VMmark® 3.1.1 Results

Server Vendor & Model: HPE ProLiant DL385 Gen10 Plus V2 **Storage Vendor & Model: VMware vSAN 7.0 U3d - All Flash** **Hypervisor: VMware ESXi 7.0 U3d, Build 19482537** **Datacenter Management Software: VMware vCenter Server 7.0 U3d, Build 19480866**	**Non-Compliant**

Number of Hosts: 4	**Uniform Hosts [yes/no]: yes**	**Total sockets/cores/threads in test: 8/512/1024**

Tested By: Hewlett Packard Enterprise	**Test Date: 07-23-2022**

Performance Section Performance	**Configuration Section** Configuration	**Notes Section** Notes for Workload

It has been determined that this result was not in compliance with the VMmark Run and Reporting Rules. Specifically, this result used an unsupported configuration and therefore was not in compliance with section 3.2.8 of the Run and Reporting Rules.

Performance -- all data has been removed = NC

	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																
p1																
p2																
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																
p1																
p2																
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																
p1																
p2																
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																
p1																
p2																
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																
p1																
p2																
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																
p1																
p2																
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																
p1																
p2																
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																
p1																
p2																
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																
p1																
p2																
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																
p1																
p2																
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																
p1																
p2																
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																
p1																
p2																
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																
p1																
p2																
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																
p1																
p2																
TILE_14	Actual	Ratio	QoS(nRT|MaxPctF)	Actual	Ratio	QoS(nRT|MaxPctF)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	GM

p0																
p1																
p2																
TILE_15	Actual	Ratio	QoS(nRT|MaxPctF)	Actual	Ratio	QoS(nRT|MaxPctF)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	GM
p0																
p1																
p2																
TILE_16	Actual	Ratio	QoS(nRT|MaxPctF)	Actual	Ratio	QoS(nRT|MaxPctF)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	GM
p0																
p1																
p2																
TILE_17	Actual	Ratio	QoS(nRT|MaxPctF)	Actual	Ratio	QoS(nRT|MaxPctF)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	GM
p0																
p1																
p2																
TILE_18	Actual	Ratio	QoS(nRT|MaxPctF)	Actual	Ratio	QoS(nRT|MaxPctF)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	GM
p0																
p1																
p2																
TILE_19	Actual	Ratio	QoS(nRT|MaxPctF)	Actual	Ratio	QoS(nRT|MaxPctF)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	GM
p0																
p1																
p2																
TILE_20	Actual	Ratio	QoS(nRT|MaxPctF)	Actual	Ratio	QoS(nRT|MaxPctF)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	GM
p0																
p1																
p2																
TILE_21	Actual	Ratio	QoS(nRT|MaxPctF)	Actual	Ratio	QoS(nRT|MaxPctF)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	GM
p0																
p1																
p2																
TILE_22	Actual	Ratio	QoS(nRT|MaxPctF)	Actual	Ratio	QoS(nRT|MaxPctF)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	GM
p0																
p1																
p2																
TILE_23	Actual	Ratio	QoS(nRT|MaxPctF)	Actual	Ratio	QoS(nRT|MaxPctF)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	GM

p0																
p1																
p2																
TILE_24	Actual	Ratio	QoS(nRT|MaxPctF)	Actual	Ratio	QoS(nRT|MaxPctF)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	GM
p0																
p1																
p2																
TILE_25	Actual	Ratio	QoS(nRT|MaxPctF)	Actual	Ratio	QoS(nRT|MaxPctF)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	GM
p0																
p1																
p2																
TILE_26	Actual	Ratio	QoS(nRT|MaxPctF)	Actual	Ratio	QoS(nRT|MaxPctF)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	GM
p0																
p1																
p2																
TILE_27	Actual	Ratio	QoS(nRT|MaxPctF)	Actual	Ratio	QoS(nRT|MaxPctF)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	GM
p0																
p1																
p2																
TILE_28	Actual	Ratio	QoS(nRT|MaxPctF)	Actual	Ratio	QoS(nRT|MaxPctF)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	GM
p0																
p1																
p2																
TILE_29	Actual	Ratio	QoS(nRT|MaxPctF)	Actual	Ratio	QoS(nRT|MaxPctF)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	GM
p0																
p1																
p2																
TILE_30	Actual	Ratio	QoS(nRT|MaxPctF)	Actual	Ratio	QoS(nRT|MaxPctF)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	GM
p0																
p1																
p2																
TILE_31	Actual	Ratio	QoS(nRT|MaxPctF)	Actual	Ratio	QoS(nRT|MaxPctF)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	GM
p0																
p1																
p2																
TILE_32	Actual	Ratio	QoS(nRT|MaxPctF)	Actual	Ratio	QoS(nRT|MaxPctF)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	GM

