VMmark® 3.1.1 Results

Server Vendor & Model: Huawei FusionServer 2288H V6 **Storage Vendor & Model: VMware vSAN 7.0 U2 - All Flash** **Hypervisor: VMware ESXi 7.0 U2 Build 17630552** **Datacenter Management Software: VMware vCenter 7.0 U2 Build 17694817**	**VMmark 3.1.1 Score = 10.25 @ 9 Tiles**

Number of Hosts: 4	**Uniform Hosts [yes/no]: yes**	**Total sockets/cores/threads in test: 8/144/288**
Tested By: Huawei	**Test Date: 06-23-2021**	

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	3576.05	0.99	0.31 | 0.00	561.91	0.98	0.24 | 0.00	1135.67	1.55	389.17	859.17	1.72	435.46	622.33	1.79	472.86	1.36
p1	3558.66	0.99	0.37 | 0.00	561.59	0.98	0.28 | 0.00	1128.85	1.54	400.70	819.08	1.64	454.09	618.62	1.78	483.06	1.34
p2	3558.87	0.99	0.27 | 0.00	560.12	0.98	0.25 | 0.02	1132.80	1.54	394.29	824.33	1.65	455.17	585.80	1.69	506.20	1.33
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	3573.67	0.99	0.37 | 0.00	570.85	1.00	0.37 | 0.00	1118.42	1.52	416.12	840.70	1.68	470.86	606.10	1.75	515.64	1.35
p1	3557.86	0.99	0.42 | 0.00	568.49	0.99	0.34 | 0.00	1116.00	1.52	425.22	806.60	1.61	488.51	604.75	1.74	527.74	1.33
p2	3543.35	0.98	0.38 | 0.00	560.34	0.98	0.28 | 0.02	1122.30	1.53	406.23	815.35	1.63	466.79	583.52	1.68	515.83	1.32
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	3585.14	1.00	0.27 | 0.00	572.56	1.00	0.36 | 0.00	1154.30	1.57	365.16	869.17	1.74	417.71	628.62	1.81	460.28	1.38
p1	3573.92	0.99	0.25 | 0.00	571.06	1.00	0.33 | 0.00	1159.83	1.58	349.24	849.42	1.70	399.38	636.45	1.84	430.18	1.37
p2	3556.91	0.99	0.25 | 0.00	569.68	1.00	0.33 | 0.00	1161.15	1.58	357.74	843.98	1.69	412.31	604.08	1.74	447.93	1.36
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	3571.75	0.99	0.24 | 0.00	566.16	0.99	0.21 | 0.01	1160.55	1.58	353.88	874.05	1.75	402.01	635.35	1.83	449.53	1.38
p1	3553.63	0.99	0.25 | 0.00	561.83	0.98	0.25 | 0.01	1167.28	1.59	340.28	849.38	1.70	397.22	635.52	1.83	431.83	1.37
p2	3540.09	0.98	0.23 | 0.00	562.88	0.98	0.22 | 0.01	1141.17	1.55	386.48	827.58	1.65	447.85	589.90	1.70	498.31	1.33
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	3572.24	0.99	0.36 | 0.00	572.47	1.00	0.36 | 0.02	1128.25	1.54	390.83	859.02	1.72	436.78	619.80	1.79	481.03	1.36
p1	3554.69	0.99	0.37 | 0.00	571.43	1.00	0.40 | 0.04	1156.05	1.57	355.03	838.00	1.67	410.43	629.85	1.82	450.54	1.36
p2	3539.06	0.98	0.37 | 0.00	565.94	0.99	0.28 | 0.00	1149.83	1.57	365.95	839.38	1.68	410.71	600.55	1.73	450.70	1.35
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	3570.26	0.99	0.25 | 0.00	566.48	0.99	0.25 | 0.01	1170.67	1.59	338.99	888.10	1.77	376.75	642.83	1.85	413.02	1.39

