

VMware® VMmark® V2.1.1 Results

Vendor and Hardware Platform: IBM Flex System x240 Compute Node
 Virtualization Platform: VMware ESXi 5 Build 474610
 VMware vCenter Server: VMware vCenter Server 5.0.0. Build 455964

**VMmark V2.1.1 Score =
10.29 @ 10 Tiles**

Number of Hosts: 2

Uniform Hosts [yes/no]: yes

Total sockets/core/threads in test: 4/32/64

Tested By: IBM

Test Date: 04-5-2012

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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	326.90	0.99	130.75	4690.60	1.01	164.64	2716.32	1.24	144.63	1849.50	1.22	162.12	1335.83	1.26	174.81	1.14
p1	327.43	0.99	120.00	4636.88	1.00	192.37	3112.05	1.42	111.69	2239.28	1.47	124.28	1585.30	1.50	133.28	1.25
p2	323.75	0.98	110.00	4678.00	1.01	175.75	3069.25	1.40	113.98	2215.25	1.46	126.32	1571.38	1.49	135.13	1.24
TILE_1	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	GM
p0	328.93	1.00	94.00	4673.32	1.01	169.26	3241.45	1.47	102.37	2356.22	1.55	114.55	1723.10	1.63	117.12	1.30
p1	321.18	0.97	94.00	4664.95	1.01	185.98	3152.90	1.43	107.45	2310.00	1.52	117.25	1676.47	1.58	121.14	1.28
p2	327.60	0.99	89.95	4647.00	1.00	196.86	3096.85	1.41	111.51	2247.43	1.48	122.98	1681.65	1.59	129.55	1.27
TILE_2	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	GM
p0	327.85	0.99	96.75	4634.27	1.00	228.49	2725.30	1.24	140.67	1879.72	1.24	156.20	1325.88	1.25	164.22	1.14
p1	327.00	0.99	94.00	4663.30	1.00	184.95	3077.32	1.40	112.66	2335.30	1.54	121.43	1689.92	1.60	128.47	1.28
p2	328.93	1.00	93.45	4669.10	1.01	191.40	3047.55	1.39	114.82	2167.78	1.43	123.51	1601.62	1.51	131.01	1.25
TILE_3	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	GM
p0	328.55	0.99	85.50	4649.18	1.00	178.28	3072.75	1.40	113.37	2295.00	1.51	126.79	1703.55	1.61	127.79	1.28
p1	323.12	0.98	83.53	4651.70	1.00	189.65	3063.70	1.39	115.05	2138.50	1.41	127.24	1576.80	1.49	134.81	1.23
p2	325.82	0.99	83.97	4661.52	1.00	178.07	3178.40	1.45	106.54	2322.50	1.53	115.80	1653.50	1.56	123.99	1.28
TILE_4	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	GM
p0	325.12	0.98	74.00	4619.60	1.00	216.31	3493.05	1.59	88.44	2532.05	1.67	100.06	1814.53	1.71	113.98	1.35
p1	324.25	0.98	85.75	4662.52	1.00	176.25	3180.35	1.45	107.02	2219.28	1.46	121.33	1563.55	1.48	127.98	1.25
p2	328.98	1.00	103.75	4668.48	1.01	190.73	3175.22	1.44	106.41	2304.00	1.52	118.49	1635.78	1.55	126.24	1.28
TILE_5	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	GM
p0	322.60	0.98	114.40	4693.32	1.01	163.60	3066.78	1.39	115.83	2091.22	1.38	136.24	1534.08	1.45	142.72	1.22
p1	329.77	1.00	104.00	4666.85	1.01	171.43	3065.85	1.39	114.55	2140.80	1.41	127.33	1508.75	1.43	135.05	1.23

