VMmark® 3.0 Results

Vendor and Hardware Platform: Dell EMC PowerEdge R740xd Virtualization Platform: VMware ESXi 6.5.0 U1, (Build 5969303) VMware vCenter Server : VMware vCenter Server 6.5 U1b (Build 6816762)	VMmark 3.0 Score = 11.00 @ 12 Tiles

Number of Hosts: 8	Uniform Hosts [yes/no]: yes	Total sockets/cores/threads in test: 16/256/512

Tested By: StorageReview.com	Test Date: 1-12-2018

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	3599.17	1.00	0.42 | 0.01	572.02	1.00	0.79 | 0.37	827.48	1.13	1144.70	591.88	1.18	1313.10	423.05	1.22	1440.08	1.10
p1	3598.46	1.00	0.41 | 0.03	572.55	1.00	0.57 | 0.22	823.45	1.12	1091.08	586.65	1.17	1250.53	424.68	1.22	1291.95	1.10
p2	3598.53	1.00	0.39 | 0.00	572.61	1.00	0.48 | 0.34	799.70	1.09	1246.42	593.02	1.18	1356.31	433.05	1.25	1543.03	1.10
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	3598.21	1.00	0.49 | 0.07	571.93	1.00	0.74 | 0.34	837.02	1.14	1234.90	596.00	1.19	1425.12	416.60	1.20	1446.94	1.10
p1	3597.32	1.00	0.44 | 0.05	573.68	1.00	0.69 | 0.44	831.27	1.13	1102.65	589.23	1.18	1251.01	431.05	1.24	1388.85	1.11
p2	3599.27	1.00	0.44 | 0.00	571.59	1.00	0.56 | 0.36	818.33	1.11	1119.58	575.30	1.15	1287.64	409.00	1.18	1384.00	1.09
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	3599.35	1.00	0.51 | 0.01	571.56	1.00	0.76 | 0.27	791.38	1.08	1234.55	551.30	1.10	1402.76	384.23	1.11	1577.95	1.06
p1	3599.04	1.00	0.47 | 0.00	571.21	1.00	0.72 | 0.43	773.65	1.05	1280.42	552.62	1.10	1450.72	384.15	1.11	1609.38	1.05
p2	3601.01	1.00	0.45 | 0.01	572.02	1.00	0.56 | 0.34	772.17	1.05	1258.13	553.40	1.11	1396.72	378.57	1.09	1572.20	1.05
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	3593.76	1.00	0.45 | 0.02	571.69	1.00	0.69 | 0.24	815.55	1.11	1163.47	571.42	1.14	1345.68	400.12	1.15	1441.52	1.08
p1	3602.92	1.00	0.43 | 0.01	571.53	1.00	0.71 | 0.38	817.38	1.11	1165.33	586.23	1.17	1346.29	428.55	1.24	1497.64	1.10
p2	3598.05	1.00	0.39 | 0.07	574.14	1.00	0.55 | 0.28	805.52	1.10	1216.42	555.73	1.11	1440.97	366.27	1.06	1599.67	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	3596.84	1.00	0.42 | 0.13	571.08	1.00	0.68 | 0.22	780.73	1.06	1248.46	561.08	1.12	1415.25	398.30	1.15	1527.17	1.06
p1	3561.50	0.99	2.19 | 0.49	573.17	1.00	0.62 | 0.37	796.40	1.08	1193.29	560.40	1.12	1334.86	400.73	1.16	1500.70	1.07
p2	3599.81	1.00	0.38 | 0.08	573.32	1.00	0.50 | 0.24	773.60	1.05	1315.73	527.92	1.05	1502.95	362.00	1.04	1653.75	1.03
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	3601.73	1.00	0.52 | 0.24	572.23	1.00	0.67 | 0.20	792.30	1.08	1248.36	574.02	1.15	1390.49	425.68	1.23	1494.96	1.09
