

## VMware® VMmark® V2.1 Results

**Vendor and Hardware Platform: HP ProLiant DL585 G7**  
**Virtualization Platform: VMware ESX 4.1.0 Build 260247**

**VMmark V2.1 Score =**  
**9.91 @ 13 Tiles**

**Number of Hosts: 2**

**Uniform Hosts [yes/no]: yes**

**Total sockets/core/threads in test: 8/96/96**

**Tested By: Hewlett-Packard**

**Test Date: 02-21-2011**

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### Performance

	mailserver			olio			dvdstoreA			dvdstoreB			dvdstoreC			
TILE_0	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	GM
<b>p0</b>	325.55	0.99	136.70	4632.60	1.00	207.65	1574.00	0.72	320.37	1079.10	0.71	347.38	731.70	0.69	379.14	0.81
<b>p1</b>	321.68	0.97	134.00	4632.18	1.00	219.20	1854.35	0.84	254.47	1306.42	0.86	283.56	969.88	0.92	297.29	0.92
<b>p2</b>	325.90	0.99	134.00	4523.38	0.97	353.38	1790.83	0.81	266.22	1209.25	0.80	296.38	829.15	0.78	315.35	0.87
<b>TILE_1</b>	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	GM
<b>p0</b>	326.68	0.99	105.38	4660.70	1.00	196.57	1966.15	0.89	233.66	1437.05	0.95	247.87	995.48	0.94	267.25	0.95
<b>p1</b>	330.45	1.00	108.75	4592.75	0.99	288.50	2070.75	0.94	214.85	1431.12	0.94	234.86	1048.53	0.99	247.25	0.97
<b>p2</b>	326.55	0.99	114.00	4631.82	1.00	215.37	2060.90	0.94	215.98	1451.03	0.96	230.76	986.12	0.93	252.33	0.96
<b>TILE_2</b>	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	GM
<b>p0</b>	327.07	0.99	131.20	4570.32	0.98	290.15	2129.57	0.97	207.17	1529.33	1.01	225.04	1097.80	1.04	247.10	1.00
<b>p1</b>	329.77	1.00	124.00	4542.88	0.98	312.20	2156.80	0.98	202.76	1499.62	0.99	221.94	982.65	0.93	255.26	0.97
<b>p2</b>	326.05	0.99	124.25	4526.80	0.98	346.20	2065.25	0.94	213.70	1481.92	0.98	234.22	1000.38	0.95	264.58	0.96
<b>TILE_3</b>	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	GM
<b>p0</b>	324.88	0.98	113.88	4636.32	1.00	196.20	1870.42	0.85	254.03	1242.12	0.82	287.13	908.35	0.86	302.32	0.90
<b>p1</b>	327.82	0.99	122.47	4642.95	1.00	196.05	1797.75	0.82	263.94	1210.33	0.80	294.52	855.08	0.81	308.38	0.88
<b>p2</b>	326.73	0.99	136.75	4673.27	1.01	189.52	1750.90	0.80	274.63	1208.65	0.80	308.40	897.85	0.85	322.88	0.88
<b>TILE_4</b>	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	GM
<b>p0</b>	322.20	0.98	87.47	4648.98	1.00	200.53	1852.22	0.84	253.47	1302.88	0.86	270.49	880.25	0.83	297.58	0.90
<b>p1</b>	324.43	0.98	81.00	4656.07	1.00	197.92	1965.05	0.89	229.00	1456.12	0.96	241.68	1004.40	0.95	265.01	0.96
<b>p2</b>	328.20	0.99	83.25	4638.23	1.00	195.92	1857.45	0.84	250.47	1288.45	0.85	272.07	890.23	0.84	306.91	0.90
<b>TILE_5</b>	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	GM
<b>p0</b>	326.20	0.99	104.75	4621.77	1.00	217.63	2173.70	0.99	199.62	1511.33	1.00	217.95	1057.00	1.00	230.49	0.99
<b>p1</b>	328.93	1.00	102.25	4646.27	1.00	214.08	1984.12	0.90	226.82	1446.40	0.95	242.23	1069.67	1.01	256.35	0.97

