VMware® VMmark® V2.5 Results

Vendor and Hardware Platform: Cisco UCS C240 M3 Virtualization Platform: VMware ESXi 5.1.0 Build 774985 VMware vCenter Server : VMware VCenter Server 5.1.0 Build 775229	VMmark V2.5 Score = 12.00 @ 10 Tiles

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

Tested By: Cisco Systems	Test Date: 05-04-2013

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	326.73	0.99	43.12	4716.68	1.02	123.17	3832.93	1.74	73.09	2672.10	1.76	84.49	1919.75	1.81	88.03	1.41
p1	325.35	0.99	47.12	4686.77	1.01	152.44	3546.38	1.61	86.99	2555.25	1.68	98.53	1841.95	1.74	103.65	1.36
p2	326.82	0.99	54.00	4649.07	1.00	201.97	3373.18	1.53	96.81	2324.82	1.53	109.99	1725.20	1.63	115.93	1.31
TILE_1	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	GM
p0	325.15	0.98	72.25	4740.48	1.02	112.80	4102.62	1.87	62.04	2950.10	1.94	67.54	2104.53	1.99	71.68	1.49
p1	323.82	0.98	64.75	4709.68	1.01	124.01	3885.65	1.77	70.33	2873.47	1.89	77.12	2163.68	2.04	81.33	1.47
p2	325.35	0.99	64.00	4712.05	1.02	126.53	3876.40	1.76	71.03	2774.88	1.83	77.58	2043.95	1.93	83.70	1.44
TILE_2	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	GM
p0	327.20	0.99	74.00	4707.05	1.01	120.59	4180.52	1.90	58.77	3049.28	2.01	67.32	2213.18	2.09	70.19	1.52
p1	326.82	0.99	79.75	4687.30	1.01	151.67	4273.18	1.94	55.35	2965.90	1.95	66.64	2232.97	2.11	69.24	1.52
p2	324.68	0.98	98.75	4647.98	1.00	196.68	4296.88	1.95	54.54	3033.57	2.00	67.81	2209.22	2.09	71.04	1.52
TILE_3	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	GM
p0	327.88	0.99	73.00	4742.98	1.02	117.72	3945.68	1.79	69.02	2896.15	1.91	76.53	2159.43	2.04	82.10	1.48
p1	325.45	0.99	66.33	4715.20	1.02	130.08	3868.47	1.76	72.32	2727.40	1.80	80.78	1901.25	1.80	88.35	1.42
p2	328.93	1.00	64.00	4691.02	1.01	136.97	3764.18	1.71	77.12	2736.93	1.80	86.32	1920.53	1.82	94.91	1.41
TILE_4	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	GM
p0	328.88	1.00	53.85	4717.30	1.02	116.76	3987.80	1.81	65.88	2889.25	1.90	71.06	2206.90	2.09	72.09	1.49
p1	325.12	0.98	53.75	4692.32	1.01	141.67	4011.60	1.82	64.76	2923.05	1.92	68.86	2170.97	2.05	67.27	1.48
p2	327.25	0.99	54.00	4660.15	1.00	186.10	3939.90	1.79	67.29	3090.72	2.04	70.33	2371.32	2.24	66.99	1.52
TILE_5	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	GM
p0	328.15	0.99	74.00	4727.38	1.02	121.52	4140.82	1.88	61.45	2934.32	1.93	68.86	2062.57	1.95	75.05	1.48
p1	329.55	1.00	73.75	4734.38	1.02	129.21	3958.00	1.80	68.50	2888.70	1.90	76.51	2061.80	1.95	82.41	1.47

