

VMware® VMmark™ V1.1.1 Results

Vendor and Hardware Platform: Cisco UCS B230 M1
Virtualization Platform: VMware ESX 4.0 U2 Build 261974

**VMmark V1.1.1 Score =
39.19 @ 27 Tiles**

Tested By: Cisco Systems

Test Date: 10-1-2010

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Performance

	webserver		javaserver		mailserver		fileserver		database		
TILE_0	Actual	Ratio	Actual	Ratio	Actual	Ratio	Actual	Ratio	Actual	Ratio	GM
p0	1938.55	1.90	18100.10	1.09	1632.92	1.49	18.02	1.40	2338.97	1.57	1.47
p1	1933.03	1.90	17698.28	1.07	1582.33	1.44	17.83	1.39	2339.07	1.57	1.45
p2	1907.10	1.87	18159.67	1.09	1483.20	1.35	17.84	1.39	2340.95	1.57	1.43
TILE_1	Actual	Ratio	Actual	Ratio	Actual	Ratio	Actual	Ratio	Actual	Ratio	GM
p0	1953.47	1.92	18129.95	1.09	1663.72	1.52	17.99	1.40	2366.07	1.59	1.48
p1	1942.58	1.91	18121.03	1.09	1572.88	1.43	17.72	1.38	2375.40	1.59	1.46
p2	1935.42	1.90	18122.95	1.09	1530.75	1.40	17.51	1.36	2379.72	1.59	1.44
TILE_2	Actual	Ratio	Actual	Ratio	Actual	Ratio	Actual	Ratio	Actual	Ratio	GM
p0	1911.05	1.88	18113.45	1.09	1718.60	1.57	17.99	1.40	2336.22	1.57	1.48
p1	1895.53	1.86	18120.22	1.09	1734.75	1.58	17.85	1.39	2341.90	1.57	1.48
p2	1852.30	1.82	18136.90	1.09	1588.28	1.45	17.78	1.39	2341.05	1.57	1.44
TILE_3	Actual	Ratio	Actual	Ratio	Actual	Ratio	Actual	Ratio	Actual	Ratio	GM
p0	1952.15	1.92	18143.58	1.09	1580.65	1.44	17.99	1.40	2363.82	1.58	1.46
p1	1946.97	1.91	18170.88	1.09	1550.50	1.41	17.77	1.39	2375.45	1.59	1.45
p2	1915.03	1.88	17684.60	1.06	1535.53	1.40	17.43	1.36	2378.10	1.59	1.43
TILE_4	Actual	Ratio	Actual	Ratio	Actual	Ratio	Actual	Ratio	Actual	Ratio	GM
p0	1913.03	1.88	17675.65	1.06	1721.62	1.57	17.68	1.38	2332.43	1.56	1.47
p1	1895.67	1.86	18141.30	1.09	1503.70	1.37	17.71	1.38	2342.70	1.57	1.43
p2	1858.78	1.82	18158.55	1.09	1603.55	1.46	17.53	1.37	2348.15	1.57	1.44
TILE_5	Actual	Ratio	Actual	Ratio	Actual	Ratio	Actual	Ratio	Actual	Ratio	GM
p0	1909.95	1.87	18095.83	1.09	1662.35	1.52	17.98	1.40	2365.07	1.58	1.47
p1	1892.10	1.86	18122.20	1.09	1711.62	1.56	17.74	1.38	2373.12	1.59	1.47
p2	1855.30	1.82	17663.50	1.06	1545.95	1.41	17.61	1.37	2378.62	1.59	1.43