p2	328.70	1.00	96.75	4662.93	1.00	186.85	3149.30	1.43	107.52	2377.00	1.57	117.71	1720.75	1.63	124.42	1.30
TILE_6	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	GM
p0	322.88	0.98	123.25	4693.50	1.01	165.09	2569.22	1.17	156.36	1801.33	1.19	168.67	1228.03	1.16	185.36	1.10
p1	327.05	0.99	109.00	4643.77	1.00	186.46	2852.90	1.30	130.69	2076.70	1.37	142.89	1474.30	1.39	151.70	1.20
p2	331.48	1.00	97.25	4656.48	1.00	186.50	2906.93	1.32	124.66	2143.18	1.41	133.70	1573.17	1.49	143.96	1.23
TILE_7	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	GM
p0	327.57	0.99	73.00	4667.43	1.01	167.18	3195.20	1.45	106.56	2305.07	1.52	111.08	1633.08	1.54	117.42	1.28
p1	327.40	0.99	73.75	4671.73	1.01	175.45	3125.07	1.42	110.28	2366.10	1.56	118.86	1714.40	1.62	125.40	1.29
p2	324.00	0.98	74.00	4660.50	1.00	187.16	3057.55	1.39	114.47	2157.53	1.42	124.39	1591.53	1.50	132.21	1.24
TILE_8	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	GM
p0	325.02	0.98	124.00	4650.68	1.00	189.77	3491.65	1.59	88.93	2554.53	1.68	97.79	1820.42	1.72	104.64	1.35
p1	324.85	0.98	107.25	4646.40	1.00	209.97	3147.95	1.43	109.37	2302.88	1.52	118.91	1714.28	1.62	126.48	1.28
p2	326.68	0.99	95.25	4635.60	1.00	210.18	3193.75	1.45	106.08	2219.22	1.46	118.91	1567.15	1.48	125.97	1.25
TILE_9	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	GM
p0	327.48	0.99	97.50	4658.30	1.00	180.58	3236.32	1.47	104.36	2364.47	1.56	114.54	1812.40	1.71	115.32	1.31
p1	328.77	1.00	93.17	4672.32	1.01	187.72	3185.05	1.45	105.80	2316.22	1.53	116.49	1611.03	1.52	120.50	1.28
p2	322.73	0.98	83.90	4664.27	1.00	183.07	3108.60	1.41	110.41	2186.50	1.44	121.79	1628.15	1.54	127.69	1.25
p0_score:	12.47															
p1_score:	12.57															
p2_score:	12.58															

Infrastructure_Operations_Scores:	vmotion	svmotion	deploy
Completed_Ops_PerHour	16.50	10.00	5.50
Avg_Seconds_To_Complete	19.37	26.74	254.29
Failures	0.00	0.00	0.00
Ratio	1.03	1.11	1.38
Number_Of_Threads	1	1	1

Summary	Run_Is_Compliant	Number_Of_Compliance_Issues(0)*	Median_Phase(p1)
Unreviewed_VMmark2_Applications_Score	12.57		
Unreviewed_VMmark2_Infrastructure_Score	1.16		
Unreviewed_VMmark2_Score	10.29		

