VMmark® 3.1.1 Results

Server Vendor & Model: Supermicro Superserver SYS-2029BT-HNR **Storage Vendor & Model:** VMware vSAN 7.0.0 **Hypervisor:** VMware ESXi 7.0.0 Build 15843807 **Datacenter Management Software:** VMware vCenter 7.0.0 Build 15952599	**VMmark 3.1.1 Score =** **10.63 @ 12 Tiles**

Number of Hosts: 4	Uniform Hosts [yes/no]: yes	Total sockets/cores/threads in test: 8/192/384
Tested By: Supermicro		**Test Date: 06-08-2020**

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	3581.53	1.00	0.89 | 0.02	573.81	1.00	0.83 | 0.21	772.12	1.05	1462.97	530.58	1.06	1761.38	374.50	1.08	2006.42	1.04
p1	3560.76	0.99	0.99 | 0.01	564.18	0.99	0.60 | 0.12	777.52	1.06	1462.30	509.35	1.02	1802.83	320.95	0.93	2103.71	0.99
p2	3548.79	0.99	1.19 | 0.02	564.68	0.99	0.65 | 0.10	810.27	1.10	1238.65	576.75	1.15	1447.08	416.75	1.20	1631.69	1.08
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	3572.48	0.99	0.94 | 0.01	564.59	0.99	0.53 | 0.09	865.83	1.18	1050.72	595.95	1.19	1240.61	429.23	1.24	1416.50	1.11
p1	3560.81	0.99	1.28 | 0.07	563.68	0.99	0.60 | 0.07	862.15	1.17	1056.01	598.95	1.20	1242.01	408.43	1.18	1423.47	1.10
p2	3546.86	0.99	1.01 | 0.04	559.49	0.98	0.57 | 0.10	850.90	1.16	1083.26	591.52	1.18	1275.64	431.75	1.24	1397.67	1.10
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	3571.32	0.99	0.90 | 0.02	571.07	1.00	0.79 | 0.16	781.62	1.06	1422.73	515.23	1.03	1735.16	342.45	0.99	2014.52	1.01
p1	3560.33	0.99	0.88 | 0.01	566.52	0.99	0.43 | 0.04	748.90	1.02	1575.74	513.17	1.03	1863.04	349.20	1.01	2122.20	1.01
p2	3550.84	0.99	0.89 | 0.01	565.25	0.99	0.60 | 0.18	795.95	1.08	1362.45	512.38	1.02	1653.43	355.27	1.02	1885.78	1.02
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	3566.52	0.99	0.93 | 0.02	564.97	0.99	0.54 | 0.11	830.45	1.13	1196.77	562.30	1.12	1422.82	383.45	1.11	1628.72	1.07
p1	3557.40	0.99	0.93 | 0.02	564.18	0.99	0.55 | 0.08	799.12	1.09	1327.51	555.40	1.11	1585.02	396.43	1.14	1807.56	1.06
p2	3539.75	0.98	0.90 | 0.01	561.76	0.98	0.47 | 0.04	830.85	1.13	1170.46	562.67	1.12	1433.51	367.68	1.06	1595.98	1.05
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	3566.66	0.99	1.34 | 0.30	572.99	1.00	0.83 | 0.24	770.20	1.05	1465.40	536.65	1.07	1728.47	364.27	1.05	1966.51	1.03
p1	3562.67	0.99	0.97 | 0.01	571.17	1.00	0.62 | 0.20	762.02	1.04	1508.00	493.82	0.99	1858.13	349.45	1.01	2094.25	1.00
p2	3555.60	0.99	1.03 | 0.01	567.34	0.99	0.49 | 0.04	772.30	1.05	1451.19	521.08	1.04	1710.23	346.00	1.00	1981.34	1.01
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