TILE_6	Actual	Ratio	Actual	Ratio	Actual	Ratio	Actual	Ratio	Actual	Ratio	GM
p0	1904.75	1.87	18167.97	1.09	1616.00	1.47	18.10	1.41	2334.57	1.56	1.46
p1	1888.20	1.85	18157.10	1.09	1540.38	1.40	17.95	1.40	2342.70	1.57	1.44
p2	1865.92	1.83	18157.92	1.09	1574.65	1.44	17.83	1.39	2348.10	1.57	1.44
TILE_7	Actual	Ratio	Actual	Ratio	Actual	Ratio	Actual	Ratio	Actual	Ratio	GM
p0	1951.42	1.92	17676.08	1.06	1617.58	1.47	18.03	1.41	2368.20	1.59	1.46
p1	1945.60	1.91	18143.85	1.09	1702.00	1.55	17.80	1.39	2371.62	1.59	1.48
p2	1936.62	1.90	18130.53	1.09	1560.28	1.42	17.58	1.37	2372.85	1.59	1.45
TILE_8	Actual	Ratio	Actual	Ratio	Actual	Ratio	Actual	Ratio	Actual	Ratio	GM
p0	1909.60	1.87	18123.22	1.09	1679.55	1.53	17.88	1.39	2339.15	1.57	1.47
p1	1893.83	1.86	18128.70	1.09	1653.20	1.51	17.64	1.37	2343.30	1.57	1.46
p2	1871.97	1.84	18121.60	1.09	1641.67	1.50	17.42	1.36	2341.47	1.57	1.45
TILE_9	Actual	Ratio	Actual	Ratio	Actual	Ratio	Actual	Ratio	Actual	Ratio	GM
p0	1906.58	1.87	17703.85	1.07	1603.85	1.46	18.02	1.40	2369.62	1.59	1.45
p1	1888.45	1.85	18123.47	1.09	1546.47	1.41	18.03	1.41	2370.38	1.59	1.45
p2	1859.55	1.82	18120.97	1.09	1485.33	1.35	17.87	1.39	2369.93	1.59	1.43
TILE_10	Actual	Ratio	Actual	Ratio	Actual	Ratio	Actual	Ratio	Actual	Ratio	GM
p0	1583.95	1.55	18145.53	1.09	1699.65	1.55	18.16	1.42	2336.62	1.57	1.42
p1	1565.72	1.54	18158.22	1.09	1737.62	1.58	17.97	1.40	2345.82	1.57	1.42
p2	1544.92	1.52	17688.30	1.06	1619.97	1.48	17.93	1.40	2348.65	1.57	1.39
TILE_11	Actual	Ratio	Actual	Ratio	Actual	Ratio	Actual	Ratio	Actual	Ratio	GM
p0	1909.55	1.87	18124.20	1.09	1572.65	1.43	18.27	1.42	2366.57	1.59	1.46
p1	1895.65	1.86	18118.20	1.09	1599.75	1.46	17.82	1.39	2368.70	1.59	1.46
p2	1872.33	1.84	18128.38	1.09	1618.25	1.48	17.87	1.39	2371.25	1.59	1.46
TILE_12	Actual	Ratio	Actual	Ratio	Actual	Ratio	Actual	Ratio	Actual	Ratio	GM
p0	1955.00	1.92	18104.22	1.09	1653.67	1.51	17.94	1.40	2337.90	1.57	1.47
p1	1947.80	1.91	18120.50	1.09	1679.05	1.53	17.77	1.39	2344.03	1.57	1.47
p2	1941.45	1.91	18125.47	1.09	1704.67	1.55	17.56	1.37	2346.78	1.57	1.47
TILE_13	Actual	Ratio	Actual	Ratio	Actual	Ratio	Actual	Ratio	Actual	Ratio	GM
p0	1912.55	1.88	18137.42	1.09	1601.58	1.46	18.19	1.42	2368.05	1.59	1.46
p1	1888.58	1.85	18134.80	1.09	1660.47	1.51	17.99	1.40	2370.30	1.59	1.47
p2	1870.05	1.84	18165.88	1.09	1606.03	1.46	17.75	1.38	2370.30	1.59	1.45
TILE_14	Actual	Ratio	Actual	Ratio	Actual	Ratio	Actual	Ratio	Actual	Ratio	GM
p0	1910.20	1.87	18131.67	1.09	1625.88	1.48	17.97	1.40	2337.88	1.57	1.46
p1	1891.67	1.86	17667.25	1.06	1610.42	1.47	17.99	1.40	2344.80	1.57	1.45
p2	1870.92	1.84	18121.12	1.09	1719.47	1.57	17.99	1.40	2349.15	1.57	1.47

