

## VMmark® 3.1 Results

**Server Vendor & Model: QuantaGrid D52B-1U**  
**Storage Vendor & Model: QuantaGrid D52B-1U**  
**Hypervisor: VMware ESXi 6.7 U3 (Build 14320388)**  
**Datacenter Management Software: VMware vCenter Server 6.7 U3 (Build 14367737)**

**VMmark 3.1 Score =**  
**8.24 @ 9 Tiles**

Number of Hosts: 4

Uniform Hosts [yes/no]: yes

Total sockets/cores/threads in test: 8/192/384

Tested By: Quanta Cloud Technology

Test Date: 10-25-2019

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### Performance

	weathervane			weathervaneE			dvdstoreA			dvdstoreB			dvdstoreC			
TILE_0	Actual	Ratio	QoS(nRTI MaxPctF)	Actual	Ratio	QoS(nRTI MaxPctF)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	GM
p0	3574.96	0.99	0.58   0.00	564.99	0.99	0.52   0.02	883.60	1.20	999.66	606.15	1.21	1192.94	414.70	1.20	1374.08	1.11
p1	3554.00	0.99	0.57   0.00	560.18	0.98	0.45   0.01	864.58	1.18	1079.50	610.33	1.22	1296.76	441.48	1.27	1456.49	1.12
p2	3545.60	0.99	0.58   0.00	559.02	0.98	0.49   0.03	877.40	1.19	1004.29	599.48	1.20	1213.93	410.43	1.18	1382.97	1.10
TILE_1	Actual	Ratio	QoS(nRTI MaxPctF)	Actual	Ratio	QoS(nRTI MaxPctF)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	GM
p0	3580.81	1.00	0.57   0.00	566.88	0.99	0.52   0.08	790.20	1.08	1403.38	536.95	1.07	1710.34	362.57	1.05	1945.41	1.04
p1	3559.49	0.99	0.63   0.00	562.65	0.98	0.45   0.03	790.75	1.08	1400.22	509.27	1.02	1750.73	356.77	1.03	1989.93	1.02
p2	3554.19	0.99	0.59   0.00	562.47	0.98	0.51   0.08	779.92	1.06	1448.33	505.95	1.01	1768.38	338.25	0.98	2019.14	1.00
TILE_2	Actual	Ratio	QoS(nRTI MaxPctF)	Actual	Ratio	QoS(nRTI MaxPctF)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	GM
p0	3697.02	1.03	0.52   0.08	585.47	1.02	0.52   0.08	839.58	1.14	1044.71	567.95	1.13	1243.66	426.52	1.23	1417.39	1.11
p1	3678.57	1.02	0.49   0.04	579.63	1.01	0.59   0.14	831.88	1.13	1086.65	610.42	1.22	1269.03	436.05	1.26	1344.05	1.12
p2	3658.59	1.02	0.56   0.06	573.16	1.00	0.66   0.10	826.92	1.13	1095.27	602.60	1.20	1186.72	429.02	1.24	1373.71	1.11
TILE_3	Actual	Ratio	QoS(nRTI MaxPctF)	Actual	Ratio	QoS(nRTI MaxPctF)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	GM
p0	3706.67	1.03	0.55   0.03	593.13	1.04	0.69   0.13	796.70	1.08	1213.58	550.30	1.10	1464.43	382.45	1.10	1584.41	1.07
p1	3657.70	1.02	0.57   0.12	581.92	1.02	0.50   0.12	780.30	1.06	1349.15	529.77	1.06	1623.54	389.60	1.12	1742.81	1.05
p2	3646.65	1.01	0.61   0.08	586.76	1.03	0.64   0.12	803.60	1.09	1204.87	544.15	1.09	1331.85	428.55	1.24	1583.43	1.09
TILE_4	Actual	Ratio	QoS(nRTI MaxPctF)	Actual	Ratio	QoS(nRTI MaxPctF)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	GM
p0	3579.62	0.99	0.57   0.00	562.29	0.98	0.49   0.05	871.58	1.19	1047.42	583.27	1.17	1281.01	396.12	1.14	1475.24	1.09
p1	3580.82	1.00	0.54   0.00	560.44	0.98	0.45   0.01	852.80	1.16	1107.17	595.70	1.19	1327.28	414.60	1.20	1493.65	1.10
p2	3564.26	0.99	0.56   0.00	556.37	0.97	0.57   0.04	852.73	1.16	1101.15	575.58	1.15	1334.92	411.38	1.19	1515.58	1.09
TILE_5	Actual	Ratio	QoS(nRTI MaxPctF)	Actual	Ratio	QoS(nRTI MaxPctF)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	GM