p1	3562.66	0.99	0.23 | 0.00	558.97	0.98	0.20 | 0.00	1168.17	1.59	344.60	845.42	1.69	403.86	631.70	1.82	440.38	1.36
p2	3546.29	0.99	0.23 | 0.00	557.73	0.97	0.25 | 0.02	1136.58	1.55	399.38	825.77	1.65	451.58	585.67	1.69	509.05	1.33
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	3584.17	1.00	0.23 | 0.00	570.66	1.00	0.33 | 0.01	1134.83	1.55	395.25	882.85	1.76	448.92	641.42	1.85	504.25	1.38
p1	3564.77	0.99	0.23 | 0.00	564.65	0.99	0.20 | 0.03	1157.47	1.58	358.86	818.95	1.64	413.88	602.02	1.74	459.16	1.34
p2	3544.46	0.99	0.24 | 0.00	564.25	0.99	0.21 | 0.01	1153.08	1.57	367.79	869.73	1.74	417.44	626.30	1.81	464.22	1.37
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	3580.46	1.00	0.34 | 0.00	563.00	0.98	0.23 | 0.00	1148.65	1.56	362.80	867.38	1.73	409.68	657.10	1.89	446.54	1.38
p1	3569.00	0.99	0.25 | 0.00	557.38	0.97	0.24 | 0.01	1164.38	1.59	350.49	846.92	1.69	399.28	603.77	1.74	451.20	1.35
p2	3552.22	0.99	0.33 | 0.00	556.62	0.97	0.29 | 0.02	1141.80	1.55	369.48	869.05	1.74	409.11	633.73	1.83	448.23	1.36
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	3580.95	1.00	0.23 | 0.00	566.97	0.99	0.28 | 0.00	1162.40	1.58	352.94	873.17	1.74	403.97	660.25	1.90	445.20	1.39
p1	3571.27	0.99	0.27 | 0.00	563.98	0.99	0.23 | 0.00	1180.38	1.61	321.37	858.73	1.72	369.87	621.45	1.79	409.83	1.37
p2	3563.66	0.99	0.27 | 0.00	563.37	0.98	0.25 | 0.01	1164.78	1.59	341.41	883.67	1.77	380.54	640.02	1.85	416.91	1.38
p0_score:	12.36															
p1_score:	12.21															
p2_score:	12.13															

Infrastructure_Operations_Scores:	vMotion	SVMotion	XVMotion	Deploy
Completed_Ops_PerHour	57.00	52.00	42.00	19.00
Avg_Seconds_To_Complete	4.65	86.44	108.28	318.61
Failures	0.00	0.00	0.00	0.00
Ratio	2.19	2.89	2.33	2.38
Number_Of_Threads	2	2	2	2

Summary	Run_Is_Compliant	Turbo_Setting:0
	Number_Of_Compliance_Issues(0)*	Median_Phase(p1)
Unreviewed_VMmark3_Applications_Score	12.21	
Unreviewed_VMmark3_Infrastructure_Score	2.43	
Unreviewed_VMmark3_Score	10.25	

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 7.0 U2 Build 17694817 / 03-09-2021
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	Huawei FusionServer 2288H V6
Processor Vendor and Model	Intel Xeon Gold 6354
Processor Speed (GHz) / Turbo Boost Speed (GHz)	3.00 / 3.60
Total Sockets/Total Cores/Total Threads	2 Sockets / 36 Cores / 72 Threads
Primary CPU Cache	32KB I + 48KB D on chip per core
Secondary CPU Cache	1.25MB I+D on chip per core
Other CPU Cache	39MB I+D on chip per chip
BIOS Version	0.66 (U1007)
Memory Size (in GB, Number of DIMMs)	1024GB, 16*64GB
Memory Type and Speed	64GB, 3200MHz, 2Rx4
Disk Subsystem Type	VMware vSAN, NFS
Number of Disk Controllers	0
Disk Controller Vendors and Models	none
Total Number of Physical Disks for Hypervisor	1
Disk Vendors, Models, Capacities, and Speeds	Huawei ES3610P V5 HWE52P431T6M005N, 1600GB, 32Gb/S
Number of Host Bus Adapters	0
Host Bus Adapter Vendors and Models	none
Number of Network Controllers	2
Network Controller Vendors and Models	2*Huawei SC382 2*25GE SFP+
Other Hardware	none
Other Software	none

Hardware Availability Date (MM-DD-YYYY)	04-26-2021
BIOS Availability Date (MM-DD-YYYY)	04-26-2021
Software Availability Date (MM-DD-YYYY)	03-09-2021
Network	
Network Switch Vendors and Models	Huawei CE6865-48S8CQ-EI Huawei CE5855-48T4S2Q-EI
Network Speed	3*25GE
Primary Storage	
Storage Category	vSAN
Storage Vendors, Models, and Firmware Versions	4*Huawei FusionServer 2288H V6
Storage Configuration Summary	VMware vSAN(caching tier): Huawei ES3610P V5 1.6TB (HWE52P431T6M005N) VMware vSAN(capacity tier): Huawei ES3510P V5 1.92TB (HWE52P431T9L005N)
Datacenter Management Server	
System Model	Huawei FusionServer 2288H V5
Processor Vendor and Model	Intel Xeon Gold 6226R
Processor Speed (GHz)	2.90
Total Sockets/Total Cores/Total Threads	2 Sockets / 32 Cores / 64 Threads
Memory Size (in GB, Number of DIMMs)	384GB, 12*32GB
Network Controller(s) Vendors and Models	Huawei LOM X722 2*10GE+2*GE, Huawei SM380 2*25GE SFP+
Operating System, Version, Bitness, and Service Pack	VMware ESXi 7.0 U2 Build 17630552
Virtual Center VM Number of vCPUs	8
Virtual Center VM Virtual Memory (in GB)	28
Virtual Center VM Operating System, Version, Bitness, and Service Pack	VMware vCenter 7.0 U2 Build 17694817
Other Hardware	none
Other Software	none
Clients	

