VMmark® 3.1 Results

Server Vendor & Model: Supermicro SYS-1029U-TN10RT **Storage Vendor & Model: Supermicro SYS-1029U-TN10RT running VMware vSAN 6.7** **Hypervisor: VMware ESXi 6.7 Update 3, Build 14320388** **Datacenter Management Software: VMware vCenter Server Appliance 6.7 Update 2a Build 13643870**	**VMmark 3.1 Score = 7.39 @ 8 Tiles**

Number of Hosts: 4	**Uniform Hosts [yes/no]: yes**	**Total sockets/cores/threads in test: 8/160/320**
Tested By: Supermicro	**Test Date: 09-19-2019**	

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	3572.86	0.99	0.41 | 0.00	564.05	0.99	0.61 | 0.29	881.50	1.20	1038.45	600.73	1.20	1242.11	408.50	1.18	1431.42	1.11
p1	3566.28	0.99	0.44 | 0.00	559.51	0.98	0.54 | 0.15	861.05	1.17	1112.54	603.05	1.20	1330.10	434.93	1.25	1519.33	1.11
p2	3552.40	0.99	0.47 | 0.00	559.04	0.98	0.67 | 0.26	856.95	1.17	1137.85	573.02	1.14	1383.78	367.93	1.06	1617.64	1.06
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	3584.92	1.00	0.41 | 0.00	561.56	0.98	0.56 | 0.16	784.58	1.07	1423.47	535.95	1.07	1706.31	365.90	1.06	1937.38	1.03
p1	3576.50	0.99	0.41 | 0.00	553.30	0.97	0.44 | 0.06	804.85	1.10	1339.32	532.15	1.06	1623.06	376.48	1.09	1843.80	1.04
p2	3570.17	0.99	0.40 | 0.00	555.04	0.97	0.68 | 0.33	831.25	1.13	1218.59	557.73	1.11	1465.17	379.98	1.10	1642.69	1.06
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	3573.69	0.99	0.43 | 0.00	566.87	0.99	0.63 | 0.31	861.25	1.17	1099.92	607.55	1.21	1322.52	437.23	1.26	1503.40	1.12
p1	3555.57	0.99	0.43 | 0.00	560.45	0.98	0.53 | 0.12	858.95	1.17	1147.15	574.98	1.15	1407.78	387.95	1.12	1625.70	1.08
p2	3546.47	0.99	0.42 | 0.00	554.62	0.97	0.65 | 0.32	851.40	1.16	1147.64	602.62	1.20	1354.56	414.32	1.19	1527.56	1.10
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	3589.21	1.00	0.41 | 0.00	570.99	1.00	0.77 | 0.60	815.80	1.11	1307.87	540.15	1.08	1587.34	376.48	1.09	1832.17	1.05
p1	3568.31	0.99	0.44 | 0.00	571.25	1.00	0.58 | 0.28	817.00	1.11	1300.46	541.23	1.08	1577.54	363.23	1.05	1806.29	1.05
p2	3555.63	0.99	0.45 | 0.00	564.53	0.99	0.66 | 0.39	843.65	1.15	1188.60	587.15	1.17	1439.28	418.25	1.21	1635.54	1.10
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	3580.70	1.00	0.39 | 0.00	567.23	0.99	0.44 | 0.25	885.27	1.21	1012.86	604.73	1.21	1222.81	410.70	1.18	1409.76	1.11
p1	3558.18	0.99	0.46 | 0.00	564.78	0.99	0.52 | 0.21	855.10	1.16	1118.57	610.92	1.22	1310.90	416.10	1.20	1516.93	1.11
p2	3544.69	0.99	0.51 | 0.00	559.76	0.98	0.62 | 0.19	905.02	1.23	942.59	621.55	1.24	1126.31	445.07	1.28	1283.46	1.14
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	3584.61	1.00	0.48 | 0.00	573.61	1.00	0.70 | 0.42	803.30	1.09	1352.56	527.45	1.05	1665.51	355.20	1.02	1903.91	1.03
p1	3565.68	0.99	0.47 | 0.00	569.61	1.00	0.55 | 0.26	801.45	1.09	1340.23	556.95	1.11	1586.83	398.93	1.15	1773.70	1.07
p2	3553.54	0.99	0.44 | 0.00	566.29	0.99	0.46 | 0.11	840.17	1.14	1205.70	559.65	1.12	1478.57	372.60	1.07	1722.31	1.06

