VMware® VMmark® V2.1.1 Results

Vendor and Hardware Platform: HP ProLiant DL360p Gen8 Virtualization Platform: VMware ESX 4.1.0 U2 Build 502767 VMware vCenter Server: VMware vCenter Server 5.0.0 Build 455964	VMmark V2.1.1 Score = 11.13 @ 10 Tiles

Number of Hosts: 2	Uniform Hosts [yes/no]: yes	Total sockets/cores/threads in test: 4/32/64

Tested By: Hewlett-Packard	Test Date: 04-27-2012

Performance Section	Configuration Section	Notes Section
Performance	Configuration	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	325.18	0.98	53.98	4655.27	1.00	194.96	3518.62	1.60	89.80	2538.80	1.67	94.83	1796.30	1.70	102.77	1.35
p1	324.18	0.98	54.00	4655.70	1.00	187.18	3563.32	1.62	84.80	2666.25	1.76	90.14	1912.12	1.81	95.60	1.38
p2	323.95	0.98	53.83	4632.55	1.00	203.80	3566.82	1.62	84.35	2551.95	1.68	91.33	1925.67	1.82	94.36	1.37
TILE_1	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	GM
p0	329.93	1.00	54.00	4633.75	1.00	205.45	3823.25	1.74	73.62	2673.28	1.76	85.80	1974.05	1.87	83.36	1.42
p1	325.88	0.99	53.30	4642.77	1.00	217.16	3845.50	1.75	71.51	2903.95	1.91	80.57	2169.45	2.05	80.67	1.47
p2	323.55	0.98	53.00	4645.98	1.00	210.53	3830.72	1.74	72.51	2672.30	1.76	83.67	2049.80	1.94	83.61	1.42
TILE_2	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	GM
p0	327.15	0.99	54.00	4670.80	1.01	193.20	3507.75	1.60	88.63	2664.70	1.75	89.99	1925.20	1.82	93.97	1.38
p1	330.20	1.00	53.75	4649.52	1.00	187.77	3531.38	1.61	87.25	2568.35	1.69	97.10	1945.55	1.84	100.81	1.38
p2	329.82	1.00	53.00	4668.55	1.01	180.72	3514.30	1.60	88.17	2472.03	1.63	98.01	1744.00	1.65	105.05	1.34
TILE_3	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	GM
p0	327.32	0.99	76.75	4652.35	1.00	198.28	3640.20	1.66	83.00	2927.57	1.93	79.77	2134.70	2.02	83.33	1.45
p1	326.70	0.99	73.95	4614.77	0.99	211.91	3740.55	1.70	75.69	2779.00	1.83	77.13	2043.80	1.93	83.56	1.43
p2	329.75	1.00	67.75	4645.05	1.00	193.92	3725.38	1.69	76.12	2769.07	1.82	77.30	1955.60	1.85	83.48	1.42
TILE_4	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	GM
p0	328.30	0.99	54.00	4673.50	1.01	180.80	3439.75	1.56	93.85	2485.80	1.64	105.10	1883.33	1.78	108.42	1.35
p1	330.00	1.00	54.00	4655.60	1.00	194.23	3475.25	1.58	90.08	2429.88	1.60	100.87	1720.28	1.63	107.02	1.33
p2	327.62	0.99	53.42	4646.02	1.00	191.90	3418.95	1.55	93.12	2491.25	1.64	102.42	1778.83	1.68	109.24	1.34
TILE_5	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	GM
p0	330.20	1.00	54.00	4646.65	1.00	194.75	3673.93	1.67	82.31	2742.90	1.81	80.31	1996.40	1.89	91.63	1.42
p1	322.75	0.98	50.42	4633.88	1.00	207.71	3706.05	1.69	77.58	2755.03	1.81	78.67	1923.30	1.82	85.98	1.40

