

VMmark® 3.1.1 Results

Server Vendor & Model: Supermicro SuperServer SYS-220BT-HNTR
Storage Vendor & Model: VMware vSAN 7.0 U2 All Flash
Hypervisor: VMware ESXi 7.0 U2a Build 17867351
Datacenter Management Software: VMware vCenter Server 7.0 U3a Build 18778458

VMmark 3.1.1 Score =
15.86 @ 16 Tiles

| | | |
|--|--|---|
| Number of Hosts: 4 | Uniform Hosts [yes/no]: yes | Total sockets/cores/threads in test: 8/256/512 |
| Tested By: Supermicro | | Test Date: 01-26-2022 |
| 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 | 3567.59 | 0.99 | 0.51 0.00 | 561.83 | 0.98 | 0.39 0.25 | 924.92 | 1.26 | 875.05 | 638.62 | 1.28 | 1078.63 | 442.30 | 1.28 | 1172.39 | 1.15 |
| p1 | 3555.52 | 0.99 | 0.52 0.00 | 561.67 | 0.98 | 0.53 0.20 | 918.40 | 1.25 | 898.31 | 636.92 | 1.27 | 1043.56 | 457.73 | 1.32 | 1196.12 | 1.15 |
| p2 | 3533.08 | 0.98 | 0.55 0.00 | 559.38 | 0.98 | 0.54 0.28 | 911.40 | 1.24 | 911.22 | 647.15 | 1.29 | 1091.93 | 454.73 | 1.31 | 1220.88 | 1.15 |
| 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 | 3584.90 | 1.00 | 0.68 0.04 | 565.60 | 0.99 | 0.54 0.19 | 967.95 | 1.32 | 743.08 | 683.17 | 1.36 | 858.69 | 473.00 | 1.36 | 987.16 | 1.19 |
| p1 | 3574.77 | 0.99 | 0.64 0.00 | 555.32 | 0.97 | 0.42 0.18 | 966.12 | 1.32 | 734.05 | 713.08 | 1.42 | 840.61 | 500.12 | 1.44 | 947.81 | 1.21 |
| p2 | 3559.82 | 0.99 | 0.55 0.00 | 554.11 | 0.97 | 0.49 0.15 | 965.75 | 1.32 | 746.43 | 680.30 | 1.36 | 878.53 | 474.77 | 1.37 | 984.68 | 1.19 |
| 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 | 3561.50 | 0.99 | 0.74 0.27 | 562.96 | 0.98 | 0.41 0.17 | 953.90 | 1.30 | 784.07 | 671.17 | 1.34 | 918.19 | 462.15 | 1.33 | 1041.41 | 1.18 |
| p1 | 3549.48 | 0.99 | 0.52 0.00 | 561.32 | 0.98 | 0.58 0.23 | 917.10 | 1.25 | 892.70 | 661.08 | 1.32 | 1044.88 | 481.82 | 1.39 | 1182.53 | 1.17 |
| p2 | 3539.31 | 0.98 | 0.46 0.00 | 557.78 | 0.97 | 0.58 0.24 | 952.67 | 1.30 | 784.24 | 665.88 | 1.33 | 935.75 | 442.62 | 1.28 | 1057.13 | 1.16 |
| 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 | 3572.98 | 0.99 | 0.80 0.27 | 568.67 | 0.99 | 0.97 0.56 | 974.90 | 1.33 | 721.15 | 720.58 | 1.44 | 815.59 | 512.05 | 1.48 | 900.91 | 1.23 |
| p1 | 3576.24 | 0.99 | 0.46 0.00 | 561.77 | 0.98 | 0.60 0.36 | 1004.20 | 1.37 | 653.51 | 709.10 | 1.42 | 761.68 | 527.15 | 1.52 | 841.62 | 1.24 |
| p2 | 3555.27 | 0.99 | 0.45 0.00 | 558.81 | 0.98 | 0.44 0.24 | 998.62 | 1.36 | 654.67 | 715.90 | 1.43 | 745.96 | 500.18 | 1.44 | 847.02 | 1.22 |
| 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 | 3580.96 | 1.00 | 0.50 0.00 | 565.28 | 0.99 | 0.36 0.07 | 948.50 | 1.29 | 777.35 | 687.45 | 1.37 | 906.76 | 510.93 | 1.47 | 1012.51 | 1.21 |
| p1 | 3566.80 | 0.99 | 0.53 0.00 | 566.31 | 0.99 | 0.47 0.10 | 948.73 | 1.29 | 800.32 | 664.90 | 1.33 | 931.27 | 456.05 | 1.32 | 1080.37 | 1.17 |
| p2 | 3554.06 | 0.99 | 0.53 0.00 | 560.89 | 0.98 | 0.50 0.17 | 948.65 | 1.29 | 787.72 | 692.77 | 1.38 | 903.48 | 492.30 | 1.42 | 1010.25 | 1.20 |
| 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 | 3581.43 | 1.00 | 0.53 0.17 | 566.72 | 0.99 | 0.55 0.25 | 960.42 | 1.31 | 749.40 | 676.83 | 1.35 | 883.01 | 464.98 | 1.34 | 1017.55 | 1.19 |

