

## VMware®VMmark®V2.1.1 Results

Vendor and Hardware Platform: Fujitsu PRIMERGY RX200 S7  
 Virtualization Platform: VMware ESX 4.1.0 U2 Build 502767  
 VMware vCenter Server: VMware vCenter Server 4.1.0 build 258902

**VMmark V2.1.1 Score =  
10.82 @ 10 Tiles**

Number of Hosts: 2	Uniform Hosts [yes/no]: yes	Total sockets/core/threads in test: 4 Sockets / 32 Cores / 64 Threads
Tested By: Fujitsu		Test Date: 03-09-2012
Performance Section <a href="#">Performance</a>	Configuration Section <a href="#">Configuration</a>	Notes Section <a href="#">Notes for Workload</a>

### 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	330.05	1.00	84.00	4675.23	1.01	190.21	3613.85	1.64	83.30	2497.95	1.64	95.71	1784.15	1.69	100.15	1.36
p1	323.93	0.98	88.25	4644.98	1.00	209.30	3490.65	1.59	88.69	2522.30	1.66	99.58	1827.60	1.73	103.62	1.35
p2	325.10	0.98	94.00	4628.80	1.00	211.01	3407.80	1.55	93.54	2457.53	1.62	104.88	1843.20	1.74	110.29	1.34
TILE_1	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	GM
p0	324.85	0.98	84.00	4647.18	1.00	189.10	3534.50	1.61	86.90	2461.40	1.62	98.33	1759.75	1.66	102.47	1.34
p1	326.02	0.99	84.00	4653.98	1.00	190.24	3394.53	1.54	93.85	2540.32	1.67	104.73	1854.50	1.75	109.20	1.35
p2	324.40	0.98	89.75	4654.15	1.00	192.68	3420.78	1.56	92.80	2360.90	1.55	106.18	1758.22	1.66	111.16	1.32
TILE_2	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	GM
p0	324.00	0.98	99.50	4639.23	1.00	187.35	3360.95	1.53	98.10	2431.22	1.60	109.38	1713.67	1.62	118.57	1.31
p1	321.55	0.97	94.00	4647.00	1.00	210.32	3422.00	1.56	93.18	2467.50	1.62	104.39	1837.50	1.74	111.31	1.34
p2	327.12	0.99	94.00	4615.73	0.99	230.60	3350.07	1.52	96.62	2342.07	1.54	107.88	1643.80	1.55	115.76	1.29
TILE_3	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	GM
p0	328.23	0.99	84.25	4663.60	1.00	186.95	3355.43	1.53	96.32	2531.00	1.67	105.81	1816.67	1.72	113.14	1.34
p1	326.38	0.99	89.75	4625.02	1.00	211.97	3298.50	1.50	100.01	2293.32	1.51	112.43	1681.15	1.59	120.26	1.29
p2	328.43	0.99	94.00	4634.93	1.00	217.79	3282.80	1.49	100.30	2302.93	1.52	111.08	1614.00	1.53	118.99	1.28
TILE_4	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	GM
p0	323.60	0.98	126.75	4643.07	1.00	201.89	3613.32	1.64	83.07	2637.18	1.74	91.85	1949.75	1.84	99.65	1.39
p1	326.73	0.99	114.00	4646.30	1.00	201.92	3470.45	1.58	89.98	2455.65	1.62	99.31	1708.12	1.61	108.23	1.32
p2	329.02	1.00	114.00	4647.57	1.00	208.55	3368.12	1.53	95.50	2466.05	1.62	104.61	1740.38	1.64	113.44	1.32
TILE_5	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	GM
p0	325.82	0.99	95.47	4653.00	1.00	188.63	3539.20	1.61	85.94	2504.65	1.65	94.84	1764.95	1.67	102.06	1.34
p1	326.43	0.99	94.00	4633.77	1.00	228.67	3381.18	1.54	94.81	2376.47	1.56	105.21	1744.67	1.65	113.03	1.31