p1	3598.00	1.00	0.45 | 0.27	572.34	1.00	0.47 | 0.20	769.08	1.05	1363.91	542.52	1.08	1490.11	384.93	1.11	1601.94	1.05
p2	3602.42	1.00	0.45 | 0.08	572.67	1.00	0.48 | 0.30	771.75	1.05	1305.47	576.20	1.15	1383.80	395.90	1.14	1580.91	1.07
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	3599.73	1.00	0.46 | 0.52	573.17	1.00	0.67 | 0.19	786.55	1.07	1269.86	545.40	1.09	1471.38	396.75	1.14	1586.83	1.06
p1	3595.13	1.00	0.45 | 0.62	571.21	1.00	0.65 | 0.33	792.52	1.08	1243.01	559.65	1.12	1399.22	399.48	1.15	1494.27	1.07
p2	3596.58	1.00	0.51 | 0.58	572.09	1.00	0.52 | 0.26	786.98	1.07	1263.75	556.65	1.11	1466.92	421.93	1.22	1543.02	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	3603.11	1.00	0.43 | 0.05	573.54	1.00	0.72 | 0.30	808.95	1.10	1196.26	547.42	1.09	1387.11	389.00	1.12	1535.22	1.06
p1	3596.67	1.00	0.46 | 0.13	571.18	1.00	0.62 | 0.17	807.40	1.10	1197.65	580.48	1.16	1381.70	416.18	1.20	1430.18	1.09
p2	3597.73	1.00	0.49 | 0.16	571.58	1.00	0.57 | 0.26	815.65	1.11	1109.20	586.70	1.17	1210.72	403.93	1.16	1350.65	1.09
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	3597.29	1.00	0.50 | 0.00	571.19	1.00	0.72 | 0.26	817.38	1.11	1187.25	570.88	1.14	1377.30	404.62	1.17	1510.76	1.08
p1	3601.99	1.00	0.49 | 0.02	572.52	1.00	0.62 | 0.32	812.00	1.11	1175.98	583.75	1.17	1339.81	426.40	1.23	1475.39	1.10
p2	3598.86	1.00	0.49 | 0.01	572.76	1.00	0.59 | 0.44	808.38	1.10	1136.34	564.12	1.13	1289.16	409.38	1.18	1326.62	1.08
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	3601.57	1.00	0.54 | 0.05	572.62	1.00	0.76 | 0.37	838.33	1.14	1287.66	611.17	1.22	1505.73	426.45	1.23	1757.40	1.11
p1	3601.10	1.00	0.44 | 0.14	575.08	1.01	0.67 | 0.35	835.73	1.14	1104.52	578.60	1.16	1289.24	423.23	1.22	1411.21	1.10
p2	3609.53	1.00	0.46 | 0.04	572.81	1.00	0.54 | 0.36	814.27	1.11	1151.30	561.67	1.12	1326.74	388.15	1.12	1476.80	1.07
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	3601.75	1.00	0.47 | 0.41	571.24	1.00	0.77 | 0.37	812.77	1.11	1152.97	591.45	1.18	1294.01	432.77	1.25	1431.32	1.10
p1	3593.02	1.00	0.43 | 0.30	572.00	1.00	0.70 | 0.27	809.27	1.10	1144.77	579.58	1.16	1266.25	405.45	1.17	1411.85	1.08
p2	3615.23	1.00	0.48 | 0.47	564.55	0.99	0.48 | 0.08	792.30	1.08	1249.97	577.95	1.15	1411.81	406.10	1.17	1501.10	1.08
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	3598.70	1.00	0.50 | 0.10	572.13	1.00	0.80 | 0.44	786.90	1.07	1280.70	537.88	1.07	1507.12	394.82	1.14	1625.58	1.06
p1	3599.66	1.00	0.49 | 0.01	571.34	1.00	0.64 | 0.45	810.23	1.10	1137.67	578.08	1.15	1274.61	411.18	1.19	1330.39	1.09
p2	3633.76	1.01	0.51 | 0.02	575.22	1.01	0.52 | 0.25	771.40	1.05	1315.37	553.80	1.11	1494.09	400.45	1.15	1558.41	1.06