	Actual	Ratio	QoS(nRT|MaxPctF)	Actual	Ratio	QoS(nRT|MaxPctF)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	GM
p0	3572.49	0.99	0.99 | 0.02	565.34	0.99	0.56 | 0.10	865.35	1.18	1043.42	621.73	1.24	1213.47	449.05	1.29	1363.72	1.13
p1	3555.62	0.99	1.23 | 0.17	563.45	0.98	0.63 | 0.11	873.15	1.19	1026.96	598.95	1.20	1227.92	403.38	1.16	1446.42	1.10
p2	3539.19	0.98	1.08 | 0.02	561.23	0.98	0.60 | 0.16	856.02	1.17	1041.84	620.15	1.24	1200.59	435.55	1.26	1335.38	1.12
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	3573.10	0.99	0.82 | 0.01	573.22	1.00	0.66 | 0.08	791.58	1.08	1419.38	518.27	1.04	1765.77	360.35	1.04	2026.49	1.03
p1	3560.14	0.99	0.98 | 0.03	566.51	0.99	0.63 | 0.16	834.92	1.14	1198.45	564.95	1.13	1433.62	383.75	1.11	1645.20	1.07
p2	3547.94	0.99	0.91 | 0.01	563.09	0.98	0.49 | 0.02	822.50	1.12	1232.11	574.85	1.15	1483.74	402.77	1.16	1619.97	1.08
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	3574.15	0.99	1.10 | 0.03	572.00	1.00	0.79 | 0.16	824.60	1.12	1200.02	559.12	1.12	1432.19	372.75	1.07	1683.93	1.06
p1	3565.80	0.99	1.37 | 0.11	566.38	0.99	0.68 | 0.16	786.15	1.07	1363.86	550.83	1.10	1590.79	371.65	1.07	1845.46	1.04
p2	3554.72	0.99	1.07 | 0.04	559.90	0.98	0.50 | 0.06	751.62	1.02	1549.89	490.82	0.98	1901.37	324.95	0.94	2192.96	0.98
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	3569.26	0.99	1.06 | 0.09	567.41	0.99	0.47 | 0.03	792.65	1.08	1351.21	531.48	1.06	1624.75	361.60	1.04	1818.35	1.03
p1	3540.32	0.98	0.91 | 0.02	567.14	0.99	0.46 | 0.07	779.35	1.06	1394.48	539.05	1.08	1661.00	392.15	1.13	1832.16	1.05
p2	3530.88	0.98	0.97 | 0.01	564.35	0.99	0.50 | 0.02	781.77	1.06	1412.26	514.95	1.03	1720.37	335.05	0.97	1918.94	1.00
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	3585.21	1.00	1.52 | 0.18	565.81	0.99	0.81 | 0.31	871.17	1.19	1011.18	628.45	1.26	1170.45	440.48	1.27	1313.08	1.13
p1	3563.89	0.99	1.28 | 0.08	557.30	0.97	0.45 | 0.01	873.50	1.19	1012.85	597.95	1.19	1208.92	441.38	1.27	1317.78	1.12
p2	3542.15	0.98	1.12 | 0.02	551.82	0.96	0.58 | 0.07	873.48	1.19	1014.72	601.00	1.20	1206.98	414.62	1.20	1343.61	1.10
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	3572.87	0.99	1.39 | 0.19	571.76	1.00	0.83 | 0.26	824.08	1.12	1207.47	578.00	1.15	1427.02	421.30	1.21	1588.22	1.09
p1	3563.81	0.99	1.28 | 0.04	565.68	0.99	0.59 | 0.13	773.88	1.05	1448.79	507.75	1.01	1775.31	345.27	1.00	1982.97	1.01
p2	3559.05	0.99	0.98 | 0.01	561.20	0.98	0.56 | 0.08	734.15	1.00	1609.65	506.05	1.01	1908.52	344.32	0.99	2133.95	0.99
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	3570.55	0.99	0.93 | 0.01	570.26	1.00	0.72 | 0.13	822.38	1.12	1206.55	554.40	1.11	1434.78	405.77	1.17	1567.67	1.07
p1	3561.89	0.99	1.17 | 0.07	566.20	0.99	0.78 | 0.36	817.17	1.11	1237.19	546.95	1.09	1495.59	382.45	1.10	1612.83	1.06
p2	3546.24	0.99	0.92 | 0.01	563.40	0.98	0.55 | 0.02	785.15	1.07	1348.86	544.85	1.09	1621.84	399.73	1.15	1769.56	1.05

p0_score:	12.82
p1_score:	12.61
p2_score:	12.61

Infrastructure_Operations_Scores:	vMotion	SVMotion	XVMotion	Deploy
Completed_Ops_PerHour	54.00	52.00	40.00	33.00
Avg_Seconds_To_Complete	8.06	87.71	107.79	172.29