<b>p2</b>	327.32	0.99	94.00	4620.00	1.00	212.18	3408.10	1.55	92.45	2502.15	1.65	100.83	1854.15	1.75	109.10	1.35
<b>TILE_6</b>	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	GM
<b>p0</b>	329.12	1.00	96.00	4604.12	0.99	229.38	3297.22	1.50	100.52	2379.93	1.57	105.64	1746.97	1.65	114.53	1.31
<b>p1</b>	327.10	0.99	88.00	4597.32	0.99	262.07	3428.70	1.56	92.47	2498.82	1.65	101.91	1781.78	1.68	108.60	1.33
<b>p2</b>	328.50	0.99	84.00	4595.40	0.99	279.42	3374.57	1.53	95.55	2357.78	1.55	106.49	1731.05	1.64	114.28	1.31
<b>TILE_7</b>	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	GM
<b>p0</b>	324.32	0.98	79.88	4637.82	1.00	211.98	3418.82	1.55	92.84	2409.15	1.59	102.41	1770.62	1.67	109.43	1.32
<b>p1</b>	329.27	1.00	79.20	4592.30	0.99	245.20	3277.38	1.49	101.77	2350.47	1.55	114.23	1747.58	1.65	121.44	1.30
<b>p2</b>	326.70	0.99	84.00	4595.25	0.99	266.18	3282.57	1.49	100.64	2302.12	1.52	111.19	1609.35	1.52	119.99	1.28
<b>TILE_8</b>	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	GM
<b>p0</b>	327.00	0.99	81.50	4649.68	1.00	183.33	3441.90	1.57	94.19	2513.53	1.66	104.45	1873.38	1.77	112.05	1.35
<b>p1</b>	323.82	0.98	82.00	4630.65	1.00	209.15	3477.62	1.58	90.37	2421.95	1.59	101.53	1788.33	1.69	108.35	1.33
<b>p2</b>	323.57	0.98	84.00	4626.20	1.00	215.06	3409.97	1.55	93.49	2389.15	1.57	103.86	1671.10	1.58	112.39	1.30
<b>TILE_9</b>	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	GM
<b>p0</b>	323.68	0.98	84.00	4667.62	1.01	186.35	3474.75	1.58	89.81	2535.62	1.67	99.09	1896.92	1.79	105.07	1.36
<b>p1</b>	327.70	0.99	84.00	4650.65	1.00	194.13	3391.55	1.54	94.23	2399.97	1.58	103.33	1681.33	1.59	111.39	1.31
<b>p2</b>	327.07	0.99	91.50	4644.50	1.00	209.45	3351.38	1.52	96.68	2453.40	1.62	105.50	1741.30	1.65	113.02	1.32
<b>p0_score:</b>	13.42															
<b>p1_score:</b>	13.24															
<b>p2_score:</b>	13.10															

<b>Infrastructure_Operations_Scores:</b>	vmotion	svmotion	deploy
<b>Completed_Ops_PerHour</b>	16.00	10.00	5.00
<b>Avg_Seconds_To_Complete</b>	44.18	37.43	301.55
<b>Failures</b>	0.00	0.00	0.00
<b>Ratio</b>	1.00	1.11	1.25
<b>Number_Of_Threads</b>	1	1	1

<b>Summary</b>	Run_Is_Compliant	Number_Of_Compliance_Issues(0)*	Median_Phase(p1)
<b>Unreviewed_VMmark2_Applications_Score</b>	13.24		
<b>Unreviewed_VMmark2_Infrastructure_Score</b>	1.12		
<b>Unreviewed_VMmark2_Score</b>	10.82		