Total Number of Virtual Clients / Virtual Client Hosts	10 / 3
System Model(s)	Huawei FusionServer 2288H V5
Processor Vendor(s) and Model(s)	Intel Xeon Gold 6230
Processor Speed(s) (GHz)	2.10
Total Sockets/Total Cores/Total Threads	2 Sockets / 40 Cores / 80 Threads
Memory per Virtual Client Host	384GB, 12*32GB
Network Controller(s) Vendors and Models	Huawei LOM X722 2*10GE+2*GE (not used), Huawei SM380 2*25GE SFP+
Virtual Client Networking Notes	All management traffic and workload traffic running on one vmnic4 and vSAN traffic running on one vmnic5.
Virtual Client Storage Notes	All clients stored on vSAN datastore.
Other Hardware	none
Other Software	VMware ESXi 7.0 U2 Build 17630552

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: Thin

Virtualization Software Notes

- PrimeClient VM configured with a 500GB sized second disk and a 500GB sized third disk for scratch (default 200GB second disk, no third disk).
- Cluster DRS Automation level set to Fully Automated.
- DRS Migration threshold set to level 2.

- Logging was disabled for all VMs (default: enabled).
- Logical CPU configuration changed for all multi-cpu VMs to one socket with multiple cores (default: Single core per socket).
- The CPU Shares of PrimeClient and all clients set to "high" (default: normal).
- VMkernel.Boot.hyperthreadingMitigation = true set on all ESXi hosts (default: false).

Server Notes

- NUMA enabled (default).
- Intel Hyper Threading enabled (default).
- Power Management Setting: Performance.
- VMX enabled (default).
- SATA Controller disable.
- MONITOR/MWAIT enabled.

- **ESXi settings of SUT hosts:**

  - CPU performance policy = High Performance (default: balanced)
  - /vmkernel/hyperthreadingMitigation = true (default: false)
  - /UserVars/HostClientSessionTimeout = 7200 (default: 900)
  - /UserVars/HostClientCEIPOptIn = 1 (default: 0)

Networking Notes

- MTU was set to 9000 for vmnic0,vmnic2 and vmnic3, and MTU was set to 9000 for VM Network, vSAN and vMotion vSwitches.
- Three Standard vSwitches were set up: vSwitch0, vSAN and vMotion.
- These three switches were backed by vmnic0, vmnic2 and vmnic3 respectively.
- vSwitch0 contains the following portgroups: VM Network, Management Network.
- vSAN contains the following portgroups: vSAN.
- vMotion contains the following portgroups: vMotion.
- All virtual machines used VM Network for traffic.
- All vSAN traffic is only run on vSAN on its only dedicated vSwitch.
- All vMotion traffic is only run on vMotion on its only dedicated vSwitch.

Storage Notes

- All client hosts OS installed on a RAID1 of 2 m.2 drives via SSSTC ER2-GD480.
- All SUT hosts OS installed on a NVMe drives via HWE52P431T6M005N.

- **NFS Folder configuration**

  - All folders are backed by two physical servers acted as NFS on a single striped zfs array, mounted storage device detailed in the "Secondary Shared Storage Device" section.
  - deploy1 datastore -> /data/deploy1 belongs to "nfs1".
  - deploy2 datastore -> /data/deploy2 belongs to "nfs2".
  - vmotion1 datastore -> /data/vmotion1 belongs to "nfs1".
  - vmotion2 datastore -> /data/vmotion2 belongs to "nfs2".

