32 Cores / 64 Threads
Primary CPU Cache	32 KB I + 48 KB D on chip per core
Secondary CPU Cache	64 MB I+D on chip per core
Other CPU Cache	60 MB I+D on chip per chip
BIOS Version	U63 v1.20 (12/01/2022)
Memory Size (in GB, Number of DIMMs)	1024 GB, 16
Memory Type and Speed	64 GB 2Rx4 PC5-4800 MHz RDIMM
Disk Subsystem Type	FC SAN
Number of Disk Controllers	1

Disk Controller Vendors and Models	HPE NS204i-u boot controller
Total Number of Physical Disks for Hypervisor	2
Disk Vendors, Models, Capacities, and Speeds	HPE 480 GB NVMe M.2 SSD
Number of Host Bus Adapters	1
Host Bus Adapter Vendors and Models	HPE SN1610Q 32 Gb 2p FC HBA
Number of Network Controllers	3
Network Controller Vendors and Models	HPE Ethernet 1Gb 2-port BASE-T BCM5720 Adapter Mellanox MCX631432 25GbE 2p Adapter Mellanox MCX623106AS 100GbE 2p QSFP56 Adapter
Other Hardware	None
Other Software	None
Hardware Availability Date (MM-DD-YYYY)	03-10-2023
BIOS Availability Date (MM-DD-YYYY)	03-10-2023
Software Availability Date (MM-DD-YYYY)	03-10-2023
<b>Network</b>	
Network Switch Vendors and Models	HPE SN2700M 100GbE 32QSFP28
Network Speed	VM network: 100 Gbps Management: 1 Gbps vMotion: 25 Gbps
<b>Primary Storage</b>	
Storage Category	SCSI Target
Storage Vendors, Models, and Firmware Versions	3 x HPE ProLiant DL385 Gen10 Plus V2
Storage Configuration Summary	<p>FC SAN Switch:</p> <ul style="list-style-type: none"> <li>• 1 x HPE SN6600B 32 Gb 48 port FC Switch</li> </ul> <p>Storage Servers:</p> <ul style="list-style-type: none"> <li>• 3 x HPE DL385 Gen10 Plus V2 <ul style="list-style-type: none"> <li>◦ OS storage <ul style="list-style-type: none"> <li>▪ HPE NS204i-p Gen10+ Boot Controller</li> </ul> </li> <li>◦ Workload Storage</li> </ul> </li> </ul>

- 12 x HPE 3.2 TB NVMe Gen4 High Performance Mixed Use SFF BC U.3 PM1735 SSD
- 2 x HPE 750GB NVMe Gen3 x4 High Performance Low Latency Write Intensive AIC HHHL P4800X SSD

**Datacenter Management Server**

System Model	HPE ProLiant DL380 Gen10
Processor Vendor and Model	Intel Xeon Gold 6238
Processor Speed (GHz)	2.10
Total Sockets/Total Cores/Total Threads	2 Sockets / 44 Cores / 88 Threads
Memory Size (in GB, Number of DIMMs)	192, 12
Network Controller(s) Vendors and Models	HPE Ethernet 1Gb 4-port 331i Adapter
Operating System, Version, Bitness, and Service Pack	VMware ESXi 8.0 GA Build 20513097
Virtual Center VM Number of vCPUs	16
Virtual Center VM Virtual Memory (in GB)	39
Virtual Center VM Operating System, Version, Bitness, and Service Pack	VMware vCenter Server 8.0 GA Build 20519528
Other Hardware	None
Other Software	None

**Clients**

Total Number of Virtual Clients / Virtual Client Hosts	13 / 4
System Model(s)	Hosts 1-2: HPE ProLiant DL385 Gen10 Plus v2 Hosts 3-4: HPE ProLiant DL385 Gen10
Processor Vendor(s) and Model(s)	Hosts 1-2: AMD EPYC 7763 Hosts 3-4: AMD EPYC 7702
Processor Speed(s) (GHz)	Hosts 1-2: 2.45 Hosts 3-4: 2.00
Total Sockets/Total Cores/Total Threads	8 Sockets / 512 Cores / 1024 Threads
Memory per Virtual Client Host	Hosts 1-2: 1 TB Hosts 3-4: 512 GB
Network Controller(s) Vendors and Models	Hosts 1-2: <ul style="list-style-type: none"> <li>• 1 x Intel I350-T4 Ethernet 1Gb 4-port BASE-T Adapter for HPE</li> <li>• 1 x Mellanox ConnectX-5 EN 100Gb/s 2-port Ethernet Adapter</li> </ul>

	Hosts 3-4: <ul style="list-style-type: none"> <li>• 1 x HPE 1Gb Ethernet 4-Port 331i Adapter</li> <li>• 1 x Mellanox ConnectX-5 EN 100Gb/s 2-port Ethernet Adapter</li> </ul>
Virtual Client Networking Notes	Details in Networking Notes
Virtual Client Storage Notes	Details in Storage Notes
Other Hardware	1 x HPE SN1610Q 32 Gb 2p FC HBA
Other Software	VMware ESXi 8.0 GA Build 20513097