<b>p0</b>	3687.49	1.02	0.46   0.06	587.97	1.03	0.59   0.13	837.80	1.14	1082.87	605.27	1.21	1273.70	433.80	1.25	1448.75	1.13
<b>p1</b>	3668.88	1.02	0.49   0.03	587.80	1.03	0.71   0.19	843.58	1.15	1070.29	608.00	1.21	1214.34	420.07	1.21	1363.49	1.12
<b>p2</b>	3659.05	1.02	0.45   0.04	585.62	1.02	0.61   0.10	831.05	1.13	1062.94	590.25	1.18	1144.88	461.82	1.33	1221.70	1.13
<b>TILE_6</b>	Actual	Ratio	QoS(nRT MaxPctF)	Actual	Ratio	QoS(nRT MaxPctF)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	GM
<b>p0</b>	3709.06	1.03	0.53   0.04	584.92	1.02	0.49   0.09	836.55	1.14	1034.40	609.95	1.22	1237.50	459.75	1.33	1276.38	1.14
<b>p1</b>	3647.44	1.01	0.61   0.08	572.33	1.00	0.47   0.05	845.52	1.15	1028.41	599.27	1.20	1162.53	436.45	1.26	1265.59	1.12
<b>p2</b>	3680.50	1.02	0.59   0.03	578.17	1.01	0.61   0.10	831.38	1.13	1057.52	600.33	1.20	1168.36	443.80	1.28	1261.27	1.12
<b>TILE_7</b>	Actual	Ratio	QoS(nRT MaxPctF)	Actual	Ratio	QoS(nRT MaxPctF)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	GM
<b>p0</b>	3570.87	0.99	0.57   0.00	568.58	0.99	0.66   0.09	827.52	1.13	1192.43	598.73	1.20	1415.12	419.48	1.21	1601.31	1.10
<b>p1</b>	3550.39	0.99	0.57   0.00	566.00	0.99	0.55   0.06	810.35	1.10	1325.32	509.98	1.02	1663.16	355.32	1.02	1893.72	1.02
<b>p2</b>	3543.50	0.98	0.57   0.00	563.59	0.98	0.49   0.03	779.33	1.06	1465.51	527.85	1.05	1764.08	358.65	1.03	2002.95	1.02
<b>TILE_8</b>	Actual	Ratio	QoS(nRT MaxPctF)	Actual	Ratio	QoS(nRT MaxPctF)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	GM
<b>p0</b>	3690.39	1.03	0.46   0.07	587.88	1.03	0.72   0.14	858.88	1.17	1007.73	592.25	1.18	1228.45	424.40	1.22	1363.29	1.12
<b>p1</b>	3682.36	1.02	0.40   0.02	584.37	1.02	0.54   0.10	817.42	1.11	1159.22	563.25	1.13	1379.78	418.18	1.21	1469.85	1.10
<b>p2</b>	3635.04	1.01	0.42   0.02	570.68	1.00	0.48   0.05	814.30	1.11	1215.17	568.50	1.14	1440.71	394.12	1.14	1610.18	1.08
<b>p0_score:</b>	9.91															
<b>p1_score:</b>	9.78															
<b>p2_score:</b>	9.75															

<b>Infrastructure_Operations_Scores:</b>	vMotion	SVMotion	XVMotion	Deploy
<b>Completed_Ops_PerHour</b>	54.00	44.00	34.00	15.00
<b>Avg_Seconds_To_Complete</b>	11.05	121.78	159.31	448.53
<b>Failures</b>	0.00	0.00	0.00	0.00
<b>Ratio</b>	2.08	2.44	1.89	1.88
<b>Number_Of_Threads</b>	2	2	2	2

<b>Summary</b>	Run_Is_Compliant	Turbo_Setting:0
	Number_Of_Compliance_Issues(0)*	Median_Phase(p1)
<b>Unreviewed_VMmark3_Applications_Score</b>	9.78	
<b>Unreviewed_VMmark3_Infrastructure_Score</b>	2.06	
<b>Unreviewed_VMmark3_Score</b>	8.24	

