

VMware® VMmark® V2.1 Results

Vendor and Hardware Platform: HP ProLiant DL580 G7

Virtualization Platform: VMware ESX 4.1 U1 Build 260247

VMware vCenter Server 4.1 U1 Build 258902

**VMmark V2.1 Score =
16.89 @ 20 Tiles**

Number of Hosts: 2

Uniform Hosts [yes/no]: yes

Total sockets/core/threads in test: 8/80/160

Tested By: Hewlett-Packard

Test Date: 04-05-2011

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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	323.52	0.98	73.62	4629.05	1.00	215.35	1872.80	0.85	239.64	1363.80	0.90	187.42	1024.42	0.97	147.65	0.94
p1	326.05	0.99	74.00	4614.00	0.99	239.05	2101.88	0.96	204.04	1583.08	1.04	165.51	1128.05	1.07	129.37	1.01
p2	329.20	1.00	84.00	4599.80	0.99	236.62	2112.22	0.96	202.72	1552.53	1.02	156.84	1097.83	1.04	120.89	1.00
TILE_1	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	GM
p0	327.05	0.99	64.00	4633.82	1.00	204.57	2028.53	0.92	217.02	1408.33	0.93	177.63	976.17	0.92	139.04	0.95
p1	329.85	1.00	64.00	4614.30	0.99	220.09	2348.15	1.07	174.50	1687.88	1.11	147.90	1243.50	1.18	122.20	1.07
p2	323.68	0.98	64.00	4629.32	1.00	229.10	2353.68	1.07	174.60	1629.03	1.07	144.24	1129.42	1.07	113.48	1.04
TILE_2	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	GM
p0	325.57	0.99	67.85	4625.95	1.00	235.05	1928.22	0.88	232.67	1363.40	0.90	200.86	984.17	0.93	153.43	0.94
p1	321.27	0.97	73.00	4572.10	0.99	272.05	2165.65	0.98	194.88	1493.72	0.98	162.27	1121.00	1.06	127.64	1.00
p2	327.57	0.99	73.00	4572.10	0.99	282.88	2167.32	0.99	196.73	1485.22	0.98	164.06	1051.03	0.99	125.68	0.99
TILE_3	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	GM
p0	319.07	0.97	74.00	4617.73	0.99	225.15	2281.05	1.04	184.37	1614.55	1.06	158.68	1205.97	1.14	128.52	1.04
p1	323.80	0.98	74.00	4608.32	0.99	236.78	2426.03	1.10	166.24	1665.65	1.10	139.39	1173.75	1.11	107.60	1.05
p2	327.73	0.99	74.00	4612.35	0.99	235.22	2391.70	1.09	169.03	1728.95	1.14	143.23	1230.80	1.16	111.99	1.07
TILE_4	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	GM
p0	326.50	0.99	84.00	4625.93	1.00	216.15	2429.90	1.10	164.03	1708.33	1.12	134.37	1260.80	1.19	108.22	1.08
p1	326.00	0.99	86.75	4606.27	0.99	233.45	2399.25	1.09	168.28	1676.80	1.10	138.07	1165.20	1.10	108.74	1.05

