

## VMware® VMmark™ V1.1.1 Results

**Vendor and Hardware Platform: Dell PowerEdge R710**  
**Virtualization Platform: VMware ESX version 4.0 Update 2 Build 258828**

**VMmark V1.1.1 Score =**  
**33.64 @ 25 Tiles**

Tested By: Dell Inc.

Test Date: 08-23-2010

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### Performance

	webserver		javaserver		mailserver		fileserver		database		
TILE_0	Actual	Ratio	Actual	Ratio	Actual	Ratio	Actual	Ratio	Actual	Ratio	GM
p0	1573.17	1.54	18088.95	1.09	1415.60	1.29	15.98	1.25	2196.35	1.47	1.32
p1	1577.70	1.55	17644.78	1.06	1544.67	1.41	16.18	1.26	2197.00	1.47	1.34
p2	1561.53	1.53	18098.42	1.09	1456.65	1.33	15.98	1.25	2190.90	1.47	1.32
TILE_1	Actual	Ratio	Actual	Ratio	Actual	Ratio	Actual	Ratio	Actual	Ratio	GM
p0	1653.38	1.62	18130.53	1.09	1388.95	1.27	15.16	1.18	2299.40	1.54	1.32
p1	1661.03	1.63	18154.17	1.09	1501.65	1.37	15.10	1.18	2298.03	1.54	1.35
p2	1676.45	1.65	17688.33	1.06	1486.62	1.36	15.13	1.18	2296.78	1.54	1.34
TILE_2	Actual	Ratio	Actual	Ratio	Actual	Ratio	Actual	Ratio	Actual	Ratio	GM
p0	1574.65	1.55	18152.80	1.09	1417.92	1.29	15.14	1.18	2219.28	1.49	1.31
p1	1589.58	1.56	17704.83	1.07	1597.78	1.46	15.33	1.19	2224.22	1.49	1.34
p2	1599.12	1.57	18141.83	1.09	1642.12	1.50	15.28	1.19	2220.30	1.49	1.35
TILE_3	Actual	Ratio	Actual	Ratio	Actual	Ratio	Actual	Ratio	Actual	Ratio	GM
p0	1632.33	1.60	18177.60	1.09	1433.00	1.31	16.34	1.27	2308.12	1.55	1.35
p1	1649.75	1.62	17727.60	1.07	1576.00	1.44	16.17	1.26	2312.35	1.55	1.37
p2	1664.97	1.63	18169.20	1.09	1504.35	1.37	16.33	1.27	2312.12	1.55	1.37
TILE_4	Actual	Ratio	Actual	Ratio	Actual	Ratio	Actual	Ratio	Actual	Ratio	GM
p0	1675.72	1.64	18139.17	1.09	1432.80	1.31	16.29	1.27	1960.45	1.31	1.31
p1	1690.00	1.66	18120.30	1.09	1587.83	1.45	16.17	1.26	1936.20	1.30	1.34
p2	1701.70	1.67	18093.65	1.09	1543.22	1.41	16.34	1.27	1926.22	1.29	1.33
TILE_5	Actual	Ratio	Actual	Ratio	Actual	Ratio	Actual	Ratio	Actual	Ratio	GM
p0	1672.30	1.64	18099.20	1.09	1433.28	1.31	16.08	1.25	2305.38	1.54	1.35
p1	1681.90	1.65	18108.53	1.09	1525.20	1.39	16.36	1.28	2305.45	1.54	1.38
p2	1690.40	1.66	17691.50	1.06	1522.10	1.39	16.20	1.26	2307.22	1.55	1.37