p0																
p1																
p2																
TILE_33	Actual	Ratio	QoS(nRT|MaxPctF)	Actual	Ratio	QoS(nRT|MaxPctF)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	GM
p0																
p1																
p2																
TILE_34	Actual	Ratio	QoS(nRT|MaxPctF)	Actual	Ratio	QoS(nRT|MaxPctF)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	GM
p0																
p1																
p2																
TILE_35	Actual	Ratio	QoS(nRT|MaxPctF)	Actual	Ratio	QoS(nRT|MaxPctF)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	GM
p0																
p1																
p2																
TILE_36	Actual	Ratio	QoS(nRT|MaxPctF)	Actual	Ratio	QoS(nRT|MaxPctF)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	GM
p0																
p1																
p2																
TILE_37	Actual	Ratio	QoS(nRT|MaxPctF)	Actual	Ratio	QoS(nRT|MaxPctF)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	GM
p0																
p1																
p2																
TILE_38	Actual	Ratio	QoS(nRT|MaxPctF)	Actual	Ratio	QoS(nRT|MaxPctF)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	GM
p0																
p1																
p2																
TILE_39	Actual	Ratio	QoS(nRT|MaxPctF)	Actual	Ratio	QoS(nRT|MaxPctF)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	GM
p0																
p1																
p2																
TILE_40	Actual	Ratio	QoS(nRT|MaxPctF)	Actual	Ratio	QoS(nRT|MaxPctF)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	GM
p0																
p1																
p2																
TILE_41	Actual	Ratio	QoS(nRT|MaxPctF)	Actual	Ratio	QoS(nRT|MaxPctF)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	GM

p0																
p1																
p2																
TILE_42	Actual	Ratio	QoS(nRT|MaxPctF)	Actual	Ratio	QoS(nRT|MaxPctF)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	GM
p0																
p1																
p2																

p0_score:	NC
p1_score:	NC
p2_score:	NC

Infrastructure_Operations_Scores:	vMotion	SVMotion	XVMotion	Deploy
Completed_Ops_PerHour	NC	NC	NC	NC
Avg_Seconds_To_Complete	NC	NC	NC	NC
Failures	NC	NC	NC	NC
Ratio	NC	NC	NC	NC
Number_Of_Threads	NC	NC	NC	NC

Summary	NC	Turbo_Setting:0
	Number_Of_Compliance_Issues(NC)*	Median_Phase(NC)
Unreviewed_VMmark3_Applications_Score	NC	
Unreviewed_VMmark3_Infrastructure_Score	NC	
Unreviewed_VMmark3_Score	NC	

Configuration

Virtualization Software	
Hypervisor Vendor, Product, Version, and Build / Availability Date (MM-DD-YYYY)	VMware ESXi 7.0 U3d, Build 19482537 / 03-29-2022
Datacenter Management Software Vendor, Product, Version, and Build / Availability Date (MM-DD-YYYY)	VMware vCenter Server 7.0 U3d, Build 19480866 / 03-29-2022
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 DL385 Gen10 Plus V2
Processor Vendor and Model	AMD EPYC 7763
Processor Speed (GHz) / Turbo Boost Speed (GHz)	2.45 / 3.5
Total Sockets/Total Cores/Total Threads	2 Sockets / 128 Cores / 256 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	A42 v2.56 (02/10/2022)
Memory Size (in GB, Number of DIMMs)	2048, 32
Memory Type and Speed	64 GB 2Rx4 PC4-3200 MHz RDIMM
Disk Subsystem Type	vSAN, FC SAN
Number of Disk Controllers	1
Disk Controller Vendors and Models	HPE NS204i-p Gen10 Plus Boot Controller
Total Number of Physical Disks for Hypervisor	2
Disk Vendors, Models, Capacities, and Speeds	480 GB NVMe M.2 SSD
Number of Host Bus Adapters	1
Host Bus Adapter Vendors and Models	HPE SN1610Q 32Gb 2p FC HBA
Number of Network Controllers	2
Network Controller Vendors and Models	1 x Mellanox MCX562A-ACAI Ethernet 10/25Gb 2-port SFP28 OCP3 Adapter for HPE 1 x Mellanox ConnectX-5 EN 100Gb/s 2-port Ethernet Adapter
Other Hardware	None
Other Software	None
Hardware Availability Date (MM-DD-YYYY)	02-10-2022
BIOS Availability Date (MM-DD-YYYY)	02-10-2022
Software Availability Date (MM-DD-YYYY)	04-14-2022
Network	

