

## VMware® VMmark® V2.1 Results

**Vendor and Hardware Platform: HP ProLiant BL620c G7**

**Virtualization Platform: VMware ESX 4.1 U1 Build 260247**

**VMware vCenter Server 4.1 U1 Build 258902**

**VMmark V2.1 Score =  
9.29 @ 11 Tiles**

**Number of Hosts: 2**

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

**Total sockets/core/threads in test: 4/40/80**

**Tested By: Hewlett-Packard**

**Test Date: 04-03-2011**

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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
p0	325.82	0.99	232.65	4631.05	1.00	213.40	2110.55	0.96	203.99	1476.25	0.97	166.14	1093.28	1.03	132.99	0.99
p1	328.85	1.00	242.40	4604.10	0.99	246.59	2272.12	1.03	181.57	1590.03	1.05	149.07	1128.58	1.07	113.59	1.03
p2	321.98	0.97	244.00	4608.07	0.99	242.64	2228.72	1.01	186.86	1611.88	1.06	157.90	1209.92	1.14	127.12	1.04
TILE_1	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	GM
p0	328.18	0.99	241.93	4629.50	1.00	233.72	2087.47	0.95	209.00	1447.50	0.95	171.62	1014.67	0.96	132.47	0.97
p1	324.30	0.98	243.32	4581.20	0.99	255.94	2253.28	1.02	184.96	1637.62	1.08	155.17	1173.22	1.11	119.83	1.03
p2	322.48	0.98	243.62	4605.77	0.99	234.84	2230.07	1.01	189.07	1536.78	1.01	156.74	1130.60	1.07	127.32	1.01
TILE_2	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	GM
p0	327.35	0.99	101.00	4611.60	0.99	224.42	1979.10	0.90	225.62	1354.38	0.89	187.27	952.55	0.90	143.75	0.93
p1	327.15	0.99	102.00	4597.18	0.99	261.48	2217.03	1.01	190.50	1564.70	1.03	164.88	1184.88	1.12	130.90	1.03
p2	323.80	0.98	104.00	4596.15	0.99	236.05	2183.15	0.99	195.28	1480.65	0.98	164.78	1048.00	0.99	125.95	0.99
TILE_3	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	GM
p0	328.00	0.99	84.45	4620.20	1.00	227.94	1898.08	0.86	239.57	1383.90	0.91	198.35	957.98	0.91	159.00	0.93
p1	330.88	1.00	89.53	4598.82	0.99	253.59	2206.25	1.00	191.90	1559.00	1.03	153.68	1131.75	1.07	125.86	1.02
p2	326.70	0.99	94.00	4614.32	0.99	247.27	2142.95	0.97	202.78	1504.42	0.99	164.02	1032.15	0.98	129.60	0.98
TILE_4	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	GM
p0	325.60	0.99	94.00	4615.50	0.99	237.75	2285.43	1.04	182.77	1659.95	1.09	152.17	1225.90	1.16	125.33	1.05
p1	324.43	0.98	94.00	4596.57	0.99	251.66	2422.65	1.10	166.29	1704.20	1.12	134.46	1183.58	1.12	106.17	1.06