p2	328.88	1.00	70.50	4693.10	1.01	136.69	3887.22	1.77	71.55	2826.65	1.86	80.22	2096.75	1.98	86.82	1.46
TILE_6	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	GM
p0	328.88	1.00	68.75	4716.18	1.02	116.55	4170.07	1.90	59.82	2899.57	1.91	70.52	2135.75	2.02	70.11	1.49
p1	324.82	0.98	73.80	4675.32	1.01	141.03	4258.12	1.94	56.86	3117.28	2.05	68.92	2386.10	2.26	66.28	1.55
p2	325.07	0.98	77.22	4651.35	1.00	195.01	4264.88	1.94	56.63	2887.97	1.90	70.78	2289.32	2.16	65.80	1.51
TILE_7	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	GM
p0	329.07	1.00	166.85	4735.57	1.02	106.99	3997.95	1.82	67.19	2908.30	1.92	75.52	2074.62	1.96	81.91	1.47
p1	332.85	1.01	100.75	4716.57	1.02	115.88	3917.38	1.78	70.19	2840.65	1.87	79.55	2097.28	1.98	86.94	1.47
p2	326.82	0.99	88.25	4699.02	1.01	120.56	3865.75	1.76	72.94	2687.57	1.77	83.33	1868.20	1.77	91.67	1.41
TILE_8	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	GM
p0	326.75	0.99	53.70	4707.50	1.01	118.17	3998.28	1.82	65.27	3058.47	2.01	66.85	2299.38	2.17	71.35	1.52
p1	326.43	0.99	53.92	4712.10	1.02	144.94	4038.47	1.84	63.70	3152.80	2.08	62.16	2219.95	2.10	69.84	1.52
p2	322.93	0.98	54.00	4646.85	1.00	195.65	3995.47	1.82	65.29	3064.22	2.02	61.49	2116.05	2.00	70.37	1.48
TILE_9	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	GM
p0	327.45	0.99	63.00	4736.93	1.02	119.92	3959.22	1.80	67.76	2812.68	1.85	75.86	2103.03	1.99	79.50	1.46
p1	324.90	0.98	63.00	4706.48	1.01	125.15	3881.22	1.76	71.12	2835.93	1.87	79.39	2047.67	1.94	83.99	1.45
p2	325.35	0.99	63.00	4685.98	1.01	133.79	3778.53	1.72	75.85	2772.45	1.83	83.66	1988.33	1.88	89.12	1.42

p0_score:	14.81
p1_score:	14.69
p2_score:	14.48

Infrastructure_Operations_Scores:	vmotion	svmotion	deploy
Completed_Ops_PerHour	18.00	11.00	5.50
Avg_Seconds_To_Complete	23.56	14.90	318.11
Failures	0.00	0.00	0.00
Ratio	1.12	1.22	1.38
Number_Of_Threads	1	1	1

Summary	Run_Is_Compliant	Turbo_Setting:0
	Number_Of_Compliance_Issues(0)*	Median_Phase(p1)
Unreviewed_VMmark2_Applications_Score	14.69	
Unreviewed_VMmark2_Infrastructure_Score	1.24	
Unreviewed_VMmark2_Score	12.00	

Configuration

Virtualization Software	
Hypervisor Vendor, Product, Version, and Build / Availability Date (MM-DD-YYYY)	VMware ESXi 5.1.0 Build 774985 / 11-19-2012
Datacenter Management Software Vendor, Product, Version, and Build / Availability Date (MM-DD-YYYY)	VMware VCenter Server 5.1.0 Build 775229 / 11-19-2012
Supplemental Software	None
Servers	
Quantity	2
Server Manufacturer and Model	Cisco UCS C240 M3
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	32KB I + 32KB D on chip per core
Secondary Cache	256KB I+D on chip per core
Other Cache	20MB I+D on chip per chip L3
BIOS Version	C240M3.1.5.1c
Memory Size (in GB, Number of DIMMs)	256GB, 16
Memory Type and Speed	16GB DIMMs 2Rx4 DDR3-1600MHz Registered ECC
Disk Subsystem Type	FC SAN
Number of Disk Controllers	1
Disk Controller Vendors and Models	LSI RAID SAS 2008M-8i
Number of Host Bus Adapters	1 dual-port
Host Bus Adapter Vendors and Models	Emulex LPe12000 8Gbps FC HBA
Number of Network Controllers	2
Network Controller Vendors and Models	Intel 1Gbps quad port I350 adapter (embedded), Emulex OneConnect 10Gbps adapter (be3)
Other Hardware	None
Other Software	None