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	3587.12	1.00	0.46 | 0.01	570.52	1.00	0.75 | 0.73	808.55	1.10	1334.98	562.80	1.12	1581.91	379.60	1.09	1816.59	1.06
p1	3574.43	0.99	0.43 | 0.00	561.67	0.98	0.54 | 0.26	813.30	1.11	1314.47	533.23	1.07	1619.37	376.93	1.09	1836.59	1.05
p2	3564.38	0.99	0.44 | 0.00	559.33	0.98	0.59 | 0.21	807.98	1.10	1331.65	529.98	1.06	1653.92	354.95	1.02	1902.85	1.03
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	3585.57	1.00	0.41 | 0.00	569.86	1.00	1.02 | 0.58	866.38	1.18	1061.95	638.52	1.28	1233.47	447.88	1.29	1408.92	1.14
p1	3578.03	0.99	0.49 | 0.00	566.68	0.99	0.63 | 0.23	894.15	1.22	981.99	589.90	1.18	1192.59	417.90	1.21	1350.21	1.11
p2	3558.61	0.99	0.42 | 0.14	564.31	0.99	0.42 | 0.17	855.85	1.17	1122.82	602.55	1.20	1348.44	415.55	1.20	1522.62	1.10

p0_score:	8.66
p1_score:	8.61
p2_score:	8.65

Infrastructure_Operations_Scores:	vMotion	SVMotion	XVMotion	Deploy
Completed_Ops_PerHour	55.00	48.00	38.00	20.00
Avg_Seconds_To_Complete	7.76	93.70	118.69	274.68
Failures	0.00	0.00	0.00	0.00
Ratio	2.12	2.67	2.11	2.50
Number_Of_Threads	2	2	2	2

Summary	Run_Is_Compliant	Turbo_Setting:0
	Number_Of_Compliance_Issues(0)*	Median_Phase(p2)
Unreviewed_VMmark3_Applications_Score	8.65	
Unreviewed_VMmark3_Infrastructure_Score	2.34	
Unreviewed_VMmark3_Score	7.39	

Configuration

Virtualization Software	
Hypervisor Vendor, Product, Version, and Build / Availability Date (MM-DD-YYYY)	VMware ESXi, 6.7.0 Update 3, 14320388 / 8-20-2019
Datacenter Management Software Vendor, Product, Version, and Build / Availability Date (MM-DD-YYYY)	VMware vCenter Server Appliance 6.7 Update 2a Build 13643870 / 5-14-2019
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	Supermicro SYS-1029U-TN10RT
Processor Vendor and Model	Intel Xeon Gold 6230
Processor Speed (GHz) / Turbo Boost Speed (GHz)	2.10 / 3.90
Total Sockets/Total Cores/Total Threads	2 Sockets / 40 Cores / 80 Threads
Primary CPU Cache	32 KB I + 32 KB D on chip per core
Secondary CPU Cache	1 MBI + D on chip per core
Other CPU Cache	27.5MB I+D on chip per chip
BIOS Version	3.1a
Memory Size (in GB, Number of DIMMs)	384, 12
Memory Type and Speed	32GB 2666Mhz RDIMM
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	Supermicro, 32GB SATADOM
Number of Host Bus Adapters	0
Host Bus Adapter Vendors and Models	none
Number of Network Controllers	2
Network Controller Vendors and Models	Supermicro AOC-m25g-i2s,Supermicro AOC-URN6-i2XT
Other Hardware	none
Other Software	none
Hardware Availability Date (MM-DD-YYYY)	02-01-2019
BIOS Availability Date (MM-DD-YYYY)	07-19-2019
Software Availability Date (MM-DD-YYYY)	08-20-2019
Network	