Network Switch Vendors and Models	HPE SN2100M 100GbE 16 port switch
Network Speed	1 x 100 GbE for management and vMotion 1 x 100 GbE for vSAN 2 x 25 GbE for VMs (client hosts 3-4 used 2 x 100 GbE)
Primary Storage	
Storage Category	VMware vSAN
Storage Vendors, Models, and Firmware Versions	4 x HPE ProLiant DL385 Gen10 Plus v2 servers in a VMware vSAN 7.0 U3d cluster
Storage Configuration Summary	VMware vSAN • 2 x Disk Groups per host • 2 x HPE 750GB NVMe Gen3 x4 High Performance Low Latency Write Intensive AIC HHHL P4800X SSD for cache • 12 x HPE 3.2TB NVMe Gen4 High Performance Mixed Use SFF BC U.3 PM1735 SSD for capacity
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 1Gb Ethernet 4-Port 331i Adapter
Operating System, Version, Bitness, and Service Pack	VMware ESXi 7.0 U3d, Build 19482537
Virtual Center VM Number of vCPUs	16
Virtual Center VM Virtual Memory (in GB)	37 GB
Virtual Center VM Operating System, Version, Bitness, and Service Pack	VMware vCenter Server 7.0 U3d, Build 19480866
Other Hardware	None
Other Software	None
Clients	
Total Number of Virtual Clients / Virtual Client Hosts	44 / 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: • 1 x Intel I350-T4 Ethernet 1Gb 4-port BASE-T Adapter for HPE • 1 x Marvell QL41232HLCU Ethernet 10/25Gb 2-port SFP28 Adapter for HPE Hosts 3-4: • 1 x HPE 1Gb Ethernet 4-Port 331i Adapter • 1 x Mellanox ConnectX-5 EN 100Gb/s 2-port Ethernet Adapter
Virtual Client Networking Notes	Details in Networking Notes
Virtual Client Storage Notes	Details in Client Notes
Other Hardware	Hosts 1-2: HPE SN1610Q 32Gb 2p FC HBA Hosts 3-4: HPE SN1100Q 16Gb 2p FC HBA
Other Software	VMware ESXi 7.0 U3d, Build 19482537

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: Thin

Virtualization Software Notes

- Cluster DRS Automation Level set to Fully Automated
- vSphere DRS Migration Threshold level set to 2
- vSphere DRS Advanced Option AggressiveCPUActive set to 1
- Logical CPU layout changed for all multi-CPU workload VMs except PrimeClient to 1 socket with multiple cores (default single core per socket)
- Logging was disabled for all VMs except PrimeClient (default enabled)
- All DS3DB, ElasticDB, and ElasticLB VMs had CPU shares set to High (default Normal)
- All Standby VMs had CPU shares set to Low (default Normal)
- All memory reserved for all DS3DB VMs
- 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)
- DS3DB0 was configured to not use the third virtual disk before building tiles 1-42.
- CD and floppy devices were removed from all VMs except PrimeClient (default installed)
- PrimeClient's second virtual disk configured to be 800 GB (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)

Server Notes

Server BIOS settings

- HPE Workload Profile set to "Virtualization - Max Performance" (default: General Power Efficient Compute)
- Determinism Control set to Manual (default: Auto)
- Last-Level Cache (LLC) as NUMA Node set to Disabled (default: Enabled)

- Thermal Configuration set to Maximum Cooling (default: Optimal Cooling)
- Maximum Memory Bus Frequency set to 2933 (default: Auto)
- L2 Stream HW Prefetcher set to Disabled (default: Enabled)
- XGMIForceLinkWidth set to x16 (default: Auto)
- XGMIMaxLinkWidth: set to x16 (Default: Auto)
- L1 Stream HW Prefetcher set to Disabled (default: Enabled)
- NUMA memory domains per socket set to 1 (default Auto)
- Memory P states set to Disabled (default: Auto)
- Data Fabric C-State Enable set to Force Enabled (default: Disabled)
- C-State efficiency mode set to Disabled (default: Disabled)
- Memory Patrol Scrubbing set to Disabled (default: Enabled)

Networking Notes

Distributed vSwitch configuration:

- All SUT and client hosts were part of the same distributed vSwitch.
- All port groups were configured with MTU of 9000 (default 1500).
- All vmnics listed below were configured with MTU of 9000 (default 1500)
- The vSAN datastore and all VMs were configured to use the storage policy named "Workload-VM-Policy".
    - The "Workload-VM-Policy" was created by cloning the "vSAN Default Storage Policy" and making the following changes:
        - "Object space reservation" was set to "Thick Provisioning" (default: Thin Provisioning)
        - "Disable object checksum" was set to "Yes" (default: No)
- 'Management' port group
    - Uplinks:
        - vmnic1 (100 GbE) of all SUT hosts
    - Usage:
        - vmk0 of all SUT hosts - used for management
- 'vMotion' port group
    - Uplinks:
        - vmnic1 (100 GbE) of all SUT hosts
    - Usage:
        - vmk2 of all SUT hosts - used for vMotion
- 'vSAN' port group
    - Uplinks:
        - vmnic0 (100 GbE) of all SUT hosts
    - Usage:
        - vmk1 of all SUT hosts - used for vSAN
- 'Management-Client' port group
    - Uplinks:
        - vmnic2 (1GbE) of client hosts 1-2
        - vmnic0 (1GbE) of client hosts 3-4
    - Usage:
        - vmk0 of all client hosts - used for management
        - PrimeClient VM
- 'vMotion-Client' port group
    - Uplinks:
        - vmnic2 (1GbE) of client hosts 1-2
        - vmnic0 (1GbE) of client hosts 3-4

    - Usage:
        - vmk1 of client hosts - used for vMotion
- 'Workload-25G' port group
    - Uplinks:
        - vmnic2 (25 GbE) and vmnic3 (25 GbE) of all SUT hosts
        - vmnic0 (25 GbE) and vmnic1 (25 GbE) of client hosts 1-2
        - vmnic4 (100 GbE) and vmnic5 (100 GbE) of client hosts 3-4
    - Usage:
        - All VMs (including PrimeClient)

HPE SN2100M switch configured for RoCE lossless and LLDP.

- All 25 GbE connections from client and SUT hosts used a 100 GbE to 4 x 25 GbE splitter cables. The switch ports that were used for these splitter cables were configured to be 4 x 25 GbE ports instead of a single 100 GbE port.

Storage Notes

OS Storage

- For each SUT host, VMware ESXi 7.0 U3d was installed on the HPE NS204i-p Gen10 Plus Boot Controller, which provides a RAID1 volume on 2 x 480 GB NVMe M.2 SSDs.
- For each client host, VMware ESXi 7.0 U3d 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

Primary Storage: VMware vSAN storage

- VMware vSAN 7.0 U3d
    - Capacity: 139.73 TB
    - Cache: 6.4 TB
    - Hardware Configuraiton
        - Each host had 2 disk groups. Each disk group had:
            - Cache Tier: 1 x HPE 750GB NVMe Gen3 x4 High Performance Low Latency Write Intensive AIC HHHL P4800X SSD
            - Capacity Tier: 6 x HPE 3.2TB NVMe Gen4 High Performance Mixed Use SFF BC U.3 PM1735 SSD
    - Software Configuration
        - RDMA support service enabled (for vSAN over RDMA feature)
        - A new storage policy was cloned from the "vSAN Default Storage Policy" and had the following changes:
            - "Disable object checksum" set to enable (default: disable)
            - "Object space reservation" set to "Thick provisioning" (default: Thin provisioning)

Secondary Storage: FC Channel Target via SCSI Target Server (LIO)

- FC SAN switch
    - 1 x HPE SN6000B 16Gb 48-port FC SAN switch
        - Used for FC LUNs on both SUT and client hosts.
        - All 32 Gb FC HBAs connected to the switch were connected at 16 Gb speed.
- Hardware details:
    - HPE ProLiant DL380 Gen10 Plus
        - 2 x Intel Xeon Platinum 8380 (2.30 GHz)
        - 2048 GB (32 x 64GB 2Rx4 3200 MHz DDR4 RDIMMs)
        - 2 x HPE SN1510Q 32Gb 2-port FC HBA used as FC target controller
        - 1 x HPE 800GB SAS 12G Write Intensive SFF SC SS540 SSD