p2	328.15	0.99	43.00	4652.30	1.00	183.44	3729.45	1.70	75.81	2863.15	1.89	77.37	2126.03	2.01	84.32	1.45
TILE_6	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	GM
p0	327.62	0.99	54.50	4622.62	1.00	219.24	3499.30	1.59	90.30	2387.12	1.57	100.22	1757.78	1.66	105.24	1.33
p1	315.62	0.96	52.65	4600.07	0.99	240.90	3440.05	1.56	91.91	2601.35	1.71	100.79	1876.55	1.77	107.99	1.35
p2	325.23	0.98	53.98	4617.52	0.99	217.09	3492.20	1.59	88.75	2357.60	1.55	99.68	1736.75	1.64	104.84	1.32
TILE_7	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	GM
p0	323.23	0.98	53.00	4646.57	1.00	203.29	3201.55	1.46	107.81	2297.07	1.51	112.52	1641.65	1.55	125.25	1.27
p1	320.18	0.97	51.67	4648.40	1.00	207.23	3187.53	1.45	108.48	2250.82	1.48	123.03	1644.67	1.55	133.96	1.27
p2	326.45	0.99	53.00	4669.62	1.01	189.68	3246.68	1.48	104.04	2173.20	1.43	116.67	1494.08	1.41	125.98	1.24
TILE_8	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	GM
p0	327.52	0.99	53.00	4656.62	1.00	190.06	3552.12	1.62	86.27	2605.18	1.72	95.93	1877.83	1.77	99.96	1.37
p1	315.18	0.95	51.92	4646.40	1.00	208.53	3671.18	1.67	80.32	2579.18	1.70	89.98	1915.90	1.81	95.32	1.37
p2	325.88	0.99	53.00	4655.50	1.00	191.01	3528.43	1.60	87.53	2495.60	1.64	96.42	1745.55	1.65	104.83	1.34
TILE_9	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	GM
p0	327.20	0.99	71.88	4667.45	1.01	175.30	3283.80	1.49	103.08	2399.10	1.58	109.82	1780.25	1.68	118.74	1.32
p1	319.00	0.97	62.40	4643.40	1.00	197.00	3258.95	1.48	102.47	2275.53	1.50	114.08	1594.75	1.51	122.33	1.26
p2	328.18	0.99	64.00	4664.75	1.01	189.38	3211.47	1.46	105.56	2334.43	1.54	115.40	1661.78	1.57	123.24	1.29

p0_score:	13.66
p1_score:	13.64
p2_score:	13.52

Infrastructure_Operations_Scores:	vmotion	svmotion	deploy
Completed_Ops_PerHour	15.50	10.00	4.50
Avg_Seconds_To_Complete	36.71	23.94	420.82
Failures	0.00	0.00	0.00
Ratio	0.97	1.11	1.12
Number_Of_Threads	1	1	1

Summary	Run_Is_Compliant	Number_Of_Compliance_Issues(0)*	Median_Phase(p1)
Unreviewed_VMmark2_Applications_Score	13.64		
Unreviewed_VMmark2_Infrastructure_Score	1.07		
Unreviewed_VMmark2_Score	11.13		

Configuration

Virtualization Software

Hypervisor Vendor, Product, Version, and Build / Availability Date (MM-DD-YYYY)	VMware ESX 4.1.0 U2 Build 502767/ 10-27-2011
Datacenter Management Software Vendor, Product, Version, and Build / Availability Date (MM-DD-YYYY)	VMware vCenter Server 5.0.0 Build 455964 / 10-27-2011
Supplemental Software	none
Servers	
Quantity	2
Server Manufacturer and Model	HP ProLiant DL360p Gen8
Processor Vendor and Model	Intel Xeon E5-2690
Processor Speed (GHz)	2.9
Total Sockets/Total Cores/Total Threads	2 Sockets / 16 Cores / 32 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	20 MB I+D on chip per chip
BIOS Version	P71 2/21/2012
Memory Size (in GB, Number of DIMMs)	256 GB, 16 x 16 GB DIMMs
Memory Type and Speed	dual rank PC3-12800 Registered DDR3 / 1600 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 81Q PCIe single port 8Gb Fibre HBA
Number of Network Controllers	2
Network Controller Vendors and Models	HP Ethernet 1 Gb 4-port 331FLR Adapter, HP Emulex OneConnect dual port 10Gb adapter
Other Hardware	none
Other Software	none
Hardware Availability Date (MM-DD-YYYY)	06-15-2012
Software Availability Date (MM-DD-YYYY)	10-27-2011