Failures	0.00	0.00	0.00	0.00
Ratio	2.08	2.89	2.22	4.12
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	12.61	
Unreviewed_VMmark3_Infrastructure_Score	2.72	
Unreviewed_VMmark3_Score	10.63	

Configuration

Virtualization Software	
Hypervisor Vendor, Product, Version, and Build / Availability Date (MM-DD-YYYY)	VMware ESXi 7.0.0 Build 15843807 / 04-02-2020
Datacenter Management Software Vendor, Product, Version, and Build / Availability Date (MM-DD-YYYY)	VMware vCenter Server Appliance 7.0.0 Build 15952599 / 04-02-2020
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 Superserver SYS-2029BT-HNR
Processor Vendor and Model	Intel Xeon Platinum 8268
Processor Speed (GHz) / Turbo Boost Speed (GHz)	2.90 / 3.90
Total Sockets/Total Cores/Total Threads	2 Sockets / 48 Cores / 96 Threads
Primary CPU Cache	32 KB I + 32KB D on chip per core
Secondary CPU Cache	1 MB I + D on chip per core
Other CPU Cache	35.75 MB I+D on chip per chip
BIOS Version	3.2

Memory Size (in GB, Number of DIMMs)	768, 12
Memory Type and Speed	64GB 2933Mhz RDIMM
Disk Subsystem Type	VMware vSAN, NFS
Number of Disk Controllers	1
Disk Controller Vendors and Models	Supermicro AOC-SMG2-2TM2
Total Number of Physical Disks for Hypervisor	2
Disk Vendors, Models, Capacities, and Speeds	Intel SSDSCKKB2240G8, 240GB, 6Gb/s
Number of Host Bus Adapters	0
Host Bus Adapter Vendors and Models	none
Number of Network Controllers	1
Network Controller Vendors and Models	Supermicro AOC-S25G-i2S
Other Hardware	none
Other Software	none
Hardware Availability Date (MM-DD-YYYY)	04-02-2019
BIOS Availability Date (MM-DD-YYYY)	10-19-2019
Software Availability Date (MM-DD-YYYY)	12-05-2019
Network	
Network Switch Vendors and Models	SSE-C3632S
Network Speed	32x One-Hundred-Gigabit Ethernet ports, each optionally configured for 4 x 25Gb/s
Primary Storage	
Storage Category	vSAN
Storage Vendors, Models, and Firmware Versions	1 x Supermicro SYS-2029BT-HNR with VMware vSAN 7.0
Storage Configuration Summary	VMware vSAN (caching tier): Intel Optane SSD DC P4800x Series SSDPE21K75 (750GB 2.5") VMware vSAN (capacity tier): Intel DC P4510 SSDPE2KX080T801 2.5" NVMe (8TB, 2.5")

Datacenter Management Server	
System Model	Supermicro Superserver SYS-2028TP-HC0R
Processor Vendor and Model	Intel Xeon E5-2670 v3
Processor Speed (GHz)	2.30
Total Sockets/Total Cores/Total Threads	2 Sockets / 24 Cores / 48 Threads
Memory Size (in GB, Number of DIMMs)	32, 16
Network Controller(s) Vendors and Models	AOC-STG-i2t
Operating System, Version, Bitness, and Service Pack	VMware ESXi 6.7 Update 3 Build 14320388
Virtual Center VM Number of vCPUs	4
Virtual Center VM Virtual Memory (in GB)	19
Virtual Center VM Operating System, Version, Bitness, and Service Pack	VMware vCenter Server Appliance 7.0.0 Build 15952599
Other Hardware	none
Other Software	none

Clients	
Total Number of Virtual Clients / Virtual Client Hosts	12/2
System Model(s)	Supermicro Superserver SYS-1029U-TN10RT
Processor Vendor(s) and Model(s)	Intel Xeon Platinum 8253
Processor Speed(s) (GHz)	2.20
Total Sockets/Total Cores/Total Threads	2 Sockets / 32 Cores / 64 Threads
Memory per Virtual Client Host	384
Network Controller(s) Vendors and Models	AOC-S25G-i2s
Virtual Client Networking Notes	All management traffic and workload traffic running on one vmnic2
Virtual Client Storage Notes	All clients mounted on NFS datastore
Other Hardware	none

Other Software	VMware ESXi 7.0.0 Build 15843807						

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 200GB sized second disk.
- Cluster DRS Automation level set to Fully Automated
- DRS Mitigation Threshold set to Level 2.
- /adv/Virsto/DedupSpaceReclaim set to 2 (default 0)

Server Notes

- Intel Hyper Threading enabled (default).
- Intel Turbo Boost Enabled (Default).
- C-States: Disabled (Default: C0/C1).
- Power Management Setting: Extreme Performance (Default: OS Controls Power Management).
- Intel VMD Mode Enabled on all disks (Default: Disabled).

