

## VMware®VMmark®V2.1.1 Results

Vendor and Hardware Platform: Fujitsu PRIMERGY BX924 S3  
 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 =  
10.94 @ 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: 02-29-2012
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
<b>p0</b>	325.70	0.99	85.90	4678.05	1.01	170.03	3495.53	1.59	88.76	2517.35	1.66	99.98	1741.22	1.65	104.79	1.34
<b>p1</b>	331.45	1.00	94.00	4643.35	1.00	194.89	3424.65	1.56	92.92	2392.78	1.58	104.02	1769.75	1.67	110.43	1.33
<b>p2</b>	328.80	1.00	94.25	4621.07	1.00	207.05	3327.15	1.51	99.25	2381.38	1.57	112.05	1790.10	1.69	117.76	1.32
<b>TILE_1</b>	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	GM
<b>p0</b>	327.10	0.99	83.50	4666.68	1.01	187.42	3598.38	1.64	83.29	2522.40	1.66	93.99	1806.35	1.71	97.67	1.36
<b>p1</b>	330.20	1.00	85.25	4667.60	1.01	195.53	3402.93	1.55	93.20	2560.10	1.69	102.91	1861.22	1.76	108.17	1.36
<b>p2</b>	330.57	1.00	94.00	4625.15	1.00	214.12	3438.88	1.56	91.82	2396.53	1.58	103.49	1778.50	1.68	108.74	1.33
<b>TILE_2</b>	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	GM
<b>p0</b>	327.93	0.99	94.00	4680.00	1.01	175.52	3490.55	1.59	89.05	2563.88	1.69	97.33	1819.20	1.72	104.84	1.36
<b>p1</b>	328.75	1.00	94.00	4645.70	1.00	203.07	3449.97	1.57	90.99	2510.20	1.65	100.66	1872.92	1.77	107.09	1.36
<b>p2</b>	325.95	0.99	94.00	4628.98	1.00	230.26	3381.38	1.54	95.18	2372.20	1.56	106.14	1652.28	1.56	115.34	1.30
<b>TILE_3</b>	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	GM
<b>p0</b>	325.20	0.98	97.00	4674.62	1.01	169.15	3479.70	1.58	90.31	2630.40	1.73	98.71	1904.78	1.80	105.17	1.37
<b>p1</b>	332.10	1.01	94.00	4652.57	1.00	193.59	3371.07	1.53	94.99	2393.40	1.58	103.44	1770.78	1.67	109.83	1.32
<b>p2</b>	324.73	0.98	94.00	4642.98	1.00	198.67	3378.65	1.54	95.07	2366.62	1.56	106.07	1658.88	1.57	114.11	1.30
<b>TILE_4</b>	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	GM
<b>p0</b>	321.07	0.97	95.25	4665.62	1.01	182.59	3504.70	1.59	87.91	2556.45	1.68	97.54	1834.12	1.73	103.32	1.35
<b>p1</b>	325.10	0.98	94.00	4651.62	1.00	200.80	3445.65	1.57	91.26	2433.28	1.60	100.45	1792.85	1.69	107.61	1.33
<b>p2</b>	328.60	1.00	94.00	4629.35	1.00	211.85	3343.18	1.52	98.10	2435.07	1.60	108.14	1714.92	1.62	117.35	1.31
<b>TILE_5</b>	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	GM
<b>p0</b>	325.75	0.99	183.95	4661.68	1.00	179.52	3614.35	1.64	82.64	2542.25	1.67	92.37	1796.10	1.70	98.99	1.36
<b>p1</b>	328.05	0.99	146.00	4639.57	1.00	189.93	3474.55	1.58	89.64	2457.93	1.62	98.50	1795.22	1.70	106.59	1.34

