

VMware® VMmark® V2.5.1 Results

Vendor and Hardware Platform: HP ProLiant DL380p Gen8
 Virtualization Platform: VMware ESXi 5.1.0 U1 Build 1065491
 VMware vCenter Server : VMware vCenter Server 5.1.0 Build 799731

**VMmark V2.5.1 Score =
16.54 @ 14 Tiles**

| | | |
|----------------------------------------------------|--------------------------------------------------------|-----------------------------------------------------|
| Number of Hosts: 2 | Uniform Hosts [yes/no]: yes | Total sockets/cores/threads in test: 4/48/96 |
| Tested By: Hewlett-Packard | | Test Date: 08-19-2013 |
| Performance Section Performance | Configuration Section Configuration | Notes Section Notes for Workload |

Performance

| | mailserver | | | olio | | | dvdstoreA | | | dvdstoreB | | | dvdstoreC | | | |
|---------------|------------|-------|-------|---------|-------|--------|-----------|-------|-------|-----------|-------|-------|-----------|-------|-------|------|
| TILE_0 | Actual | Ratio | QoS | Actual | Ratio | QoS | Actual | Ratio | QoS | Actual | Ratio | QoS | Actual | Ratio | QoS | GM |
| p0 | 327.02 | 0.99 | 54.00 | 4698.23 | 1.01 | 138.40 | 3610.50 | 1.64 | 64.88 | 2870.40 | 1.89 | 71.43 | 2121.80 | 2.01 | 70.24 | 1.44 |
| p1 | 326.95 | 0.99 | 54.00 | 4703.88 | 1.01 | 139.72 | 3556.00 | 1.62 | 67.38 | 2914.88 | 1.92 | 74.40 | 2154.95 | 2.04 | 74.38 | 1.45 |
| p2 | 327.40 | 0.99 | 59.00 | 4683.90 | 1.01 | 155.81 | 3540.62 | 1.61 | 67.95 | 2788.57 | 1.84 | 76.06 | 2163.82 | 2.05 | 74.20 | 1.43 |
| TILE_1 | Actual | Ratio | QoS | Actual | Ratio | QoS | Actual | Ratio | QoS | Actual | Ratio | QoS | Actual | Ratio | QoS | GM |
| p0 | 326.35 | 0.99 | 53.80 | 4700.60 | 1.01 | 135.72 | 3925.38 | 1.78 | 68.13 | 2821.45 | 1.86 | 74.06 | 2056.53 | 1.94 | 75.39 | 1.45 |
| p1 | 328.68 | 1.00 | 53.95 | 4686.10 | 1.01 | 140.71 | 3900.15 | 1.77 | 69.04 | 2906.43 | 1.91 | 74.58 | 2272.70 | 2.15 | 73.18 | 1.49 |
| p2 | 326.38 | 0.99 | 54.00 | 4691.73 | 1.01 | 156.70 | 3831.85 | 1.74 | 72.34 | 2745.62 | 1.81 | 78.67 | 2007.00 | 1.90 | 79.00 | 1.43 |
| TILE_2 | Actual | Ratio | QoS | Actual | Ratio | QoS | Actual | Ratio | QoS | Actual | Ratio | QoS | Actual | Ratio | QoS | GM |
| p0 | 327.88 | 0.99 | 53.80 | 4678.45 | 1.01 | 134.77 | 3534.97 | 1.61 | 68.60 | 2899.97 | 1.91 | 75.53 | 2089.38 | 1.97 | 80.13 | 1.43 |
| p1 | 328.43 | 0.99 | 53.12 | 4680.57 | 1.01 | 138.49 | 3579.32 | 1.63 | 66.55 | 2827.47 | 1.86 | 74.14 | 2136.28 | 2.02 | 76.34 | 1.44 |
| p2 | 328.68 | 1.00 | 53.00 | 4698.25 | 1.01 | 147.18 | 3483.93 | 1.58 | 71.04 | 2737.65 | 1.80 | 79.71 | 1935.10 | 1.83 | 85.80 | 1.39 |
| TILE_3 | Actual | Ratio | QoS | Actual | Ratio | QoS | Actual | Ratio | QoS | Actual | Ratio | QoS | Actual | Ratio | QoS | GM |
| p0 | 324.93 | 0.98 | 60.25 | 4715.45 | 1.02 | 138.04 | 3934.55 | 1.79 | 67.96 | 2939.10 | 1.94 | 73.32 | 2248.53 | 2.13 | 75.23 | 1.49 |
| p1 | 324.60 | 0.98 | 54.00 | 4696.52 | 1.01 | 136.85 | 3863.22 | 1.76 | 71.39 | 2766.70 | 1.82 | 78.34 | 1958.65 | 1.85 | 84.25 | 1.43 |
| p2 | 325.45 | 0.99 | 54.00 | 4686.65 | 1.01 | 153.27 | 3762.35 | 1.71 | 75.50 | 2797.00 | 1.84 | 81.68 | 2009.15 | 1.90 | 86.98 | 1.43 |
| TILE_4 | Actual | Ratio | QoS | Actual | Ratio | QoS | Actual | Ratio | QoS | Actual | Ratio | QoS | Actual | Ratio | QoS | GM |
| p0 | 324.90 | 0.98 | 54.45 | 4685.50 | 1.01 | 138.08 | 3949.60 | 1.80 | 66.84 | 2867.50 | 1.89 | 71.38 | 2217.72 | 2.10 | 70.33 | 1.48 |
| p1 | 330.23 | 1.00 | 54.00 | 4711.62 | 1.02 | 134.85 | 3906.32 | 1.78 | 68.69 | 2827.47 | 1.86 | 73.79 | 2064.70 | 1.95 | 74.61 | 1.46 |
| p2 | 332.30 | 1.01 | 59.38 | 4708.10 | 1.01 | 152.54 | 3842.65 | 1.75 | 71.02 | 2980.78 | 1.96 | 75.47 | 2257.82 | 2.13 | 73.99 | 1.50 |
| TILE_5 | Actual | Ratio | QoS | Actual | Ratio | QoS | Actual | Ratio | QoS | Actual | Ratio | QoS | Actual | Ratio | QoS | GM |
| p0 | 328.02 | 0.99 | 64.00 | 4724.35 | 1.02 | 140.62 | 3927.88 | 1.79 | 67.93 | 2827.53 | 1.86 | 73.56 | 2078.07 | 1.96 | 73.83 | 1.46 |
| p1 | 328.98 | 1.00 | 53.27 | 4689.50 | 1.01 | 137.16 | 3891.88 | 1.77 | 69.34 | 2905.47 | 1.91 | 74.57 | 2172.57 | 2.05 | 73.63 | 1.48 |