## Configuration

<b>Virtualization Software</b>
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Hypervisor Vendor, Product, Version, and Build / Availability Date (MM-DD-YYYY)	VMware ESX 4.1.0 U2 Build 502767 / 10-27-2011
Datacenter Management Software Vendor, Product, Version, and Build / Availability Date (MM-DD-YYYY)	VMware vCenter Server 4.1.0 Build 258902 / 07-13-2010
Supplemental Software	none
<b>Servers</b>	
Quantity	2
Server Manufacturer and Model	Fujitsu PRIMERGY RX200 S7
Processor Vendor and Model	Eight-core Intel Xeon E5-2690
Processor Speed (GHz)	2.90
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	20MB I+D on chip per chip L3
BIOS Version	V4.6.5.1 R0.99.20
Memory Size (in GB, Number of DIMMs)	256GB, 16
Memory Type and Speed	16GB DIMMs 2Rx4 L DDR3-1600 R ECC
Disk Subsystem Type	FC SAN
Number of Disk Controllers	1 (disabled)
Disk Controller Vendors and Models	Intel Patsburg SAS/SATA SCU
Number of Host Bus Adapters	1
Host Bus Adapter Vendors and Models	Dual-channel Emulex LPe12002
Number of Network Controllers	2
Network Controller Vendors and Models	Integrated Intel I350 Dual Port 1GbE Adapter, Fujitsu D2755 Dual Port 10GbE Adapter
Other Hardware	none
Other Software	none
Hardware Availability Date (MM-DD-YYYY)	07-01-2012
Software Availability Date (MM-DD-YYYY)	10-27-2011

<b>Network</b>	
Network Switch Vendors and Models	Fujitsu PRIMERGY BX600 GbE Switch Blade 30/12, CISCO 4900M
Network Speed	1Gbps for SUT management, Prime Client and VMotion, 10Gbps for remaining clients and all VMs
<b>Storage</b>	
Array Vendors, Models, and Firmware Versions	6xFujitsu ETERNUS DX80, Firmware version V10L20-0000 1xFujitsu ETERNUS DX80S2, Firmware version V10L16-0000
Fibre Channel Switch Vendors and Models	Brocade 5100
Disk Space Used	3352GB
Array Cache Size	2GB
Total Number of Physical Disks Used	118
Total Number of Enclosures/Pods/Shelves Used	12
Number of Physical Disks Used per Enclosure/Pod/Shelf	Details in section Storage Notes
Total Number of Storage Groups Used	8
Number of LUNs Used	29
LUN Size and Number of Disks Per LUN	Details in section Storage Notes
RAID Type	0
Number of Members per RAID Set	Details in section Storage Notes
Disk Vendors, Models, and Speeds	4xSeagate, ST3450856SS, 15krpm; 104xSeagate, ST3300656SS, 15krpm; 10xSTEC Zeus SSD, Z16IZF2D-100UCT-FUJ
<b>Datacenter Management Server</b>	
System Model	Fujitsu PRIMERGY BX620S4
Processor Vendor and Model	Intel Xeon X5470
Processor Speed (GHz)	3.33
Total Sockets/Total Cores/Total Threads	2 Sockets / 4 Cores / 8 Threads
Memory	4GB
Network Controller(s) Vendors and Models	3xDual Port Broadcom NetXtreme, 5 Ports disabled
Operating System, Version, and Service Pack	Microsoft(R) Windows(R) Server 2003 R2 Enterprise x64 Edition, SP2
Other Hardware	none
Other Software	none

<b>Clients</b>	
Number of Clients	1 physical client (Prime Client) used as a dedicated Benchmark Controller 1 physical client (ESX server) used for 10 virtual clients
System Model(s)	Prime Client: Fujitsu PRIMERGY BX620S4 ESX server : Fujitsu PRIMERGY RX600S6
Processor Vendor(s) and Model(s)	Prime Client: Intel Xeon X5470 ESX server : Intel Xeon E7-4870
Processor Speed(s) (GHz)	Prime Client: 3.33 ESX server : 2.4
Total Sockets/Total Cores/Total Threads	Prime Client: 2 Sockets / 4 Cores / 4 Threads ESX server : 4 Sockets / 40 Cores / 80 Threads
Memory per Client	Prime Client: 4 GB ESX server : 512 GB
Network Controller(s) Vendors and Models	Prime Client: 3xDual Port Broadcom NetXtreme, 4 Ports disabled ESX server : 2xDual Port Broadcom NetXtreme, 3 Ports unused, Fujitsu D2755 Dual Port 10GbE Adapter
Operating System, Version, and Service Pack	Prime Client : Microsoft(R) Windows(R) Server 2003 R2 Enterprise Edition (32-bit), SP2 ESX server : ESX 4.1.0 U2 Build 502767 Virtual clients: Microsoft(R) Windows(R) Server 2008 Enterprise Edition (64-bit), SP2
Other Hardware	ESX server: 1xDual-channel Emulex LPe12002, 1xFujitsu ETERNUS DX80 with 24x300GB disks
Other Software	none