<b>p2</b>	328.62	1.00	134.00	4623.50	1.00	214.46	3432.97	1.56	91.70	2497.45	1.64	101.30	1876.78	1.77	106.78	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>	331.15	1.00	249.60	4656.95	1.00	201.65	3520.30	1.60	87.52	2463.28	1.62	98.17	1748.72	1.65	103.09	1.34
<b>p1</b>	332.15	1.01	164.65	4617.45	0.99	230.93	3462.65	1.57	90.71	2530.40	1.67	99.40	1869.90	1.77	107.87	1.36
<b>p2</b>	326.38	0.99	139.00	4540.98	0.98	339.55	3377.53	1.54	96.46	2343.05	1.54	108.79	1718.20	1.62	116.62	1.30
<b>TILE_7</b>	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	GM
<b>p0</b>	332.07	1.01	190.32	4633.32	1.00	183.29	3441.07	1.56	92.46	2453.18	1.62	100.25	1806.67	1.71	107.18	1.34
<b>p1</b>	333.35	1.01	134.00	4638.23	1.00	210.92	3417.93	1.55	93.12	2477.57	1.63	103.28	1840.15	1.74	110.44	1.35
<b>p2</b>	323.68	0.98	119.50	4621.35	1.00	224.97	3433.15	1.56	92.53	2400.40	1.58	103.38	1667.30	1.58	112.86	1.31
<b>TILE_8</b>	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	Actual	Ratio	QoS	GM
<b>p0</b>	324.48	0.98	94.40	4663.40	1.00	181.21	3493.60	1.59	88.15	2588.47	1.70	95.09	1935.33	1.83	100.81	1.37
<b>p1</b>	321.18	0.97	94.00	4674.68	1.01	183.53	3477.45	1.58	89.47	2448.05	1.61	99.27	1800.35	1.70	106.52	1.34
<b>p2</b>	328.88	1.00	94.00	4637.02	1.00	200.24	3349.35	1.52	97.18	2345.10	1.54	108.34	1660.42	1.57	114.99	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>	328.23	0.99	94.00	4671.48	1.01	184.75	3536.65	1.61	86.40	2620.55	1.73	92.84	1958.03	1.85	98.76	1.39
<b>p1</b>	328.15	0.99	94.00	4632.85	1.00	210.00	3450.70	1.57	91.54	2419.18	1.59	101.69	1695.50	1.60	109.63	1.32
<b>p2</b>	322.62	0.98	94.00	4640.75	1.00	201.47	3382.90	1.54	94.47	2477.38	1.63	103.46	1766.17	1.67	110.47	1.33
<b>p0_score:</b>	13.58															
<b>p1_score:</b>	13.40															
<b>p2_score:</b>	13.14															

<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>	41.29	36.38	296.54
<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>	13.40		
<b>Unreviewed_VMmark2_Infrastructure_Score</b>	1.12		
<b>Unreviewed_VMmark2_Score</b>	10.94		

## 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 BX924 S3
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 R0.99.21
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	PY FC Mezz. Card 8Gb 2 Port (MC-FC82E, LPe12000 based)
Number of Network Controllers	2
Network Controller Vendors and Models	Emulex 0C111102-LOM 2-p OneConnect 10Gb NIC (be3), PY Eth Mezz Card 1Gb 4 Port (Intel 82575EB)
Other Hardware	PY CB FC Pass Thru 8Gb 18/18
Other Software	vmware-esx-drivers-net-be2net_400.4.0.306.0-1vmw.2.17.249663
Hardware Availability Date (MM-DD-YYYY)	06-01-2012
Software Availability Date (MM-DD-YYYY)	10-27-2011

<b>Network</b>	
Network Switch Vendors and Models	1xFujitsu PRIMERGY BX600 GbE Switch Blade 30/12 2xFujitsu PRIMERGY BX900 CB Eth Switch/IBP 10Gb 18/8, 1xFujitsu PRIMERGY BX900 CB Eth Switch/IBP 1Gb 36/8+2, 1xCISCO 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	9xFujitsu ETERNUS DX80, Firmware version V10L20-0000 1xFujitsu ETERNUS DX80S2, Firmware version V10L16-0000
Fibre Channel Switch Vendors and Models	Brocade 5100
Disk Space Used	3722GB
Array Cache Size	2GB
Total Number of Physical Disks Used	180
Total Number of Enclosures/Pods/Shelves Used	18
Number of Physical Disks Used per Enclosure/Pod/Shelf	Details in section Storage Notes
Total Number of Storage Groups Used	11
Number of LUNs Used	48
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; 166xSeagate, 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 Mailserver) 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/MonMigEnable = 0 (default 1)  
/adv/Numa/PageMigEnable = 0 (default 1)  
/adv/Numa/SwapLoadEnable = 0 (default 1)  
/adv/Numa/SwapLocalityEnable = 0 (default 1)  
/vmkernel/module/lpfc820.o/options = "lpfc\_cr\_count=5 lpfc\_cr\_delay=1" (defaults 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 CNA adapter Personality: NIC (default FCoE)
  - Onboard CNA Oprom: 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)
- PY FC Mezz. Card 8Gb 2 Port (MC-FC82E) 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 vmnic2 for VMotion (1Gb)
  - vSwitch2 on vmnic4 (10Gb) for all Olio VMs and Deploy VM
  - vSwitch3 on vmnic5 (10Gb) for all other VMs

## Storage Notes

- ETERNUS DX80[0] (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[1] (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[2] (2 shelves, total 20 disks)
  - RAID set 0: (4 disks)
    - LUN 1: For Tile 0 DS2WebA, DS2WebB, DS2WebC, first VHD from Mailserver and first VHD from DS2DB (140GB)
    - LUN 2: For Tile 0 OlioDB (20GB)
  - RAID set 1: (4 disks)
    - LUN 3: For Tile 2 DS2WebA, DS2WebB, DS2WebC, first VHD from Mailserver and first VHD from DS2DB (140GB)
    - LUN 4: For Tile 2 OlioDB (20GB)
  - RAID set 2: (4 disks)
    - LUN 5: For Tile 4 DS2WebA, DS2WebB, DS2WebC, first VHD from Mailserver and first VHD from DS2DB (140GB)
    - LUN 6: For Tile 4 OlioDB (20GB)
  - RAID set 3: (4 disks)
    - LUN 7: For Tile 6 DS2WebA, DS2WebB, DS2WebC, first VHD from Mailserver and first VHD from DS2DB (140GB)
    - LUN 8: For Tile 6 OlioDB (20GB)
  - RAID set 4: (4 disks)
    - LUN 9: For Tile 8 DS2WebA, DS2WebB, DS2WebC, first VHD from Mailserver and first VHD from DS2DB (140GB)
    - LUN 10: For Tile 8 OlioDB (20GB)
  
