

# VMware® VMmark™ V1.1 Results

**Vendor and Hardware Platform: HP ProLiant DL785 G5**  
**Virtualization Platform: VMware ESX 4.0 (Build 154785)**

**VMmark V1.1 Score =**  
**31.56 @ 21 Tiles**

**Tested By: Hewlett-Packard**

**Test Date: 04/23/2009**

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## Performance

	webservers		javaserver		mailserver		fileservers		database		
<b>TILE_0</b>	Actual	Ratio	Actual	Ratio	Actual	Ratio	Actual	Ratio	Actual	Ratio	GM
<b>p0</b>	2059.93	2.02	18000.70	1.08	1793.55	1.64	19.62	1.53	2334.22	1.56	1.54
<b>p1</b>	2063.12	2.02	18028.80	1.09	1863.62	1.70	18.17	1.42	2357.65	1.58	1.53
<b>p2</b>	2060.95	2.02	18064.83	1.09	1813.25	1.65	18.54	1.44	2376.45	1.59	1.53
<b>TILE_1</b>	Actual	Ratio	Actual	Ratio	Actual	Ratio	Actual	Ratio	Actual	Ratio	GM
<b>p0</b>	2033.47	2.00	17975.92	1.08	1793.03	1.63	19.67	1.53	2349.90	1.57	1.53
<b>p1</b>	2029.10	1.99	18008.92	1.08	1795.88	1.64	18.59	1.45	2301.53	1.54	1.51
<b>p2</b>	2034.30	2.00	18036.20	1.09	1740.10	1.59	18.29	1.43	2305.75	1.55	1.50
<b>TILE_2</b>	Actual	Ratio	Actual	Ratio	Actual	Ratio	Actual	Ratio	Actual	Ratio	GM
<b>p0</b>	1962.00	1.93	17581.62	1.06	1797.53	1.64	19.69	1.53	2376.88	1.59	1.52
<b>p1</b>	1875.85	1.84	17995.62	1.08	1942.92	1.77	19.59	1.53	2384.80	1.60	1.54
<b>p2</b>	1869.88	1.84	18061.58	1.09	2039.25	1.86	19.32	1.51	2389.93	1.60	1.55
<b>TILE_3</b>	Actual	Ratio	Actual	Ratio	Actual	Ratio	Actual	Ratio	Actual	Ratio	GM
<b>p0</b>	2017.88	1.98	18027.95	1.09	1965.58	1.79	20.11	1.57	2257.62	1.51	1.56
<b>p1</b>	2014.78	1.98	17989.72	1.08	1757.78	1.60	19.93	1.55	2311.57	1.55	1.53
<b>p2</b>	2018.50	1.98	18056.78	1.09	1764.83	1.61	20.34	1.59	2311.40	1.55	1.53
<b>TILE_4</b>	Actual	Ratio	Actual	Ratio	Actual	Ratio	Actual	Ratio	Actual	Ratio	GM
<b>p0</b>	2037.05	2.00	17437.45	1.05	1867.70	1.70	18.50	1.44	2400.32	1.61	1.53
<b>p1</b>	2025.28	1.99	17907.50	1.08	1855.45	1.69	18.44	1.44	2401.47	1.61	1.53
<b>p2</b>	2026.80	1.99	17926.30	1.08	1777.80	1.62	18.37	1.43	2396.78	1.61	1.52
<b>TILE_5</b>	Actual	Ratio	Actual	Ratio	Actual	Ratio	Actual	Ratio	Actual	Ratio	GM
<b>p0</b>	2004.78	1.97	18029.00	1.09	1797.35	1.64	19.38	1.51	2315.45	1.55	1.52
<b>p1</b>	2001.88	1.96	17625.70	1.06	1950.05	1.78	19.22	1.50	2289.20	1.53	1.53
<b>p2</b>	2008.72	1.97	18043.80	1.09	1867.80	1.70	19.26	1.50	2275.97	1.53	1.53
<b>TILE_6</b>	Actual	Ratio	Actual	Ratio	Actual	Ratio	Actual	Ratio	Actual	Ratio	GM
<b>p0</b>	2043.92	2.01	18046.05	1.09	1813.55	1.65	18.39	1.43	2251.90	1.51	1.51
<b>p1</b>	2055.70	2.02	18062.67	1.09	1836.05	1.67	18.34	1.43	2306.97	1.55	1.52