| | | | |
|------------------------------------------------|---------------------------------|------------------|--------|
| Infrastructure_Operations_Scores: | vmotion | svmotion | deploy |
| Completed_Ops_PerHour | 17.00 | 11.00 | 4.50 |
| Avg_Seconds_To_Complete | 30.37 | 18.02 | 422.97 |
| Failures | 0.00 | 0.00 | 0.00 |
| Ratio | 1.06 | 1.22 | 1.12 |
| Number_Of_Threads | 1 | 1 | 1 |
| Summary | Run_Is_Compliant | Turbo_Setting:0 | |
| | Number_Of_Compliance_Issues(0)* | Median_Phase(p1) | |
| Unreviewed_VMmark2_Applications_Score | 20.39 | | |
| Unreviewed_VMmark2_Infrastructure_Score | 1.13 | | |
| Unreviewed_VMmark2_Score | 16.54 | | |

Configuration

| Virtualization Software | |
|-----------------------------------------------------------------------------------------------------|-------------------------------------------------------|
| Hypervisor Vendor, Product, Version, and Build / Availability Date (MM-DD-YYYY) | VMware ESXi 5.1.0 U1 Build 1065491/ 04-25-2013 |
| Datacenter Management Software Vendor, Product, Version, and Build / Availability Date (MM-DD-YYYY) | VMware vCenter Server 5.1.0 Build 799731 / 11-19-2012 |
| Supplemental Software | none |
| Servers | |
| Quantity | 2 |
| Server Manufacturer and Model | HP ProLiant DL380p Gen8 |
| Processor Vendor and Model | Intel Xeon E5-2697 v2 |
| Processor Speed (GHz) | 2.70 |
| Total Sockets/Total Cores/Total Threads | 2 Sockets / 24 Cores / 48 Threads |
| Primary Cache | 32 KB I + 32 KB D on chip per core |

