

## VMware® VMmark™ V1.1.1 Results

Vendor and Hardware Platform: Fujitsu RX200 S5  
Virtualization Platform: VMware ESX 4.0 (build 164009)

**VMmark V1.1.1 Score =  
24.20 @ 17 Tiles**

Tested By: Fujitsu

Test Date: 08/03/2009

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### Performance

	webserver		javaserver		mailserver		fileserver		database		
TILE_0	Actual	Ratio	Actual	Ratio	Actual	Ratio	Actual	Ratio	Actual	Ratio	GM
p0	1863.50	1.83	18172.62	1.09	1715.55	1.56	16.43	1.28	2383.75	1.60	1.45
p1	1874.70	1.84	18212.33	1.10	1571.35	1.43	16.24	1.27	2386.35	1.60	1.42
p2	1879.35	1.84	18188.17	1.09	1684.80	1.54	16.64	1.30	2391.50	1.60	1.45
TILE_1	Actual	Ratio	Actual	Ratio	Actual	Ratio	Actual	Ratio	Actual	Ratio	GM
p0	1873.42	1.84	18163.58	1.09	1645.10	1.50	16.30	1.27	2341.97	1.57	1.43
p1	1877.67	1.84	18163.10	1.09	1643.42	1.50	16.26	1.27	2346.40	1.57	1.43
p2	1879.83	1.84	18162.65	1.09	1624.97	1.48	16.45	1.28	2349.38	1.57	1.43
TILE_2	Actual	Ratio	Actual	Ratio	Actual	Ratio	Actual	Ratio	Actual	Ratio	GM
p0	1882.55	1.85	18200.50	1.10	1760.85	1.61	16.44	1.28	2146.18	1.44	1.43
p1	1885.72	1.85	18171.72	1.09	1790.50	1.63	16.40	1.28	2153.78	1.44	1.44
p2	1892.05	1.86	18178.45	1.09	1807.33	1.65	16.65	1.30	2162.40	1.45	1.44
TILE_3	Actual	Ratio	Actual	Ratio	Actual	Ratio	Actual	Ratio	Actual	Ratio	GM
p0	1875.15	1.84	18165.95	1.09	1731.55	1.58	16.64	1.30	2192.50	1.47	1.43
p1	1882.22	1.85	18159.80	1.09	1689.97	1.54	16.61	1.29	2192.40	1.47	1.43
p2	1885.17	1.85	18162.62	1.09	1634.55	1.49	16.72	1.30	2193.62	1.47	1.42
TILE_4	Actual	Ratio	Actual	Ratio	Actual	Ratio	Actual	Ratio	Actual	Ratio	GM
p0	1500.12	1.47	17730.08	1.07	1643.78	1.50	16.37	1.28	2157.45	1.45	1.34
p1	1514.28	1.49	18201.62	1.10	1616.17	1.47	16.24	1.27	2167.57	1.45	1.35
p2	1526.60	1.50	18174.15	1.09	1681.75	1.53	16.39	1.28	2175.93	1.46	1.36
TILE_5	Actual	Ratio	Actual	Ratio	Actual	Ratio	Actual	Ratio	Actual	Ratio	GM
p0	1861.67	1.83	17707.38	1.07	1751.67	1.60	16.68	1.30	2176.78	1.46	1.43
p1	1875.28	1.84	18185.58	1.09	1725.45	1.57	17.10	1.33	2175.68	1.46	1.44
p2	1878.35	1.84	18183.28	1.09	1770.40	1.61	17.11	1.33	2173.20	1.46	1.45