<b>p2</b>	2061.35	2.02	18057.60	1.09	1883.30	1.72	18.30	1.43	2307.38	1.55	1.53
<b>TILE_7</b>	Actual	Ratio	Actual	Ratio	Actual	Ratio	Actual	Ratio	Actual	Ratio	GM
<b>p0</b>	1959.28	1.92	18017.92	1.08	1807.75	1.65	20.07	1.56	2385.65	1.60	1.54
<b>p1</b>	1937.62	1.90	17565.15	1.06	2055.75	1.87	19.43	1.51	2381.93	1.60	1.56
<b>p2</b>	1952.38	1.92	18035.67	1.09	1917.08	1.75	17.80	1.39	2381.55	1.60	1.52
<b>TILE_8</b>	Actual	Ratio	Actual	Ratio	Actual	Ratio	Actual	Ratio	Actual	Ratio	GM
<b>p0</b>	2048.78	2.01	17993.67	1.08	1697.75	1.55	18.16	1.42	2302.18	1.54	1.49
<b>p1</b>	2045.03	2.01	17562.88	1.06	1745.17	1.59	18.24	1.42	2277.62	1.53	1.49
<b>p2</b>	2067.60	2.03	18027.20	1.09	1825.72	1.66	18.19	1.42	2262.75	1.52	1.51
<b>TILE_9</b>	Actual	Ratio	Actual	Ratio	Actual	Ratio	Actual	Ratio	Actual	Ratio	GM
<b>p0</b>	1969.33	1.93	17946.92	1.08	1796.65	1.64	19.65	1.53	2360.88	1.58	1.53
<b>p1</b>	1989.95	1.95	17974.30	1.08	1704.12	1.55	19.57	1.53	2363.70	1.58	1.51
<b>p2</b>	1992.03	1.95	17537.80	1.06	1836.42	1.67	19.40	1.51	2361.82	1.58	1.53
<b>TILE_10</b>	Actual	Ratio	Actual	Ratio	Actual	Ratio	Actual	Ratio	Actual	Ratio	GM
<b>p0</b>	2004.17	1.97	17845.50	1.07	1722.83	1.57	18.93	1.48	2311.65	1.55	1.50
<b>p1</b>	2001.78	1.96	17427.33	1.05	1767.22	1.61	17.15	1.34	2284.70	1.53	1.47
<b>p2</b>	2007.17	1.97	17881.10	1.08	1857.90	1.69	17.90	1.40	2266.43	1.52	1.50
<b>TILE_11</b>	Actual	Ratio	Actual	Ratio	Actual	Ratio	Actual	Ratio	Actual	Ratio	GM
<b>p0</b>	1939.22	1.90	17936.30	1.08	1589.58	1.45	17.79	1.39	2261.57	1.52	1.44
<b>p1</b>	1894.30	1.86	17916.85	1.08	1765.17	1.61	17.73	1.38	2319.07	1.55	1.47
<b>p2</b>	1851.42	1.82	17901.35	1.08	1815.55	1.66	17.13	1.34	2317.93	1.55	1.46
<b>TILE_12</b>	Actual	Ratio	Actual	Ratio	Actual	Ratio	Actual	Ratio	Actual	Ratio	GM
<b>p0</b>	1886.22	1.85	18038.62	1.09	1657.03	1.51	17.73	1.38	2390.72	1.60	1.46
<b>p1</b>	1897.83	1.86	17583.97	1.06	1778.05	1.62	17.66	1.38	2396.12	1.61	1.48
<b>p2</b>	1954.08	1.92	18054.67	1.09	1760.90	1.61	17.24	1.34	2400.15	1.61	1.49
<b>TILE_13</b>	Actual	Ratio	Actual	Ratio	Actual	Ratio	Actual	Ratio	Actual	Ratio	GM
<b>p0</b>	1989.53	1.95	18040.60	1.09	1622.40	1.48	18.11	1.41	2358.95	1.58	1.48
<b>p1</b>	1999.78	1.96	17552.38	1.06	1709.83	1.56	17.56	1.37	2381.50	1.60	1.48
<b>p2</b>	2005.12	1.97	18033.15	1.09	1852.55	1.69	18.17	1.42	2397.62	1.61	1.52
<b>TILE_14</b>	Actual	Ratio	Actual	Ratio	Actual	Ratio	Actual	Ratio	Actual	Ratio	GM
<b>p0</b>	1989.83	1.95	17917.30	1.08	1670.92	1.52	19.15	1.49	2367.57	1.59	1.50
<b>p1</b>	1994.30	1.96	17919.22	1.08	1700.75	1.55	19.10	1.49	2319.32	1.55	1.50
<b>p2</b>	2000.58	1.96	17924.95	1.08	1796.15	1.64	17.37	1.35	2326.60	1.56	1.49
<b>TILE_15</b>	Actual	Ratio	Actual	Ratio	Actual	Ratio	Actual	Ratio	Actual	Ratio	GM
<b>p0</b>	2032.20	1.99	17879.12	1.08	1608.12	1.47	18.52	1.44	2355.70	1.58	1.48
<b>p1</b>	2025.67	1.99	17933.75	1.08	1663.53	1.52	18.52	1.44	2361.50	1.58	1.49
<b>p2</b>	2023.17	1.99	17929.58	1.08	1758.22	1.60	18.49	1.44	2364.78	1.58	1.51
<b>TILE_16</b>	Actual	Ratio	Actual	Ratio	Actual	Ratio	Actual	Ratio	Actual	Ratio	GM
<b>p0</b>	2004.62	1.97	17789.47	1.07	1563.05	1.43	19.30	1.50	2340.60	1.57	1.48
<b>p1</b>	1999.47	1.96	17921.22	1.08	1670.67	1.52	19.20	1.50	2360.38	1.58	1.50