TILE_15	Actual	Ratio	Actual	Ratio	Actual	Ratio	Actual	Ratio	Actual	Ratio	GM
p0	1953.35	1.92	18146.15	1.09	1574.65	1.44	18.06	1.41	2369.30	1.59	1.46
p1	1942.38	1.91	18170.88	1.09	1613.90	1.47	17.84	1.39	2372.05	1.59	1.47
p2	1940.08	1.90	18168.75	1.09	1569.50	1.43	17.47	1.36	2372.57	1.59	1.45
TILE_16	Actual	Ratio	Actual	Ratio	Actual	Ratio	Actual	Ratio	Actual	Ratio	GM
p0	1955.75	1.92	17673.15	1.06	1534.30	1.40	17.76	1.38	2339.07	1.57	1.44
p1	1942.72	1.91	18137.38	1.09	1672.47	1.52	17.83	1.39	2344.57	1.57	1.47
p2	1939.72	1.90	18128.03	1.09	1647.40	1.50	17.64	1.37	2342.25	1.57	1.46
TILE_17	Actual	Ratio	Actual	Ratio	Actual	Ratio	Actual	Ratio	Actual	Ratio	GM
p0	1913.28	1.88	18160.97	1.09	1458.10	1.33	18.22	1.42	2344.20	1.57	1.44
p1	1890.12	1.85	18148.55	1.09	1658.40	1.51	18.05	1.41	2351.65	1.58	1.47
p2	1871.78	1.84	17718.22	1.07	1714.38	1.56	17.96	1.40	2355.57	1.58	1.47
TILE_18	Actual	Ratio	Actual	Ratio	Actual	Ratio	Actual	Ratio	Actual	Ratio	GM
p0	1953.38	1.92	18144.33	1.09	1364.58	1.24	17.90	1.40	2339.32	1.57	1.42
p1	1942.00	1.91	18161.10	1.09	1534.65	1.40	17.60	1.37	2347.38	1.57	1.44
p2	1932.90	1.90	18132.00	1.09	1671.42	1.52	17.59	1.37	2352.55	1.58	1.47
TILE_19	Actual	Ratio	Actual	Ratio	Actual	Ratio	Actual	Ratio	Actual	Ratio	GM
p0	1955.62	1.92	18160.72	1.09	1492.58	1.36	18.20	1.42	2349.12	1.57	1.45
p1	1945.15	1.91	17723.70	1.07	1582.78	1.44	17.97	1.40	2349.72	1.57	1.45
p2	1936.92	1.90	18169.10	1.09	1745.70	1.59	17.70	1.38	2348.90	1.57	1.48
TILE_20	Actual	Ratio	Actual	Ratio	Actual	Ratio	Actual	Ratio	Actual	Ratio	GM
p0	1956.62	1.92	18096.38	1.09	1412.65	1.29	18.12	1.41	2341.82	1.57	1.43
p1	1946.58	1.91	18123.97	1.09	1516.35	1.38	18.02	1.40	2345.22	1.57	1.45
p2	1938.25	1.90	18121.47	1.09	1621.62	1.48	17.99	1.40	2351.20	1.58	1.47
TILE_21	Actual	Ratio	Actual	Ratio	Actual	Ratio	Actual	Ratio	Actual	Ratio	GM
p0	1915.10	1.88	18148.47	1.09	1359.55	1.24	18.01	1.40	2371.93	1.59	1.42
p1	1896.30	1.86	17690.28	1.06	1586.45	1.45	18.02	1.40	2372.68	1.59	1.45
p2	1872.85	1.84	18162.33	1.09	1598.80	1.46	17.90	1.40	2371.88	1.59	1.45
TILE_22	Actual	Ratio	Actual	Ratio	Actual	Ratio	Actual	Ratio	Actual	Ratio	GM
p0	1956.60	1.92	18135.62	1.09	1295.55	1.18	17.96	1.40	2345.32	1.57	1.40
p1	1946.50	1.91	18144.15	1.09	1506.30	1.37	17.79	1.39	2344.45	1.57	1.44
p2	1938.70	1.90	18138.15	1.09	1622.22	1.48	17.54	1.37	2345.85	1.57	1.46
TILE_23	Actual	Ratio	Actual	Ratio	Actual	Ratio	Actual	Ratio	Actual	Ratio	GM
p0	1922.40	1.89	17707.83	1.07	1297.97	1.18	18.11	1.41	2370.47	1.59	1.40
p1	1964.70	1.93	18155.25	1.09	1504.92	1.37	17.98	1.40	2380.72	1.60	1.45
p2	1954.20	1.92	18132.17	1.09	1536.22	1.40	18.04	1.41	2385.10	1.60	1.46