Network Switch Vendors and Models	Supermicro SSE-C3632S
Network Speed	2 x 25GbE used for management, vMotion, vSAN, and VMs, 1 x 10GbE used for back up management.
Primary Storage	
Storage Category	vSAN
Storage Vendors, Models, and Firmware Versions	4 x Supermicro SYS-1029U-TN10RT with VMware vSAN 6.7,
Storage Configuration Summary	VMware vSAN (caching tier): Intel Optane SSD DC P4800x Series PE21K375GA (375GB, 2.5" u.2) VMware vSAN (capacity tier): Intel SSD DC P4510 Series SSDPE2KX080T8OS (8TB, 2.5" u.2)

Datacenter Management Server	
System Model	SYS-1028U-TN10RT
Processor Vendor and Model	Intel Xeon E5-2699 v4
Processor Speed (GHz)	2.2Ghz
Total Sockets/Total Cores/Total Threads	2 Sockets / 22 Cores / 44 Threads
Memory Size (in GB, Number of DIMMs)	384,24
Network Controller(s) Vendors and Models	Supermicro AOC-M25G-i2s
Operating System, Version, Bitness, and Service Pack	VMware ESXi, 6.7.0 Upate 2, Build 13006603
Virtual Center VM Number of vCPUs	8
Virtual Center VM Virtual Memory (in GB)	24
Virtual Center VM Operating System, Version, Bitness, and Service Pack	VMware vCenter Server Appliance 6.7 Update 2a Build 13643870
Other Hardware	none
Other Software	none

Clients	
Total Number of Virtual Clients / Virtual Client Hosts	9 / 2
System Model(s)	SYS-1028U-TN10RT
Processor Vendor(s) and Model(s)	Intel Xeon E5-2699 v4
Processor Speed(s) (GHz)	2.2
Total Sockets/Total Cores/Total Threads	2 Sockts / 44 Cores / 88 Threads
Memory per Virtual Client Host	384GB

Network Controller(s) Vendors and Models	Supermicro AOC-M25-i2s
Virtual Client Networking Notes	All clients are connect to a distributed switch through VMnic3
Virtual Client Storage Notes	Clients and vCenter Server hosted on SYS-1028U-TN10RT on the NFS datastore: NFS.
Other Hardware	none
Other Software	none

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 100 GB sized second disk
- /adv/Virsto/DedupSpaceReclaim set to 2 on all SUT hosts (default 0)
- *Cluster DRS Automation Level* set to **Fully Automated**, *DRS Migration Threshold* set to **Level 2**
  Drivers/Tools
  - intel-nvme-vmd 1.7.0.1000-1OEM.670.0.0.8169922 - Needed for Intel Select Solution
  - intel_ssd_data_center_tool 3.0.19-400 - Useful for updating firmware and getting SMART info
- /adv/LSOM/blLLOGCacheLines set to 32768 on all SUT hosts (default 128)
- /adv/LSOM/blPLOGLsnCacheLines set to 32768 on all SUT hosts (default 4096)
- /adv/Power/CpuPolicy set to “High Performance” on all SUT hosts (default Balanced)

Server Notes:

Server BIOS Settings:

- Intel Hyper Threading Enabled (Default)
- Intel Turbo Boost Enabled (Default)

- C-States: Disabled (Default: C0/C1)
- Power Management Setting: Extreme Performance (Default: OS Control Power Management)

Networking Notes:

Distributed vSwitch Configuration:

- Four port groups for different traffic types on a distributed switch with 2 uplinks: Management, VMNetwork, vMotion, vSAN-Network.
- Each VMK can access both uplinks.

Client Configuration:

- Uplink1: VMnic3 for Client hosts: 172.16.81.10, 172.16.81.13.
- vmk0, and vmk2 were configured for management traffic.
- vmk1 set to vMotion traffic.