| | | | | | | | | | | | | | | | | |
|----------------|---------|-------|------------------|--------|-------|------------------|---------|-------|---------|--------|-------|---------|--------|-------|---------|------|
| p1 | 3570.87 | 0.99 | 0.55 0.00 | 563.77 | 0.99 | 0.41 0.11 | 956.98 | 1.30 | 774.61 | 672.83 | 1.34 | 898.86 | 487.30 | 1.41 | 1022.62 | 1.19 |
| p2 | 3545.27 | 0.99 | 0.56 0.00 | 560.72 | 0.98 | 0.54 0.19 | 964.15 | 1.31 | 742.95 | 704.55 | 1.41 | 849.46 | 494.82 | 1.43 | 972.93 | 1.21 |
| 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 | 3565.05 | 0.99 | 0.76 0.24 | 563.82 | 0.99 | 0.46 0.12 | 964.70 | 1.31 | 754.08 | 680.40 | 1.36 | 884.54 | 468.18 | 1.35 | 1011.95 | 1.19 |
| p1 | 3551.90 | 0.99 | 0.52 0.01 | 560.65 | 0.98 | 0.51 0.13 | 925.27 | 1.26 | 876.47 | 668.85 | 1.34 | 1017.54 | 462.60 | 1.33 | 1178.38 | 1.17 |
| p2 | 3537.46 | 0.98 | 0.49 0.00 | 558.61 | 0.98 | 0.39 0.09 | 915.38 | 1.25 | 913.99 | 631.77 | 1.26 | 1080.31 | 451.90 | 1.30 | 1236.25 | 1.15 |
| 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 | 3572.48 | 0.99 | 0.80 0.00 | 565.73 | 0.99 | 0.95 0.59 | 948.17 | 1.29 | 798.35 | 670.20 | 1.34 | 929.28 | 460.48 | 1.33 | 1069.75 | 1.18 |
| p1 | 3566.70 | 0.99 | 0.78 0.00 | 562.38 | 0.98 | 0.45 0.12 | 979.92 | 1.33 | 697.94 | 724.05 | 1.45 | 797.20 | 538.48 | 1.55 | 880.65 | 1.24 |
| p2 | 3548.54 | 0.99 | 0.77 0.00 | 560.75 | 0.98 | 0.55 0.26 | 995.80 | 1.36 | 657.78 | 714.73 | 1.43 | 751.13 | 501.20 | 1.45 | 838.08 | 1.22 |
| 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 | 3584.55 | 1.00 | 0.49 0.00 | 567.77 | 0.99 | 0.52 0.28 | 956.23 | 1.30 | 771.39 | 698.05 | 1.39 | 890.99 | 491.88 | 1.42 | 1000.80 | 1.21 |
| p1 | 3570.52 | 0.99 | 0.49 0.00 | 559.15 | 0.98 | 0.40 0.09 | 977.98 | 1.33 | 706.38 | 691.67 | 1.38 | 822.47 | 502.73 | 1.45 | 936.80 | 1.21 |
| p2 | 3555.91 | 0.99 | 0.58 0.00 | 557.15 | 0.97 | 0.49 0.06 | 978.77 | 1.33 | 724.10 | 688.73 | 1.38 | 841.43 | 475.12 | 1.37 | 968.52 | 1.19 |
| 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 | 3565.31 | 0.99 | 0.51 0.00 | 569.35 | 1.00 | 0.51 0.29 | 949.02 | 1.29 | 781.70 | 698.48 | 1.40 | 932.89 | 515.77 | 1.49 | 1001.99 | 1.21 |
| p1 | 3552.78 | 0.99 | 0.56 0.00 | 567.36 | 0.99 | 0.42 0.11 | 943.05 | 1.28 | 813.42 | 655.33 | 1.31 | 966.47 | 454.85 | 1.31 | 1094.61 | 1.17 |