Hardware Availability Date (MM-DD-YYYY)	06/05/2012
Software Availability Date (MM-DD-YYYY)	3/20/2013
Network	
Network Switch Vendors and Models	Cisco Nexus 5548 UP
Network Speed	10Gbps, 1Gbps
Storage	
Array Vendors, Models, and Firmware Versions	Fusion-io ION Data Accelerator, FW 1.2.0 Revision 1602
Fibre Channel Switch Vendors and Models	Cisco Nexus 5548 UP
Disk Space Used	2740GB
Array Cache Size	N/A
Total Number of Physical Disks Used	12 HDDs (4 per SUT OS, 4 for ION OS), 3 PCI-e Flash
Total Number of Enclosures/Pods/Shelves Used	1
Number of Physical Disks Used per Enclosure/Pod/Shelf	4 HDDs for ION OS, 3 PCI-e Flash
Total Number of Storage Groups Used	1
Number of LUNs Used	7
LUN Size and Number of Disks Per LUN	All LUNs spread across 3 PCI-e Flash cards • 1 LUN at 100GB (Source) • 1 LUN at 20GB (Target) • 1 LUN at 600GB (DS2DB) • 1 LUN at 400GB (DS2Web) • 1 LUN at 1000GB (Mailserver) • 1 LUN at 200GB (OlioDB) • 1 LUN at 1000GB (OlioWeb)
RAID Type	RAID0 for SUT OS and PCI-e Flash, RAID1 for ION OS
Number of Members per RAID Set	RAID0 on SUTs: 1 RAID0 on ION: 7 RAID1 on ION: 1
Disk Vendors, Models, and Speeds	12 x 300GB 15K Seagate HDDs (ST9300653SS), 3 x Fusion-io 2.4TB ioDrive2 Duo

Datacenter Management Server	
System Model	Cisco UCS C200 M2
Processor Vendor and Model	Intel Xeon X5670
Processor Speed (GHz)	2.93
Total Sockets/Total Cores/Total Threads	2 Sockets / 12 Cores / 14 Threads
Memory	96GB
Network Controller(s) Vendors and Models	Intel 82599EB 10Gigabit 2-port
Operating System, Version, Bitness, and Service Pack	VMware ESXi 5.0.0 Build 469512 (Windows 2008 R2 Enterprise 64-bit for VM)
Other Hardware	None
Other Software	None

Clients	
Total Number of Clients / Total Physical Clients / Total Virtual Client Hosts	11 / 1 / 4
System Model(s)	• ESX client servers: UCS B230 M2 • Prime Client: Cisco UCS B200 M2
Processor Vendor(s) and Model(s)	• Intel Xeon E7-4870 (clients) • Intel Xeon E5570 (prime client)
Processor Speed(s) (GHz)	• 2.40GHz (E7-4870) • 2.93GHz (E5570)
Total Sockets/Total Cores/Total Threads	• 2 Sockets / 20 Cores / 40 Threads (clients) • 2 Sockets / 8 Cores / 16 Threads (prime client)
Memory per Physical Client	• 256GB (clients) • 24GB (prime client)
Network Controller(s) Vendors and Models	• Cisco UCS M81KR Virtual Interface Card 10Gigabit 2-port (clients) • Intel 82598EB 10Gigabit 2-port (prime client)
Operating System, Version, Bitness, and Service Pack	• Microsoft Windows Server 2008 R2 Enterprise 64-bit (prime client) • VMware ESX 4.1 Build 348481 (physical clients) • Microsoft Windows Server 2008 R2 Enterprise 64-bit (virtual clients)
Number of Virtual Clients	10
Number of vCPUs Per Virtual Client	4