## Configuration

<b>Virtualization Software</b>
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Hypervisor Vendor, Product, Version, and Build / Availability Date (MM-DD-YYYY)	VMware ESXi 6.7 U3 , Build 14320388 / 08-20-2019
Datacenter Management Software Vendor, Product, Version, and Build / Availability Date (MM-DD-YYYY)	VMware vCenter Server 6.7 U3 , Build 14367737 / 08-20-2019
Supplemental Software	none
<b>Servers</b>	
Number of Servers in System Under Test (all subsequent fields in this section are per server)	4
Server Manufacturer and Model	QuantaGrid D52B-1U
Processor Vendor and Model	Intel® Xeon Gold 6252
Processor Speed (GHz) / Turbo Boost Speed (GHz)	2.1 / 3.7
Total Sockets/Total Cores/Total Threads	2 Sockets / 48 Cores / 96 Threads
Primary CPU Cache	32 KB I + 32 KB 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	3B13
Memory Size (in GB, Number of DIMMs)	384, 12
Memory Type and Speed	32GB DDR4 2666MHz RDIMM
Disk Subsystem Type	VMware vSAN, iSCSI
Number of Disk Controllers	N/A
Disk Controller Vendors and Models	N/A
Total Number of Physical Disks for Hypervisor	1
Disk Vendors, Models, Capacities, and Speeds	INTEL, SSD DC S4500, 480GB, 6.0Gb/s
Number of Host Bus Adapters	N/A
Host Bus Adapter Vendors and Models	N/A
Number of Network Controllers	1

Network Controller Vendors and Models	Intel Ethernet Network Adapter XXV710-DA2 25GbE
Other Hardware	none
Other Software	none
Hardware Availability Date (MM-DD-YYYY)	04-26-2019
BIOS Availability Date (MM-DD-YYYY)	04-26-2019
Software Availability Date (MM-DD-YYYY)	08-20-2019
<b>Network</b>	
Network Switch Vendors and Models	QuantaMesh BMS T3048-LY8
Network Speed	10Gb
<b>Primary Storage</b>	
Storage Category	VMware vSAN (with default vSAN storage policy)
Storage Vendors, Models, and Firmware Versions	4 x QuantaGrid D52B-1U, with VMware vSAN 6.7 U3
Storage Configuration Summary	VMware vSAN (caching tier): 8 x Intel® SSD DC P4800X Series SSDPED1K375GAQ (375 GB, AIC) NVMe SSD, VMware vSAN (capacity tier): 16 x Intel® SSD DC P4510 Series SSDPE2KX020T8 (2 TB, 2.5-inch) NVMe SSD
<b>Datacenter Management Server</b>	
System Model	QuantaPlex D51BP-1U
Processor Vendor and Model	Intel® Xeon CPU E5-2699 v4
Processor Speed (GHz)	2.20 GHz
Total Sockets/Total Cores/Total Threads	2 Sockets / 44 Cores / 88 Threads
Memory Size (in GB, Number of DIMMs)	160GB, 10
Network Controller(s) Vendors and Models	QN 10GbE 82599ES
Operating System, Version, Bitness, and Service Pack	VMware ESXi Server 6.7 U3, Build 14320388
Virtual Center VM Number of vCPUs	8
Virtual Center VM Virtual Memory (in GB)	24
Virtual Center VM Operating System, Version, Bitness, and	VMware vCenter Server 6.7 U3, Build 14367737

Service Pack	
Other Hardware	N/A
Other Software	N/A

#### Clients

Total Number of Virtual Clients / Virtual Client Hosts	11/3
System Model(s)	QuantaGrid D51BP-1U
Processor Vendor(s) and Model(s)	Intel® Xeon E5-2699 v4
Processor Speed(s) (GHz)	2.2 GHz
Total Sockets/Total Cores/Total Threads	2 Sockets / 44 Cores / 88Threads
Memory per Virtual Client Host	192GB
Network Controller(s) Vendors and Models	QN 10GbE 82599ES
Virtual Client Networking Notes	1 vmnic for management, 1 vmnic for workload traffic
Virtual Client Storage Notes	VMware vSAN (caching tier): 6 x Intel® SSD DC P3700 Series SSDPE2MD800G4 (800 GB, 2.5-inch) NVMe SSD, VMware vSAN (capacity tier): 18 x Intel® SSD DC P3500 Series SSDPE2MX020T4 (2 TB, 2.5-inch) NVMe SSD
Other Hardware	N/A
Other Software	VMware ESXi 6.7 U3 , Build 14320388

#### 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: Thick Eager (default: Thick Eager)

## Virtualization Software Notes

- All VMs are virtual hardware version 11 (default:11)
- Cluster DRS Automation Level set to Fully Automated, DRS Migration Threshold set to level 4 (default: Disabled)
- Power management Policy = High Performance (default: Balanced)
- NTP server set to 216.239.35.4 (default: Disabled)
- Client Notes
  - Following settings were set to 1, but was not disclosed:
    - /adv/UserVars/HostClientCEIPOptIn
    - /adv/UserVars/SuppressHyperthreadWarning
    - /adv/UserVars/SuppressShellWarning
  - /adv/Virsto/DedupSpaceReclaim was set to 2, but was not disclosed
- Two modules (intel-nvme-vmd, intel\_ssd\_data\_center\_tool) were updated after OS installation