p2	325.90	0.99	94.00	4619.52	1.00	242.35	2352.25	1.07	172.94	1704.05	1.12	146.08	1263.08	1.19	119.94	1.07
TILE_5	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	GM
p0	331.85	1.00	74.00	4635.62	1.00	212.47	2098.75	0.95	206.60	1460.67	0.96	168.96	1021.58	0.97	131.23	0.98
p1	328.18	0.99	74.00	4612.73	0.99	244.61	2156.68	0.98	198.02	1560.75	1.03	165.82	1101.50	1.04	130.74	1.01
p2	327.82	0.99	74.00	4572.10	0.99	265.46	2159.65	0.98	198.50	1494.83	0.98	162.95	1094.67	1.03	132.03	1.00
TILE_6	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	GM
p0	328.65	1.00	80.00	4621.18	1.00	224.06	2382.22	1.08	171.07	1620.78	1.07	145.00	1164.17	1.10	109.15	1.05
p1	323.27	0.98	84.00	4592.10	0.99	267.98	2299.80	1.05	177.94	1625.00	1.07	156.07	1249.12	1.18	121.47	1.05
p2	324.75	0.98	84.00	4575.88	0.99	265.38	2305.88	1.05	179.57	1554.58	1.02	153.60	1131.50	1.07	113.39	1.02
TILE_7	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	GM
p0	325.65	0.99	84.00	4638.07	1.00	201.60	2544.12	1.16	153.64	1863.90	1.23	128.00	1328.80	1.26	99.67	1.12
p1	326.90	0.99	84.00	4602.07	0.99	226.98	2493.22	1.13	157.91	1749.00	1.15	129.89	1295.05	1.22	103.78	1.09
p2	325.75	0.99	84.00	4605.95	0.99	239.78	2485.47	1.13	159.42	1749.25	1.15	129.75	1241.65	1.17	98.92	1.08
TILE_8	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	GM
p0	322.18	0.98	74.00	4623.80	1.00	231.93	2088.50	0.95	207.38	1537.45	1.01	169.86	1152.75	1.09	137.04	1.00
p1	323.38	0.98	74.00	4561.15	0.98	274.94	2256.18	1.03	182.32	1630.40	1.07	143.14	1149.92	1.09	110.53	1.03
p2	324.93	0.98	82.00	4591.65	0.99	279.52	2234.30	1.02	186.39	1660.85	1.09	151.51	1180.12	1.12	119.08	1.04
TILE_9	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	GM
p0	327.23	0.99	74.00	4658.80	1.00	199.67	2469.82	1.12	161.37	1716.38	1.13	133.32	1262.75	1.19	107.75	1.09
p1	323.68	0.98	77.50	4642.93	1.00	223.27	2409.22	1.10	166.41	1691.67	1.11	136.27	1181.85	1.12	106.60	1.06
p2	323.62	0.98	84.00	4597.73	0.99	248.68	2427.68	1.10	165.58	1755.88	1.16	139.83	1304.83	1.23	114.11	1.09
TILE_10	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	GM
p0	327.57	0.99	86.85	4624.75	1.00	215.82	2524.80	1.15	154.00	1819.22	1.20	121.68	1257.22	1.19	96.83	1.10
p1	326.77	0.99	83.20	4601.38	0.99	245.14	2385.93	1.08	168.00	1818.58	1.20	132.59	1276.12	1.21	106.02	1.09
p2	326.90	0.99	83.60	4602.00	0.99	260.45	2400.07	1.09	167.47	1727.33	1.14	131.56	1261.97	1.19	107.86	1.08
TILE_11	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	GM
p0	323.80	0.98	81.15	4636.30	1.00	204.22	2231.70	1.01	190.64	1544.28	1.02	157.07	1082.47	1.02	122.20	1.01
p1	324.90	0.98	84.00	4633.93	1.00	219.16	2340.28	1.06	174.75	1686.42	1.11	147.95	1253.00	1.18	120.92	1.07
p2	325.50	0.99	84.00	4599.27	0.99	244.68	2340.12	1.06	175.69	1617.83	1.07	145.51	1130.05	1.07	113.24	1.03
TILE_12	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	GM
p0	324.60	0.98	93.00	4628.25	1.00	203.51	2236.57	1.02	188.69	1610.12	1.06	159.84	1155.17	1.09	123.20	1.03
p1	327.00	0.99	94.00	4598.07	0.99	233.82	2295.65	1.04	179.25	1591.30	1.05	148.25	1184.80	1.12	117.69	1.04
p2	326.52	0.99	94.00	4594.98	0.99	257.20	2277.05	1.04	182.74	1582.97	1.04	150.01	1118.70	1.06	115.14	1.02