| p2 | 3538.02 | 0.98 | 0.54 0.00 | 568.76 | 0.99 | 0.49 0.11 | 926.50 | 1.26 | 858.73 | 673.83 | 1.35 | 978.17 | 469.93 | 1.36 | 1115.95 | 1.18 |
| 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 | 3570.17 | 0.99 | 0.46 0.00 | 564.15 | 0.99 | 0.40 0.14 | 968.25 | 1.32 | 742.34 | 680.50 | 1.36 | 874.78 | 497.20 | 1.43 | 982.51 | 1.20 |
| p1 | 3557.83 | 0.99 | 0.51 0.00 | 560.09 | 0.98 | 0.42 0.08 | 947.70 | 1.29 | 799.53 | 668.15 | 1.33 | 930.05 | 460.98 | 1.33 | 1054.38 | 1.17 |
| p2 | 3539.91 | 0.98 | 0.47 0.00 | 559.11 | 0.98 | 0.40 0.18 | 953.65 | 1.30 | 770.31 | 698.08 | 1.39 | 885.14 | 517.38 | 1.49 | 982.23 | 1.21 |
| 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 | 3565.90 | 0.99 | 1.29 0.27 | 570.10 | 1.00 | 0.96 0.48 | 998.60 | 1.36 | 661.84 | 684.12 | 1.37 | 775.89 | 497.88 | 1.44 | 866.97 | 1.21 |
| p1 | 3557.03 | 0.99 | 0.80 0.00 | 571.75 | 1.00 | 0.74 0.39 | 1002.65 | 1.37 | 647.15 | 743.95 | 1.49 | 732.14 | 529.77 | 1.53 | 809.06 | 1.25 |
| p2 | 3548.22 | 0.99 | 0.76 0.00 | 564.42 | 0.99 | 0.67 0.33 | 1002.35 | 1.37 | 659.33 | 713.42 | 1.43 | 761.39 | 525.27 | 1.51 | 845.38 | 1.23 |
| 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 | 3579.62 | 0.99 | 0.45 0.00 | 565.02 | 0.99 | 0.82 0.45 | 970.38 | 1.32 | 729.46 | 687.35 | 1.37 | 844.96 | 481.75 | 1.39 | 941.75 | 1.20 |
| p1 | 3561.96 | 0.99 | 0.51 0.00 | 563.45 | 0.98 | 0.49 0.25 | 950.75 | 1.29 | 781.25 | 694.70 | 1.39 | 897.23 | 517.73 | 1.49 | 980.80 | 1.21 |
| p2 | 3537.26 | 0.98 | 0.57 0.00 | 556.00 | 0.97 | 0.52 0.14 | 968.95 | 1.32 | 729.17 | 677.85 | 1.35 | 867.56 | 477.88 | 1.38 | 964.72 | 1.19 |
| 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 | 3572.97 | 0.99 | 0.81 0.27 | 569.19 | 0.99 | 0.43 0.16 | 950.42 | 1.29 | 782.85 | 693.92 | 1.39 | 903.67 | 486.77 | 1.40 | 1028.30 | 1.20 |
| p1 | 3567.37 | 0.99 | 0.45 0.00 | 563.40 | 0.98 | 0.47 0.15 | 959.75 | 1.31 | 764.25 | 674.50 | 1.35 | 897.16 | 492.48 | 1.42 | 999.83 | 1.20 |
| p2 | 3548.91 | 0.99 | 0.51 0.00 | 563.11 | 0.98 | 0.41 0.09 | 962.25 | 1.31 | 753.42 | 675.02 | 1.35 | 884.06 | 470.23 | 1.36 | 1007.14 | 1.18 |
| 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 | 3574.69 | 0.99 | 0.49 0.00 | 563.80 | 0.99 | 0.86 0.57 | 957.30 | 1.30 | 776.94 | 699.60 | 1.40 | 892.51 | 516.48 | 1.49 | 997.33 | 1.22 |