Configuration

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Virtualization Software	
Hypervisor Vendor, Product, Version, and Build / Availability Date (MM-DD-YYYY)	VMware ESXi 5.0.0 Build 474610/12-13-2011
Datacenter Management Software Vendor, Product, Version, and Build / Availability Date (MM-DD-YYYY)	VMware vCenter Server 5.0.0. Build 455964/ 08-24-2011
Supplemental Software	None
Servers	
Quantity	2
Server Manufacturer and Model	IBM Flex System x240 Compute Node
Processor Vendor and Model	Intel Xeon E5-2690
Processor Speed (GHz)	2.9
Total Sockets/Total Cores/Total Threads	2 Sockets / 16 Cores / 32 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	20 MB I + D on chip per chip
BIOS Version	B2E111M
Memory Size (in GB, Number of DIMMs)	256 GB, 16 x 16 GB DIMMs
Memory Type and Speed	Dual rank PC3-12800 Registered DDR3 1600MHz
Disk Subsystem Type	FC SAN
Number of Disk Controllers	1
Disk Controller Vendors and Models	LSI 2004 SAS Controller (unused)
Number of Host Bus Adapters	1
Host Bus Adapter Vendors and Models	Qlogic 8Gb Dual Port Mezzanine Card
Number of Network Controllers	1
Network Controller Vendors and Models	Emulex BE3 Dual 10Gb Ethernet Controller (LOM model)
Other Hardware	None
Other Software	None
Hardware Availability Date (MM-DD-YYYY)	04-11-2012
Software Availability Date (MM-DD-YYYY)	08-24-2011
Network	
Network Switch Vendors and Models	1 x Cisco Catalyst 6506 Enhanced 6-slot chassis 2 x Cat6500 48-port GE Module WS-X6748-GE TX 1 x Cat6500 Series 4-port 10GE Module WS-X6704-10GE
Network Speed	10Gb for all VMs, VMotion and SUT management

Storage	
Array Vendors, Models, and Firmware Versions	2 x IBM System Storage DS5300, version 07.70.38.00 3 x IBM Storwize V7000 Midrange Disk System, version 6.2.0.2 (build 36.3.1107080000)
Fibre Channel Switch Vendors and Models	None
Disk Space Used	2.0TB
Array Cache Size	4GB for System Storage DS5300, 8GB for IBM Storwize V7000
Total Number of Physical Disks Used	160 plus 2 UBS keys
Total Number of Enclosures/Pods/Shelves Used	9
Number of Physical Disks Used per Enclosure/Pod/Shelf	Five enclosures with 16 each (16 x 300GB 15K disks) One enclosure with 8 each (8 x 300GB 15K disks) Three enclosures with 24 each (24 x 200GB SSD) Two 2GB USB keys used as ESXi 5 boot drives (one per each node)
Total Number of Storage Groups Used	2
Number of LUNs Used	33
LUN Size and Number of Disks Per LUN	1 LUN at 180GB (Deployment Template), set over 2 x 200GB SSD 1 LUN at 160GB (Deployment Target), set over 16 x 300GB 15K disks 1 LUN at 300GB (Standby VMs), set over 32 x 300GB 15K disks 1 LUN at 160GB (sVmotion Target), set over 32 x 300GB 15K disks 1 LUN at 400GB (OlioDB8), set over 8 x 300GB 15K disks 2 LUNs at 1000GB each (Mailserver_Odd for both C and F drives, Mailserver_Even for both C and F drives), set over 6 x 200GB SSD 2 LUNs at 500GB each (OlioWeb_Odd, OlioWeb_Even), set over 3 x 200GB SSDs 2 LUNs at 170GB each (OlioDb_Odd, OlioDb_Even except OlioDB8), set over 1 x 200GB SSDs 10 LUNs at 400GB each (DS2DB0-9), set over 5 x 200GB SSDs 10 LUNs at 400GB each (DS2WebA0-9, DS2WebB0-9, DS2WebC0-9), set over 16 x 300GB 15K disks 2 USB Keys (boot)
RAID Type	RAID 0
Number of Members per RAID Set	1 RAID 0 RAID set each over 2 x 200GB SSDs 1 RAID 0 RAID set each over 16 x 300GB 15K disks 1 RAID 0 RAID set each over 32 x 300GB 15K disks 1 RAID 0 RAID set each over 32 x 300GB 15K disks 1 RAID 0 RAID set each over 8 x 300GB 15K disks 2 RAID 0 RAID set each over 6 x 200GB SSD 2 RAID 0 RAID set each over 3 x 200GB SSD 2 RAID 0 RAID set each over 1 x 200GB SSD 10 RAID 0 RAID set each over 5 x 200GB SSD
Disk Vendors, Models, and Speeds	Seagate Technology Inc. ST3300657FC, 300GB, 15K RPM 200 GB 2.5-inch SSD (2076-124 Feature Code 3512)