Network	
Network Switch Vendors and Models	1 x HP ProCurve 2910-al-24G
Network Speed	HP ProCurve 2910-al-24G - 24 x 1 GbE ports with 4 x 10GbE uplinks
Storage	
Array Vendors, Models, and Firmware Versions	VS SmartArray Storage Server by id7 Limited system BIOS: 02/13/2012 HP Smart Array P420i firmware: 1.28 HP Smart Array P420 firmware: 1.28
Fibre Channel Switch Vendors and Models	HP StorageWorks SAN Switch 8/24
Disk Space Used	5.8 TB
Array Cache Size	2GB
Total Number of Physical Disks Used	20
Total Number of Enclosures/Pods/Shelves Used	1
Number of Physical Disks Used per Enclosure/Pod/Shelf	Internal: 2 disk per host (O/S) VS SmartArray Storage Server by ID7 Limited: 16 disks
Total Number of Storage Groups Used	0
Number of LUNs Used	5
LUN Size and Number of Disks Per LUN	2 LUNs: 1.05 TB on 6 disks : P420i in ID7 system 3 LUNs: 966.5 GB on 8 disks : P420 in ID7 system
RAID Type	RAID 0
Number of Members per RAID Set	RAID 0: 6 RAID 0: 8
Disk Vendors, Models, and Speeds	HP 72GB 15K RPM SAS SFF HP 400GB SAS SSD 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 Enterprise (64-bit)
Other Hardware	none

Other Software	none

Clients	
Number of Clients	6 physical servers: 1 physical server used for non-virtualized primeclient 5 physical servers hosting 10 virtual clients (2 virtual clients per physical server)
System Model(s)	HP ProLiant DL360 G5
Processor Vendor(s) and Model(s)	Primeclient Intel Xeon E5440 Physical Clients 0-4: Intel Xeon E5450
Processor Speed(s) (GHz)	Primeclient 2.83 Physical Clients 0-4: 3.00
Total Sockets/Total Cores/Total Threads	2 Sockets / 8 Cores / 8 Threads
Memory per Client	Primeclient 8 GB Physical Clients 0-4: 16 GB
Network Controller(s) Vendors and Models	2 x HP NC373i embedded Gigabit adapters, 1 x NC360T dual port 10GbE adapter
Operating System, Version, and Service Pack	Prime Client: Microsoft® Windows® 2003 Enterprise SP2 (32-bit) Physical Clients 0-4: VMware ESXi 4.1.0 (Build 260247) Virtual Clients 0-9: Microsoft® Windows® 2008 R2 Enterprise (64-bit)
Other Hardware	none
Other Software	none

Notes for Workload

Virtualization Software Notes

- all VMs used virtual hardware V7
- ethernet adapter type set to vmxnet3 for all VMs (default vmxnet2)
- logging was disabled for all VMs (default enabled)
- 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
- Logical CPU layout changed for all VMs (except for mailserver, standby and deploy VMs) to one socket with multiple cores
  - default - multiple sockets with one core per socket
  - The total number of cores per VM remained unchanged.
- Cluster DRS Automation Level set to Fully Automated level 1

Advanced Settings:

- Cpu.CoschedCrossCall = 0 (Default 1)
- Cpu.HaltingIdleMsecPenalty = 0 (Default 800)
- DataMover.HardwareAcceleratedInit = 0 (Default 1)
- DataMover.HardwareAcceleratedMove = 0 (Default 1)
- Disk.SchedNumReqOutstanding = 256 (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.NetTxCompletionWorldlet = 0 (default 1)
- Net.NetTxWordlet = 0 (default 2)
- Numa.AutoSplitVM = 0 (default 1)
- Numa.LTermFairnessinterval = 0 (default 5)
- Numa.PageMigEnable = 0 (default 1)
- Numa.MonMigEnable = 0 (default 1)
- Numa.SwapLoadEnable = 0 (default 1)
- Numa.SwapLocalityEnable = 0 (default 1)
- VMFS3.HardwareAcceleratedLocking = 0 (default 1)