### 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 Provision Eager Zeroed

### Virtualization Software Notes

- Cluster DRS Automation Level set to Fully Automated
- vSphere DRS Migration Threshold level set to 2
- Logical CPU layout changed for all multi-CPU VMs to 1 socket with multiple cores (default single core per socket)
- Logging was disabled for all VMs (default enabled)
- All DS3DB, ElasticDB, and ElasticLB VMs had CPU shares set to High (default Normal)
- sched.mem.lpage.enable1GPage set to TRUE for all DS3DB VMs (Default FALSE)
- All DS3DB VMs were configured with "Reserve all guest memory (All locked)" enabled (default: disabled)
- All Standby VMs had CPU shares set to Low (default Normal)
- DS3DB0 was configured to not use the third virtual disk before building additional tiles.
- PrimeClient's second virtual disk configured to be 1 TB (default: 200 GB)

Advanced Settings:

- Cpu.CoschedCrossCall = 0 (default 1)
- 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.MaxPortRxQueueLen = 160 (default 80)
- Numa.LTermFairnessInterval = 0 (default 5)
- Numa.LargeInterleave = 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)
- Power.CpuPolicy = 'High Performance' (default Balanced)
- VMkernel.Boot.hyperthreadingMitigation = TRUE (default FALSE)

## Server Notes

Server BIOS settings:

- Workload Profile set to "Virtualization - Max Performance" (default: General Power Efficient Compute)
- Memory Patrol Scrubbing set to Disabled (default: Enabled)
- Processor x2APIC Support set to Force Enabled (default: Auto)
- LLC Dead Line Allocation set to Disabled (default: Enabled)
- HW Prefetcher set to Disabled (default: Enabled)
- DCU Stream Prefetcher set to Disabled (default: Enabled)
- DCU IP Prefetcher set to Disabled (default: Enabled)
- LLC Prefetch set to Enabled (default: Disabled)
- Enhanced Processor Performance Profile set to Aggressive (default: Disabled)
- Thermal Configuration set to "Maximum Cooling" (default: Optimal Cooling)

## Networking Notes

Standard vSwitch configuration:

- Each client and SUT host used the default standard vSwitch for management and vmk0.

- Client hosts 1-2 used vmnic2.
- All other hosts used vmnic0.

#### Distributed vSwitch configuration:

- All SUT and client hosts were part of the same distributed vSwitch.
- The MTU of the distributed vSwitch was set to 9000 (default 1500).
- The vmnics assigned to the distributed vSwitch had MTU set to 9000 (default 1500).
- 'vMotion' port group
  - Uplinks:
    - vmnic1 on SUT hosts and client hosts 3-4
    - vmnic3 on client hosts 1-2
  - Usage:
    - vmk1 for all client and SUT hosts - used for vMotion
- 'Workload' port group
  - Uplinks: 2-5
    - SUT hosts: vmnic2, vmic3
    - client hosts 1-2: vmnic0, vmnic1
    - client hosts 3-4: vmnic4, vmnic5
  - Usage:
    - All VMs - including one virtual NIC port of PrimeClient VM

HPE SN2700M switch was configured for RoCE lossless and LLDP.

## Storage Notes

#### OS Storage

- Each SUT host had VMware ESXi 8.0a Patch installed on the HPE NS204i-u boot controller, which provides a RAID1 volume on 2 x 480 GB NVMe M.2 SSDs.
- For each client host, VMware ESXi 8.0 GA was installed on a RAID1 volume on 2 x HPE 400GB 12G SAS MU SFF SC DS SSDs.
  - Client hosts 1-3: HPE Smart Array P408i-a SR Gen10
  - Client host 4: HPE Smart Array E208i-a SR Gen10

#### FC SAN Storage: FC Channel Target via SCSI Target Server (LIO)

- All SUT and client hosts were configured to use Round Robin path policy (default Most Recently Used) with iops = 1 (default 1000).
- Three servers with identical hardware and software configurations were used to provide FC SAN storage for SUT and client hosts.
  - Hardware Details
    - HPE ProLiant DL385 Gen10 Plus V2
      - 2 x AMD EPYC 7763 (2.45 GHz)
      - 2048 GB memory (32 x 64 GB 2Rx4 PC4-3200 MHz RDIMMs)
      - 2 x HPE SN1610Q 32 Gb 2p FC HBA
      - OS Storage:
        - HPE NS204i-p Gen10 Plus Boot Controller
      - FC Target Storage:
        - 12 x HPE 3.2 TB NVMe Gen4 High Performance Mixed Use SFF BC U.3 PM1735 SSD



- 2 x HPE 750GB NVMe Gen3 x4 High Performance Low Latency Write Intensive AIC HHHL P4800X SSD

- Software Details:

- Operating System: SUSE Linux Enterprise Server 15 SP4 - 5.14.21-150400.22-default x86\_64
- Fibre Channel Target SW: LIO (part of SUSE Linux Enterprise Server 15 SP4)
- Unless otherwise specified, an entire disk device was configured as a single LUN.