<b>p2</b>	328.65	1.00	98.75	4601.93	0.99	257.38	2331.40	1.06	176.20	1700.90	1.12	146.55	1196.30	1.13	116.46	1.06
<b>TILE_5</b>	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	GM
<b>p0</b>	328.25	0.99	94.90	4608.62	0.99	215.79	1994.17	0.91	221.35	1372.28	0.90	183.42	1006.85	0.95	147.67	0.95
<b>p1</b>	328.95	1.00	94.00	4601.82	0.99	246.55	2205.93	1.00	192.91	1502.45	0.99	162.51	1049.25	0.99	125.87	0.99
<b>p2</b>	324.55	0.98	94.00	4604.77	0.99	244.79	2179.05	0.99	196.13	1537.12	1.01	170.65	1145.80	1.08	137.25	1.01
<b>TILE_6</b>	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	GM
<b>p0</b>	330.65	1.00	95.00	4620.23	1.00	205.32	2160.35	0.98	199.00	1498.50	0.99	163.56	1043.33	0.99	128.07	0.99
<b>p1</b>	325.40	0.99	103.75	4617.57	0.99	231.41	2285.53	1.04	179.56	1666.97	1.10	150.81	1186.38	1.12	117.81	1.05
<b>p2</b>	328.73	1.00	104.00	4599.75	0.99	242.63	2249.18	1.02	185.70	1566.75	1.03	152.28	1153.03	1.09	122.58	1.03
<b>TILE_7</b>	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	GM
<b>p0</b>	326.57	0.99	104.00	4609.30	0.99	238.82	2060.90	0.94	213.26	1423.75	0.94	175.82	982.40	0.93	138.44	0.96
<b>p1</b>	326.93	0.99	104.00	4581.88	0.99	263.14	2250.07	1.02	185.48	1617.05	1.06	157.35	1202.80	1.14	128.05	1.04
<b>p2</b>	328.32	0.99	104.00	4626.12	1.00	245.06	2225.88	1.01	191.00	1530.03	1.01	158.46	1054.03	1.00	125.43	1.00
<b>TILE_8</b>	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	GM
<b>p0</b>	326.48	0.99	93.00	4630.93	1.00	216.39	2342.47	1.07	175.43	1746.72	1.15	142.45	1242.90	1.17	111.91	1.07
<b>p1</b>	324.65	0.98	93.47	4583.60	0.99	250.93	2375.88	1.08	169.47	1742.10	1.15	130.10	1301.25	1.23	103.58	1.08
<b>p2</b>	328.05	0.99	94.00	4611.88	0.99	229.97	2360.78	1.07	171.76	1706.78	1.12	134.26	1207.85	1.14	103.52	1.06
<b>TILE_9</b>	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	GM
<b>p0</b>	326.73	0.99	91.75	4620.02	1.00	219.24	2346.32	1.07	176.24	1728.40	1.14	145.03	1257.95	1.19	121.48	1.07
<b>p1</b>	330.02	1.00	92.50	4618.45	1.00	247.83	2435.70	1.11	164.25	1744.65	1.15	129.96	1197.40	1.13	104.39	1.07
<b>p2</b>	326.68	0.99	94.00	4591.68	0.99	241.09	2379.05	1.08	170.45	1767.67	1.16	138.53	1231.62	1.16	111.63	1.07
<b>TILE_10</b>	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	GM
<b>p0</b>	323.80	0.98	105.50	4633.52	1.00	212.63	2682.72	1.22	141.60	1867.38	1.23	116.98	1391.47	1.32	93.29	1.14
<b>p1</b>	326.10	0.99	96.25	4597.65	0.99	253.06	2542.60	1.16	153.06	1787.70	1.18	125.32	1258.33	1.19	96.85	1.10
<b>p2</b>	325.25	0.98	94.00	4620.77	1.00	237.31	2495.95	1.13	158.68	1808.30	1.19	134.10	1347.50	1.27	108.86	1.11
<b>p0_score:</b>	11.06															
<b>p1_score:</b>	11.50															
<b>p2_score:</b>	11.36															

**Infrastructure\_Operations\_Scores:**

	vmotion	svmotion	deploy
<b>Completed_Ops_PerHour</b>	15.00	9.00	4.00
<b>Avg_Seconds_To_Complete</b>	50.42	44.91	467.34
<b>Failures</b>	0.00	0.00	0.00

<b>Ratio</b>	0.94	1.00	1.00
<b>Number_Of_Threads</b>	1	1	1
<b>Summary</b>	<b>Run_Is_Compliant</b>	<b>Number_Of_Compliance_Issues(0)*</b>	<b>Median_Phase(p2)</b>
<b>Unreviewed_VMmark2_Applications_Score</b>	11.36		
<b>Unreviewed_VMmark2_Infrastructure_Score</b>	0.98		
<b>Unreviewed_VMmark2_Score</b>	9.29		

## Configuration

Virtualization Software	
Hypervisor Vendor, Product, Version, and Build / Availability Date (MM-DD-YYYY)	VMware ESX 4.1 U1 Build 260247/ 02-11-2011
Datacenter Management Software Vendor, Product, Version, and Build / Availability Date (MM-DD-YYYY)	VMware vCenter Server 4.1 U1 Build 258902 / 02-11-2011
Supplemental Software	none
Servers	
Quantity	2
Server Manufacturer and Model	HP ProLiant BL620c G7
Processor Vendor and Model	Intel Xeon E7-2870
Processor Speed (GHz)	2.40
Total Sockets/Total Cores/Total Threads	2 Sockets / 20 Cores / 40 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	I25 02/22/2011
Memory Size (in GB, Number of DIMMs)	256 GB, 16 x 16 GB DIMMs
Memory Type and Speed	dual rank PC3-8500 Registered DDR3-1066
Disk Subsystem Type	FC SAN
Number of Disk Controllers	1
Disk Controller Vendors and Models	HP SmartArray P410i Controller
Number of Host Bus Adapters	1