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|------------------|---------|-------|------------------|--------|-------|------------------|--------|-------|---------|--------|-------|---------|--------|-------|---------|------|
| p1 | 3554.39 | 0.99 | 0.54 0.00 | 559.47 | 0.98 | 0.61 0.34 | 970.17 | 1.32 | 722.36 | 682.33 | 1.36 | 804.41 | 457.82 | 1.32 | 892.90 | 1.18 |
| p2 | 3539.57 | 0.98 | 0.52 0.00 | 560.35 | 0.98 | 0.58 0.19 | 981.33 | 1.34 | 694.01 | 747.65 | 1.49 | 742.13 | 510.60 | 1.47 | 824.08 | 1.23 |
| 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 | 3577.99 | 0.99 | 0.75 0.00 | 570.01 | 1.00 | 0.96 0.57 | 987.10 | 1.34 | 694.89 | 719.00 | 1.44 | 814.53 | 512.65 | 1.48 | 893.83 | 1.23 |
| p1 | 3563.46 | 0.99 | 0.79 0.00 | 560.00 | 0.98 | 0.54 0.20 | 999.08 | 1.36 | 658.82 | 686.33 | 1.37 | 763.42 | 497.90 | 1.44 | 860.44 | 1.21 |
| p2 | 3552.86 | 0.99 | 0.80 0.00 | 563.03 | 0.98 | 0.65 0.26 | 987.92 | 1.35 | 672.72 | 732.60 | 1.46 | 762.16 | 546.40 | 1.58 | 840.70 | 1.25 |
| p0_score: | 19.18 | | | | | | | | | | | | | | | |
| p1_score: | 19.14 | | | | | | | | | | | | | | | |
| p2_score: | 19.15 | | | | | | | | | | | | | | | |