Datacenter Management Server	
System Model	IBM System x3550 M2
Processor Vendor and Model	Intel Xeon E5520
Processor Speed (GHz)	2.27
Total Sockets/Total Cores/Total Threads	2 Sockets / 8 Cores / 16 Threads

Memory	32 GB
Network Controller(s) Vendors and Models	Onboard Broadcom BCM5709C NetXtreme II GigE Intel PRO/1000 PT Quad Port LP Server Adapter
Operating System, Version, and Service Pack	Microsoft Windows Server 2008 R2 Enterprise 64-bit
Other Hardware	None
Other Software	None

Clients	
Number of Clients	11 (1 Dedicated Prime client, 10 clients)
System Model(s)	IBM System x3550 M2
Processor Vendor(s) and Model(s)	Intel Xeon E5520
Processor Speed(s) (GHz)	2.27
Total Sockets/Total Cores/Total Threads	2 Sockets / 8 Cores / 16 Threads
Memory per Client	32 GB
Network Controller(s) Vendors and Models	Onboard Broadcom BCM5709C NetXtreme II GigE Intel PRO/1000 PT Quad Port LP Server Adapter
Operating System, Version, and Service Pack	Prime Client: Microsoft Windows Server 2003 Enterprise 32-bit, Service Pack 2 Clients: Microsoft Windows Server 2008 R2 Enterprise 64-bit
Other Hardware	None
Other Software	None

Notes for Workload

Virtualization Software Notes

- All VMs used virtual hardware V8
- Ethernet adapter type set to VMXNET 3 for all VMs (default VMXNET 2)
- Logging was disabled for all VMs (default enabled)
- Floppy and CDROM were removed for all VMs (default enabled)
- Firewall disabled for Console OS (default enabled)
- Cluster DRS Automation Level set to “Fully Automated”, Level 1 (“Aggressive”)

- /adv/Cpu/CoschCrossCall = "0" (default 1)
- /adv/CPU/HTWholeCoreThreshold= "0" (default 200)
- /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/intOpts/NetTxCompletionWorldlet 0 (default 1)
- /adv/Net/NetTxWorldlet = "0" (default 2)
- /adv/Net.vmnetThroughputWeight=255(default 0)
- /adv/Numa/LTermFairnessInterval = "0" (default 5)
- /adv/Numa/PageMigEnable = "0" (default 1)
- /adv/Numa,SwapLoadEnable=0 (default 1)
- /adv/Numa.SwapLocalityEnabled=0 (default1)
- /adv/Numa.PageMigRateMax=10 (default 1000)
- /adv/Numa.LTermFairnessInterval=0 (default 5)
- /vmkernel/iovDisableIR = "TRUE" (default FALSE)
- /adv/Disk/intOpts/SchedNumReqOutstanding 256 (default 32)
- /adv/Numa/intOpts/MonMigEnable 0 (default 1)
- /adv/Numa/intOpts/MigPreventLTermThresh 20 (default 0)
- /adv/Numa/intOpts/InitialPlacement 2 (default 0)
- /adv/Cpu/intOpts/HTStolenTolerance 90 (default 100)
- Enable Jumbo frame for Vmotion
- Disable /DataMover/HardwareAcceleratedMove (default enable)

- Disable /DataMover/HardwareAcceleratedInit (default enable)
- Disable /VMFS3/HardwareAcceleratedLocking (default enable)
- Disable /VMFS3/EnableBlockDelete (default enable)
- Change logging level for hostd, vpxa to "none" (default verbose)
- Change logging level for vpxd.log to "error" (default verbose)
- Remove IBM IMM Provider package (82.ibm-locker-config, 179.ibm-cronjob)
- Power Management settings for host to 'High Performance' (default Balanced)
- All Mailserver, OlioWeb, and OlioDB VMs on Paravirtual SCSI controller (default LSI SAS)
- Logical CPU layout changed for all VMs (except Standby) for one socket with multiple cores (default: multiple sockets with one core per socket)

