

VMware® VMmark® V2.1 Results

Vendor and Hardware Platform: Cisco UCS C460 M2
 Virtualization Platform: VMware ESX 4.1 U1 Build 348481
 VMware vCenter Server: VMware vCenter Server 4.1.0 build 258902

**VMmark V2.1 Score =
16.89 @ 18 Tiles**

Number of Hosts: 2

Uniform Hosts [yes/no]: yes

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

Tested By: Cisco Systems

Test Date: 04-17-2011

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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	332.15	1.01	235.62	4633.02	1.00	222.05	2866.22	1.30	125.95	2102.22	1.38	136.78	1496.65	1.41	145.05	1.21
p1	326.10	0.99	233.00	4615.43	0.99	227.91	2870.43	1.31	125.61	2079.50	1.37	138.70	1547.45	1.46	147.44	1.21
p2	328.95	1.00	233.00	4594.75	0.99	243.53	2844.43	1.29	127.57	2005.85	1.32	139.83	1406.12	1.33	149.70	1.17
TILE_1	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	GM
p0	326.50	0.99	222.75	4631.10	1.00	224.41	2502.05	1.14	157.32	1856.88	1.22	166.10	1357.35	1.28	179.96	1.12
p1	326.50	0.99	218.25	4629.38	1.00	233.12	2521.05	1.15	155.75	1861.28	1.23	165.77	1294.95	1.22	181.07	1.11
p2	325.93	0.99	219.00	4609.70	0.99	257.20	2512.18	1.14	156.72	1805.42	1.19	165.57	1248.00	1.18	178.73	1.09
TILE_2	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	GM
p0	325.98	0.99	228.43	4601.85	0.99	229.69	2852.97	1.30	127.02	1972.60	1.30	143.66	1489.50	1.41	146.88	1.18
p1	325.25	0.98	214.25	4597.50	0.99	257.92	2798.57	1.27	130.96	2016.60	1.33	146.56	1464.33	1.38	150.61	1.18
p2	330.70	1.00	214.00	4591.30	0.99	258.84	2695.95	1.23	139.27	1983.15	1.31	150.37	1435.58	1.36	155.16	1.17
TILE_3	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	GM
p0	327.77	0.99	217.50	4626.52	1.00	229.56	2800.03	1.27	130.75	1952.35	1.29	145.81	1401.17	1.32	149.82	1.16
p1	332.18	1.01	214.00	4588.50	0.99	252.85	2755.78	1.25	134.11	1975.20	1.30	150.78	1464.90	1.38	150.44	1.18
p2	323.60	0.98	214.00	4581.48	0.99	278.27	2698.10	1.23	139.30	1922.15	1.27	157.42	1480.05	1.40	158.02	1.16
TILE_4	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	GM
p0	326.38	0.99	221.30	4621.98	1.00	216.70	2588.38	1.18	148.72	1881.40	1.24	154.65	1309.97	1.24	167.10	1.12
p1	327.85	0.99	214.00	4630.65	1.00	222.60	2438.90	1.11	163.88	1868.08	1.23	173.34	1335.95	1.26	185.13	1.11
p2	326.85	0.99	214.00	4545.38	0.98	268.87	2360.80	1.07	172.94	1659.42	1.09	187.20	1213.17	1.15	199.15	1.05
TILE_5	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	GM
p0	324.45	0.98	238.25	4613.98	0.99	224.75	2632.03	1.20	145.09	1938.42	1.28	155.50	1391.03	1.31	163.29	1.14
p1	322.93	0.98	236.00	4606.15	0.99	236.24	2591.30	1.18	148.48	1896.03	1.25	160.62	1432.58	1.35	166.43	1.14