<b>TILE_6</b>	Actual	Ratio	Actual	Ratio	Actual	Ratio	Actual	Ratio	Actual	Ratio	GM
<b>p0</b>	1861.03	1.83	17711.08	1.07	1730.12	1.58	16.98	1.32	2173.00	1.46	1.43
<b>p1</b>	1872.22	1.84	18172.78	1.09	1709.03	1.56	16.92	1.32	2173.40	1.46	1.43
<b>p2</b>	1876.35	1.84	18168.38	1.09	1737.10	1.58	16.80	1.31	2176.35	1.46	1.44
<b>TILE_7</b>	Actual	Ratio	Actual	Ratio	Actual	Ratio	Actual	Ratio	Actual	Ratio	GM
<b>p0</b>	1876.65	1.84	17714.75	1.07	1590.88	1.45	16.63	1.30	2196.05	1.47	1.40
<b>p1</b>	1884.70	1.85	18182.88	1.09	1710.33	1.56	16.87	1.31	2196.90	1.47	1.44
<b>p2</b>	1891.00	1.86	18212.22	1.10	1733.05	1.58	16.96	1.32	2197.35	1.47	1.44
<b>TILE_8</b>	Actual	Ratio	Actual	Ratio	Actual	Ratio	Actual	Ratio	Actual	Ratio	GM
<b>p0</b>	1861.75	1.83	18164.10	1.09	1601.22	1.46	16.51	1.29	2165.45	1.45	1.40
<b>p1</b>	1871.72	1.84	18167.10	1.09	1636.30	1.49	16.78	1.31	2173.20	1.46	1.42
<b>p2</b>	1880.35	1.85	18168.22	1.09	1748.03	1.59	16.97	1.32	2179.75	1.46	1.44
<b>TILE_9</b>	Actual	Ratio	Actual	Ratio	Actual	Ratio	Actual	Ratio	Actual	Ratio	GM
<b>p0</b>	1821.53	1.79	18167.58	1.09	1638.80	1.49	16.34	1.27	2308.72	1.55	1.42
<b>p1</b>	1827.38	1.79	18163.80	1.09	1743.78	1.59	16.24	1.27	2307.35	1.55	1.44
<b>p2</b>	1838.33	1.80	17711.17	1.07	1658.22	1.51	16.48	1.28	2309.35	1.55	1.42
<b>TILE_10</b>	Actual	Ratio	Actual	Ratio	Actual	Ratio	Actual	Ratio	Actual	Ratio	GM
<b>p0</b>	1882.72	1.85	18213.95	1.10	1643.75	1.50	16.61	1.29	2188.85	1.47	1.42
<b>p1</b>	1881.53	1.85	18215.15	1.10	1692.35	1.54	16.45	1.28	2185.75	1.46	1.42
<b>p2</b>	1887.70	1.85	17757.03	1.07	1803.55	1.64	16.67	1.30	2190.93	1.47	1.44
<b>TILE_11</b>	Actual	Ratio	Actual	Ratio	Actual	Ratio	Actual	Ratio	Actual	Ratio	GM
<b>p0</b>	1877.35	1.84	18177.67	1.09	1467.97	1.34	16.56	1.29	2305.07	1.54	1.40
<b>p1</b>	1880.50	1.85	18158.90	1.09	1669.58	1.52	16.27	1.27	2304.20	1.54	1.43
<b>p2</b>	1885.08	1.85	18156.50	1.09	1615.72	1.47	16.71	1.30	2305.95	1.55	1.43
<b>TILE_12</b>	Actual	Ratio	Actual	Ratio	Actual	Ratio	Actual	Ratio	Actual	Ratio	GM
<b>p0</b>	1873.97	1.84	18160.00	1.09	1539.05	1.40	16.38	1.28	2386.00	1.60	1.42
<b>p1</b>	1880.15	1.85	18167.05	1.09	1677.42	1.53	16.60	1.29	2393.03	1.60	1.45
<b>p2</b>	1881.28	1.85	18153.90	1.09	1702.12	1.55	16.39	1.28	2392.95	1.60	1.45
<b>TILE_13</b>	Actual	Ratio	Actual	Ratio	Actual	Ratio	Actual	Ratio	Actual	Ratio	GM
<b>p0</b>	1861.65	1.83	18168.08	1.09	1398.50	1.28	16.21	1.26	2375.38	1.59	1.39
<b>p1</b>	1867.47	1.83	18167.38	1.09	1709.33	1.56	16.60	1.29	2388.15	1.60	1.45
<b>p2</b>	1876.78	1.84	18161.53	1.09	1726.80	1.57	16.58	1.29	2391.90	1.60	1.46
<b>TILE_14</b>	Actual	Ratio	Actual	Ratio	Actual	Ratio	Actual	Ratio	Actual	Ratio	GM
<b>p0</b>	1597.90	1.57	18162.95	1.09	1371.00	1.25	16.98	1.32	2259.05	1.51	1.34
<b>p1</b>	1779.97	1.75	18162.00	1.09	1558.92	1.42	16.92	1.32	2353.28	1.58	1.41
<b>p2</b>	1829.35	1.80	18161.92	1.09	1672.08	1.52	17.01	1.33	2353.82	1.58	1.44