TILE_13	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	GM			
p0	328.60	1.00	94.50	4647.35	1.00	185.30	2424.95	1.10	166.47	1831.83	1.21	142.70	1302.78	1.23	114.45	1.10			
p1	328.40	0.99	94.00	4626.07	1.00	207.53	2439.45	1.11	164.67	1644.42	1.08	130.60	1190.10	1.12	105.19	1.06			
p2	325.88	0.99	94.00	4643.70	1.00	203.95	2361.82	1.07	172.12	1730.65	1.14	143.49	1210.65	1.14	114.48	1.07			
TILE_14	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	GM			
p0	327.50	0.99	89.50	4615.73	0.99	231.72	2003.12	0.91	218.21	1421.40	0.94	176.57	1037.55	0.98	143.06	0.96			
p1	329.82	1.00	93.75	4578.32	0.99	271.21	2299.32	1.05	178.75	1612.97	1.06	145.75	1126.17	1.06	113.98	1.03			
p2	325.10	0.98	94.00	4611.80	0.99	248.60	2263.55	1.03	182.62	1645.38	1.08	153.61	1224.88	1.16	124.90	1.05			
TILE_15	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	GM			
p0	329.35	1.00	84.00	4644.50	1.00	214.95	2447.35	1.11	162.45	1675.33	1.10	127.34	1229.67	1.16	100.80	1.07			
p1	328.85	1.00	84.00	4619.80	1.00	233.50	2418.22	1.10	164.39	1766.78	1.16	137.89	1271.10	1.20	106.75	1.09			
p2	324.60	0.98	84.00	4628.88	1.00	225.36	2425.72	1.10	164.37	1707.00	1.12	133.90	1276.38	1.21	106.07	1.08			
TILE_16	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	GM			
p0	325.02	0.98	93.67	4618.35	1.00	215.87	2277.43	1.04	182.14	1554.20	1.02	142.32	1120.58	1.06	115.82	1.02			
p1	326.30	0.99	93.92	4613.62	0.99	238.45	2266.10	1.03	181.88	1642.28	1.08	154.11	1218.55	1.15	125.33	1.05			
p2	327.12	0.99	94.00	4593.62	0.99	254.45	2282.05	1.04	181.56	1582.45	1.04	150.28	1104.80	1.04	116.99	1.02			
TILE_17	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	GM			
p0	324.70	0.98	90.25	4646.50	1.00	207.37	2431.95	1.11	164.39	1712.28	1.13	134.00	1190.88	1.13	105.06	1.07			
p1	324.40	0.98	84.00	4597.35	0.99	227.61	2339.93	1.06	175.32	1610.58	1.06	146.13	1180.15	1.12	118.67	1.04			
p2	326.85	0.99	84.00	4639.38	1.00	223.00	2335.03	1.06	176.76	1614.35	1.06	146.18	1115.42	1.05	115.40	1.03			
TILE_18	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	GM			
p0	333.15	1.01	98.25	4640.55	1.00	214.84	2358.57	1.07	171.51	1734.08	1.14	141.77	1229.22	1.16	111.85	1.07			
p1	331.23	1.00	94.00	4609.65	0.99	240.97	2306.20	1.05	177.94	1566.90	1.03	139.70	1136.03	1.07	112.50	1.03			
p2	327.80	0.99	94.00	4617.27	0.99	238.71	2244.97	1.02	186.19	1643.17	1.08	153.73	1158.65	1.10	121.82	1.04			
TILE_19	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	GM			
p0	327.73	0.99	84.00	4639.88	1.00	214.62	2461.45	1.12	161.26	1788.40	1.18	135.85	1326.03	1.25	111.61	1.10			
p1	327.82	0.99	83.75	4607.93	0.99	232.91	2402.62	1.09	167.54	1674.58	1.10	138.63	1162.92	1.10	108.62	1.05			
p2	321.50	0.97	74.00	4641.98	1.00	213.42	2361.38	1.07	172.78	1709.65	1.13	145.74	1209.03	1.14	114.88	1.06			
p0_score:	20.71																		
p1_score:	20.97																		
p2_score:	20.88																		
Infrastructure_Operations_Scores:										vmotion			svmotion			deploy			

Completed_Ops_PerHour	15.50	8.00	4.00
Avg_Seconds_To_Complete	46.23	57.06	475.46
Failures	0.00	0.00	0.00
Ratio	0.97	0.89	1.00
Number_Of_Threads	1	1	1
Summary	Run_Is_Compliant	Number_Of_Compliance_Issues(0)*	
Unreviewed_VMmark2_Applications_Score	20.88	Median_Phase(p2)	
Unreviewed_VMmark2_Infrastructure_Score	0.95		
Unreviewed_VMmark2_Score	16.89		