<b>TILE_6</b>	Actual	Ratio	Actual	Ratio	Actual	Ratio	Actual	Ratio	Actual	Ratio	GM
<b>p0</b>	1324.10	1.30	18133.78	1.09	1407.88	1.28	16.04	1.25	2282.82	1.53	1.28
<b>p1</b>	1322.95	1.30	18133.28	1.09	1574.00	1.44	16.21	1.26	2286.70	1.53	1.32
<b>p2</b>	1343.78	1.32	18133.95	1.09	1535.65	1.40	16.14	1.26	2284.78	1.53	1.31
<b>TILE_7</b>	Actual	Ratio	Actual	Ratio	Actual	Ratio	Actual	Ratio	Actual	Ratio	GM
<b>p0</b>	1581.30	1.55	18099.70	1.09	1444.28	1.32	16.19	1.26	2222.32	1.49	1.33
<b>p1</b>	1592.03	1.56	18123.95	1.09	1534.08	1.40	16.06	1.25	2222.03	1.49	1.35
<b>p2</b>	1609.58	1.58	17676.17	1.06	1536.62	1.40	16.32	1.27	2221.82	1.49	1.35
<b>TILE_8</b>	Actual	Ratio	Actual	Ratio	Actual	Ratio	Actual	Ratio	Actual	Ratio	GM
<b>p0</b>	1592.40	1.56	18189.28	1.09	1413.12	1.29	16.17	1.26	2296.05	1.54	1.34
<b>p1</b>	1597.00	1.57	17708.72	1.07	1587.78	1.45	16.10	1.25	2293.18	1.54	1.36
<b>p2</b>	1606.38	1.58	18057.22	1.09	1601.40	1.46	16.26	1.27	2290.57	1.53	1.37
<b>TILE_9</b>	Actual	Ratio	Actual	Ratio	Actual	Ratio	Actual	Ratio	Actual	Ratio	GM
<b>p0</b>	1583.70	1.55	18054.38	1.09	1418.75	1.29	14.91	1.16	2246.45	1.51	1.31
<b>p1</b>	1593.90	1.56	18111.00	1.09	1511.35	1.38	14.97	1.17	2239.25	1.50	1.33
<b>p2</b>	1615.83	1.59	18129.72	1.09	1541.50	1.41	15.17	1.18	2238.80	1.50	1.34
<b>TILE_10</b>	Actual	Ratio	Actual	Ratio	Actual	Ratio	Actual	Ratio	Actual	Ratio	GM
<b>p0</b>	1680.17	1.65	18143.53	1.09	1355.42	1.24	16.12	1.26	2300.03	1.54	1.34
<b>p1</b>	1690.78	1.66	18161.35	1.09	1649.03	1.50	16.34	1.27	2299.65	1.54	1.40
<b>p2</b>	1702.15	1.67	17660.12	1.06	1531.03	1.40	16.28	1.27	2298.85	1.54	1.37
<b>TILE_11</b>	Actual	Ratio	Actual	Ratio	Actual	Ratio	Actual	Ratio	Actual	Ratio	GM
<b>p0</b>	1607.50	1.58	18189.45	1.09	1371.03	1.25	15.40	1.20	2222.22	1.49	1.31
<b>p1</b>	1628.85	1.60	17730.88	1.07	1471.50	1.34	15.35	1.20	2215.85	1.48	1.32
<b>p2</b>	1628.47	1.60	18157.55	1.09	1674.58	1.53	15.53	1.21	2218.78	1.49	1.37
<b>TILE_12</b>	Actual	Ratio	Actual	Ratio	Actual	Ratio	Actual	Ratio	Actual	Ratio	GM
<b>p0</b>	1683.50	1.65	18124.08	1.09	1410.78	1.29	16.11	1.26	2299.50	1.54	1.35
<b>p1</b>	1665.62	1.63	18132.90	1.09	1577.65	1.44	16.32	1.27	2295.50	1.54	1.38
<b>p2</b>	1699.90	1.67	18132.00	1.09	1594.75	1.45	16.14	1.26	2294.70	1.54	1.39
<b>TILE_13</b>	Actual	Ratio	Actual	Ratio	Actual	Ratio	Actual	Ratio	Actual	Ratio	GM
<b>p0</b>	1682.65	1.65	18137.25	1.09	1298.95	1.18	15.23	1.19	2236.43	1.50	1.31
<b>p1</b>	1695.58	1.66	18148.62	1.09	1454.72	1.33	15.35	1.20	2234.32	1.50	1.34
<b>p2</b>	1706.92	1.68	17675.97	1.06	1505.95	1.37	15.33	1.19	2225.22	1.49	1.34
<b>TILE_14</b>	Actual	Ratio	Actual	Ratio	Actual	Ratio	Actual	Ratio	Actual	Ratio	GM
<b>p0</b>	1613.62	1.58	18112.08	1.09	1319.90	1.20	15.22	1.19	2237.43	1.50	1.30
<b>p1</b>	1634.75	1.60	18104.60	1.09	1465.38	1.34	15.43	1.20	2233.95	1.50	1.33
<b>p2</b>	1633.15	1.60	18140.95	1.09	1593.35	1.45	15.34	1.20	2232.43	1.50	1.35