<b>p2</b>	324.02	0.98	94.00	4608.18	0.99	239.25	1931.35	0.88	237.19	1353.20	0.89	253.81	940.70	0.89	270.17	0.93
<b>TILE_6</b>	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	GM
<b>p0</b>	329.23	1.00	168.72	4577.23	0.99	270.09	1775.15	0.81	267.88	1257.20	0.83	291.66	866.08	0.82	316.41	0.88
<b>p1</b>	328.20	0.99	143.00	4605.62	0.99	245.72	1744.40	0.79	277.33	1147.22	0.76	314.37	820.67	0.78	337.90	0.86
<b>p2</b>	331.73	1.00	134.00	4569.07	0.98	295.67	1683.95	0.77	289.26	1129.62	0.74	322.47	771.83	0.73	348.62	0.84
<b>TILE_7</b>	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	GM
<b>p0</b>	327.88	0.99	126.00	4662.32	1.00	175.59	2178.07	0.99	198.68	1592.97	1.05	212.18	1155.45	1.09	231.06	1.03
<b>p1</b>	327.05	0.99	118.25	4629.15	1.00	202.49	2236.82	1.02	190.75	1545.42	1.02	209.58	1070.97	1.01	225.05	1.01
<b>p2</b>	325.05	0.98	114.00	4643.60	1.00	184.95	2084.47	0.95	211.12	1502.22	0.99	230.11	1036.55	0.98	250.80	0.98
<b>TILE_8</b>	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	GM
<b>p0</b>	327.45	0.99	150.28	4616.02	0.99	236.01	2063.07	0.94	222.65	1349.22	0.89	260.96	971.85	0.92	279.62	0.95
<b>p1</b>	330.82	1.00	144.00	4594.93	0.99	238.11	1827.25	0.83	258.36	1212.20	0.80	293.68	837.58	0.79	311.83	0.88
<b>p2</b>	325.30	0.99	134.25	4585.27	0.99	270.39	1708.05	0.78	284.86	1160.58	0.76	324.06	845.77	0.80	344.02	0.86
<b>TILE_9</b>	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	GM
<b>p0</b>	324.00	0.98	103.00	4618.38	1.00	222.95	2190.78	1.00	196.86	1479.08	0.97	223.52	1071.75	1.01	226.33	0.99
<b>p1</b>	324.02	0.98	94.00	4578.07	0.99	272.90	2091.57	0.95	208.95	1509.67	0.99	227.48	1093.88	1.03	233.90	0.99
<b>p2</b>	322.50	0.98	94.00	4601.52	0.99	259.62	2024.95	0.92	220.46	1368.53	0.90	248.80	1047.78	0.99	248.43	0.96
<b>TILE_10</b>	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	GM
<b>p0</b>	329.12	1.00	137.75	4611.75	0.99	228.09	1694.35	0.77	282.71	1158.95	0.76	310.74	815.73	0.77	325.36	0.85
<b>p1</b>	329.88	1.00	130.50	4622.12	1.00	218.97	1868.78	0.85	244.34	1352.65	0.89	265.13	1004.20	0.95	276.52	0.94
<b>p2</b>	326.60	0.99	125.25	4578.20	0.99	281.63	1797.70	0.82	264.02	1221.35	0.80	292.91	844.45	0.80	313.10	0.87
<b>TILE_11</b>	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	GM
<b>p0</b>	327.20	0.99	109.72	4619.02	1.00	227.20	2102.35	0.96	209.22	1504.40	0.99	228.69	1057.50	1.00	243.35	0.99
<b>p1</b>	325.60	0.99	100.75	4558.20	0.98	303.12	2020.33	0.92	221.77	1394.47	0.92	243.92	1025.67	0.97	256.21	0.95
<b>p2</b>	330.18	1.00	94.50	4580.30	0.99	283.59	1908.78	0.87	240.78	1331.05	0.88	259.08	939.02	0.89	270.71	0.92
<b>TILE_12</b>	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	GM
<b>p0</b>	323.52	0.98	107.40	4645.18	1.00	209.67	1913.10	0.87	241.84	1358.22	0.89	262.20	1005.58	0.95	275.22	0.94
<b>p1</b>	324.95	0.98	104.00	4616.55	0.99	217.48	1797.55	0.82	265.29	1214.08	0.80	293.02	836.15	0.79	314.23	0.87
<b>p2</b>	326.95	0.99	101.72	4634.77	1.00	204.21	1718.85	0.78	280.20	1228.20	0.81	301.48	856.25	0.81	323.26	0.87
<b>p0_score:</b>	12.17															
<b>p1_score:</b>	12.16															
<b>p2_score:</b>	11.80															