TILE_24	Actual	Ratio	Actual	Ratio	Actual	Ratio	Actual	Ratio	Actual	Ratio	GM
p0	1930.70	1.89	17655.47	1.06	1279.38	1.17	18.15	1.41	2344.90	1.57	1.39
p1	1914.45	1.88	18120.92	1.09	1505.65	1.37	17.95	1.40	2350.18	1.57	1.44
p2	1893.25	1.86	18112.10	1.09	1606.30	1.46	17.91	1.40	2354.53	1.58	1.46
TILE_25	Actual	Ratio	Actual	Ratio	Actual	Ratio	Actual	Ratio	Actual	Ratio	GM
p0	1925.95	1.89	18123.33	1.09	1153.20	1.05	17.99	1.40	2382.07	1.60	1.37
p1	1912.65	1.88	18148.58	1.09	1456.50	1.33	17.90	1.39	2390.97	1.60	1.44
p2	1887.92	1.85	18153.03	1.09	1650.38	1.50	17.53	1.37	2398.35	1.61	1.46
TILE_26	Actual	Ratio	Actual	Ratio	Actual	Ratio	Actual	Ratio	Actual	Ratio	GM
p0	1975.10	1.94	17719.17	1.07	1116.88	1.02	18.13	1.41	2379.57	1.59	1.37
p1	1965.85	1.93	18143.58	1.09	1345.47	1.23	17.76	1.38	2382.25	1.60	1.42
p2	1959.85	1.92	18127.33	1.09	1561.47	1.42	17.72	1.38	2382.50	1.60	1.46
p0_score:	38.92										
p1_score:	39.23										
p2_score:	39.19										
Unreviewed_VMmark_Score:	39.19										

Configuration

Server and Network	
Server Manufacturer and Model	Cisco UCS B230 M1
Processor Vendor and Model	Intel Xeon X7560
Processor Speed (GHz)	2.27 GHz
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	24MB I + D on chip per chip L3
BIOS Version	B230M1.1.4.0.31.072720101113
Memory Size (in GB, Number of DIMMs)	256GB, 32x8GB
Memory Type and Speed	Dual rank 1066MHz 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 (on the Converged Network Adapter)

