

## VMware® VMmark® V2.1 Results

<b>Vendor and Hardware Platform: HP ProLiant BL620c G7</b> <b>Virtualization Platform: VMware ESX 4.1 U1 Build 260247</b> <b>VMware vCenter Server 4.1 U1 Build 258902</b>	<b>VMmark V2.1 Score =</b> <b>9.02 @ 10 Tiles</b>
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Number of Hosts: 2	Uniform Hosts [yes/no]: yes	Total sockets/core/threads in test: 4/40/80
Tested By: Hewlett-Packard		Test Date: 03-18-2011
<b>Performance Section</b> <a href="#">Performance</a>	<b>Configuration Section</b> <a href="#">Configuration</a>	<b>Notes Section</b> <a href="#">Notes for Workload</a>

### 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>	323.85	0.98	93.55	4612.85	0.99	228.72	2482.38	1.13	159.29	1769.10	1.16	127.90	1226.95	1.16	100.89	1.08
<b>p1</b>	326.68	0.99	94.00	4609.05	0.99	224.63	2499.65	1.14	157.55	1923.97	1.27	131.89	1365.35	1.29	106.64	1.13
<b>p2</b>	328.48	0.99	94.00	4625.55	1.00	225.26	2514.82	1.14	156.51	1728.97	1.14	121.30	1240.12	1.17	99.09	1.09
<b>TILE_1</b>	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	GM
<b>p0</b>	329.07	1.00	81.25	4645.88	1.00	201.67	2646.45	1.20	144.67	1926.30	1.27	121.71	1378.83	1.30	94.98	1.15
<b>p1</b>	324.75	0.98	81.50	4621.30	1.00	226.38	2620.20	1.19	146.24	1908.20	1.26	123.20	1426.17	1.35	100.16	1.15
<b>p2</b>	325.93	0.99	84.00	4613.27	0.99	228.48	2639.90	1.20	145.14	1787.92	1.18	115.14	1243.08	1.17	88.12	1.10
<b>TILE_2</b>	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	GM
<b>p0</b>	329.38	1.00	94.00	4604.20	0.99	262.00	2299.05	1.05	180.26	1711.58	1.13	157.04	1166.47	1.10	120.44	1.05
<b>p1</b>	327.00	0.99	90.75	4589.60	0.99	256.17	2284.53	1.04	182.47	1573.97	1.04	151.17	1161.30	1.10	121.60	1.03
<b>p2</b>	328.85	1.00	84.25	4592.15	0.99	252.14	2285.70	1.04	182.45	1586.45	1.04	149.90	1105.42	1.04	117.12	1.02
<b>TILE_3</b>	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	GM
<b>p0</b>	325.95	0.99	84.75	4626.00	1.00	232.81	2510.65	1.14	157.75	1809.05	1.19	134.05	1353.62	1.28	108.33	1.11
<b>p1</b>	326.75	0.99	84.00	4615.45	0.99	237.41	2609.30	1.19	148.38	1792.45	1.18	125.16	1267.12	1.20	96.20	1.11
<b>p2</b>	331.00	1.00	84.00	4624.85	1.00	237.52	2559.30	1.16	153.46	1832.65	1.21	131.63	1308.00	1.24	102.83	1.12
<b>TILE_4</b>	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	GM
<b>p0</b>	323.95	0.98	104.00	4603.23	0.99	226.70	2477.57	1.13	160.27	1742.12	1.15	130.10	1289.78	1.22	104.75	1.09
<b>p1</b>	325.43	0.99	104.00	4623.10	1.00	239.91	2471.50	1.12	160.80	1742.30	1.15	130.57	1216.72	1.15	102.28	1.08
<b>p2</b>	328.35	0.99	104.00	4612.55	0.99	231.09	2448.12	1.11	162.44	1801.17	1.19	134.58	1335.85	1.26	110.35	1.10
<b>TILE_5</b>	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	GM
<b>p0</b>	328.62	1.00	81.10	4632.77	1.00	210.79	2599.65	1.18	148.74	1809.12	1.19	123.48	1274.90	1.20	95.58	1.11