| | |
|----------------------------------------------|--------------------------------------------------------------------------------------------|
| Secondary Cache | 256 KB I+D on chip per core |
| Other Cache | 30 MB I+D on chip per chip L3 |
| BIOS Version | P70 09/08/2013 |
| Memory Size (in GB, Number of DIMMs) | 256 GB, 16 x 16 GB DIMMs |
| Memory Type and Speed | Dual Rank PC3-14900R 1866 MHz |
| Disk Subsystem Type | FC SAN |
| Number of Disk Controllers | 1 |
| Disk Controller Vendors and Models | HP Smart Array P420i |
| Number of Host Bus Adapters | 1 |
| Host Bus Adapter Vendors and Models | HP SN1000Q PCIe dual port 16 Gb Fibre HBA |
| Number of Network Controllers | 2 |
| Network Controller Vendors and Models | HP Ethernet 1 Gb 4-port 331FLR Adapter, 1 x Intel X520-DA2 Dual Port 10 GbE Server Adapter |
| Other Hardware | none |
| Other Software | none |
| Hardware Availability Date (MM-DD-YYYY) | 09-10-2013 |
| Software Availability Date (MM-DD-YYYY) | 08-21-2013 |
| Network | |
| Network Switch Vendors and Models | 1 x H3C S5820X-28S |
| Network Speed | H3C S5820X-28S - 24 x 10 GbE ports, 4 x 1 GbE ports |
| Storage | |
| Array Vendors, Models, and Firmware Versions | Fusion-io ION Data Accelerator, FW 2.1.10 |
| Fibre Channel Switch Vendors and Models | none (hosts were directly cabled to the storage) |
| Disk Space Used | 7.2 TB |
| Array Cache Size | N/A |
| Total Number of Physical Disks Used | 6 (2 per SUT OS, 2 for Fusion ION OS), 3 PCI-e Flash |
| Total Number of Enclosures/Pods/Shelves Used | 1 |

| | |
|-------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------|
| Number of Physical Disks Used per Enclosure/Pod/Shelf | Internal: 2 disks per host Enclosure: 2 disks for Fusion ION OS, 3 PCI-e Flash |
| Total Number of Storage Groups Used | 0 |
| Number of LUNs Used | 16 |
| LUN Size and Number of Disks Per LUN | All LUNS spread across 3 x Fusion-io PCIe cards under the control of the Fusion-io ION Data Accelerator 16 LUNs: 450 GB |
| RAID Type | RAID 0 for enclosure, RAID 1 for OS drives |
| Number of Members per RAID Set | RAID 1: 2 RAID 0: 3 |
| Disk Vendors, Models, and Speeds | 6 x HP 146GB 15K RPM SAS SFF (P/N 652605-B21) 3 x Fusion-io 2.4 TB ioDrive2 Duo |

Datacenter Management Server

| | |
|------------------------------------------------------|-----------------------------------------------------------------------|
| System Model | HP ProLiant BL465c G7 |
| Processor Vendor and Model | AMD Opteron 6134 |
| Processor Speed (GHz) | 2.30 |
| Total Sockets/Total Cores/Total Threads | 2 Sockets / 16 Cores / 16 Threads |
| Memory | 16 GB |
| Network Controller(s) Vendors and Models | Integrated NC553i Dual Port FlexFabric 10Gb Converged Network Adapter |
| Operating System, Version, Bitness, and Service Pack | Microsoft® Windows® 2008 R2 Enterprise (64-bit) |
| Other Hardware | none |
| Other Software | none |

Clients

| | |
|-------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Total Number of Clients / Total Physical Clients / Total Virtual Client Hosts | 15 / 1 / 12 |
| System Model(s) | HP ProLiant BL465c Gen8 |
| Processor Vendor(s) and Model(s) | AMD Opteron 6174 |
| Processor Speed(s) (GHz) | 2.20 |
| Total Sockets/Total Cores/Total Threads | 2 Sockets / 24 Cores / 24 Threads |
| Memory per Physical Client | 64 GB |
| Network Controller(s) Vendors and Models | Prime Client: HP 551i embedded dual port FlexFabric 10Gb adapter, 1xHP NC542m dual port Flex-10 10 GbE adapter Virtual Client Hosts 0-11: HP NC551i embedded dual port FlexFabric 10Gb Adapter, 1xHP NC542m dual port Flex-10 10 GbE adapter, 1xHP NC552m dual port Flex-10 10 GbE adapter |