<b>Infrastructure_Operations_Scores:</b>										vmotion			svmotion			deploy		
<b>Completed_Ops_PerHour</b>										15.00			8.00			3.50		
<b>Avg_Seconds_To_Complete</b>										47.08			44.37			489.60		

<b>Failures</b>	0.00	0.00	0.00
<b>Ratio</b>	0.94	0.89	0.88
<b>Number_Of_Threads</b>	1	1	1
<b>Summary</b>	Run_Is_Compliant	Number_Of_Compliance_Issues(0)*	Median_Phase(p1)
<b>Unreviewed_VMmark2_Applications_Score</b>	12.16		
<b>Unreviewed_VMmark2_Infrastructure_Score</b>	0.90		
<b>Unreviewed_VMmark2_Score</b>	9.91		

## Configuration

<b>Virtualization Software</b>	
Hypervisor Vendor, Product, Version, and Build / Availability Date (MM-DD-YYYY)	VMware ESX 4.1.0 Build 260247/ 07-13-2010
Datacenter Management Software Vendor, Product, Version, and Build / Availability Date (MM-DD-YYYY)	VMware vCenter Server 4.1.0 Build 258902 / 07-13-2010
Supplemental Software	none
<b>Servers</b>	
Quantity	2
Server Manufacturer and Model	HP ProLiant DL585 G7
Processor Vendor and Model	AMD Opteron 6180 SE
Processor Speed (GHz)	2.5
Total Sockets/Total Cores/Total Threads	4 Sockets / 48 Cores / 48 Threads
Primary Cache	64 KB I + 64 KB D on chip per core
Secondary Cache	512 KB I+D on chip per core
Other Cache	12 MB I+D on chip per chip, 6 MB shared / 6 cores
BIOS Version	A16 12/20/2010
Memory Size (in GB, Number of DIMMs)	256 GB, 32 x 8 GB DIMMs
Memory Type and Speed	dual rank PC3-10600 Registered DDR3
Disk Subsystem Type	FC SAN
Number of Disk Controllers	1
Disk Controller Vendors and Models	HP Smart Array P410i
Number of Host Bus Adapters	1

Host Bus Adapter Vendors and Models	LPe12000 dual port 8Gb Fibre HBA
Number of Network Controllers	2
Network Controller Vendors and Models	HP NC375i embedded quad port 1GbE adapter, HP NC550 SFP dual port 10 GbE adapter
Other Hardware	none
Other Software	none
Hardware Availability Date (MM-DD-YYYY)	02-14-2011
Software Availability Date (MM-DD-YYYY)	07-13-2010
<b>Network</b>	
Network Switch Vendors and Models	HP ProCurve 2910-al-24G
Network Speed	1 GbE with 10GbE uplinks
<b>Storage</b>	
Array Vendors, Models, and Firmware Versions	10xHP StorageWorks MSA 2312, 2xHP StorageWorks MSA 2324
Fibre Channel Switch Vendors and Models	HP StorageWorks SAN Switch 4/32
Disk Space Used	14.5 TB
Array Cache Size	1GB
Total Number of Physical Disks Used	182
Total Number of Enclosures/Pods/Shelves Used	12
Number of Physical Disks Used per Enclosure/Pod/Shelf	Internal: 2 disks 9 enclosures: 12 disks 3 enclosures: 24 disks
Total Number of Storage Groups Used	2
Number of LUNs Used	15
LUN Size and Number of Disks Per LUN	11 LUNs: 819.5GB on 12 disks 4 LUNs: 408.75 GB on 12 disks
RAID Type	RAID 10, RAID 1 for OS
Number of Members per RAID Set	12