Driver Options:

- Updated Drivers:
  - net-tg3 400.3.122g.v40.2-1vmw.2.17.00000
  - scsi-hpsa 400.4.1.0-18OEM
  - net-be2net 400.4.1.334.0-1vmw.2.17.249663
- /vmkernel/module/qla2xxx.o/options = "ql2xmaxqdepth=256 ql2xintrdelaytimer=3; (default 32 and 0)

Server Notes

Server BIOS settings:

- HP Power Profile set to Maximum Performance (default: Balanced Performance)
- Thermal Configuration set to Max Cooling (default: Optimal Cooling)
- HW Prefetcher set to Disabled (default: Enabled)
- Adjacent Sector Prefetch set to Disabled: (default: Enabled)
- Processor Power and Utilization Monitoring set to Disabled: (default: Enabled)
- Memory Pre-Failure Notification set to Disabled: (default: Enabled)
- Intel(R) Turbo Boost Technology set to Optimized for Performance (frequency boost to 3.8 GHz @ 1 core): (default: Optimized for Performance)

Networking Notes

vSwitch Configuration:

- vSwitch0 for the Service Console on vmnic0 at 1Gb/s
- vSwitch1 for all ds2db and ds2web VMs on vmnic4 at 10Gb/s
- vSwitch2 for all oliodb and olioweb VMs on vmnic5 at 10Gb/s
- vSwitch3 defined as vmkernel vMotion connection on vmnic1 at 1Gb/s
- vSwitch4 for all mailserver VMs on vmnic2 at 1Gb/s
- vSwitch5 for all standby and deploy VMs on vmnic3 at 1Gb/s

Storage Notes

- ESX was installed on two disks (72 GB 15K RPM SAS SFF) configured as RAID1 in the internal server storage bay on each host
- VS SmartArray Storage Server by id7 Limited uses LUNs configured as block devices; as such no system memory is used for write caching.

- VS SmartArray Storage Server by id7 Limited (hardware configuration details and VM layout)
    - HP ProLiant DL380p Gen8 server
        - 2 x Intel Xeon E5-2690 2.9 GHz processors
        - 256 GB memory (16 x 16 GB dual rank PC3-12800 Registered DDR3 / 1600 MHz DIMMS)
        - HP 380/385 Gen8 8-SFF Cage/Bkpln Kit
        - HP 82Q PCIe dual port 8Gb Fibre HBA
        - HP Smart Array P420i controller with 2 GB FBWC
            - Array A - 2 x HP 400GB SAS SSD SFF disks
                - Logical disk 1
                    - 372.6 GB, RAID 1
                    - used for OS for id7 VS-fusion super-hybrid
            - Array B - 6 x HP 400GB SAS SSD SFF disks
                - Logical disk 2
                    - 1.0 TB, RAID 0
                    - exported as fibre target LUN
                    - All VMs from tiles 0 & 5 except for standby VM.
                    - Deploy Template
                - Logical disk 3
                    - 1.0 TB, RAID 0
                    - exported as fibre target LUN
                    - All VMs from tiles 1 & 6.
                    - standby VMs from all tiles
        - HP Smart Array P420 controller with 2 GB FBWC
            - Array A - 8 x HP 400GB SAS SSD SFF disks
                - Logical disk 1
                    - 990 GB, RAID 0
                    - exported as fibre target LUN
                    - All VMs from tiles 2 & 7 except for standby VM.
                - Logical disk 2
                    - 990 GB, RAID 0
                    - exported as fibre target LUN
                    - All VMs from tiles 3 & 8 except for standby VM.
                    - SVMotion target
                - Logical disk 3
                    - 990 GB, RAID 0
                    - exported as fibre target LUN
                    - All VMs from tiles 4 & 9 except for standby VM.
                    - Deploy Target LUN

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

- 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.
- Five HP ProLiant DL360 G5 clients ran two client virtual machines each.
- All client operating systems were updated via Windows Update.

Other Notes

None