<b>p1</b>	329.00	1.00	74.00	4607.90	0.99	233.72	2614.07	1.19	146.30	1886.67	1.24	125.22	1351.97	1.28	97.52	1.13
<b>p2</b>	326.82	0.99	74.00	4642.73	1.00	223.56	2596.30	1.18	148.71	1801.03	1.19	123.90	1338.12	1.26	99.28	1.12
<b>TILE_6</b>	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	GM
<b>p0</b>	326.80	0.99	107.50	4630.80	1.00	215.99	2461.53	1.12	162.21	1694.03	1.12	136.35	1199.97	1.13	104.02	1.07
<b>p1</b>	330.88	1.00	104.00	4616.98	0.99	237.65	2429.35	1.10	164.97	1741.75	1.15	141.54	1310.28	1.24	113.27	1.09
<b>p2</b>	327.05	0.99	104.00	4617.52	0.99	216.83	2431.80	1.11	165.68	1662.55	1.09	139.86	1176.47	1.11	107.06	1.06
<b>TILE_7</b>	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	GM
<b>p0</b>	321.40	0.97	104.00	4630.82	1.00	215.77	2716.65	1.24	138.13	2004.12	1.32	114.43	1422.62	1.34	90.12	1.16
<b>p1</b>	324.60	0.98	104.00	4599.12	0.99	241.98	2705.30	1.23	138.53	1907.17	1.26	113.05	1414.42	1.34	90.90	1.15
<b>p2</b>	329.62	1.00	104.00	4631.90	1.00	222.69	2667.03	1.21	142.68	1885.08	1.24	115.62	1327.95	1.26	89.76	1.13
<b>TILE_8</b>	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	GM
<b>p0</b>	331.35	1.00	93.25	4642.62	1.00	226.66	2361.38	1.07	173.13	1715.33	1.13	145.09	1269.25	1.20	118.75	1.08
<b>p1</b>	325.48	0.99	84.75	4616.35	0.99	237.77	2389.50	1.09	168.47	1675.97	1.10	137.81	1176.70	1.11	107.03	1.06
<b>p2</b>	327.07	0.99	84.00	4639.90	1.00	222.02	2332.88	1.06	176.06	1690.72	1.11	147.95	1191.47	1.13	117.02	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>	323.15	0.98	73.17	4639.05	1.00	211.72	2641.70	1.20	144.85	1840.55	1.21	120.22	1357.70	1.28	96.80	1.13
<b>p1</b>	327.90	0.99	73.95	4606.85	0.99	235.14	2624.30	1.19	146.68	1807.08	1.19	123.70	1276.62	1.21	95.21	1.11
<b>p2</b>	329.73	1.00	74.00	4631.73	1.00	217.15	2602.53	1.18	149.02	1863.90	1.23	128.18	1389.17	1.31	104.13	1.14
<b>p0_score:</b>	11.03															
<b>p1_score:</b>	11.03															
<b>p2_score:</b>	10.94															

<b>Infrastructure_Operations_Scores:</b>									vmotion			svmotion			deploy		
<b>Completed_Ops_PerHour</b>									14.50			9.00			4.00		
<b>Avg_Seconds_To_Complete</b>									45.12			43.54			450.75		
<b>Failures</b>									0.00			0.00			0.00		
<b>Ratio</b>									0.91			1.00			1.00		
<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>				11.03											
<b>Unreviewed_VMmark2_Infrastructure_Score</b>				0.97											
<b>Unreviewed_VMmark2_Score</b>				9.02											