<b>TILE_15</b>	Actual	Ratio	Actual	Ratio	Actual	Ratio	Actual	Ratio	Actual	Ratio	GM
<b>p0</b>	1686.97	1.66	18116.72	1.09	1280.05	1.17	15.08	1.18	2226.90	1.49	1.30
<b>p1</b>	1702.58	1.67	18149.95	1.09	1531.80	1.40	15.31	1.19	2225.40	1.49	1.35
<b>p2</b>	1708.35	1.68	18149.35	1.09	1634.95	1.49	15.38	1.20	2225.68	1.49	1.37
<b>TILE_16</b>	Actual	Ratio	Actual	Ratio	Actual	Ratio	Actual	Ratio	Actual	Ratio	GM
<b>p0</b>	1616.22	1.59	18128.35	1.09	1308.85	1.19	14.29	1.11	2221.15	1.49	1.28
<b>p1</b>	1630.47	1.60	18131.50	1.09	1456.92	1.33	14.21	1.11	2214.60	1.48	1.31
<b>p2</b>	1637.90	1.61	18126.25	1.09	1591.65	1.45	14.23	1.11	2217.62	1.49	1.33
<b>TILE_17</b>	Actual	Ratio	Actual	Ratio	Actual	Ratio	Actual	Ratio	Actual	Ratio	GM
<b>p0</b>	1615.30	1.59	18059.28	1.09	1353.33	1.23	16.21	1.26	2313.15	1.55	1.33
<b>p1</b>	1634.30	1.60	18096.12	1.09	1458.72	1.33	16.41	1.28	2307.60	1.55	1.36
<b>p2</b>	1641.33	1.61	18100.15	1.09	1422.08	1.30	16.24	1.27	2309.28	1.55	1.35
<b>TILE_18</b>	Actual	Ratio	Actual	Ratio	Actual	Ratio	Actual	Ratio	Actual	Ratio	GM
<b>p0</b>	1620.28	1.59	18170.62	1.09	1257.15	1.15	16.34	1.27	2320.28	1.55	1.32
<b>p1</b>	1641.80	1.61	17657.35	1.06	1491.35	1.36	16.37	1.28	2314.88	1.55	1.36
<b>p2</b>	1640.28	1.61	18117.67	1.09	1594.03	1.45	16.23	1.27	2314.60	1.55	1.38
<b>TILE_19</b>	Actual	Ratio	Actual	Ratio	Actual	Ratio	Actual	Ratio	Actual	Ratio	GM
<b>p0</b>	1616.15	1.59	18145.28	1.09	1281.90	1.17	15.16	1.18	2219.47	1.49	1.29
<b>p1</b>	1639.38	1.61	18154.38	1.09	1503.17	1.37	15.36	1.20	2219.97	1.49	1.34
<b>p2</b>	1638.42	1.61	18155.70	1.09	1679.10	1.53	15.33	1.19	2219.05	1.49	1.37
<b>TILE_20</b>	Actual	Ratio	Actual	Ratio	Actual	Ratio	Actual	Ratio	Actual	Ratio	GM
<b>p0</b>	1628.20	1.60	18125.80	1.09	1222.20	1.11	16.32	1.27	2300.43	1.54	1.31
<b>p1</b>	1640.53	1.61	17663.42	1.06	1452.28	1.32	16.22	1.26	2299.03	1.54	1.35
<b>p2</b>	1649.33	1.62	18174.62	1.09	1572.25	1.43	16.45	1.28	2298.43	1.54	1.38
<b>TILE_21</b>	Actual	Ratio	Actual	Ratio	Actual	Ratio	Actual	Ratio	Actual	Ratio	GM
<b>p0</b>	1693.47	1.66	18116.67	1.09	1203.17	1.10	15.19	1.18	2304.50	1.54	1.29
<b>p1</b>	1711.17	1.68	18144.00	1.09	1447.00	1.32	15.39	1.20	2304.40	1.54	1.35
<b>p2</b>	1710.33	1.68	17682.40	1.06	1523.08	1.39	15.35	1.20	2301.62	1.54	1.36
<b>TILE_22</b>	Actual	Ratio	Actual	Ratio	Actual	Ratio	Actual	Ratio	Actual	Ratio	GM
<b>p0</b>	1692.47	1.66	17733.97	1.07	1117.03	1.02	15.14	1.18	2317.28	1.55	1.27
<b>p1</b>	1699.85	1.67	18176.47	1.09	1387.45	1.26	15.21	1.19	2317.12	1.55	1.34
<b>p2</b>	1715.12	1.68	18177.85	1.09	1575.35	1.44	15.50	1.21	2315.43	1.55	1.38
<b>TILE_23</b>	Actual	Ratio	Actual	Ratio	Actual	Ratio	Actual	Ratio	Actual	Ratio	GM
<b>p0</b>	1687.55	1.66	17645.20	1.06	1215.75	1.11	15.26	1.19	2218.25	1.49	1.28
<b>p1</b>	1704.10	1.67	18137.92	1.09	1417.05	1.29	15.30	1.19	2214.72	1.48	1.33
<b>p2</b>	1704.70	1.67	18113.12	1.09	1499.33	1.37	15.52	1.21	2217.70	1.49	1.35