p0_score:	12.97
p1_score:	13.00
p2_score:	12.84

Infrastructure_Operations_Scores:	vMotion	SVMotion	XVMotion	Deploy
Completed_Ops_PerHour	104.00	76.00	60.00	14.00
Avg_Seconds_To_Complete	11.73	142.68	177.80	917.89

Failures	0.00	0.00	0.00	0.00
Ratio	4.00	4.22	3.33	1.75
Number_Of_Threads	4	4	4	4

Summary	Run_Is_Compliant	Turbo_Setting:0
	Number_Of_Compliance_Issues(0)*	Median_Phase(p0)
Unreviewed_VMmark3_Applications_Score	12.97	
Unreviewed_VMmark3_Infrastructure_Score	3.15	
Unreviewed_VMmark3_Score	11.00	

Configuration

Virtualization Software	
Hypervisor Vendor, Product, Version, and Build / Availability Date (MM-DD-YYYY)	VMware ESXi 6.5.0 U1, Build 5969303 / 07-27-2017
Datacenter Management Software Vendor, Product, Version, and Build / Availability Date (MM-DD-YYYY)	VMware vCenter Server 6.5 U1b, Build 6816762 / 10-26-2017
Supplemental Software	None

Servers	
Number of Servers in System Under Test (all subsequent fields in this section are per server)	8
Server Manufacturer and Model	Dell EMC PowerEdge R740xd
Processor Vendor and Model	Intel Xeon Gold 6130
Processor Speed (GHz)	2.1
Total Sockets/Total Cores/Total Threads	2 Sockets / 32 Cores / 64 Threads
Primary CPU Cache	32 KB I + 32 KB D on chip per core
Secondary CPU Cache	1MB I+D on chip per core
Other CPU Cache	22 MB MB I+D on chip per chip L3
BIOS Version	1.2.11

Memory Size (in GB, Number of DIMMs)	256, 16
Memory Type and Speed	16 GB 2Rx8 PC4-2666 RDIMM
Disk Subsystem Type	FC SAN
Number of Disk Controllers	1
Disk Controller Vendors and Models	Dell PERC H730P
Total Number of Physical Disks for Hypervisor	1
Disk Vendors, Models, Capacities, and Speeds	Dell, HUC156030CSS204, 300GB 15K RPM SAS
Number of Host Bus Adapters	1
Host Bus Adapter Vendors and Models	Emulex LightPulse LPe16002B-M6
Number of Network Controllers	1
Network Controller Vendors and Models	Mellanox 25GbE 2P ConnectX4LX RNDC
Other Hardware	None
Other Software	None
Hardware Availability Date (MM-DD-YYYY)	07-11-2017
BIOS Availability Date (MM-DD-YYYY)	10-19-2017
Software Availability Date (MM-DD-YYYY)	10-26-2017
Network	
Network Switch Vendors and Models	2 x Dell EMC Networking Z9100-ON
Network Speed	25Gbps for VM traffic, vMotion and Management
Storage	
Array Vendors, Models, and Firmware Versions	NetApp AFF A200, NetApp Release 9.2P2
Fibre Channel Switch Vendors and Models	Brocade 6510
Disk Space Used	50.4TB: See Storage Notes
Array Cache Size	64GB
Total Number of Physical Disks Used	24 SAS SSD

Total Number of Enclosures/Pods/Shelves Used	1
Number of Physical Disks Used per Enclosure/Pod/Shelf	24
Total Number of Storage Groups Used	1
Number of LUNs Used	12: See Storage Notes
LUN Size and Number of Disks Per LUN	4 x 3TB, 24 disks, 8 x 100GB, 24 disks
RAID Type	RAID-DP
Number of Members per RAID Set	24
Disk Vendors, Models, and Speeds	NetApp, 960 GB SSD, 12Gbps
Storage	
Array Vendors, Models, and Firmware Versions	Seagate AssuredSAN 6004, GL222R050
Fibre Channel Switch Vendors and Models	Brocade 6510
Disk Space Used	50.4TB: See Storage Notes
Array Cache Size	40GB
Total Number of Physical Disks Used	48 SAS SSD
Total Number of Enclosures/Pods/Shelves Used	1
Number of Physical Disks Used per Enclosure/Pod/Shelf	48
Total Number of Storage Groups Used	1
Number of LUNs Used	2: See Storage Notes
LUN Size and Number of Disks Per LUN	2 x 17TB, 24 disks
RAID Type	RAID5
Number of Members per RAID Set	24
Disk Vendors, Models, and Speeds	Toshiba, 960 GB SSD, 12Gbps
Datacenter Management Server	

System Model	Dell PowerEdge R730
Processor Vendor and Model	Intel Xeon E5-2699 v4
Processor Speed (GHz)	2.2
Total Sockets/Total Cores/Total Threads	2 Sockets / 44 Cores / 88 Threads
Memory Size (in GB, Number of DIMMs)	256GB / 16
Network Controller(s) Vendors and Models	Mellanox 25GbE 2P ConnectX4LX
Operating System, Version, Bitness, and Service Pack	VMware ESXi 6.5.0 U1, Build 5969303
Virtual Center VM Number of vCPUs	8
Virtual Center VM Virtual Memory (in GB)	24.6GB
Virtual Center VM Operating System, Version, Bitness, and Service Pack	VMware vCenter Server 6.5 U1b, Build 6816762
Other Hardware	Emulex LightPulse LPe16002B-M6
Other Software	None