- ETERNUS DX80[3] (2 shelves, total 20 disks)
  - RAID set 0: (4 disks)
    - LUN 1: For Tile 1 DS2WebA, DS2WebB, DS2WebC, first VHD from Mailserver and first VHD from DS2DB (140GB)
    - LUN 2: For Tile 1 OlioDB (20GB)
  - RAID set 1: (4 disks)
    - LUN 3: For Tile 3 DS2WebA, DS2WebB, DS2WebC, first VHD from Mailserver and first VHD from DS2DB (140GB)
    - LUN 4: For Tile 3 OlioDB (20GB)
  - RAID set 2: (4 disks)
    - LUN 5: For Tile 5 DS2WebA, DS2WebB, DS2WebC, first VHD from Mailserver and first VHD from DS2DB (140GB)
    - LUN 6: For Tile 5 OlioDB (20GB)
  - RAID set 3: (4 disks)
    - LUN 7: For Tile 7 DS2WebA, DS2WebB, DS2WebC, first VHD from Mailserver and first VHD from DS2DB (140GB)
    - LUN 8: For Tile 7 OlioDB (20GB)
  - RAID set 4: (4 disks)
    - LUN 9: For Tile 9 DS2WebA, DS2WebB, DS2WebC, first VHD from Mailserver and first VHD from DS2DB (140GB)
    - LUN 10: For Tile 9 OlioDB (20GB)
  
- ETERNUS DX80[4] (2 shelves, total 24 disks)
  - RAID set 0: (6 disks)
    - LUN 1: For Tile 0 second VHD from Mailserver (45GB)
  - RAID set 1: (6 disks)
    - LUN 2: For Tile 3 second VHD from Mailserver (45GB)
  - RAID set 2: (6 disks)
    - LUN 3: For Tile 6 second VHD from Mailserver (45GB)
  - RAID set 3: (6 disks)
    - LUN 4: For Tile 9 second VHD from Mailserver (45GB)
  
- ETERNUS DX80[5] (2 shelves, total 18 disks)
  - RAID set 0: (6 disks)
    - LUN 1: For Tile 1 second VHD from Mailserver (45GB)
  - RAID set 1: (6 disks)
    - LUN 2: For Tile 4 second VHD from Mailserver (45GB)

RAID set 2: (6 disks)

LUN 3: For Tile 7 second VHD from Mailserver (45GB)

- ETERNUS DX80[6] (2 shelves, total 18 disks)

RAID set 0: (6 disks)

LUN 1: For Tile 2 second VHD from Mailserver (45GB)

RAID set 1: (6 disks)

LUN 2: For Tile 5 second VHD from Mailserver (45GB)

RAID set 2: (6 disks)

LUN 3: For Tile 8 second VHD from Mailserver (45GB)

- ETERNUS DX80[7] (2 shelves, total 21 disks)

RAID set 0: (7 disks)

LUN 1: For Tile 0,6 OlioWeb (180GB)

RAID set 1: (7 disks)

LUN 2: For Tile 2,8 OlioWeb (180GB)

RAID set 2: (7 disks)

LUN 3: For Tile 4 OlioWeb (180GB)

- ETERNUS DX80[8] (2 shelves, total 21 disks)

RAID set 0: (7 disks)

LUN 1: For Tile 1,7 OlioWeb (180GB)

RAID set 1: (7 disks)

LUN 2: For Tile 3,9 OlioWeb (180GB)

RAID set 2: (7 disks)

LUN 3: For Tile 5 OlioWeb (180GB)

- ETERNUS DX80S2[9] (1 shelf, total 10 SSDs)

RAID set 0: (2 SSDs)

LUN 1: For Tile 0,2 second VHD from DS2DB (80GB)

RAID set 1: (2 SSDs)

LUN 2: For Tile 1,3 second VHD from DS2DB (80GB)

RAID set 2: (2 SSDs)

LUN 3: For Tile 4,6 second VHD from DS2DB (80GB)

RAID set 3: (2 SSDs)

LUN 4: For Tile 5,7 second VHD from DS2DB (80GB)

RAID set 4: (2 SSDs)

LUN 5: For Tile 8,9 second VHD from DS2DB (80GB)

## Datacenter Management Server Notes

None

## Operating System Notes

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

## Software Notes



Mailserv 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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