| | |
|------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Operating System, Version, Bitness, and Service Pack | Prime Client: Microsoft® Windows® 2008 R2 (64-bit) Virtual Client Hosts 0-11: VMware ESXi 4.1 U1 (Build 348481) Virtual Clients 0-13: Microsoft® Windows® 2008 R2 Enterprise (64-bit) |
| Number of Virtual Clients | 14 |
| Number of vCPUs Per Virtual Client | 4 |
| Number of vMem (GB) Per Virtual Client | 4 |
| Virtual Client Networking Notes | All client VMs attached to port 1 of NC542m card running at speed of 10 Gb/s |
| Virtual Client Storage Notes | Client VMs stored on local media respective to their ESX host. 1x300GB 6G 10K rpm SFF SAS disk per Physical Client |
| Other Hardware | HP BladeSystem c7000 Enclosure, 2xHP VC Flex-10 Ethernet Modules (only one used),4xHP 10 GbE Pass-Thru Modules (only one used) |
| Other Software | HP BladeSystem c7000 Onboard Administrator Version 3.31, HP Virtual Connect Manager Version 3.18 |

Notes for Workload

Virtualization Software Notes

- All VMs used virtual hardware V7
- All VMs (except for Deploy Template) had VMware tools version 8305 installed and running
- Ethernet adapter type set to vmxnet3 for all VMs (default vmxnet2)
- Logging was disabled for all VMs (default enabled)
- CD and floppy devices were removed on all VMs (default enabled)
- Firewall was disabled in the console OS (default enabled)
- All VMs besides standbys: Paravirtual Controller
- Cluster DRS Automation Level set to Fully Automated
- DrsMigrationThreshold set to level 1
- Logical CPU layout changed for all multi-cpu VMs to 1 socket w/ multiple cores. (default Single core per socket)

Advanced Settings:

- Cpu.CoschedCrossCall = 0 (default 1)
- Cpu.CreditAgePeriod = 533 (default 3000)
- Cpu.HTWholeCoreThreshold = 0 (default 200)
- DataMover.HardwareAcceleratedInit = 0 (default 1)
- DataMover.HardwareAcceleratedMove = 0 (default 1)
- Disk.SchedNumReqOutstanding = 256 (default 32)
- Irq.BestVcpuRouting = 1 (default 0)
- Irq.IRQRebalancePeriod = 50 (default 2)
- Mem.BalancePeriod = 0 (default 15)
- Mem.SamplePeriod = 0 (default 60)
- Mem.ShareScanGHz = 0 (default 4)
- Mem.VMOverheadGrowthLimit = 0 (default 4294967295)
- Misc.TimerMaxHardPeriod = 4000 (default 100000)

- Misc.TimerMinHardPeriod = 2000 (default 100)
- Net.MaxNetifRxQueueLen = 500 (default 100)
- Net.MaxNetifTxQueueLen = 1000 (default 500)
- Net.NetTxCompletionWorldlet = 0 (default 1)
- Net.NetTxWordlet = 0 (default 2)
- Numa.LargeInterleave = 0 (default 1)
- Numa.LTermFairnessInterval = 0 (default 5)
- Numa.MigImbalanceThreshold = 57 (default 10)
- Numa.MonMigEnable = 0 (default 1)
- Numa.PreferHT = 1 (default 0)
- Numa.RebalancePeriod = 60000 (default 2000)
- Numa.SwapInterval = 1 (default 3)
- Numa.SwapLoadEnable = 0 (default 1)
- Numa.SwapLocalityEnable = 0 (default 1)
- VMFS3.HardwareAcceleratedLocking = 0 (default 1)

Driver Options:

- Updated drivers:
 - scsi-qla2xxx-934.5.6.0-1OEM.500.0.0.472560
- /vmkernel/module/qla2xxx/options = "ql2xmaxqdepth=256 ql2xintrdelaytimer=2 qlxenablesix=1" (default 32, 0, and 0)
- /vmkernel/module/ixgbe/options = "MQ=0,0 InterruptThrottleRate=2000,2000 InterruptType=2,2 " (default 1, 16000, and 2)

Server Notes

Server BIOS settings:

- HP Power Profile set to Maximum Performance (default: Balanced Power and Performance)
- Memory Power Savings Mode set to Maximum Performance (default: Balanced)
- Intel VT-d set to Disabled (default: Enabled)
- Thermal Configuration set to Maximum Cooling (default: Optimal Cooling)
- HW Prefetcher set to Disabled (default: Enabled)
- Adjacent Sector Prefetcher set to Disabled: (default: Enabled)
- Memory Refresh Rate set to 1x Refresh (default: 2x Refresh)
- Intel Turbo Boost Enabled (frequency boost to 3.5 GHz) (default: Enabled)