Clients	
Total Number of Virtual Clients / Virtual Client Hosts	13 / 4
System Model(s)	Dell PowerEdge R730
Processor Vendor(s) and Model(s)	Intel Xeon E5-2690 v3
Processor Speed(s) (GHz)	2.6
Total Sockets/Total Cores/Total Threads	8 Sockets / 96 Cores / 192 Threads
Memory per Virtual Client Host	256GB
Network Controller(s) Vendors and Models	Mellanox 25GbE 2P ConnectX4LX RNDC
Virtual Client Networking Notes	1 virtual adapter for management and workload traffic
Virtual Client Storage Notes	All virtual clients hosted on Seagate AssuredSAN 6004 / Refer Section: Storage Notes
Other Hardware	Emulex LightPulse LPe16002B-M6 / Refer Section: DataCenter Management Notes
Other Software	VMware ESXi 6.5.0 U1, Build 5969303

Notes for Workload

Virtualization Software Notes

Server OS was installed using VMware-VMvisor-Installer-6.5.0.update01-5969303.x86_64-DellEMC_Customized-A01.iso. This is a publicly available Dell Customized ISO that is based on VMware ESXi 6.5 U1.

Cluster DRS Automation Level set to "Fully Automated"; Level 2

/adv/UserVars/SuppressShellWarning = 1 (default 0)

/adv/Mem/VMOverheadGrowthLimit = 0 (default 4294967295)

Logging was disabled for all VMs except PrimeClient (default enabled)

Power Management Policy set to High Performance: Default Balanced

EVC mode set to Intel Broadwell on SUT Cluster

Mellanox ConnectX-4 Driver Updated to nmlx5-core-4.16.8.8

Server Notes

Dell Controlled Turbo Boost Enabled (frequency boost to 3.7 GHz): Default Disabled

Server Power Profile set to Performance: Default Performance Per Watt DAPC

Networking Notes

vSwitch0 on vmnic0 for Service Console and all VMs (25Gb/s)

vSwitch1 on vmnic1 for vMotion (25Gb/s)

vMotion vmKernel, vSwitch1 and vmnic1 MTU set to 9000 (default 1500)

Storage Notes

SUT Host OS installed on 1 x 300GB 15K RPM SAS HDD, for each host

All LUNS configured as block devices and no system memory used for write caching

NetApp AFF A200 configured in RAID-DP mode with data reduction features enabled: Inline Deduplication and Inline Compression

VMW_PSP_RR selected as the path selection policy on NetApp AFF A200: (default most recently used)

LUN Layout for NetApp AFF A200

- LUN 00 "Deploy1" : Deploy1 / 100GB
- LUN 01 "Deploy2" : Deploy2 / 100GB
- LUN 02 "Deploy3" : Deploy3 / 100GB
- LUN 03 "Deploy4" : Deploy4 / 100GB
- LUN 04 "Flash1" : Tile 0,4,8 / 3TB
- LUN 05 "Flash2" : Tile 1,5,9 / 3TB

- LUN 06 "Flash3" : Tile 2,6,10 / 3TB
- LUN 07 "Flash4" : Tile 3,7,11 / 3TB
- LUN 08 "SVMotion1" : SVMotion Operations 1,3 / 100GB
- LUN 09 "SVMotion2" : SVMotion Operations 2,4 / 100GB
- LUN 10 "XVMotion1" : XVMotion Operations 1,3 / 100GB
- LUN 11 "XVMotion2" : XVMotion Operations 2,4 / 100GB

Template storage located on Seagate AssuredSAN 6004: See Client Notes

Datacenter Management Server Notes

DataCenter Management Host OS installed on 1 x 300GB 10K RPM SAS HDD

vCenter VCSA storage located on Seagate AssuredSAN 6004: See Client Notes

Operating System Notes

None

Software Notes

None

Client Notes

Power Management Policy set to High Performance: Default Balanced

/adv/UserVars/SuppressShellWarning = 1 (default 0)

Mellanox ConnectX-4 Driver Updated to nmlx5-core-4.16.8.8

Client Host OS installed on 1 x 300GB 10K RPM SAS HDD, for each host

12 Clients, PrimeClient and VCSA storage located on Seagate AssuredSAN 6004

- 48 960GB PX04SV SAS 12Gbps SSDs
- 2 Pools, 24 SSDs per pool / Four diskgroups per pool, each with 6 SSDs in RAID5
- 17TB LUN on PoolA / Clients 0,2,4,6,8,10, PrimeClient, Templates 1,2
- 17TB LUN on PoolB / Clients 1,3,5,7,9,11, Templates 3,4, VCSA

12 Clients on four Client Hosts

- Client Host 1: PrimeClient, Client 0,4,8
- Client Host 2: Client 1,5,9
- Client Host 3: Client 2,6,10
- Client Host 4: Client 3,7,11

Other Notes

None

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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