SUT Configuration:

- Uplink1: VMnic2 for SUT hosts: 172.16.81.19,172.16.81.23,172.16.81.27,172.16.81.31.
- Uplink2: VMnic3 for SuT hosts: 172.16.81.19,172.16.81.23,172.16.81.27,172.16.81.31.
- MTU Set to 9000 on Distributed vSwitch and Supermicro SSE-C3632S, as well as on vmk1, vmk2, and vmk3.
- vmk0 on SUT is set for management Traffic on the distributed switch
- vmk1 on SUT is set for vSAN Traffic
- vmk2 on SUT is set for vMotion Traffic
- vmk3 on SUT is set for a back up management network on a standard vSwitch (vSwitch0)
- No MTU change was made to the VMs.

Storage Notes:

- All OS installed on SATADOM

NFS Folder configuration:

- All folders are backed by the same NFS server on a single striped zfs array, mounted storage device detailed in the "Secondary Storage device section"
- "vmotion" datastore -> /data
- "deploy" datastore -> /data/deploy
- "deploy2" datastore -> /data/deploy2
- "NFS" datastore -> /data/NFS

Systems Under Test configuration:

SYS-1029U-TN10RT

- 2 x Intel Gold 6230 2.1GHz Processors
- 384GB Memory (12 x 32GB 2666Mhz)
- 2 x Intel P4800x 375GB NVMe(Shelf)
- 6 x Intel P4510 8TB NVMe(Shelf)

Software Configuration:

- All Flash vSAN

- Two disk groups per host.
- Each diskgroup contains 1 x Intel P4800x for caching and 3 x Intel P4510 for capacity.
- vSAN Default Storage Policy used.

Virtual Machine LUN Distribution:

vsanDatastore contains the following workloads:

- AuctionWebA*,AuctionWebB*,AuctionAppA*,AuctionAppB*,AuctionDB*,AuctionMSQ*,AuctionLB*,AuctionNoSQL*,DS3WebB*,DS3WebC*,DS3DB*,ElasticLB*,ElasticWebA*,ElasticWebB*,ElasticAppA*,ElasticAppB*,ElasticDB*

"vmotion" storage contains the following workloads:

- Standby*, DS3WebA*

Secondary Shared Storage Device:

SYS-1029U-TN10RT

- 2 x Intel Gold 6140 Processors
- 192GB Memory (24 x 8GB 2133MHz)
- 9 x INTEL SSDPE2KX040T7 P4500 4TB 2.5" NVME

Software Configuration:

- CentOS 7.6 with Kernel Version: 3.10.0-957.21.3.el7.x86_64
- ZFS version: 0.8.1-1.el7
- 9 x Intel P4500 4TB configured flat striping mounted to /data
- 2 x AOC-S40G-i2Q bonded in LACP Active
- NFS Server DPCNFSDCOUNT=32, export to /data
- 4 NFS mounts to all Client servers and SuTs with the following Datastore names: NFS, vmotion, deploy, deploy2.

Workload configuration:

- vmmarkt(Deploy-Template) and vmmarkt2(Deploy-Template2) are located on the NFS datastore.
- deploy & deploy2 LUNs contain the following workload: deploy
- vmotion LUN contains the following workloads: xvmotion, svmotion

Datacenter Management Server Notes

- Supermicro SYS-1028U-TN10RT+ running VMware ESXi, 6.7 update 3, 13006603 with VMware 6.7 Update 2a Server Appliance Build 13643870

Operating System Notes

- none

Software Notes

- none

Client Notes

- Clients, Primeclient and vCenter server hosted on SYS-1028U-TN10RT+, hosted on the "NFS" datastore

- /adv/UserVars/HostClientCEIPOptIn set to 2 on both client hosts
- /adv/UserVars/SuppressHyperthreadWarning set to 1 on both client hosts
- /adv/UserVars/SuppressShellWarning set to 1 on client host 172.16.81.13
- Client Host 172.16.81.13 contains the following VMs: Client0, Client1, Client2, and Client3
- Client Host 172.16.81.10 contains the following VMs: Client4, Client5, Client6, Client7,PrimeClient, and VMware vCenter Appliance

Other Notes

- VCscratchDIr set to /root/VMmark3/results/scratch (default /root/VMmark3/samples)