TILE_24	Actual	Ratio	Actual	Ratio	Actual	Ratio	Actual	Ratio	Actual	Ratio	GM
p0	1658.78	1.63	17647.05	1.06	1160.67	1.06	15.44	1.20	2208.28	1.48	1.27
p1	1672.47	1.64	18116.78	1.09	1461.58	1.33	15.37	1.20	2214.15	1.48	1.33
p2	1699.58	1.67	18131.75	1.09	1581.22	1.44	15.50	1.21	2211.40	1.48	1.36
p0_score:	32.76										
p1_score:	33.64										
p2_score:	33.91										
Unreviewed_VMmark_Score:	33.64										

## Configuration

Server and Network	
Server Manufacturer and Model	Dell PowerEdge R710
Processor Vendor and Model	Intel Xeon X5680
Processor Speed (GHz)	3.33 GHz
Total Sockets/Total Cores/Total Threads	2 Sockets / 12 Cores / 24 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	12 MB I+D on chip per chip L3
BIOS Version	2.2.0
Memory Size (in GB, Number of DIMMs)	192GB, 12x16GB
Memory Type and Speed	Quad rank 1066MHz Registered DDR3 downclocked to 800 MHz
Disk Subsystem Type	SAS DAS
Number of Disk Controllers	3
Disk Controller Vendors and Models	1x Dell PERC H700 Integrated 2x Dell PERC H800 Adapter
Number of Host Bus Adapters	0
Host Bus Adapter Vendors and Models	N/A
Number of Network Controllers	6
Network Controller Vendors and Models	2x Dual-port Broadcom BCM5709 (onboard) 2x Single-port Intel 82598EB 10GbE SR
Network Switch Vendors and Models	2x Dell PowerConnect 6248
Network Speed	10Gbps for all Webserver VMs, 1Gbps for all remaining VMs and clients
Other Hardware	None
Other Software	None