<b>p2</b>	2006.53	1.97	17930.08	1.08	1633.20	1.49	18.96	1.48	2381.68	1.60	1.49
<b>TILE_17</b>	Actual	Ratio	Actual	Ratio	Actual	Ratio	Actual	Ratio	Actual	Ratio	GM
<b>p0</b>	2050.50	2.01	18053.75	1.09	1488.35	1.36	18.58	1.45	2363.60	1.58	1.47
<b>p1</b>	2065.38	2.03	18050.97	1.09	1596.90	1.46	18.54	1.44	2368.15	1.59	1.49
<b>p2</b>	2070.03	2.03	18024.50	1.08	1709.40	1.56	18.60	1.45	2370.90	1.59	1.51
<b>TILE_18</b>	Actual	Ratio	Actual	Ratio	Actual	Ratio	Actual	Ratio	Actual	Ratio	GM
<b>p0</b>	2052.80	2.01	17837.55	1.07	1377.28	1.26	17.45	1.36	2400.40	1.61	1.43
<b>p1</b>	2062.10	2.02	17426.65	1.05	1644.55	1.50	18.29	1.43	2401.55	1.61	1.49
<b>p2</b>	2066.82	2.03	17874.00	1.08	1778.70	1.62	17.69	1.38	2399.80	1.61	1.51
<b>TILE_19</b>	Actual	Ratio	Actual	Ratio	Actual	Ratio	Actual	Ratio	Actual	Ratio	GM
<b>p0</b>	2007.12	1.97	17813.97	1.07	1272.12	1.16	18.50	1.44	2347.97	1.57	1.41
<b>p1</b>	2018.12	1.98	17872.12	1.08	1529.38	1.39	19.25	1.50	2353.05	1.58	1.48
<b>p2</b>	2015.78	1.98	17918.60	1.08	1667.95	1.52	19.65	1.53	2356.57	1.58	1.51
<b>TILE_20</b>	Actual	Ratio	Actual	Ratio	Actual	Ratio	Actual	Ratio	Actual	Ratio	GM
<b>p0</b>	2051.62	2.01	18030.53	1.09	1247.30	1.14	18.59	1.45	2369.20	1.59	1.42
<b>p1</b>	2063.20	2.02	18007.08	1.08	1478.92	1.35	18.52	1.44	2369.03	1.59	1.47
<b>p2</b>	2064.70	2.03	18025.70	1.08	1620.78	1.48	18.66	1.45	2368.93	1.59	1.50
<b>p0_score:</b>	31.33										
<b>p1_score:</b>	31.56										
<b>p2_score:</b>	31.74										
<b>Unreviewed_VMmark_Score:</b>	31.56										

## Configuration

<b>Server and Network</b>	
Server Manufacturer and Model	HP ProLiant DL785 G5
Processor Vendor and Model	Quad-Core AMD Opteron™ 8393SE
Processor Speed (GHz)	3.1 GHz
Number of Sockets/Cores per Socket	8 Sockets / 4 Cores per Socket (32 Cores Total)
Primary Cache	64 KB I + 64 KB D on chip per core
Secondary Cache	512 KB I+D on chip per core
Other Cache	6 MB I+D L3 on chip per chip
Memory	256 GB (32 x 8 GB) PC2-5300 667MHz Registered ECC DDR2 DIMM
Disk Subsystem Type	SAS (OS), FC SAN (VMs)
Number of Disk Controllers	1
Number of Host Bus Adapters	4

Host Bus Adapter Vendors and Models	HP Storage Works FC1242SR Dual Channel 4 Gb PCI-e HBA (Qlogic); onboard Smart Array P400i
Number of Network Controllers	4
Network Controller Vendors and Models	HP NC364T PCI Express Quad Port Gigabit Server Adapter onboard 2 x NetXtremeII 5706 Gigabit Ethernet
Network Switch Vendors and Models	HP ProCurve 3500yl-48G-PWR Switch
Network Speed	Gigabit Ethernet TX
Other Hardware	None
Other Software	None
Hardware Availability Date	5/28/2009
Software Availability Date	5/21/2009