Host Bus Adapter Vendors and Models	Cisco UCS VIC M81KR Converged Network Adapter
Number of Network Controllers	1 dual-port (on the Converged Network Adapter)
Network Controller Vendors and Models	(see "Host Bus Adapter" above)
Network Switch Vendors and Models	(2) Cisco UCS-6120XP, (1) Cisco Nexus 5010, (1) Cisco Nexus 2148T
Network Speed	10Gbps
Other Hardware	none
Other Software	none
Hardware Availability Date (MM-DD-YYYY)	01-03-2011
Software Availability Date (MM-DD-YYYY)	07-26-2010
Virtualization Software	
Vendor, Product, Version, and Build	VMware ESX 4.0 U2 (build 261974)
Virtualization Type	Hardware
Supplemental Software	VMware vCenter Server 4.0.0 Build 200785, Cisco VEM VEM400-201007310
Virtualization Software Availability Date (MM-DD-YYYY)	06/10/2010
Storage	
Array Vendors, Models, and Firmware Versions	(1) EMC CX4-240 (version 04.29.000.5.003), (1) EMC CX4-480 (version 04.29.000.5.003)
Fibre Channel Switch Vendors and Models	Cisco MDS 9134
Disk Space Used	1699.71GB
Array Cache Size	8996MB (CX4-480), 2522MB (CX4-240)
Total Number of Physical Disks Used	73
Total Number of Enclosures/Pods/Shelves Used	6
Total Number of Physical Disks per Enclosures/Pods/Shelves Used	5 @ 12 disks, 1 @ 5 disks, 1 @ 8 disks
Total Number of Storage Groups Used	2
Number LUNs Used	61
LUN Size and Number of Disks Per LUN	5 sets of 5 LUNs at 38GB (Fileserver + Mailserver), each set over 8x73GB SSDs 5 sets of 5 LUNs at 15GB (Database) plus 1 LUN at 150GB (5 tiles' worth of Standby, Webserver, Javaserer) over 4x450GB 15K disks 2 LUNs at 38GB (Fileserver + Mailserver) over 5x73GB SSDs

	2 LUNs at 15GB (Database) plus 1 LUN at 180GB (2 tiles' worth of Standby, Webserver, Javaserer) over 3x450GB 15K disks 1 LUN at 15GB (boot) over 5x300GB 15K disks
RAID Type	RAID 0 for VMs, RAID 5 for VMware ESX 4.0 U2 O/S
Number of Members per RAID Set	5 raid sets of 8x73SSDs, each set containing 5x38GB LUNS (Fileserver + Mailserver) 5 raid sets of 4x450GB 15K disks, each set containing 5x15GB LUNS (Database) + 1x150GB LUN (5 tiles' worth of Standby, Webserver, Javaserer) 1 raid set of 5x73GB SSDs containing 2x38GB LUNS (Fileserver + Mailserver) 1 raid set of 3x450GB 15K disks containing 2x15GB LUNS (Database) + 1x180GB (2 tiles worth of Standby, Webserver, Javaserer) 1 raid set of 5x450GB 15K disks (boot)
Disk Vendors, Models, and Speeds	STEC ZIV2A074 CLAR72, SEAGATE ST345085 CLAR450, SEAGATE ST330065 CLAR300

Clients

Number of Clients	27
System Model(s)	clients 0-22: Cisco UCS C200 M1 client23: Cisco UCS B200 M1 client24: Cisco UCS B200 M2 client25-26: Cisco UCS B200 M1
Processor Vendor(s) and Model(s)	client0: Intel Xeon E5540 client1-21: Intel Xeon E5520 client22: Intel Xeon E5530 client23: Intel Xeon E5520 client24-25: Intel Xeon X5680 client26: Intel Xeon X5570
Processor Speed(s) (GHz)	client0: 2.53GHz client1-21: 2.26GHz client22: 2.40GHz client23: 2.26GHz client24-25: 3.33GHz client26: 2.93GHz
Total Sockets/Total Cores/Total Threads	client0-23: 2 Sockets / 8 Cores / 16 Threads client24-25: 2 Sockets / 12 Cores / 24 Threads client26: 2 Sockets / 8 Cores / 16 Threads
Memory per Client	client0-22: 24GB client23: 48GB client24-25: 64GB client26: 24GB
Network Controller Vendors and Models	client0-22: Intel 82576 (1Gb/s) client23-26: Intel 82598EB (10Gb/s)
Operating System, Version, and Service Pack	Windows Server 2003 Enterprise Edition SP2
Other Hardware	None
Other Software	None

Notes for Workload

Server BIOS Settings

- Intel Turbo Boost enabled up to 2.67GHz (default Enabled)

Virtual Switch Configuration

- The COS and all even-numbered tile virtual machines with the exception of the webservers connected to vSwitch0
 - The vSwitch was configured with 248 ports (default 56) on vmnic0.
- All odd-numbered tile virtual machines with the exception of the webservers connected to vSwitch1
 - The vSwitch was configured with 120 ports (default 56) on vmnic2.
- 27 dynamic virtual NICs were configured on the Cisco UCS VIC M81KR CNA using the physical interfaces of vmnic29
- These 27 virtual NICs were configured as a Distributed Virtual Switch in VMware vCenter DVS-VMmark
- The 27 webservers were assigned to this Distributed Virtual Switch