Hardware Availability Date (MM-DD-YYYY)	07-07-2010
Software Availability Date (MM-DD-YYYY)	07-07-2010
<b>Virtualization Software</b>	
Vendor, Product, Version, and Build	VMware ESX 4.0 Update 2 Build 258828
Virtualization Type	Hardware
Supplemental Software	None
Virtualization Software Availability Date (MM-DD-YYYY)	06-10-2010
<b>Storage</b>	
Array Vendors, Models, and Firmware Versions	2x Dell PowerVault MD1220 version A.00
Fibre Channel Switch Vendors and Models	None
Disk Space Used	1550GB
Array Cache Size	N/A
Total Number of Physical Disks Used	42
Total Number of Enclosures/Pods/Shelves Used	2
Total Number of Physical Disks per Enclosures/Pods/Shelves Used	1(17x 146GB SSDs), 1(24x 146GB SAS 15k disks)
Total Number of Storage Groups Used	N/A
Number LUNs Used	22
LUN Size and Number of Disks Per LUN	17 LUNs at 138GB (MailServer and FileServer) each on 1x146GB SSD 4 LUNs at 816.5GB (Misc) over 6x146GB 15k disks 1 LUN at 66.5GB (boot) over 1 local 73GB 15k disk
RAID Type	RAID0
Number of Members per RAID Set	17 RAID sets each over 1x 146GB SSD 4 RAID sets over 6x146GB 15k disks 1 RAID set over 1x 73GB 15k disk
Disk Vendors, Models, and Speeds	Pliant LB 150S, Hitachi GST HUC151414CSS600
<b>Clients</b>	
Number of Clients	25

System Model(s)	PowerEdge 1750: Clients 0-3 PowerEdge 1850: Clients 4,10-24 PowerEdge 1950: Clients 5-9
Processor Vendor(s) and Model(s)	Intel Xeon, P4, E5205
Processor Speed(s) (GHz)	3.06GHz: Clients 0,1 3.20GHz: Clients 2,3 2.80GHz: Clients 4 1.86GHz: Clients 5-9, 3.40GHz: Client 10 3.60GHz: Clients 11-24
Total Sockets/Total Cores/Total Threads	2 Sockets / 1 Core per Socket / 4 Threads: Clients 0-4, 10-24 2 Sockets / 4 Cores per Socket / 4 Threads: Clients 5-9
Memory per Client	2GB: Clients 0-4, 11-24 4GB: Clients 5-10
Network Controller Vendors and Models	Broadcom NetXtreme 5704 Gigabit Ethernet (PE1750) Intel PRO/1000 MT Network Controller (PE1850) Broadcom 5708 Gigabit Network Controller (PE1950)
Operating System, Version, and Service Pack	Windows Server 2003 Enterprise Edition SP2
Other Hardware	None
Other Software	None

## Notes for Workload

### Server and Network Notes

- Server BIOS settings:
  - Turbo Boost Technology = Enabled (Intel Turbo Boost up to 3.60GHz, default Enabled)
  - Virtualization Technology = Enabled (default Disabled)
  - Adjacent Cache Line Prefetch = Disabled (default Enabled)
  - Hardware Prefetch = Disabled (default Enabled)
  - DCU Streamer = Disabled (default Enabled)
  - Data Reuse Optimizations = Disabled (default Enabled)
  - Intel(R) QPI Bandwidth Priority = I/O (default Compute)
  - Embedded SATA = Off (default On)
  - Internal USB port = Off (default On)
  - User Accessible USB ports = Only back ports on (default All ports on)
  - Power Management = Maximum Performance (default Active Power Controller)
- PERC BIOS settings:
  - SSD virtual disks set to Write-Through, No Read Ahead (default Write-Back, Adaptive Read Ahead)
  - SAS virtual disks set to Write-Back, Read Ahead (default Write-Back/Adaptive Read Ahead)
- Network Settings:
  - Broadcom NICs (vmnic0,1,2,3) bound to vSwitch0,1,2,3 respectively
  - Intel 10GbE NICs (vmnic4,5) bound to vSwitch4,5 respectively