p2	323.77	0.98	238.50	4590.70	0.99	271.02	2615.12	1.19	146.49	1860.65	1.23	157.15	1321.47	1.25	164.56	1.12
TILE_6	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	GM
p0	324.30	0.98	230.62	4621.07	1.00	235.31	2585.72	1.18	149.96	1938.65	1.28	163.35	1420.17	1.34	168.44	1.15
p1	326.48	0.99	224.00	4596.77	0.99	249.45	2566.75	1.17	151.63	1783.70	1.17	167.99	1322.83	1.25	175.33	1.11
p2	329.70	1.00	219.25	4575.32	0.99	275.97	2552.00	1.16	153.80	1795.53	1.18	167.17	1261.28	1.19	176.65	1.10
TILE_7	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	GM
p0	326.77	0.99	232.00	4635.10	1.00	215.40	2756.45	1.25	134.82	2015.35	1.33	146.46	1488.22	1.41	156.93	1.18
p1	321.65	0.97	234.00	4635.77	1.00	235.46	2765.90	1.26	133.34	1976.65	1.30	143.34	1368.03	1.29	155.96	1.16
p2	327.05	0.99	234.00	4608.05	0.99	232.90	2709.10	1.23	138.63	2006.22	1.32	147.18	1410.78	1.33	159.53	1.16
TILE_8	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	GM
p0	330.32	1.00	134.50	4605.48	0.99	233.90	2848.88	1.30	127.03	2014.08	1.33	139.17	1486.35	1.40	146.82	1.19
p1	324.43	0.98	134.00	4580.48	0.99	267.62	2819.78	1.28	129.26	2001.85	1.32	140.31	1411.53	1.33	148.73	1.17
p2	319.85	0.97	134.00	4614.93	0.99	253.61	2794.68	1.27	130.96	2041.40	1.34	143.03	1525.10	1.44	151.03	1.19
TILE_9	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	GM
p0	325.62	0.99	137.12	4595.95	0.99	249.13	2809.30	1.28	129.70	2074.15	1.37	139.55	1480.88	1.40	148.04	1.19
p1	331.20	1.00	134.00	4568.10	0.98	279.27	2731.75	1.24	135.87	2022.97	1.33	145.65	1447.12	1.37	153.29	1.17
p2	323.95	0.98	134.00	4517.70	0.97	343.93	2736.07	1.24	135.88	1932.00	1.27	148.53	1435.70	1.36	155.41	1.15
TILE_10	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	GM
p0	327.32	0.99	140.38	4648.07	1.00	203.12	2819.40	1.28	129.57	1990.38	1.31	141.85	1490.55	1.41	146.46	1.19
p1	325.23	0.98	134.00	4614.50	0.99	220.06	2788.80	1.27	132.03	1998.03	1.32	148.44	1534.67	1.45	149.76	1.19
p2	328.88	1.00	134.00	4603.15	0.99	232.08	2747.45	1.25	135.54	1903.38	1.25	152.17	1375.08	1.30	155.15	1.15
TILE_11	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	GM
p0	326.02	0.99	150.20	4641.50	1.00	217.01	2764.53	1.26	133.50	2085.53	1.37	145.81	1523.67	1.44	151.38	1.20
p1	330.23	1.00	147.60	4611.30	0.99	248.78	2709.57	1.23	138.77	1885.75	1.24	154.46	1403.45	1.33	160.92	1.15
p2	324.95	0.98	144.00	4578.30	0.99	261.29	2647.68	1.20	144.19	1860.58	1.23	158.17	1320.10	1.25	165.08	1.12
TILE_12	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	GM
p0	330.52	1.00	142.75	4604.32	0.99	229.56	2676.25	1.22	141.17	1999.00	1.32	148.56	1500.70	1.42	154.96	1.18
p1	332.95	1.01	135.75	4591.23	0.99	242.23	2603.32	1.18	147.49	1916.10	1.26	150.97	1355.88	1.28	158.52	1.14
p2	329.55	1.00	134.00	4613.57	0.99	272.31	2522.20	1.15	154.92	1933.10	1.27	157.05	1385.75	1.31	164.80	1.14
TILE_13	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	GM
p0	326.20	0.99	134.03	4625.93	1.00	219.73	2677.80	1.22	141.02	1897.00	1.25	153.08	1404.50	1.33	160.67	1.15
p1	326.02	0.99	124.50	4603.75	0.99	250.40	2641.50	1.20	144.02	1889.15	1.24	153.92	1325.45	1.25	163.71	1.13
p2	333.35	1.01	130.25	4595.75	0.99	260.00	2616.65	1.19	146.13	1931.17	1.27	156.81	1441.50	1.36	164.35	1.16
TILE_14	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	GM
p0	331.27	1.00	145.22	4638.88	1.00	213.39	2876.90	1.31	124.58	2062.62	1.36	133.58	1469.08	1.39	139.47	1.20
p1	327.50	0.99	144.00	4623.32	1.00	229.19	2787.32	1.27	131.55	2068.62	1.36	140.29	1491.83	1.41	146.37	1.19