Storage Configuration

- There were 5 RAID 0 RAID sets, each created over 8x73GB SSDs. Each set housed 5x38GB LUNs, each LUN containing the Mailserver & Fileserver VM's for a tile.
- There was a RAID 0 RAID set created over 5x73GB SSDs. This set housed 2x38GB LUNs, each LUN containing the Mailserver & Fileserver VM's for a tile.
- There were 5 RAID 0 RAID sets, each created over 4x450GB 15K disks. Each set housed 5x15GB LUNS and 1x150GB LUN.
 - Each of the 15GB LUNs housed a Database server from one tile.
 - The 150GB LUN contained the Webserver, Javasever and Standby from 5 tiles.
- There was a RAID 0 RAID set created over 3x450GB 15K disks.
 - This set housed 2x15GB LUNS, each containing a Database server from one tile.
 - This set also had a 180GB LUN, containing the Webserver, Javasever and Standby from 2 tiles.
- There was a RAID 5 RAID set created over 5x450GB 15K disks, housing a 15GB LUN for the COS.

Virtualization Software Notes

- Virtual hardware upgraded from V4 to V7
- Virtual MMU was enabled for all VMs (default Automatic)
- Ethernet adapter type set to vmxnet3 for all VMs
- Logging was disabled for all VMs
- Storage multipathing was set to "Fixed" (default MRU)
- IDE & Floppy removed for all VMs (default enabled)
- BufferCache.SoftMaxDirty=85 (default 15)
- Disk.SchedNumReqOutstanding = 120 (default 32)
- IRQ.RoutingPolicy = 0 (default 2)
- Mem.BalancePeriod=0 (default 15)
- Mem.SamplePeriod=0 (default 60)
- Mem.ShareScanGHz=0 (default 4)
- Net.MaxNetifRxQueueLen=300 (default 100)
- Net.MaxNetifTxQueueLen=1000 (default 500)
- Net.TcpipHeapMax=120 (default 64)
- Net.vmxnetThroughputWeight=255 (default 0)
- CPU.Quantum=60 (default 50)
- CPU.HaltingIdleMsecPenalty=0 (default 100)
- Numa.PageMigEnable=0 (default 1)
- Used the AutoPart utility to expand all mailserver data partitions
- firewall for the COS was stopped

Operating System Notes

- Microsoft Windows Server 2003 virtual machines were updated to Service Pack 2
- Microsoft Windows Server 2003 virtual machines updated with KB955839
- Fileserver and Webserver VMs were updated to SLES 10 SP2

Software Notes

Used a delay in parallel setup for KillLockMem in benchmark setup.

Client Notes

- Microsoft Windows Server 2003 client machines were updated to Service Pack 2
- TCP TOE chimney was disabled on all clients (default enabled)
- Microsoft Windows Server 2003 clients updated with KB943545 & KB955839
- Clients23-26 were Cisco UCS B200 blade servers housed in the same chassis as the SUT.
- Network traffic between these (6) clients and the SUT leaves the blade chassis and is switched at the UCS 6120 fabric interconnects.
- The other clients are connected to the Nexus 2148T which is in turn connected to the Nexus 5010.
- The UCS 6120 fabric interconnects are connected to the Nexus 5010.

Other Notes

- The TILEDELAY and DELAYTIME values were modified in the VMMARK.CONFIG file
 - MailServer/DELAYTIME="0" (default 5)
 - JavaServer/DELAYTIME="25" (default 540)
 - Standby/DELAYTIME="35" (default 170)
 - WebServer/DELAYTIME="50" (default 180)
 - Database/DELAYTIME="75" (default 360)
 - Fileserver/DELAYTIME="100" (default 450)
 - TILEDELAY=275 (default 600)

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