Host Bus Adapter Vendors and Models	LPe1205 dual port 8Gb Fibre HBA
Number of Network Controllers	4
Network Controller Vendors and Models	4xHP NC553i 10Gb FlexFabric Adapters
Other Hardware	none
Other Software	none
Hardware Availability Date (MM-DD-YYYY)	04-05-2011
Software Availability Date (MM-DD-YYYY)	07-13-2010
<b>Network</b>	
Network Switch Vendors and Models	HP ProCurve 2910-a1-24G
Network Speed	1 GbE with 10GbE uplinks
<b>Storage</b>	
Array Vendors, Models, and Firmware Versions	8xHP StorageWorks P2000
Fibre Channel Switch Vendors and Models	2xHP B-series 8/24c SAN Switch BladeSystem c-Class
Disk Space Used	17.4 TB
Array Cache Size	2GB
Total Number of Physical Disks Used	192
Total Number of Enclosures/Pods/Shelves Used	6
Number of Physical Disks Used per Enclosure/Pod/Shelf	Internal: 1 disks 8 enclosures: 24 disks
Total Number of Storage Groups Used	2
Number of LUNs Used	28
LUN Size and Number of Disks Per LUN	12 LUNs (544.75GB) each on own set of 8 disks 16 LUNs (400.75GB) 2 LUNs combined per array of 12 disks
RAID Type	RAID0
Number of Members per RAID Set	4 enclosures had 3 arrays of 8 disks. Each array had 1 LUN (544.75GB) configured. 4 enclosures configured with 2 arrays of 12 disks. Each array had 2 LUNs (400.75GB) configured.
Disk Vendors, Models, and Speeds	145 HP 72GB 15K RPM SAS SFF 48 HP 146GB 15K RPM SAS SFF

<b>Datacenter Management Server</b>	
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	8 GB
Network Controller(s) Vendors and Models	Integrated NC551i DualPort FlexFabric 10Gb Converged Network Adapter
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	1 Prime Client 5 other clients (each running 2 virtual clients, clients 0-4) 1 other client (running 1 virtual client, client5)
System Model(s)	Prime Client and Clients 0-5: HP ProLiant DL360 G5
Processor Vendor(s) and Model(s)	Prime Client: Intel Xeon E5440 Clients 0-5: Intel Xeon E5450
Processor Speed(s) (GHz)	Prime Client: 2.83 Clients 0-5: 3.00
Total Sockets/Total Cores/Total Threads	Prime Client and Clients 0-5: 2 Sockets / 8 Cores / 8 Threads
Memory per Client	Prime Client: 4 GB Clients 0-5: 16 GB
Network Controller(s) Vendors and Models	Prime Client: 2 x HP NC373i embedded Gigabit adapters Clients 0-4: 2 x HP NC373i embedded Gigabit adapters, 1 x HP NC360T dual port Gigabit adapter Clients 5: 2 x HP NC373i embedded Gigabit adapters, 1 x HP NC364T quad port Gigabit adapter
Operating System, Version, and Service Pack	Prime Client: Microsoft® Windows® 2003 Enterprise SP2 (32-bit) Client0-5: Microsoft® Windows® 2008 R2 Enterprise (64-bit)
Other Hardware	none
Other Software	Prime Client: None Clients 0-5: VMware ESX 4.1 U1 (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
- Cluster DRS Automation Level set to Fully Automation level 1 (VMmark V2.1 default is Fully Automated level 2)
- IDE & floppy devices were removed on all VMs (default enabled)
- firewall was disabled in the console os (default enabled)
- All Mailserver VMs used Hard Disk 1 on LSI Logic SAS controller, Hard Disk 2 on Paravirtual controller
- SVE-be2net-2.103.377.0 ServerEngines BladeEngine NIC Driver installed on both servers
- EMU-lpfc820-8.2.1.90.28 lpfc820:scsi driver for VMware ESX installed on both servers