p2	324.32	0.98	142.25	4601.40	0.99	242.36	2779.53	1.26	132.25	1981.58	1.30	142.46	1478.58	1.40	148.42	1.18
TILE_15	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	GM
p0	327.07	0.99	152.05	4606.02	0.99	229.68	2772.82	1.26	133.07	1974.85	1.30	143.59	1399.53	1.32	150.74	1.16
p1	327.57	0.99	144.00	4616.88	0.99	246.51	2751.65	1.25	134.74	2012.53	1.33	146.29	1511.85	1.43	153.01	1.19
p2	328.93	1.00	144.00	4547.80	0.98	310.25	2748.72	1.25	134.95	1943.20	1.28	147.21	1370.97	1.30	155.61	1.15
TILE_16	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	GM
p0	327.02	0.99	248.00	4607.52	0.99	227.57	2865.93	1.30	125.71	2111.50	1.39	135.65	1497.70	1.42	144.74	1.20
p1	325.30	0.99	230.75	4594.55	0.99	248.75	2877.00	1.31	125.35	2015.58	1.33	138.74	1485.12	1.40	147.22	1.19
p2	328.93	1.00	224.00	4574.10	0.99	269.13	2851.20	1.30	127.14	2012.85	1.33	139.03	1414.10	1.34	148.17	1.18
TILE_17	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	GM
p0	331.62	1.00	238.70	4635.77	1.00	237.26	2788.20	1.27	132.07	2042.60	1.35	143.35	1509.55	1.43	153.06	1.20
p1	327.80	0.99	225.00	4604.90	0.99	259.74	2793.53	1.27	131.57	1979.20	1.30	142.99	1382.22	1.31	153.23	1.16
p2	326.48	0.99	224.00	4519.50	0.97	284.73	2758.25	1.25	134.16	2019.67	1.33	145.75	1438.15	1.36	154.63	1.17
p0_score:	21.12															
p1_score:	20.87															
p2_score:	20.61															

Infrastructure_Operations_Scores:	vmotion	svmotion	deploy
Completed_Ops_PerHour	15.00	8.00	4.50
Avg_Seconds_To_Complete	47.92	53.77	390.02
Failures	0.00	2.00	0.00
Ratio	0.94	0.89	1.12
Number_Of_Threads	1	1	1

Summary	Run_Is_Compliant	Number_Of_Compliance_Issues(0)*	Median_Phase(p1)
Unreviewed_VMmark2_Applications_Score	20.87		
Unreviewed_VMmark2_Infrastructure_Score	0.98		
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 348481 / 02-10-2011
Datacenter Management Software Vendor, Product, Version, and Build /	VMware vCenter Server 4.1.0 build 258902 / 07-13-2010

Availability Date (MM-DD-YYYY)	
Supplemental Software	<ul style="list-style-type: none"> • INT-intel-lad-ddk-ixgbe-400.3.1.17.1-1.2.17.249663 driver update • BCM-bnx2x-1.62.11.v40.1 driver update
Servers	
Quantity	2
Server Manufacturer and Model	Cisco UCS C460 M2
Processor Vendor and Model	Intel Xeon E7-4870
Processor Speed (GHz)	2.4 GHz
Total Sockets/Total Cores/Total Threads	4 Sockets / 40 Cores / 80 Threads
Primary Cache	32KB I + 32KB D on-chip per core
Secondary Cache	256KB I + D on chip per core
Other Cache	30MB I + D on chip per chip L3
BIOS Version	C460.1.3.1.2
Memory Size (in GB, Number of DIMMs)	512GB, 64x8GB
Memory Type and Speed	Dual rank 1333MHz Registered DDR3
Disk Subsystem Type	FC SAN
Number of Disk Controllers	1 (unused)
Disk Controller Vendors and Models	LSI Logic embedded
Number of Host Bus Adapters	1 dual-port
Host Bus Adapter Vendors and Models	LPe12000 dual port 8Gb Fibre HBA
Number of Network Controllers	2 dual-port 10Gb , 1 dual-port 1Gb
Network Controller Vendors and Models	Intel X520-2 dual-port 10Gb, Broadcom NetXtremeII BCM 5709 dual-port 1Gb (embedded) Broadcom NetXtremeII 57711 dual-port 10Gb
Other Hardware	None
Other Software	None
Hardware Availability Date (MM-DD-YYYY)	07-01-2011
Software Availability Date (MM-DD-YYYY)	02-10-2011
Network	
Network Switch Vendors and Models	(1) Cisco Nexus 5010
Network Speed	10Gbps
Storage	