## Configuration

<b>Virtualization Software</b>															
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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
<b>Servers</b>	
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-al-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) each on 6 disks
RAID Type	RAID0
Number of Members per RAID Set	4 enclosures held the OlioDB and DS2DB VMs had 3 volumes each containing 8 disks. 4 enclosures held the rest of the VMs had 4 volumes each containing 6 disks.
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)
System Model(s)	Prime Client and Clients 0-4: HP ProLiant DL360 G5
Processor Vendor(s) and Model(s)	Prime Client: Intel Xeon E5440 Clients 0-4: Intel Xeon E5450
Processor Speed(s) (GHz)	Prime Client: 2.83 Clients 0-4: 3.00
Total Sockets/Total Cores/Total Threads	Prime Client and Clients 0-4: 2 Sockets / 8 Cores / 8 Threads
Memory per Client	Prime Client: 4 GB Clients 0-4: 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
Operating System, Version, and Service Pack	Prime Client: Microsoft® Windows® 2003 Enterprise SP2 (32-bit) Client0-3: Microsoft® Windows® 2008 R2 Enterprise (64-bit)
Other Hardware	none
Other Software	Prime Client: None Client0-3: VMware ESX 4.1 (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 used Hard Disk 1 on LSI Logic SAS controller, Hard Disk 2 on Paravirtual controller
- SVE-be2net-400.2.102.518.0 ServerEngines BladeEngine NIC Driver 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=5 lpfc\_cr\_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)
- 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 4.80 GHz,default: enabled)

## 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
- vSwitch3 for all Olio VMs on vmnic9 at 10Gb/s

## Storage Notes

- Enclosure1: 3x8 disk LUNs  
1:OlioDB0,DS2DB0  
2:OlioDB1,DS2DB1  
3:OlioDB2,DS2DB2
- Enclosure2: 3x8 disk LUNs  
1:OlioDB3,DS2DB3  
2:OlioDB4,DS2DB4  
3:OlioDB5,DS2Db5
- Enclosure3: 3x8 disk LUNs  
1:OlioDB6,DS2DB6  
2:OlioDB7,DS2DB7  
3:OlioDB8,DS2Db8
- Enclosure4: 3x8 disk LUNs  
1:OlioDB9,DS2DB9  
2:OlioDB10,DS2DB10  
3:OlioDB11,DS2DB11
- Enclosure5: 4x6 disk LUNs  
1:Web and Mailserver VM's for Tile0

- 2:Web and Mailserver VM's for Tile1
- 3:Web and Mailserver VM's for Tile2
- 4:Web and Mailserver VM's for Tile3.
- Enclosure6: 4x6 disk LUNs
  - 1:Web and Mailserver VM's for Tile4
  - 2:Web and Mailserver VM's for Tile5
  - 3:Web and Mailserver VM's for Tile6
  - 4:Web and Mailserver VM's for Tile7.
- Enclosure7: 4x6 disk LUNs
  - 1:Web and Mailserver VM's for Tile8
  - 2:Web and Mailserver VM's for Tile9
  - 3:Deploy Target LUN
  - 4:SVMotion Target LUN
- Enclosure8: 4x6 disk LUNs
  - 1:Web and Mailserver VM's for Tile10
  - 2:Web and Mailserver VM's for Tile11
  - 3:DeployTemplate
  - 4:Standby VM's for all tiles
- DeployTemplate was on a single LUN (6 disk)
- The VMs for each tile (except standby) were grouped together on two LUNs for each tile. 1st LUN (8 disks) held the DS2DB and OlioDB VM. 2nd LUN (6 disks) held rest of the VMs.
- The target for the sVMotion was on a single LUN (6 disk)
- The target for Deploy operations was a single dedicated LUN (6 disk).

## **Datacenter Management Server Notes**

None

## **Operating System Notes**

- All mailserver VMs running Microsoft® Windows® 2008 R2 Enterprise
- All standby VMs running Microsoft® Windows® 2003 Enterprise SP2

## **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).
- Five HP ProLiant DL360 G5 client machines were installed with VMware ESX 4.1
- Five HP ProLiant DL360 G5 clients ran two client virtual machines.

## **Other Notes**

None

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