## Server Notes

Server BIOS setting:

- Intel® Hyper Threading Technology Enabled (default: Enabled)
- Intel® Turbo Boost Technology Enabled (Frequency boost up to 3.70 GHz) (default: Enabled)
- Intel® Speed Shift Technology: HWP Native (default: HWP Native)
- C-States: Disabled (default: Disabled)
- Power Management Settings: Performance (default: Balance)
- Intel® TXT Enabled (default: Disable)

## Client Networking Notes

vSwitch Configuration:

- vSwitch0 for the Management, vMotion, vSAN, provisioning services
- vMotion, vSAN traffic on vmnic0 at 10Gb/s and set the MTU 9000
- vSwitch0 set the MTU to 9000, and physical switches has set MTU to 9216
- vSwitch1 for all VMs on vmnic1 at 10Gb

## SUT Networking Notes

vSwitch Configuration:

- vSwitch0 for the Management, vMotion, iSCSI , vSAN, provisioning services
- vMotion, iSCSI and vSAN traffic on vmnic0 at 10Gb/s and set the MTU 9000
- vSwitch0 set the MTU to 9000, and physical switches has set MTU to 9216
- vSwitch1 for all VMs on vmnic1 at 10Gb

## Storage Notes

- OS was installed on SATA SSD for each host.

Storage box#1 (System Under Test): Cluster1 vsanDatastore(32TB), 3TB cache used

Hardware Configuration

QuantaGrid D52B-1U

- 2 x Intel® Xeon Gold 6252
- 384 GB Memory (12 x 32GB DDR4 2666MHz RDIMM)
- 2 x Intel® SSD DC P4800X, 375GB, Gen 3x4 Gbps
- 4 x Intel® SSD DC P4510, 2TB, Gen 3.1x4 Gbps Software Configuration
- All Flash vSAN with two disk groups, each disk group include 1 Intel® SSD DC P4800X 375GB (AIC) for array cache and 2 Intel® SSD DC P4510 Series 2TB (NVMe) for capacity.
- vSAN Default Storage Policy used for all disk object

LUN/VM layout

- LUN1(32TB,3TB cache):  
DS3DB\*,DS3WebB\*,DS3WebC\*,AuctionLB\*,AuctionNoSQL\*,AuctionAppA\*,AuctionAppB\*,AuctionDB\*,AuctionMSQ\*,AuctionWebA\*,AuctionWebB\*,ElasticLB\*,ElasticAppA\*,ElasticAppB\*,ElasticDB\*,ElasticWebA\*,ElasticWebB\*  
for tile 0-9,Standby\*,template

Storage box#2 (Shared storage): Windows Server 2016 with two volumes shared as iSCSI target to System Under Test, each of volumn consist of 500GB.

Hardware Configuration

QuantaPlex D51BP-1U (one node)

- 2 x Intel® Xeon E5-2699 v4 processors
- 160GB Memory (10 x 16 GB DIMMs 1600MHz DDR4)
- 1 x Intel® SSD DC X25-E 60GB, 2.5", SATA 3Gb/s (used in shelf)
- 2 x Intel® SSD DC P4600 Series 1.6 TB, 2.5" NVMe SSD (used in shelf)

#### Software Configuration

- Storage Pools were created using Windows Server 2016
- 2 x Intel® SSD DC P4600 1.6 TB were built into 2\*500GB iSCSI Lun for volume sharing to SUT

#### LUN/VM layout

LUN0 (500GB, no cache): SVMotion, XVMotion and Deploy target LUN

LUN1 (500GB, no cache): SVMotion, XVMotion and Deploy target LUN

### **Datacenter Management Server Notes**

QuantaPlex D51BP-1U running VMware ESXi 6.7 U3, Build 14320388 with VMware vCenter Server 6.7 U3, Build 14367737 for SUT and client hosts.

- 8 vCPUs
- 24GB virtual memory
- VMware vCenter Server 6.7 U3, Build 14367737

### **Operating System Notes**

All hosts (Management, Client and SUT) configured with VMware ESXi 6.7 U3, Build 14320388

### **Software Notes**

none

### **Client Notes**

QuantaGrid D51BP-1U was used for client hosts.

- Client hosts ESXi 6.7U3, Build 14320388
- Client host1: Client0, Client3, Client6



· Client host2: Client1, Client4, Client7

· Client host3: Client2, Client5, Client8, PrimeClient

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## Other Notes

none

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