#### Virtualization Software

Vendor, Product, Version, and Build	VMware ESX 4.0 Build 154785
Virtualization Type	Hardware Virtualization
Supplemental Software	None
Virtualization Software Availability Date	May 21, 2009

#### Storage

Array Vendor, Model, and Firmware Version	2 HP StorageWorks 4400 Enterprise Virtual Array, Firmware Revision 09006000
Fibre Channel Switch Vendors and Models	None
Disk Space Used	1446GB
Array Cache Size	2048MB per controller
Number and Size of LUNs	21 LUNs, each 200GB 21 LUNs, each 36GB
RAID Type	RAID0 (all LUNs)
Number of Members per RAID Set	48
Disk Vendor, Model, and Speed	HP StorageWorks 4Gb dual port FC EVA M6412 146GB 15K rpm

#### Clients

Number of Clients	21
System Model(s)	HP ProLiant DL360 G5
Processor Vendor(s) and Model(s)	Intel Xeon
Processor Speed(s) (GHz)	3.0 GHz
Number of Sockets/Cores per Socket	2 Sockets / 4 Cores per Socket (8 Cores Total)

Memory	4 GB
Network Controller Vendor and Model	HP NC373i Multifunction Gigabit Network Adapter
Operating System, Version, and Service Pack	Microsoft Windows Server 2003 Enterprise Edition SP2
Other Hardware	None
Other Software	None

## Notes for Workload

### SUT Notes

- The onboard controller contained 4 72GB/15K drives for OS with RAID 0/1
- Server BIOS settings:
  - Ultra Low Power State: disabled (default enabled)
  - Power Regulator: Static High Performance (default Dynamic Power Savings Mode)
  - CPU Prefetching disabled (default enabled)
  - Low Power Halt State: disabled (default enabled)
- Qlogic HBA BIOS settings:
  - Fibre Channel tape support disabled (default enabled)
  - Data rate option set to 3 (default 2)
  - Execution Throttle set to 256 (default 16)
  - Operation Mode set to 5 (default 0)
  - Interrupt Delay Timer set to 10 (default 0)
- Storage Configuration:
  - Each tile (except for database VM) was stored on its own LUN
  - Each database VM was stored on its own LUN
- vSwitch Configuration:
  - vSwitch0 attached to vmnic0 for the Service Console
  - vSwitch2 attached to vmnic2 for all VMs (except for webserver VMs) of tiles 0,1,2
  - vSwitch3 attached to vmnic3 for all VMs (except for webserver VMs) of tiles 3,4,5

- vSwitch6 attached to vmnic6 for all VMs (except for webserver VMs) of tiles 6,7,8
- vSwitch7 attached to vmnic7 for all VMs (except for webserver VMs) of tiles 9,10,11
- vSwitch10 attached to vmnic10 for all VMs (except for webserver VMs) of tiles 12,13,14
- vSwitch11 attached to vmnic11 for all VMs (except for webserver VMs) of tiles 15,16,17
- vSwitch14 attached to vmnic14 for all VMs (except for webserver VMs) of tiles 18,19,20
- vSwitch4 attached to vmnic4 for webserver VMs of tiles 0,1,2
- vSwitch5 attached to vmnic5 for webserver VMs of tiles 3,4,5
- vSwitch8 attached to vmnic8 for webserver VMs of tiles 6,7,8
- vSwitch9 attached to vmnic9 for webserver VMs of tiles 9,10,11
- vSwitch12 attached to vmnic12 for webserver VMs of tiles 12,13,14
- vSwitch13 attached to vmnic13 for webserver VMs of tiles 15,16,17
  
- vSwitch15 attached to vmnic15 for webserver VMs of tiles 18,19,20

## Virtualization Software Notes

- Unloaded VMFS2 prior to run
- Disabled IPtables processes and stopped firewall on the ESX host
- Disabled ESX logging on all VMs
- Used vmxnet3 and hardware version 7 for all VMs
- Enabled Virtualized MMU for all VMs (default Automatic)
- Removed IDE and floppy devices from all VMs
- EtherswitchHashSize = 4 (default 1)
- IRQ.RoutingPolicy = 0 (default 2)
- Disk.SchedNumReqOutstanding = 128 (default 32)
- BufferCache.SoftMaxDirty = 85 (default 15)

## Operating System Notes

- Microsoft Windows Server 2003 R2 Enterprise Edition Service Pack 2 on Windows-based VMs
  
- KB933360 was applied to Windows-based VMs
  
- SuSE Linux Enterprise Server 10 SP2 on Linux-based VMs

## Software Notes

### Client Notes

- Microsoft Windows Server 2003 R2 Enterprise Edition Service Pack 2
  
- TCP TOE chimney was disabled (default enabled)
  
- KB933360 was applied

## Other Notes

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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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