Networking Notes

- Two Standard vSwitches were set up: vSwitch0 and vSwitch1.
- These two switches were backed by vmnic0 and vmnic1 respectively.
- vSwitch0 contains the following portgroups: Management Network, VM Network, and vMotion.
- vSwitch1 contains the following portgroups: vSAN.
- All virtual machines used VM Network for traffic.
- All vSAN traffic is only run on vSwitch1 on its only dedicated vSwitch.

Storage Notes

- All client server OS installed on SATADOM.
- All SuT hosts OS installed on a RAID1 of 2 m.2 drives via AOC-SMG2-2TM2.

- **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 section."
    - vMotion datastore -> /data/deploy
    - vMotion2 datastore -> /data/deploy2
    - NFS datastore -> /data

- **System under Test configuration**

    - 2 x Intel Xeon Gold 8268 2.90Ghz processors
    - 768GB Memory (12 x 64GB 2666Mhz)
    - 2 x Intel P4800x 750GB NVMe (shelf)
    - 4 x Intel P4510 8TB NVMe (Shelf)

- **Software configuration**

    - All Flash vSAN.
    - Two diskgroups per host.
    - Each disk group contains 1 x Intel P4800x for caching and 2 x P4510 for capacity.
    - vSAN Default Storage Policy used.

    - **Virtual Machine LUN Distribution:**

        - **vsanDatastore contains the following workloads:**

            - AuctionAppA*
            - AuctionAppB*
            - AuctionDB*
            - AuctionLB*
            - AuctionMSQ*
            - AuctionNoSQL*
            - AuctionWebA*
            - AuctionWebb*
            - DS3DB*
            - DS3Webb*
            - DS3WebC*
            - ElasticAppA*
            - ElasticAppb*
            - ElasticDB*
            - ElasticLB*
            - ElasticWebA*
            - ElasticWebB*
            - Standby*
            - DS3WebA*

- **Secondary Shared Storage Device:**

  - Hardware: SYS-1029P-N32R
    - 768GB Memory 12x 72ASS8G72LZ-2G6D2 64GB 2666 DIMM @ 2666MHz; 1DPC
    - 2x MCX455A-ECAT - Single Port; bonded 100G LACP
    - 2x Xeon 6230; Turbo Enabled, H0 Stepping
    - 16x Intel 4TB P4500 (SSDPE2KX040T7) NVMe SSD's
    - 1x SuperMicro SSD 32GB SATADOM
  - Firmware:
    - BIOS - 3.1a
    - IPMI - 1.56
    - MCX455A-ECAT - 12.27.1016 (MT_2180110032)
    - 4TB P4500 (SSDPE2KX040T7) - QDV101D0
    - SuperMicro SSD 32GB SATADOM - SOB20R
  - Software:
    - Ubuntu 18.04.4 w/ Updates as of 04/09/2020
    - Kernel 4.15.0-91-generic
    - zfs module - 0.7.5-1ubuntu1
    - zfs release - 0.7.5-1ubuntu1
  - Configuration:
    - Disks installed into Bays 0,1,2,3,12,13,14,15,16,17,18,19,28,29,30,31
    - zfs configured `raidz` over all 16 disks, mounted to /data
    - MCX455A-ECAT set to MTU 9000
    - LACP Bond of MCX455A-ECAT set to MTU 9000
    - ufw disabled
    - nfs-kernel-server modified /etc/default/nfs-kernel-server `RPCNFSDCOUNT=40`

  - **Virtual Machine LUN Distribution:**

  - vMotion contains the following workload: deploy0
  - vMotion2 containts the following workload: deploy1

Datacenter Management Server Notes

- The datacenter management server was hosted on a seperate vCenter Server Appliance from the Clients and SuT.

Operating System Notes

- driver: intel-nvme-vmd installed after ESXi installation, version used: 1.8.0.1001-1OEM

Software Notes

- none

Client Notes

- NFS contains all the client and PrimeClient virtual machines.

Other Notes

- none

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