<b>TILE_15</b>	Actual	Ratio	Actual	Ratio	Actual	Ratio	Actual	Ratio	Actual	Ratio	GM
<b>p0</b>	1824.95	1.79	18155.25	1.09	1183.17	1.08	16.41	1.28	2379.95	1.59	1.34
<b>p1</b>	1829.97	1.80	18139.40	1.09	1558.35	1.42	16.84	1.31	2379.28	1.59	1.42
<b>p2</b>	1837.85	1.80	18157.42	1.09	1698.45	1.55	16.97	1.32	2379.18	1.59	1.45
<b>TILE_16</b>	Actual	Ratio	Actual	Ratio	Actual	Ratio	Actual	Ratio	Actual	Ratio	GM
<b>p0</b>	1812.00	1.78	18171.80	1.09	1105.78	1.01	16.43	1.28	2377.95	1.59	1.32
<b>p1</b>	1826.33	1.79	18142.88	1.09	1403.08	1.28	16.65	1.30	2357.57	1.58	1.39
<b>p2</b>	1830.67	1.80	18151.05	1.09	1573.05	1.43	16.44	1.28	2335.88	1.57	1.41
<b>p0_score:</b>	23.79										
<b>p1_score:</b>	24.20										
<b>p2_score:</b>	24.38										
<b>Unreviewed_VMmark_Score:</b>	24.20										

## Configuration

<b>Server and Network</b>	
Server Manufacturer and Model	Fujitsu RX200 S5
Processor Vendor and Model	Quad-core Intel Xeon X5570
Processor Speed (GHz)	2.93
Total Sockets/Total Cores/Total Threads	2 Sockets / 8 Cores / 16 Threads
Primary Cache	32KB I + 32KB D on chip per core
Secondary Cache	256KB per core
Other Cache	8MB L3
BIOS Version	6.00 R1.05A.2786
Memory Size (in GB, Number of DIMMs)	96GB, 12
Memory Type and Speed	8GB per DIMM, 1066MHz registered ECC DDR3
Disk Subsystem Type	FC SAN
Number of Disk Controllers	0
Number of Host Bus Adapters	1
Host Bus Adapter Vendors and Models	1 dual-channel QLogic QLE2462
Number of Network Controllers	2
Network Controller Vendors and Models	Integrated Intel 82575EB dual port 1GbE Adapter, 1xIntel 82571EB quad port adapter
Network Switch Vendors and Models	3xBX600 GbE Switch Blade 30/12
Network Speed	1Gb

Other Hardware	none
Other Software	none
Hardware Availability Date (MM-DD-YYYY)	03/30/2009
Software Availability Date (MM-DD-YYYY)	05/21/2009

**Virtualization Software**

Vendor, Product, Version, and Build	VMware ESX 4.0 (build 164009)
Virtualization Type	Hardware
Supplemental Software	igb-Driver version 1.3.19.12
Virtualization Software Availability Date (MM-DD-YYYY)	05/21/2009

**Storage**

Array Vendors, Models, and Firmware Versions	4xEMC FibreCAT CX500, FLARE-Operating-Environment 02.19.500.5.019
Fibre Channel Switch Vendors and Models	Brocade SilkWorm 4100, 2xBrocade SilkWorm 3250
Disk Space Used	2.1TB for VMs, 11GB for Host-OS, 120GB for VM-config and swap, 150GB Backup etc.
Array Cache Size	3GB
Total Number of Physical Disks Used	291
Total Number of Enclosures/Pods/Shelves Used	20
Total Number of Physical Disks per Enclosures/Pods/Shelves Used	15 except first CX500 with only 2 shelves (11 and 10 disks)
Total Number of Storage Groups Used	7
Number LUNs Used	Total 37: 34 LUNs for VMs, 1 LUN for Host-OS, 1 LUN for VM-config and swap, 1 LUN for backup
LUN Size and Number of Disks Per LUN	17x100GB/11 Disks, 17x24GB/15 Disks, 1x11GB/5 Disks, 1x120GB/5 Disks, 1x150GB/5 Disks
RAID Type	0
Number of Members per RAID Set	17x100GB: 1, 17x24GB: 3, 1x11GB and 1x120GB on the same RAID Set, 1x150GB: 1
Disk Vendors, Models, and Speeds	Seagate, ST373453FCV, 15krpm