#### Advanced Settings:

- Cpu.HaltingIdleMsecPenalty = 0 (default 100)
- Disk.SchedNumReqOutstanding = 128 (default 32)
- 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.NetTxWorldlet = 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=30 lpfc\_cr\_delay=2" (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)
- Adjacent Sector Line Prefetch: Disabled (default: enabled)
- Hardware Prefetch: Disabled (default: enabled)
- DCU Streamer: Disabled (default: enabled)
- Turbo Boost Technology: Enabled (Intel Turbo Boost up to 2.80 GHz,default: enabled)
- System Locality Information Table: Enabled (default: disabled)
- Serial port: disabled (default: COM2)

## Networking Notes

#### vSwitch Configuration:

- vSwitch0 for the Service Console on vmnic0 at 10Gb/s
- vSwitch1 for all VMs except Olio on vmnic1 at 10Gb/s
- vSwitch2 defined as vmkernel vMotion connection on vmnic8 at 10Gb/s Jumbo frames were enabled for this network with MTU set to 9000.
- dvSwitch defined with 132 ports and configured with 2 dvUplink ports (dvSwitch-DVUplinks-1701) assigned to vmnic9 on each host.
- A dvPortGroup for the dvSwitch defined with 128 ports and static binding. All OlioDB and OlioWeb VMs were assigned to this dvPortGroup

#### Storage Notes

- Enclosure1: 3x8 disk (72GB disk drives) Arrays each with 1 LUN  
1:Mailserver0  
2:Mailserver1  
3:Mailserver2
- Enclosure2: 3x8 disk (72GB disk drives) Arrays each with 1 LUN  
1:Mailserver3  
2:Mailserver4  
3:Mailserver5
- Enclosure3: 3x8 disk (72GB disk drives) Arrays each with 1 LUN  
1:Mailserver6  
2:Mailserver7  
3:Mailserver8
- Enclosure4: 3x8 disk (72GB disk drives) Arrays each with 1 LUN  
1:Mailserver9  
2:Mailserver10  
3:Mailserver11
- Enclosure5: 2x12 disk (72GB disk drives) Arrays each with 2 LUNs  
Array 1 LUN 1:Rest of VM's for Tile0  
Array 1 LUN 2:Rest of VM's for Tile1  
Array 2 LUN 1:Rest of VM's for Tile2  
Array 2 LUN 2:Rest of VM's for Tile3.
- Enclosure6: 2x12 disk (72GB disk drives) Arrays each with 2 LUNs  
Array 1 LUN 1:Rest of VM's for Tile4  
Array 1 LUN 2:Rest of VM's for Tile5  
Array 2 LUN 1:Rest of VM's for Tile6  
Array 2 LUN 2:Rest of VM's for Tile7.
- Enclosure7: 1x12 disk (146 GB disk drives) Arrays each with 2 LUNs  
Array 1 LUN 1:Rest of VM's for Tile8  
Array 1 LUN 2:Rest of VM's for Tile9  
2x6 Disk (146 GB disk drives) LUNs each with 1 LUN  
LUN 1:Deploy Target LUN  
LUN 2:SVMotion Target LUN
- Enclosure8: 1x12 disk (146 GB disk drives) Arrays each with 2 LUNs  
Array 1 LUN 1:Rest of VM's for Tile10  
Array 1 LUN 2:Rest of VM's for Tile11  
2x6 Disk (146 GB disk drives) LUNs each with 1 LUN

LUN 1:DeployTemplate  
LUN 2:Standby VM's for all tiles

## Datacenter Management Server Notes

None

## Operating System Notes

- All mailserver VMs running Microsoft® Windows® 2008 R2 Enterprise (64-bit)
- All standby VMs running Microsoft® Windows® 2003 Enterprise SP2 (32-bit)

## Software Notes

None

## 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.
- Each virtual machine was running Microsoft® Windows® 2008 R2 Enterprise (64-bit).
- Six HP ProLiant DL360 G5 client machines were installed with VMware ESX 4.1
- Five HP ProLiant DL360 G5 clients ran two client virtual machines.
- One HP ProLiant DL360 G5 client ran one client virtual machines.

## Other Notes

None

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