        - 2 x HPE 750GB NVMe Gen3 x4 High Performance Low Latency Write Intensive AIC HHHL P4800X SSD
        - 1 x HPE 3.2TB NVMe Gen4 x8 High Performance Mixed Use AIC HHHL PM1735 SSD
- Software details:
    - Operating System: SUSE Linux Enterprise Server 15 SP2 - 5.3.18-22-default (64-bit)
    - Fibre Channel Target SW: LIO (part of SUSE Linux Enterprise Server 15 SP2)
- LUN details:
    - 1 x HPE 800GB SAS 12G Write Intensive SFF SC SS540 SSD
        - Storage system OS (not exported as FC target LUN)
    - 1 x HPE 750GB NVMe Gen3 x4 High Performance Low Latency Write Intensive AIC HHHL P4800X SSD
        - 1 LUN (698.5 GB): SVmotion Target LUN
    - 1 x HPE 750GB NVMe Gen3 x4 High Performance Low Latency Write Intensive AIC HHHL P4800X SSD
        - 1 LUN (698.5 GB): Deploy Target LUN
    - 1 x HPE 3.2TB NVMe Gen4 x8 High Performance Mixed Use AIC HHHL PM1735 SSD
        - 1 LUN (2.91 TB): XVmotion Target LUN

Datacenter Management Server Notes

VMware vCenter Server Appliance 7.0 U3d, Build 19480866 was hosted on a HPE ProLiant DL380 Gen10 system that was not part of the client or SUT clusters.

Operating System Notes

SUT and client hosts used the VMware vCenter Server 7.0 U3d, Build 19480866 ISO as released by VMware for OS installation. After the OS was installed, VIB packages were downloaded from the URLs listed below and were installed.

- https://vibsdepot.hpe.com/hpe/apr2022/esxi-700-devicedrivers/
- https://vibsdepot.hpe.com/hpe/apr2022/esxi-700-bundles/

Software Notes

None

Client Notes

Advanced ESXi settings:

- Power.CpuPolicy = High Performance (default Balanced)
- Thermal Configuration set to Maximum Cooling (default: Optimal Cooling)

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, Client3, Client7, Client11, Client15, Client19, Client23, Client27, Client31, Client35, Client39
- Client host 2: Client0, Client4, Client8, Client12, Client16, Client20, Client24, Client28, Client32, Client36, Client40
- Client host 3: Client1, Client5, Client9, Client13, Client17, Client21, Client25, Client29, Client33, Client37, Client41, Client42
- Client host 4: Client2, Client6, Client10, Client14, Client18, Client22, Client26, Client30, Client34, Client38

Client Storage: FC Channel Target via SCSI Target Server (LIO)

- Hardware details:
  - HPE ProLiant DL380 Gen10 Plus
    - 2 x Intel Xeon Platinum 8380 (2.30 GHz)
    - 2048 GB (32 x 64GB 2Rx4 3200 MHz DDR4 RDIMMs)
    - 2 x HPE SN1510Q 32Gb 2-port FC HBA used as FC target controller
    - 1 x HPE 800GB SAS 12G Write Intensive SFF SC SS540 SSD
    - 4 x HPE 1.6TB SAS 12G Mixed Use SFF SC SS540 SSD
- Software details:
  - Operating System: SUSE Linux Enterprise Server 15 SP2 - 5.3.18-22-default (64-bit)
  - Fibre Channel Target SW: LIO (part of SUSE Linux Enterprise Server 15 SP2)
- LUN details:
  - 1 x HPE 800GB SAS 12G Write Intensive SFF SC SS540 SSD
    - Storage system OS (not exported as FC target LUN)
  - 1 x HPE 1.6TB SAS 12G Mixed Use SFF SC SS540 SSD
    - 1 LUN(1.46 TB): PrimeClient VM
  - 1 x HPE 1.6TB SAS 12G Mixed Use SFF SC SS540 SSD configured in Raid0 Mode using HPE Smart Array P816i-a SR Gen10
    - 1 LUN(4.37 TB): ClientVMs

Other Notes

VMmark3.properties file modifications:

- TileDelay = 5 (default 60)
- VCscratchDir = /root/VMmark3/results/scratch (default /root/VMmark3/samples)

This is a full disclosure report for a VMmark® benchmark result. All published VMmark results must be from fully-compliant tests for which a full disclosure report is publicly available.

For information about VMmark and the rules regarding its usage visit www.vmware.com/products/vmmark.

VMware and VMmark are trademarks or registered trademarks of VMware, Inc. VMmark is a product of VMware, Inc. VMmark utilizes the SPEC Power and Temperature Daemon (SPEC PTDaemon), which is available from the Standard Performance Evaluation Corporation (SPEC®). VMmark results are not SPEC metrics and cannot be compared to SPEC metrics in any way.