## Notes for Workload

### Virtualization Software Notes

- Floppy and CDROM removed for all VMs (default enabled)
- Firewall disabled for the Console OS (default enabled)
- Hardware version 7 used for all VMs (default 7)
- Logging disabled for all VMs (default enabled)
- Logical CPU layout changed for all VMs (except Standby and Mailservers) to one socket with multiple cores (default: multiple sockets with one core per socket)
- SCSI adapter type PVSCSI used for all Standby VMs (default LSI Logic parallel)
- SCSI adapter type PVSCSI used for all Mailserver VMs (default LSI Logic SAS)
- VMXNET3 enabled for all VMs (default VMXNET2)
- Changes in esx.conf:
  - /adv/Cpu/CoschedCrossCall = 0 (default 1)
  - /adv/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/NetTxCompletionWorldlet = 0 (default 1)
  - /adv/Net/NetTxWorldlet = 0 (default 2)

/adv/Numa/AutoSplitVM = 0 (default 1)  
/adv/Numa/LTermFairnessInterval = 0 (default 5)  
/adv/Numa/PageMigEnable = 0 (default 1)  
/adv/Numa/SwapLoadEnable = 0 (default 1)  
/adv/Numa/SwapLocalityEnable = 0 (default 1)  
/vmkernel/module/ixgbe.o/options = "VMDQ=2,2" (defaults 8,8)  
/vmkernel/module/lpfc820.o/options = "lpfc\_lun\_queue\_depth=64 lpfc\_cr\_count=5 lpfc\_cr\_delay=1" (defaults 31,1,0)

## Server Notes

- Server BIOS settings:
  - Adjacent Cache Line Prefetch: Disabled (default enabled)
  - Energy Performance: Performance (default Energy Efficient)
  - Hardware Prefetcher: Disabled (default enabled)
  - Onboard SAS/SATA SCU: Disabled (default enabled)
  - Serial 1: Disabled (default enabled)
  - Turbo Boost Technology: Enabled (Intel Turbo Boost up to 3.8GHz, default enabled)
- Emulex HBA BIOS settings:
  - defaults

## Networking Notes

- One dedicated VLAN for the systems under test, vCenter Server and Benchmark Controller (SUT-VLAN)
- One dedicated VLAN for the VMs and Clients (Load-VLAN)
- vSwitch Configuration:
  - vSwitch0 on vmnic0 for Service Console (1Gb)
  - vSwitch1 on vmnic1 for VMotion (1Gb)
  - vSwitch2 on vmnic2 (10Gb) for all Olio VMs and Deploy VM
  - vSwitch3 on vmnic3 (10Gb) for all other VMs

## Storage Notes

- ETERNUS DX80[1] (1 shelf, total 4 disks)
  - RAID set 0: (4 disks)
    - LUN 0: Boot/Console OS for SUT1 (11GB)
    - LUN 1: Boot/Console OS for SUT2 (11GB)
- ETERNUS DX80[2] (2 shelves, total 24 disks)
  - RAID set 0: (6 disks)
    - LUN 1: All even numbered Standby VMs (110GB)
    - LUN 2: All odd numbered Standby VMs (110GB)
  - RAID set 1: (6 disks)
    - LUN 3: Source Deploy Template (50GB)
  - RAID set 2: (6 disks)
    - LUN 4: Target Storage VMotion (50GB)
  - RAID set 3: (6 disks)
    - LUN 5: Target Deploy Template (50GB)
- ETERNUS DX80[3] (2 shelves, total 24 disks)