Service Console, Standby and JavaServer VMs were attached to vSwitch0

MailServer VMs were attached to vSwitch1

FileServer VMs were attached to vSwitch2

Database VMs were attached to vSwitch3

Even WebServer VMs were attached to vSwitch 4

Odd WebServer VMs were attached to vSwitch 5

vSwitch0 configured with 128 ports (default 56)

- Storage Configuration:

17 LUNs of 138GB were created (One LUN per hard drive) for FileServer VMs

LUN1 for MailServer and FileServer 0,17

LUN2 for MailServer and FileServer 1,18

LUN3 for MailServer and FileServer 2,19

LUN4 for MailServer and FileServer 3,20

LUN5 for MailServer and FileServer 4,21

LUN6 for MailServer and FileServer 5,22

LUN7 for MailServer and FileServer 6,23

LUN8 for MailServer and FileServer 7,24

LUN9 for MailServer and FileServer 8

LUN10 for MailServer and FileServer 9

LUN11 for MailServer and FileServer 10

LUN12 for MailServer and FileServer 11

LUN13 for MailServer and FileServer 12

LUN14 for MailServer and FileServer 13

LUN15 for MailServer and FileServer 14

LUN16 for MailServer and FileServer 15

LUN17 for MailServer and FileServer 16

4 LUNs of 817GB were created across 6 SSD for Standby, Database, WebServer and JavaServer VMs

LUN0 for Tiles 0,4,8,12,16,20,24

LUN1 for Tiles 1,5,9,13,17,21

LUN2 for Tiles 2,6,10,14,18,22

LUN3 for Tiles 3,7,11,15,19,23

## Virtualization Software Notes

- Hardware support for both CPU and MMU virtualization enabled on all VMs (default automatic)
- All VM's hardware upgraded to version 7
- Ethernet adapter type upgraded to VMXNET3 for all VM's
- Logging was disabled for all VMs
- IDE and Floppy devices were removed on all VMs(default enabled)
- iptables and firewall services were disabled at boot
- BufferCache.SoftMaxDirty = "85" (default 15)
- CPU.HaltingIdleMsecPenalty = "0" (default 100)
- CPU.Quantum=70 (default 50)
- Disk.SchedNumReqOutstanding set to 256 (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)
- Net.EtherswitchHashSize = "4" (default 1)
- Numa.PageMigEnable = "0" (default 1)
- VMFS3.MaxHeapSizeMB = "64" (default 80)
- JavaServer VMs use jrockit-R27.5.0-jdk1.5.0\_15
- All mailserv data partitions have been expanded

## Operating System Notes

- Microsoft Windows Server 2003 virtual machines were updated to Service Pack 2, and KB951072-v2 was applied
- SUSE Linux Enterprise Server 10 virtual machines were updated to Service Pack 2

## Software Notes

- None

## Client Notes

- KB951072-v2 was applied to all clients and overwrites KB933360

## Other Notes

- VMmark Config
  - TILEDELAY=120 (Default="600")
  - MailServer/DELAYTIME="15" (Default="5")
  - JavaServer/DELAYTIME="10" (Default="540")
  - Standby/DELAYTIME="0" (Default="170")
  - WebServer/DELAYTIME="25" (Default="180")
  - Database/DELAYTIME="20" (Default="360")
  - FileServer/DELAYTIME="0" (Default="450")

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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.

For information about VMmark and the rules regarding its usage visit [www.vmware.com/products/vmmark](http://www.vmware.com/products/vmmark).

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