Driver Options:

- update scsi-qla2xxx 911.k1.1-24OEM.500.0.0.472560 (default: 901.k1.1-14vmw.500.0.0.469512)
- update Emulex firmware 4.1.334.36, device driver 4.1.334.0-1OEM.500.0.0.472560
- esxcfg-module -s "qlport_down_retry=14 (default 30) ql2xmaxqdepth=256 (default 32) ql2xintrdelaytimer=3 (default 0) ql2xqfulltracking=0 (default 1)

Server Notes

- Processor Performance states: Disable (default Enable)
- Memory Power management: Disable (default Automatic)
- Patrol Scrub: Disable (default Enable)
- Memory Data Scrambling Disable (default Enable)
- Operating Mode: Max Performance (Default Custom Mode)
- Turbo Boost Technology: Enabled (Intel Turbo Boost up to 3.8GHz, default enabled)

Networking Notes

- vSwitch0 for Virtual Machine Ports for all VMs is connected to vmnic1 at 10Gb/s.
- vSwitch1 for Service Console Port and VMkernel ports is connected vmnic0 at 10Gb/s. Jumbo Frames was enabled for VMkernel Port.

Storage Notes

- ESXi 5 was installed on USB key

V7000-1:

- 1 LUN at 180GB (Deployment Template), set over 2 x 200GB SSD
- 4 LUNs at 400GB each (DS2DB6-9 tile), set over 5 x 200GB SSD
- 2 LUNs at 170GB each (OlioDB odd and even except OlioDB8), set over 1 x 200GB SSD

V7000-2:

- 1 LUN at 1000GB (Mailserver Even for both C drive and F drive), set over 6 x 200GB SSD
- 1 LUNs at 500GB (Olioweb even tile), set over 3 x 200GB SSD
- 3 LUNs at 400GB each (DS2DB0,2,4), set over 5 x 200GB SSD

V7000-3:

- 1 LUN at 1000GB (Mailserver Odd for both C drive and F drive), set over 6 x 200GB SSD
- 1 LUN at 500GB (Olioweb Odd tile), set over 3 x 200GB SSD
- 3 LUNs at 400GB each (DS2DB1,3,5), set over 5 x 200GB SSD

DS5300-1

- 1 LUN at 160GB (DeployTarget), set each over 16 x 300GB 15K disks

DS5300-2

- 1 LUN at 160GB (Standby/sVmotionSrc), set each over 32 x 300GB 15K disks
- 1 LUN at 160GB (sVmotionTarget), set each over 32 x 300GB 15K disks
- 1 LUN at 400GB (OlioDB8), set each over 8 x 300GB 15K disks

- Multipath policy: Round-robin (default Most Recently Used) for Mailserver_Odd, Mailserver_Even and Fixed (default Most Recently Used) for Other LUNs

Datacenter Management Server Notes

None

Operating System Notes

- All Standby VMs running Microsoft Windows Server 2003 Enterprise SP2 (32-bit)
- All Mailserver VMs running Microsoft Windows Server 2008 R2 Enterprise (64-bit)
- Storage Controller for all Exchange Database Virtual Disks set to Paravirtual
- The service "WinHTTP Web Proxy Auto-Discovery Service" was not running on Mailserver0, 2, 3, 5-9.s

Software Notes

None

Client Notes

- Prime client functionality was split from the client0 driver and was run on a non-virtualized copy of Microsoft® Windows® 2003 Enterprise SP2 (32-bit)
- Prime client running VMware vSphere PowerCLI 5.0 build 435427

Other Notes

HBA Qlogic Adapter

- Loop reset delay 8 (default 5)
- Port Down Retry Count 14 (default 30)
- Operation Mode 5 (default 0)
- Link down timeout 60 (default 30)
- Enable Target Reset No (default yes)
- Interrupt Delay Timer 10 (default 0)

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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