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|--|---------|----------|----------|--------|
| Infrastructure_Operations_Scores: | vMotion | SVMotion | XVMotion | Deploy |
| Completed_Ops_PerHour | 56.00 | 52.00 | 40.00 | 30.00 |
| Avg_Seconds_To_Complete | 6.28 | 86.31 | 113.63 | 198.49 |
| Failures | 0.00 | 0.00 | 0.00 | 0.00 |
| Ratio | 2.15 | 2.89 | 2.22 | 3.75 |
| 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 | 19.15 | |
| Unreviewed_VMmark3_Infrastructure_Score | 2.68 | |
| Unreviewed_VMmark3_Score | 15.86 | |

Configuration

| Virtualization Software | |
|---|---|
| Hypervisor Vendor, Product, Version, and Build / Availability Date (MM-DD-YYYY) | VMware ESXi 7.0 U2a Build 17867351 / 04-29-2021 |
| Datacenter Management Software Vendor, Product, Version, and Build / Availability Date (MM-DD-YYYY) | VMware vCenter Server Appliance 7.0 U3a Build 18778458 / 10-21-2021 |
| Supplemental Software | None |
| Servers | |
| Number of Servers in System Under Test | 4 |

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| (all subsequent fields in this section are per server) | |
| Server Manufacturer and Model | Supermicro SuperServer SYS-220BT-HNTR |
| Processor Vendor and Model | Intel Xeon Platinum 8352Y |
| Processor Speed (GHz) / Turbo Boost Speed (GHz) | 2.20 / 3.40 |
| Total Sockets/Total Cores/Total Threads | 2 Sockets / 64 Cores / 128 Threads |
| Primary CPU Cache | 32KB I+48KB D on chip per core |
| Secondary CPU Cache | 1280KB I+D on chip per core |
| Other CPU Cache | 48MB I+D on chip per chip |
| BIOS Version | 1.1 |
| Memory Size (in GB, Number of DIMMs) | 1024, 16 |
| Memory Type and Speed | 64GB 3200MHz Dual-Rank RDIMM |
| Disk Subsystem Type | VMware vSAN, NFS |
| Number of Disk Controllers | 1 |
| Disk Controller Vendors and Models | Supermicro AOC-SMG3-2M2-B-P |
| Total Number of Physical Disks for Hypervisor | 2 |
| Disk Vendors, Models, Capacities, and Speeds | Samsung, MZVL21T0HCLR-00B00, 1024GB, 8.0GB/s |
| Number of Host Bus Adapters | 0 |
| Host Bus Adapter Vendors and Models | None |
| Number of Network Controllers | 1 |
| Network Controller Vendors and Models | AOC-A25G-m2SM |
| Other Hardware | none |
| Other Software | none |
| Hardware Availability Date (MM-DD-YYYY) | 04-06-2021 |
| BIOS Availability Date (MM-DD-YYYY) | 05-06-2021 |
| Software Availability Date (MM-DD-YYYY) | 10-05-2021 |

Network

| | |
|--|---|
| Network Switch Vendors and Models | Supermicro SSE-C3632S |
| Network Speed | 32x One-Hundred-Gigabit QSFP28 ports, each optionally configured to 4x 25 Gb/s |
| Primary Storage | |
| Storage Category | vSAN |
| Storage Vendors, Models, and Firmware Versions | 1 x Supermicro SYS-220BT-HNTR with VMware vSAN 7.0 U2 |
| Storage Configuration Summary | VMware vSAN (caching tier): Intel Optane SSD DC P5800x Series SSDPF21Q016TB (1600GB 2.5") VMware vSAN (capacity tier): Intel DC P5510 SSDPF2KX038TZ 2.5" NVMe (3.84TB, 2.5") See Storage Notes for more details |
| Datacenter Management Server | |
| System Model | Supermicro SuperServer SYS-1029U-TN10RT |
| Processor Vendor and Model | Intel Xeon Platinum 8253 CPU |
| Processor Speed (GHz) | 2.20 |
| Total Sockets/Total Cores/Total Threads | 2 Sockets / 64 Cores / 128 Threads |
| Memory Size (in GB, Number of DIMMs) | 32, 12 |
| Network Controller(s) Vendors and Models | Supermicro AOC-M25G-i2s |
| Operating System, Version, Bitness, and Service Pack | VMware ESXi 7.0 Update 3 Build 18644231 |
| 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 7.0 U3a Build 18778458 |
| Other Hardware | none |
| Other Software | none |
| Clients | |
| Total Number of Virtual Clients / Virtual Client Hosts | 17/2 |
| System Model(s) | SYS-120U-TNR |
| Processor Vendor(s) and Model(s) | Intel Xeon Gold 6338 |
| Processor Speed(s) (GHz) | 2.00 |

| | |
|--|--|
| Total Sockets/Total Cores/Total Threads | 2 Sockets / 64 Cores / 128 Threads |
| Memory per Virtual Client Host | 1024 |
| Network Controller(s) Vendors and Models | AOC-S25G-i2s |
| Virtual Client Networking Notes | All management traffic and workload traffic running on vmnic0 and vmnic1 |
| Virtual Client Storage Notes | All clients mounted on NFS datastore |
| Other Hardware | none |
| Other Software | VMware ESXi 7.0 U2a Build 17867351 |