- **System under Test configuration**

  - 4 x 2 x Intel(R) Xeon(R) Gold 6354

o 4 x 16 x 64GB Memory, 3200MHz, 2Rank (2G*8bit)
o 4 x 3 x Huawei ES3610P V5 1.6TB NVMe
o 4 x 6 x Huawei ES3510P V5 1.92TB NVMe
o 4 x 2 x Huawei SC382 2*25GE SFP+

• Software configuration

o All Flash vSAN.
o Two disk groups per host.
o Each disk group contains 1 x Huawei ES3610P V5 1.6TB for caching and 3 x Huawei ES3510P V5 1.92TB for capacity.
o vSAN Default Storage Policy used.

• Virtual Machine LUN Distribution:

o vsanDatastore contains the following workloads:

♦ AuctionAppA*
♦ AuctionAppB*
♦ AuctionDB*
♦ AuctionLB*
♦ AuctionMSQ*
♦ AuctionNoSQL*
♦ AuctionWebA*
♦ AuctionWebB*
♦ DS3DB*
♦ DS3WebA*
♦ DS3WebB*
♦ DS3WebC*
♦ ElasticAppA*
♦ ElasticAppB*
♦ ElasticDB*
♦ ElasticLB*
♦ ElasticWebA*
♦ ElasticWebB*
♦ Standby*

• Secondary Shared Storage Device:

o Hardware: Huawei FusionServer 2288H V5
♦ 2 x Huawei FusionServer 2288H V5
♦ 2 x 2 x Intel(R) Xeon(R) Gold 6226R
♦ 2 x 12 x 32GB Memory, 2933MHz, 2Rank (2G*8bit)
♦ 2 x Huawei LOM X722 2*10GE+2*GE
♦ 2 x Huawei SM380 2*25GE SFP+
♦ 2 x Huawei SP382 2*25GE SFP+ (not used)
♦ 2 x 5 x Huawei ES3510P V5 1.92TB NVMe
♦ 2 x SSSTC ER2-GD480

♦ 2 x LSI SAS3004

o Firmware:
♦ BIOS - 7.58 (U47)
♦ BMC - 5.20 (U4282)
♦ X722 - 3.33
♦ SM380 - 14.28.1300
♦ SP382 - 16.28.1002
♦ 1.92TB Huawei ES3510P V5 1.92TB (HWE52P431T9L005N) -3248
♦ SSSTC ER2-GD480 - E4N6404

o Software:
♦ CentOS-7-x86_64-DVD-2009/ Updates as of 11/04/2020

o Configuration:
♦ Disks installed into Bays 1, 2, 3, 4, 5 per host
♦ All 5 disks mount to the path /data per host
♦ ufw disabled per host

o Virtual Machine LUN Distribution:
♦ deploy1 contains the following workload: deploy1, belongs to "nfs1"
♦ deploy2 contains the following workload: deploy2, belongs to "nfs2"
♦ vmotion1 contains the following workload: vmotion1, belongs to "nfs1"
♦ vmotion2 contains the following workload: vmotion2, belongs to "nfs2"

Datacenter Management Server Notes

The datacenter management server was hosted on a separate vCenter Server Appliance from the Clients and SUT.

Operating System Notes

- none

Software Notes

- none

Client Notes

- Cluster DRS Automation level set to Fully Automated.
- DRS Migration threshold set to level 2.
- MTU was set to 9000 for vmnic4 and MTU was set to 9000 for vSwitch of VM Network and Management.
- MTU was set to 9000 for vmnic5 and MTU was set to 9000 for vSwitch of vSAN.
- The CPU Shares of PrimeClient and all clients set to "high" (default: normal).

- **ESXi settings of Client hosts:**

  o CPU performance policy = High Performance (default: balanced)
  o /vmkernel/hyperthreadingMitigation = true (default: false)

o /UserVars/HostClientSessionTimeout = 7200 (default: 900)
o /UserVars/HostClientCEIPOptIn = 1 (default: 0)

- **vSAN configuration**

o All Flash vSAN.
o One disk group per host.
o Each disk group contains 1 x Huawei ES3610P V5 1.6TB for caching and 3 x Huawei ES3610P V5 1.6TB for capacity.
o vSAN Default Storage Policy used.

o vsanDatastore contains the following Client VMs:

♦ Client0
♦ Client1
♦ Client2
♦ Client3
♦ Client4
♦ Client5
♦ Client6
♦ Client7
♦ Client8
♦ PrimeClient

Other Notes

- VMmark3.properties - DebugLevel = 3 (default: 0)
- VMmark3.properties - VCscratchDir = /root/VMmark3/results/scratch (default: /root/VMmark3/samples/)
- VMmark3.properties - VCsupportTimeOut = 4800 (default: 2400)
- VMmark3.properties - TileDelay = 10 (default: 60)