Networking Notes

- vSwitch0 for the Service Console on vmnic0 at 1Gb/s
- vSwitch1 defined as vmkernel vMotion connection on vmnic1 at 1Gb/s
- vSwitch2 for the DS2* workloads on vmnic4 at 10Gb/s
- vSwitch3 for the Olio* workloads on vmnic5 at 10Gb/s
- vSwitch4 for the mailserver workloads on vmnic2 at 1Gb/s
- vSwitch5 for the standby and deploy workloads on vmnic3 at 1Gb/s

Storage Notes

- ESX was installed on two disks configured as RAID1 in the internal server storage bay

- All LUNs were spread across three 2.4 TB Fusion-io ioDrive2 Duo PCI-e Flash cards in RAID0 within a single HP ProLiant DL380p Gen8 running Fusion-io ION Data Accelerator software.
- Physical Configuration for Fusion-io ION Data Accelerator:
 - HP ProLiant DL380p Gen8
 - 2 x Intel Xeon E5-2690 2.90 GHz processors
 - 256 GB Memory (16 x 16 GB DIMMs dual rank PC3-12800 Registered DDR3)
 - 3 x 2.4 TB Fusion-io ioDrive2 Duo PCI-e Flash Cards configured in RAID 0
 - 2 x HP SN1000Q dual port 16 GB fibre HBAs
 - 1 x HP Smart Array 420i controller for ION OS
 - 2 x 146 GB 15K RPM SAS SFF for ION OS
- Virtual Configuration for Fusion-io ION Data Accelerator:
 - 16 LUNs at 450 GB
 - 14 LUNs had all VMs from only 1 tile (except for the standby VM)
 - 1 LUN had all standby VMs and the Deploy Template
 - 1 LUN used for deploy target and sVmotion target
- All LUNs were distributed across all three 2.4 TB Fusion-io ioDrive2 Duo Flash cards in RAID0
- All LUNs were configured as block devices and no system memory was used for write caching

Datacenter Management Server Notes

None

Operating System Notes

- All mailserver VMs running Microsoft® Windows® 2008 R2 Enterprise SP1 (64-bit) and were updated with all critical updates via windows update on July 20, 2012.
- The Shell Hardware Detection service was not running on mailserver VMs.
- All standby VMs running Microsoft® Windows® 2003 Enterprise SP2 (32-bit)
- All DS2DB, DS2WebA, DS2WebB, DS2WebC, OlioDB and OlioWeb running SUSE® Linux Enterprise Server 11 SP2 (64-bit)

Software Notes

- Microsoft® Exchange Server 2007 Enterprise SP3 (64-bit) was installed on each mailserver VM

Client Notes

- Prime client functionality was split from the client0 driver and was run on a non-virtualized copy of Microsoft® Windows® 2008 R2 Enterprise (64-bit).
- Prime client was running VMware vSphere PowerCLI 5.1 Release 1 Build 793510
- All client drivers were run on virtual machines that were each defined with 4 virtual CPUs, 4 GB of memory, 1 vmxnet2 network, and 32 GB of disk space.
- Twelve HP ProLiant BL465c G7 clients ran the 14 client virtual machines as follows:
 - system 1: hosted vclients: 0, 12
 - system 2: hosted vclients: 1, 13
 - system 3: hosted vclients: 2
 - system 4: hosted vclients: 3
 - system 5: hosted vclients: 4
 - system 6: hosted vclients: 5
 - system 7: hosted vclients: 6

- system 8: hosted vclients: 7
- system 9: hosted vclients: 8
- system 10: hosted vclients: 9
- system 11: hosted vclients: 10
- system 12: hosted vclients: 11

- All client operating systems were updated via Windows Update.

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.

For information about VMmark and the rules regarding its usage visit www.vmware.com/products/vmmark.

VMware and VMmark are trademarks or registered trademarks of VMware, Inc. VMware® VMmark® is a product of [VMware, Inc.](http://www.vmware.com) VMmark utilizes the SPEC Power and Temperature Daemon (SPEC PTDaemon), which is available from the Standard Performance Evaluation Corporation (SPEC®). VMmark results are not SPEC metrics and cannot be compared to SPEC metrics in any way.