Number of vMem (GB) Per Virtual Client	4GB
Virtual Client Networking Notes	All Client VMs connected to default vSwitch
Virtual Client Storage Notes	All Client VMs stored on 3 x RAID5 LUNs comprised of 16 x 72GB SSDs per RAID Group
Other Hardware	None
Other Software	None

Notes for Workload

Virtualization Software Notes

- Virtual hardware for all VMs was set to V9
- Ethernet adapter type set to vmxnet3 for all VMs (default vmxnet2)
- IDE and floppy were removed from all VMs (default attached)
- Logging was disabled for all VMs (default enabled)
- All Linux VMs configured to have a single virtual socket with multiple cores (default one core per multiple virtual sockets)
- vSphere DRS Migration Threshold set to Fully Automated level 2
- /adv/Power/CpuPolicy = "static" (default balanced)
- /adv/VMFS3/HardwareAcceleratedLocking = "0" (default 1)
- /adv/Mem/SamplePeriod = "0" (default 60)
- /adv/Mem/BalancePeriod = "0" (default 15)
- /adv/Mem/ShareScanGHz = "0" (default 4)
- /adv/Cpu/CoschedCrossCall = "0" (default 1)
- /adv/Cpu/CreditAgePeriod = "500" (default 1)
- /adv/Cpu/HTWholeCoreThreshold = "0" (default 200)
- /adv/Disk/SchedNumReqOutstanding = "256" (default 32)
- /adv/Irq/IRQRebalancePeriod = "20000" (default 50)
- /adv/Irq/BestVcpuRouting = "1" (default 0)
- /adv/Net/MaxNetifTxQueueLen = "1000" (default 500)
- /adv/Net/MaxNetifRxQueueLen = "500" (default 100)
- /adv/Net/NetTxWorldlet = "1" (default 2)
- /adv/Net/NetTxCompletionWorldlet = "0" (default 1)
- /adv/DataMover/HardwareAcceleratedInit = "0" (default 1)
- /adv/DataMover/HardwareAcceleratedMove = "0" (default 1)
- /adv/Numa/LargeInterleave = "0" (default 1)
- /adv/Numa/LTermFairnessInterval = "0" (default 5)
- /adv/Numa/PreferHT = "1" (default 0)
- /adv/Numa/RebalancePeriod = "60000" (default 2000)
- /adv/Numa/SwapLocalityEnable = "0" (default 1)
- /adv/Numa/SwapLoadEnable = "0" (default 1)
- /adv/Numa/SwapInterval = "1" (default 3)

- /adv/Numa/MonMigEnable = "0" (default 1)
- /adv/Numa/PageMigEnable = "0" (default 1)
- /adv/Misc/TimerMaxHardPeriod = "4000" (default 100000)
- /adv/Misc/TimerMinHardPeriod = "2000" (default 30)
- /vmkernel/module/lpfc820.o/options = "lpfc_lun_queue_depth=64 lpfc_cr_count=3 lpfc_cr_delay=1" (default 31,1,0)
- /vmkernel/module/ixgbe/options = "VMDQ=16,16 InterruptThrottleRate=2000,2000 InterruptType=2,2" (default 8, 16000, and 2)

Server Notes

- Intel Turbo Boost enabled up to 3.8GHz (default Enabled)
- Memory Performance set to Maximum Performance (default Power Saving)
- Hardware Prefetcher set to Disabled (default Enabled)
- Adjacent Cache Line Prefetcher set to Disabled (default Enabled)
- DRAM Refresh Rate set to 1X (default 2X)