**Clients**

Number of Clients	17
System Model(s)	BX620 S4

Processor Vendor(s) and Model(s)	Intel Xeon 5130
Processor Speed(s) (GHz)	2
Total Sockets/Total Cores/Total Threads	2 Sockets / 4 Cores / 4 Threads
Memory per Client	3GB
Network Controller Vendors and Models	Broadcom NetXtreme
Operating System, Version, and Service Pack	Microsoft(R) Windows(R) Server 2003 R2 Enterprise Edition, Service Pack 2
Other Hardware	none
Other Software	none

## Notes for Workload

### Server and Network Notes

- Server BIOS settings:
  - Defaults
- QLogic HBA BIOS settings:
  - Tape support disabled
  - Execution Throttle set to 256
  - LUNs per target set to 32
  - Interrupt mode set to 6
  - Interrupt delay set to 5
- vSwitch Configuration:
  - vSwitch0 for Service Console on vmnic2
  - vSwitch0 configured for 24 Ports (default 56)
  - vSwitch1 for all VMs except web servers on vmnic0
  - vSwitch1 configured for 120 Ports (default 56)
  - vSwitch2 for all web servers on vmnic1
- Storage Configuration:
  - 2 LUNs per Tile, first LUN with Database/File server/JAVA server/Web server/Standby, second LUN for Mail server (raw LUN mapping)
  - CX500[1]: Boot-LUN, Config/Swap-LUN, Backup-LUN, first Tile-LUN for Tile 0
  - CX500[2]: First Tile-LUN for Tile 1 to Tile 8
  - CX500[3]: First Tile-LUN for Tile 9 to Tile 16
  - CX500[4]: Second Tile-LUN (Mail servers) for all Tiles

### Virtualization Software Notes

- All VMs were upgraded to hardware version 7
- Virtualized MMU was set to full hardware support for all VMs (default automatic)
- Ethernet adapter type set to vmxnet3 for all VMs
- Logging disabled for all VMs

- Floppy and CDROM removed for all VMs
- Firewall disabled for the Console OS
- Mem.SwapInBatchPages was set to 512 (default 64)
- Net.EtherswitchHashSize was set to 4 (default 1)
- Net.MaxPortRxQueueLen was set to 256 (default 80)
- Net.MaxNetifRxQueueLen was set to 512 (default 100)
- Net.MaxNetifTxQueueLen was set to 1000 (default 500)
- Net.Vmxnet2PinRxBuf was set to 1 (default 0)
- BufferCache.SoftMaxDirty was set to 75 (default 15)
- Disk.SchedNumReqOutstanding was set to 128 (default 32)
- QLogic-Driver: Interrupt delay 3ms, max queue depth 128
- Network-Drivers: Interrupt throttle was activated
- vmnic0/vmnic1: rx-queue size was 512, tx-queue size was 1024
- VGA buffer for all Windows VMs was set to 1310720 Bytes
- VGA buffer for all Linux VMs was set to 1572864 Bytes
- Ballooning disabled for all File server VMs (sched.mem.maxmemctrl=0)
- One dedicated LUN for the VM configuration/swap files

## Operating System Notes

- Microsoft Windows Server 2003 R2 VMs were updated with Service Pack 2 and KB955839
- File server and Web server were updated to SLES10 SP 2
- DHCP-Client service was disabled on all Windows VMs
- Wireless configuration service was disabled on all Windows VMs
- Windows Time service was disabled on all JAVA and Standby VMs

## Software Notes

- none

## Client Notes

- Microsoft Windows Server 2003 R2 Clients were updated with Service Pack 2 and KB955839

## Other Notes

- none

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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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