Array Vendors, Models, and Firmware Versions	EMC CX4-480 (version 04.29.000.5.003)
Fibre Channel Switch Vendors and Models	Cisco MDS 9134
Disk Space Used	4652.96GB
Array Cache Size	8996MB X 2
Total Number of Physical Disks Used	149
Total Number of Enclosures/Pods/Shelves Used	11
Number of Physical Disks Used per Enclosure/Pod/Shelf	<ul style="list-style-type: none"> • Nine enclosures with 14 each (10x450GB 15K + 2x73GB SSD) • One enclosure with 12 (12x450GB 15K disks) • One enclosure with 11 (10x450GB 15K disks + 1x73GB SSD)
Total Number of Storage Groups Used	3
Number of LUNs Used	24
LUN Size and Number of Disks Per LUN	<ul style="list-style-type: none"> • 9 LUNs at 600GB (2xOlio DB, 2xOlioWeb, 2xDS2Web, 2xMailserver), set over 10x450GB 15K • 1 LUN at 25GB (Deploy Source), set over 1x73GB SSD • 1 LUN at 50GB (Deploy Target), set over 6x450GB 15K disk • 1 LUN at 140GB (Standby Source), set over 6x450GB 15K disk • 1 LUN at 140GB (Standby Target), set over 6x450GB 15K disk • 9 LUNs at 150GB (2xDS2DB), set over 4x73GB SSD • 2 LUNs at 340GB (VMware ESX Boot), each set over 2x450GB 15K
RAID Type	RAID 0 for VM LUNs, RAID 1 for VMware ESX 4.1 O/S, JBOD for Deploy Source
Number of Members per RAID Set	<ul style="list-style-type: none"> • 9 RAID 0 RAID sets each over 10x450GB 15K disks • 2 RAID 1 RAID sets each over 2x450GB 15K disks • 9 RAID 0 RAID sets each over 4x73GB 15K disks • 3 RAID 0 RAID sets each over 6x450GB 15K disks • 1 JBOD "Disk" over 1x73GB SSD
Disk Vendors, Models, and Speeds	STEC ZIV2A074 CLAR72, SEAGATE ST345085 CLAR450

Datacenter Management Server

System Model	Cisco UCS C200 M1
Processor Vendor and Model	Intel Xeon E5520
Processor Speed (GHz)	2.27GHz
Total Sockets/Total Cores/Total Threads	2 Sockets / 8 Cores / 16 Threads
Memory	24GB
Network Controller(s) Vendors and Models	Intel 82576NS Gigabit Server Adapter

Operating System, Version, and Service Pack	Microsoft Windows Server 2008 Enterprise 64-bit with SP1
Other Hardware	None
Other Software	None
Clients	
Number of Clients	4
System Model(s)	Prime Client: Dell PowerEdge 2950 Physical Clients 0 & 2: Cisco UCS B200 M2 Physical Clients 1 & 3: Cisco UCS B200 M1
Processor Vendor(s) and Model(s)	Prime Client: Intel Xeon E5430 Physical Client 0 & 2: Intel Xeon X5690 Physical Client 1 & 3: Intel Xeon X5570
Processor Speed(s) (GHz)	Prime Client: 2.66GHz Physical Client 0 & 2: 3.46GHz Physical Client 1 & 3: 2.93GHz
Total Sockets/Total Cores/Total Threads	Prime Client: 2 Sockets / 8 Cores / 16 Threads Physical Client 0 & 2: 2 Sockets / 12 Cores / 24 Threads Physical client 1 & 3: 2 Sockets / 8 Cores / 16 Threads
Memory per Client	Prime Client: 16GB Physical Client 0 & 2: 96GB Physical Client 1 & 3: 24GB
Network Controller(s) Vendors and Models	Prime Client: Broadcom 5708C Gigabit Ethernet Controller Physical Clients 0-3: Intel 82598EB 10 Gigabit Ethernet Controller
Operating System, Version, and Service Pack	Prime Client: Microsoft Windows Server 2003 Enterprise 32-bit, Service-Pack 2 Physical Clients 0-3: VMware ESX 4.1 U1 (build 260247) Virtual Clients 0-17: Microsoft Windows Server 2008 Enterprise R2 64-bit
Other Hardware	None
Other Software	None