- RAID set 0: (8 disks)
  - LUN 1: For Tile 0 DS2WebA, DS2WebB, DS2WebC, Mailserver, OlioWeb and first VHD from DS2DB (240GB)
  - LUN 2: For Tile 0 OlioDB (20GB)
- RAID set 1: (8 disks)
  - LUN 3: For Tile 2 DS2WebA, DS2WebB, DS2WebC, Mailserver, OlioWeb and first VHD from DS2DB (240GB)
  - LUN 4: For Tile 2 OlioDB (20GB)
- RAID set 2: (8 disks)
  - LUN 5: For Tile 4 DS2WebA, DS2WebB, DS2WebC, Mailserver, OlioWeb and first VHD from DS2DB (240GB)
  - LUN 6: For Tile 4 OlioDB (20GB)
- ETERNUS DX80[4] (2 shelves, total 24 disks)
  - RAID set 0: (8 disks)
    - LUN 1: For Tile 1 DS2WebA, DS2WebB, DS2WebC, Mailserver, OlioWeb and first VHD from DS2DB (240GB)
    - LUN 2: For Tile 1 OlioDB (20GB)
  - RAID set 1: (8 disks)
    - LUN 3: For Tile 3 DS2WebA, DS2WebB, DS2WebC, Mailserver, OlioWeb and first VHD from DS2DB (240GB)
    - LUN 4: For Tile 3 OlioDB (20GB)
  - RAID set 2: (8 disks)
    - LUN 5: For Tile 5 DS2WebA, DS2WebB, DS2WebC, Mailserver, OlioWeb and first VHD from DS2DB (240GB)
    - LUN 6: For Tile 5 OlioDB (20GB)
- ETERNUS DX80[5] (2 shelves, total 16 disks)
  - RAID set 0: (8 disks)
    - LUN 1: For Tile 6 DS2WebA, DS2WebB, DS2WebC, Mailserver, OlioWeb and first VHD from DS2DB (240GB)
    - LUN 2: For Tile 6 OlioDB (20GB)
  - RAID set 1: (8 disks)
    - LUN 3: For Tile 8 DS2WebA, DS2WebB, DS2WebC, Mailserver, OlioWeb and first VHD from DS2DB (240GB)
    - LUN 4: For Tile 8 OlioDB (20GB)
- ETERNUS DX80[6] (2 shelves, total 16 disks)
  - RAID set 0: (8 disks)
    - LUN 1: For Tile 7 DS2WebA, DS2WebB, DS2WebC, Mailserver, OlioWeb and first VHD from DS2DB (240GB)
    - LUN 2: For Tile 7 OlioDB (20GB)
  - RAID set 1: (8 disks)
    - LUN 3: For Tile 9 DS2WebA, DS2WebB, DS2WebC, Mailserver, OlioWeb and first VHD from DS2DB (240GB)
    - LUN 4: For Tile 9 OlioDB (20GB)
- ETERNUS DX80[7] (1 shelf, total 10 SSDs)
  - RAID set 0: (5 SSDs)
    - LUN 1: Second VHD for all even numbered DS2DBs (180GB)
  - RAID set 1: (5 SSDs)
    - LUN 2: Second VHD for all odd numbered DS2DBs (180GB)

## Datacenter Management Server Notes

None

## Operating System Notes

Mailserver VMs: Microsoft Windows 2008 R2 Enterprise 64-bit.

## Software Notes

Mailserver VMs: Microsoft Exchange 2007 Enterprise x64 Edition updated with SP3.

## Client Notes

Prime Client was running VMware vSphere PowerCLI 4.1 build 264274.

All client drivers were run on virtual machines that were each defined with 4 virtual cpus, 4GB of memory, 1 vmxnet3 network, and 32GB of disk space.

## Other Notes

One Client used as a dedicated Benchmark Controller. This system was connected to the SUT- and the Load-VLAN.

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