- LIO server #1 - LUN Details

- 1 x 3.2 TB NVMe
  - 1 LUN: All Auction\* VMs for tile 6
- 1 x 3.2 TB NVMe
  - 1 LUN: All Auction\* VMs for tile 3, 8
- 1 x 3.2 TB NVMe
  - 1 LUN: All Auction\* VMs for tiles 5, 10
- 1 x 3.2 TB NVMe
  - 1 LUN: All DS3\* VMs for tiles 1, 8
- 1 x 3.2 TB NVMe
  - 1 LUN: All DS3\* VMs for tiles 3, 10
- 1 x 3.2 TB NVMe
  - 1 LUN: All DS3\* VMs for tile 5
- 1 x 3.2 TB NVMe
  - 1 LUN: All Elastic\* VMs for tiles 1, 6, 11
- 1 x 3.2 TB NVMe
  - 1 LUN: All Elastic\* VMs for tiles 3, 8
- 1 x 3.2 TB NVMe
  - 1 LUN: All Elastic\* VMs for tiles 4, 9
- 1 x 3.2 TB NVMe
  - 1 LUN: unused datastore
- 1 x 750 GB NVMe
  - 1 LUN: unused datastore
- 1 x 750 GB NVMe
  - 1 LUN: unused datastore

- LIO server #2 - LUN Details

- 1 x 3.2 TB NVMe
  - 1 LUN: All Auction\* VMs for tiles 0, 11
- 1 x 3.2 TB NVMe
  - 1 LUN: All Auction\* VMs for tiles 2, 7
- 1 x 3.2 TB NVMe
  - 1 LUN: All Auction\* VMs for tiles 4, 9
- 1 x 3.2 TB NVMe
  - 1 LUN: All DS3\* VMs for tiles 0, 7
- 1 x 3.2 TB NVMe
  - 1 LUN: All DS3\* VMs for tiles 2, 9
- 1 x 3.2 TB NVMe
  - 1 LUN: All DS3\* VMs for tiles 4, 11
- 1 x 3.2 TB NVMe

- 1 LUN: All DS3\* VMs for tile 6
  - 1 x 3.2 TB NVMe
    - 1 LUN: All Elastic\* VMs for tiles 0, 5, 10
  - 1 x 3.2 TB NVMe
    - 1 LUN: All Elastic\* VMs for tiles 2, 7
  - 1 x 3.2 TB NVMe
    - 1 LUN: All Standby VMs for all even tile numbers
  - 1 x 3.2 TB NVMe
    - 1 LUN: All Standby VMs for all odd tile numbers
  - 1 x 3.2 TB NVMe
    - 1 LUN (800 GB): SVMotion target
    - 1 LUN (800 GB): XVMotion target
    - 1 LUN (800 GB): deploy target
    - 1 LUN (400 GB): template VMs
  - 1 x 750 GB NVMe
    - 1 LUN: unused datastore
  - 1 x 750 GB NVMe
    - 1 LUN: unused datastore
- LIO server #3 - LUN Details
  - 1 x 3.2 TB NVMe
    - 1 LUN: PrimeClient VM
  - 1 x 3.2 TB NVMe
    - 1 LUN: All client VMs for tiles 0, 7, 10
  - 1 x 3.2 TB NVMe
    - 1 LUN: All client VMs for tiles 1, 4, 11
  - 1 x 3.2 TB NVMe
    - 1 LUN: All client VMs for tiles 2, 5, 8
  - 1 x 3.2 TB NVMe
    - 1 LUN: All client VMs for tiles 3, 6, 9
  - 6 x 3.2 TB NVMe
    - 1 LUN for each NVMe: unused datastores

## **Datacenter Management Server Notes**

VMware vCenter Server Appliance 8.0 GA, Build 20519528 was hosted on a HPE ProLiant DL380 Gen10 system that was not part of the client or SUT clusters.

## **Operating System Notes**

Client hosts used the HPE customized ISO (VMware-ESXi-8.0.0-20513097-HPE-800.0.0.10.10.0.41-Oct2022.iso) for VMware ESXi 8.0 GA installation. This customized ISO is not supported for use on HPE ProLiant Gen11 servers.

SUT hosts used HPE customized ESXi 8.0a Patch ISO for ProLiant Gen11 servers. This is a pre-released version, which will be publicly released and available for customers to access by March 10, 2023.

## **Software Notes**

None

## Client Notes

Advanced ESXi settings:

- Power.CpuPolicy = High Performance (default Balanced)

Server BIOS settings:

- HPE Workload Profile set to "Virtualization - Max Performance" (default: General Power Efficient Compute)

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

- Client host 1: PrimeClient VM, Client VMs for tiles 4, 8, 11
- Client host 2: Client VMs for tiles 0, 5, 9
- Client host 3: Client VMs for tiles 1, 2, 6, 10
- Client host 4: Client VMs for tiles 3, 7

Client storage is described in the Storage Notes section.

## Other Notes

VMmark3.properties file modifications:

- TileDelay = 5 (default: 60)
- VCscratchDir = /root/VMmark3/results/scratch (default: /root/VMmark3/samples)
- ScrubConfigFile = true (default: false)

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