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

- Cluster DRS Automation level set to Fully Automated.
- DRS Migration Threshold set to Level 2.
- vSphere DRS Advanced Options: AggressiveCPUActive = 1 (default 0).
- CPU shares set to high for all DS3DB VMS (default:normal)
- All memory reserved for DS3DB* VMs. (default: no reservation)
- Set VMkernel.Boot.hyperthreadingMitigation = true (default: false)
- Added driver iavmd 2.7-IOEM and nmlx5-core and nmlx5-rdma 4.21 to ESXi 7.0u2 ISO build 17867351 using VMware PowerCLI to create a custom ESXi ISO.
- All SUT hosts have /adv/UserVars/SuppressShellWarning = 1 (default 0)

- sched.mem.pin set to TRUE for all DS3DB VMs. (default: FALSE)
- Second SUT host has /adv/UserVars/HostClientCEIPOptIn = 1 (default 0).

Server Notes

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

Networking Notes

- Single Distributed Switch with two uplinks.
- These two uplinks were backed by vmnic0 and vmnic1 respectively.
- Uplink1 contains the following distributed portgroups: Management Network, VMNetwork, and vMotion.
- Uplink2 contains the following distributed portgroups: vSAN.
- All virtual machines used VMNetwork for traffic.
- All vSAN traffic is only run on Uplink2 on its own dedicated vmnic.
- All vmnic and Dswitch are set to MTU 9000.
- Only SUT 10.16.0.42 used different virtual NIC name (vmk3) for vMotion (Others used vmk1).

Storage Notes

- All client server OS installed on SATADOM.
- All SUT hosts OS installed on a RAID1 of 2 m.2 drives via Supermicro AOC-SMG3-2M2-B-P.
- **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."
 - deploy1 datastore -> /data/VMmark2021/deploy
 - deploy2 datastore -> /data/VMmark2021/deploy2
 - NFS datastore -> /data/VMmark2021
 - vMotion datastore -> /data/VMmark2021/vmotion
 - vMotion2 datastore -> /data/VMmark2021/vmotion2
- **System under Test configuration**
 - 2 x Intel Xeon Platinum 8352Y 2.20GHz processors
 - 1024GB Memory (16 x 64GB 3200MHz)
 - 2 x Intel P5800x 1600GB NVMe (shelf)
 - 4 x Intel P5510 3.84TB NVMe (Shelf)
- **Software configuration**
 - All Flash vSAN.

- Two diskgroups per host.
- Each disk group contains 1 x Intel P5800x for caching and 2 x P5510 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*
 - DS3WebA*
 - DS3Webb*
 - DS3WebC*
 - ElasticAppA*
 - ElasticAppb*
 - ElasticDB*
 - ElasticLB*
 - ElasticWebA*
 - ElasticWebB*
 - Standby*

- **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
 - 24x 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 - 0.7.5-1ubuntu16.11
- zfs release - 0.7.5-1ubuntu16.11
- Configuration:
 - 3x raidz3 pools on one large pool over all 24 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:**
- deploy1 contains the following workload: deploy1
- deploy2 contains the following workload: deploy2

Datacenter Management Server Notes

- None

Operating System Notes

- None

Software Notes

- none

Client Notes

- Primeclient VM configured with a 200GB sized second disk.
- NFS contains all the client and PrimeClient virtual machines.
- /adv/UserVars/SuppressShellWarning = 1 (default : 0)
- Set VMkernel.Boot.hyperthreadingMitigation = true (default : false)
- All vmnic and Dswitch set to MTU 9000
- Host1 contains the following workloads: Client0, Client2, Client4, Client6, Client8, Client10, Client12, Client14.
- Host2 contains the following workloads: Client1, Client3, Client5, Client7, Client9, Client11, Client13, Client15, PrimeClient.

Other Notes

- VMmark3.properties modifications:
 - VCscratchDir = /root/VMmark3/results/scratch

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.

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