Disk Vendors, Models, and Speeds	48 HP 72GB 15K RPM SAS SFF 132 HP 146GB 15K RPM SAS LFF
<b>Datacenter Management Server</b>	
System Model	HP ProLiant DL360 G5
Processor Vendor and Model	Intel Xeon E5440
Processor Speed (GHz)	2.83
Total Sockets/Total Cores/Total Threads	1 Sockets / 4 Cores / 4 Threads
Memory	8 GB
Network Controller(s) Vendors and Models	2 x HP NC373i embedded Gigabit adapters
Operating System, Version, and Service Pack	Microsoft® Windows® 2008 R2 Enterprise (64-bit)
Other Hardware	none
Other Software	none
<b>Clients</b>	
Number of Clients	7
System Model(s)	HP ProLiant DL360 G5
Processor Vendor(s) and Model(s)	Clients 0-4, Client6: Intel Xeon E5450 Client 5: Intel Xeon E5440
Processor Speed(s) (GHz)	Clients 0-4, Client6: 3.00 Client 5: 2.83
Total Sockets/Total Cores/Total Threads	2 Sockets / 8 Cores / 8 Threads
Memory per Client	Clients 0-1, Clients 3-6: 16 GB Client 2: 32 GB
Network Controller(s) Vendors and Models	2 x HP NC373i embedded Gigabit adapters, 1 x HP NC360T dual port Gigabit adapter
Operating System, Version, and Service Pack	Prime Client: Microsoft® Windows® 2003 Enterprise SP2 (32-bit) Client0-6: Microsoft® Windows® 2008 R2 Enterprise (64-bit)
Other Hardware	none
Other Software	Prime Client: None Client0-6: VMware ESX 4.1.0 (Build 260247)

## Notes for Workload

### Virtualization Software Notes

- all VMs used virtual hardware V7
- ethernet adapter type set to vmxnet3 for all VMs

- logging was disabled for all VMs
- IDE & floppy devices were removed on all VMs (default enabled)
- firewall was disabled in the console os (default enabled)
- All Mailserver VMs: Hard Disk 1 on LSI Logic SAS controller, Hard Disk 2 on Paravirtual controller
- Cluster DRS Automation Level set to Fully Automated level 1 (VMmark V2.1 default is Fully Automated level 2)
- Driver SVE-be2net-2.102.518.0 installed

#### Advanced Settings:

- Irq.RoutingPolicy = 0 (default 2)
- Mem.BalancePeriod = 0 (default 15)
- Mem.SamplePeriod = 0 (default 60)
- Mem.ShareScanGHz = 0 (default 4)
- Misc.TimerMaxHardPeriod = 4000 (default 100000)
- Misc.TimerMinHardPeriod = 2000 (default 100)
- Net.MaxNetifRxQueueLen = 500 (default 100)
- Net.MaxNetifTxQueueLen = 1000 (default 500)
- Net.TxWorldlet = 1 (default 2)
- Numa.PageMigEnable = 0 (default 1)
- Numa.LTermFairnessInterval = 0 (default 5)

#### Driver Options:

- /vmkernel/module/lpfc820.o/options = "lpfc\_lun\_queue\_depth=128 lpfc\_cr\_count=5 lpfc\_cf\_delay=1" (default 31,1, and 0)

## Server Notes

#### Server BIOS settings:

- HP Power Profile set to Maximum Performance (default: Balanced Performance)
- Collaborative Power Control disabled (default enabled)
- Thermal Configuration set to Increased Cooling (default: Optimal Cooling)

## Networking Notes

#### vSwitch Configuration:

- vSwitch0 for the Service Console on vmnic0 at 1Gb/s
- vSwitch1 for all VMs on vmnic4 at 10Gb/s
- vSwitch2 defined as vmkernel vMotion connection on vmnic5 at 10Gb/s

## Storage Notes

- ESX was installed on two disks configured as RAID1 in the internal server storage bay
- All standby VMs were on a single LUN
- The VMs for each tile (except standby) were grouped together on one LUN for each tile.
- The target for the sVMotion and Deploy operations was a single dedicated LUN.

## Datacenter Management Server Notes

None

## Operating System Notes

- All mailserver VMs running Microsoft® Windows® 2008 R2 Enterprise (64-bit)
- The Shell Hardware Detection service was not running on mailserver VMs 1-11
- All standby VMs running Microsoft® Windows® 2003 Enterprise SP2 (32-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® 2003 Enterprise SP2 (32-bit).
- Prime client was running VMware vSphere PowerCLI 4.1 U1 build 332441
- All client drivers were run on virtual machines that were each defined with 4 virtual cpus, 4GB of memory, 1 vmxnet3 network, and 32GB of disk space.
- Six HP ProLiant DL360 G5 clients ran two client virtual machines.
- One HP ProLiant DL360 G5 client ran one client virtual machine.
- All client operating systems were updated via Windows Update.

## Other Notes

None

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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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