Networking Notes

There were 3 vSwitches configured, two at 10Gbps and one at 1Gbps

- vSwitch0 on vmnic4 (10Gbps) for Service Console, Mailserver, Standby, and deploy VMs; for Olio VMs 0,1,4,5,8,9
- vSwitch2 on vmnic5 (10Gbps) for all DS2 VMs; for Olio VMs 2,3,6,7
- vSwitch1 on vmnic0 (1Gbps) for VMkernel traffic (MTU set to 9000)

Storage Notes

- ESX was installed on a 25GB partition across four 300GB HDDs configured in RAID0 as locally attached storage using LSI SAS 2008M-8i RAID controller.
- All LUNs were spread across three 2.4TB Fusion-io ioDrive2 Duo PCI-e Flash cards in RAID0 within a single Cisco UCS C240 M3 running Fusion-io ION Data Accelerator software.
- Physical Configuration for Fusion-io ION Data Accelerator:
  - Cisco UCS C240 M3 SFF
  - 2 x Intel Xeon E5-2690 2.9 GHz processors
  - 256 GB Memory (16 x 16GB DIMMs 2Rx4 DDR3-1600MHz Registered ECC)
  - 3 x 2.4TB Fusion-io ioDrive2 Duo PCI-e Flash Cards configured in RAID0
  - 2 x QLogic QLE2562 8Gb Fibre Channel HBAs
  - 1 x Embedded Intel ICH10 RAID Controller for ION OS
  - 4 x 300GB Seagate 15K SAS HDDs for ION OS
- Virtual Configuration for Fusion-io ION Data Accelerator:
  - There was 1 LUN at 100GB used as the Standby and Deploy Source LUN.
  - There was 1 LUN at 20GB used as the Standby and Deploy Target LUN.
  - There was 1 LUN at 600GB, containing the DS2DB VMs.
  - There was 1 LUN at 400GB, containing the DS2Web VMs.
  - There was 1 LUN at 1000GB, containing the Mailserver VMs.
  - There was 1 LUN at 200GB, containing the OlioDB VMs.
  - There was 1 LUN at 1000GB, containing the OlioWeb VMs.
- All LUNs were using a Round Robin (VMware) Path Selection Policy and given an I/O Operation Limit of 8. (default Fixed)
- All LUNs evenly distributed across all three 2.4TB Fusion-io ioDrive2 Duo Flash cards in RAID0
- All LUNs were configured as block devices and no system memory is used for write caching.

Datacenter Management Server Notes

The Datacenter Management Server was a virtual machine configured with 4 vCPUs and 32GB RAM.

Operating System Notes

- All Mailservers running Microsoft Windows Server 2008 R2 Enterprise 64-bit
- All storage controllers for the virtual machines were set to Paravirtual (default LSI Logic SAS)
- All SLES 11 VMs were updated to SP2
- The filesystems of all Linux and Standby VMs were aligned to a 4K boundary
- All Linux VMs restored to using a single queue within vmxnet3 driver (default queues match number of vCPUs in ESXi 5.1)
- The service "Application Experience" was running on Mailserver1 (default not running)

Software Notes

None

Client Notes

- Microsoft Windows Server 2008 R2 64-bit installed on client virtual machines and updated through Windows Update.
- Prime client was running Microsoft Windows Server 2008 R2 Enterprise 64-bit and VMware vSphere PowerCLI 4.1.1.2816 build 332441.
- All clients were run on virtual machines that were each defined with 4 virtual CPUs, 4GB of memory, 1 vmxnet3 network, and 40GB of disk space.
- Virtual clients 0, 4, and 8 were hosted on physical client1.
- Virtual clients 1, 5, and 9 were hosted on physical client2.
- Virtual clients 2 and 6 were hosted on physical client3.
- Virtual clients 3 and 7 were hosted on physical client4.
- ESX clients run with hyperthreading and turbo boost enabled. ESX configuration settings unchanged from default.

Other Notes

- Prime client run on a dedicated, non-client machine. Hyperthreading was enabled for the Prime Client.
- STAF Communication over SSL was disabled on all VMs and clients. (default enabled)

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