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 DL580 G7
Processor Vendor and Model	Intel Xeon E7-4870
Processor Speed (GHz)	2.40
Total Sockets/Total Cores/Total Threads	4 Sockets / 40 Cores / 80 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	P65 02/28/2011
Memory Size (in GB, Number of DIMMs)	512 GB, 64 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	LPe12002 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	
Other Software	none
Hardware Availability Date (MM-DD-YYYY)	04-05-2011
Software Availability Date (MM-DD-YYYY)	02-11-2011
Network	
Network Switch Vendors and Models	HP ProCurve 2910-al-24G
Network Speed	1 GbE with 10GbE uplinks
Storage	
Array Vendors, Models, and Firmware Versions	26xHP StorageWorks MSA 2212, 2xHP StorageWorks MSA 2324, 2xHP StorageWorks P2000 MSA
Fibre Channel Switch Vendors and Models	2 x HP StorageWorks SAN Switch 8/24
Disk Space Used	54.70 TB
Array Cache Size	1GB (MSA 2212, MSA 2324), 2GB (P2000 MSA)
Total Number of Physical Disks Used	410 (2 disks internal, 408 disks external)
Total Number of Enclosures/Pods/Shelves Used	30
Number of Physical Disks Used per Enclosure/Pod/Shelf	26 enclosures: 12 disks 4 enclosures: 24 disks
Total Number of Storage Groups Used	2
Number of LUNs Used	56
LUN Size and Number of Disks Per LUN	2 LUNs: 818.5GB on 12 disks 6 LUNs: 232.75 GB on 12 disks (4 of 6 LUNs were used) 20 LUNs: 1.60 TB on 12 disks (18 of 20 LUNs were used) 12 LUNs: 546.50 GB on 12 disks (8 of 12 LUNs were used) 6 LUNs: 545.50 GB on 12 disks (2 of 6 LUNs were used)

	4 LUNs: 819.50 GB on 6 disks 6 LUNs: 819.50 GB on 12 disks
RAID Type	RAID 0, RAID 1 for OS
Number of Members per RAID Set	12 (for 42 LUNs); 6 (for 4 LUNs)
Disk Vendors, Models, and Speeds	HP 72GB 15K RPM SAS SFF HP 146GB 15K RPM SAS LFF HP 146 GB 15K RPM SAS SFF

Datacenter Management Server

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

Clients

Number of Clients	10
System Model(s)	HP ProLiant DL360 G5
Processor Vendor(s) and Model(s)	Clients 0-4, Clients 6-8: Intel Xeon E5450 Clients 5,9: Intel Xeon E5440
Processor Speed(s) (GHz)	Clients 0-4, Clients 6-8: 3.00 Clients 5, 9: 2.83
Total Sockets/Total Cores/Total Threads	2 Sockets / 8 Cores / 8 Threads
Memory per Client	Clients 0-1, Clients 3-9: 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) Clients 0-9: VMware ESX 4.1 U1 (Build 260247)
Other Hardware	none
Other Software	Prime Client: None

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-2.103.377.0 HP NC550SFP NIC driver for VMware ESX installed on both servers
- EMU-lpfc820-8.2.1.90.28 HP 82E PCI-e 8Gb Fibre HBA driver for VMware ESX installed on both servers
- MEL-mlx4_en-1.5.5-436 driver for Mellanox 10GbE NIC installed on both servers
 - The Mellanox 10GbE NICs were physically removed from the system, but the drivers were still 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.NetTxWorldlet = 1 (default 2)
- Numa.PageMigEnable = 0 (default 1)
- Numa.LTermFairnessInterval = 0 (default 5)
- Disk.SchedNumReqOutstanding = 128 (default 32)
- Cpu.HaltingIdleMsecPenalty = 0 (default 100)

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)
 - Intel Turbo Boost enabled up to 2.80 GHz
- Thermal Configuration set to Increased Cooling (default: Optimal Cooling)

Server Hardware:

- Host 1 had a SATA DVD-ROM drive installed. Host 2 did not have any optical drives nor any devices connected to the embedded SATA controller, which was subsequently disabled automatically by ESX.

Networking Notes

vSwitch Configuration:

- vSwitch0 for the Service Console on vmnic0 at 1Gb/s
- vSwitch1 for all VMs on vmnic4 of host 1 and vmnic6 of host 2 at 10Gb/s
- vSwitch2 defined as vmkernel vMotion connection on vmnic5 on host 1 and vmnic7 on host 2 at 10Gb/s
 - Jumbo frames were enabled
- vSwitch3 unused - no NICs or VMs assigned

Storage Notes

- All standby VMs were on a single LUN
- Each mailserver VM was on a single LUN by itself.
- The VMs for each tile (except standby and mailserver) 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

- DRS Migration Threshold set to 1

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).
- All HP ProLiant DL360 G5 client machines were installed with VMware ESX 4.1 U1 (Build 260247)
 - Each HP ProLiant DL360 G5 client machine ran two client virtual machines with Microsoft® Windows® 2008 R2 Enterprise (64-bit) as the guest OS.
 - All virtual client operating systems were updated via Windows Update.

Other Notes

None

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