Notes for Workload

Virtualization Software Notes

- Virtual hardware for all VMs was set to V7
- Ethernet adapter type set to vmxnet3 for all VMs
- IDE and floppy were removed from all VMs
- Logging was disabled for all VMs
- CPU.HaltingIdleMsecPenalty=0 (default 100)
- /adv/Irq/RoutingPolicy = 0 (default 2)
- /adv/Mem/BalancePeriod = 0 (default 15)
- /adv/Mem/SamplePeriod = 0 (default 60)
- /adv/Mem/ShareScanGHz = 0 (default 4)
- /adv/Misc/TimerMaxHardPeriod = 4000 (default 100000)
- /adv/Misc/TimerMinHardPeriod = 2000 (default 100)
- /adv/Net/MaxNetifRxQueueLen = 500 (default 100)

- /adv/Net/MaxNetifTxQueueLen = 1000 (default 500)
- /adv/Net/NetTxWorldlet = 1 (default 2)
- /adv/Numa/LTermFairnessInterval = 0 (default 5)
- /adv/Numa/PageMigEnable = 0 (default 1)
- /vmkernel/module/lpfc820.o/options = "lpfc_lun_queue_depth=64 lpfc_cr_count=5 lpfc_cr_delay=1" (defaults 31,1,0)
- /vmkernel/pageSharing = FALSE (default TRUE)
- /vmkernel/iovDisableIR = TRUE (default FALSE)
- Firewall was disabled for the COS
- Cluster DRS Automation Level was set to "Fully Automated", Level 1 ("Aggressive")

Server Notes

- Turbo Boost up to 2.53GHz (default disabled)
- Hyperthreading Enabled (default disabled)

Networking Notes

- Virtual Machine Port Groups and Service Console Ports were all connected to vSwitch0 on vmnic5 & vmnic6, all at 10Gbps.
- VMkernel ports were all connected to vSwitch1 on vmnic7 at 10Gbps. Jumbo Frames was enabled for the VMkernel vSwitch.
- OlioWeb and OlioDB virtual machines were attached to VSwitch 2 on vmnic4 at 10Gbps.
- A secondary Service Console port was configured on VSwitch 3 on vmnic0 at 1Gbps.

Storage Notes

- There was 1x25GB JBOD LUN, created over a single 73GB SSD. This LUN contained the VM used for source deployment operations.
- There was 1x50GB RAID 0 LUN, created over 6x450GB 15K disks. This LUN contained the VM used for target deployment operations.
- There were 2x140GB RAID 0 LUNS, each created over 6x450GB 15K disks. One of these was the SVMotion Source LUN, one was the SVMotion Target LUN
- There were 9x600GB RAID 0 LUNS, each created over 10x450GB 15K disk. These LUNs each contained 2 tiles' worth of DS2 Webserver VMs, Mailservers, OlioWeb and OlioDB.
- There were 9x150GB RAID 0 LUNS, each created over four 73GB SSDs. These LUNs contained 2 tiles' worth of DS2DB VMs.
- There were 2x340GB RAID 1 LUNS, each created over two 450GB 15K disks. These LUNs were used for booting ESX over SAN.

Datacenter Management Server Notes

- VMware vSphere Center was run on a Cisco UCS C200 M1.
- The vSphere was running on a Windows 2008 Server Enterprise Edition 64-bit, with SP1

Operating System Notes

- All Mailservers running Microsoft Windows Server 2008 R2 Enterprise 64-bit.
- Storage Controller for all Exchange Database Virtual Disks set to Paravirtual.

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 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, 8, 12, and 16 were hosted on physical client 0.
- Virtual clients 1, 5, 9, and 13 were hosted on physical client 1.
- Virtual clients 2, 6, 10, 14, and 17 were hosted on physical client 2.
- Virtual clients 3, 7, 11, and 15 were hosted on physical client 3.
- ESX client run with hyperthreading and turbo boost enabled. ESX configuration settings unchanged from default.

Other Notes

Prime client run on a dedicated, non-client machine.

This is a full disclosure report for a VMmark benchmark result. All published VMmark results must be from fully-compliant tests for which a full disclosure report is publicly available.

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