



VMware Horizon View 5.3 VDI Scalability Testing on Cisco UCS B200 M3 with E5-2697 v2 processor and Storage Accelerator

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Americas Headquarters

Cisco Systems, Inc.
170 West Tasman Drive
San Jose, CA 95134-1706
USA
<http://www.cisco.com>
Tel: 408 526-4000
800 553-NETS (6387)
Fax: 408 527-0883



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CHAPTER 1

VMWare VDI Scalability Testing on Cisco UCS B200 M3 Server With Storage Accelerator

- [Overview, page 1](#)

Overview

When deploying your virtual desktop solution, choosing server hardware that is powerful enough across the compute and memory dimensions to support a large number of virtual desktops is crucial. The more virtual desktops per server you can support, the fewer servers you need to buy to provide virtual desktops to support your desired number of users.

To find the virtual desktop capacity of a single Cisco UCS B200 M3 Server, we used the Login Consultants Virtual Session Indexer (Login VSI) 4.0.11 benchmark. The Login VSI workload we used performs a range of tasks to simulate a typical knowledge worker. The benchmark results show the maximum number of virtual desktops that a server can support by measuring response times throughout the test

We set out to examine such a virtual desktop solution that consisted of the following components:

- Cisco UCS B200M3 Blade Server with Intel(R) Xeon(R) E5-2697 v2 and powered with Cisco UCS Storage accelerator
- VMware vSphere 5.5.0
- A VMware Horizon View 5.3 virtual desktop linked clone pool consisting of Microsoft Windows 7 and Windows 8 x64 VMs
- All Virtual machines in the Desktop Pool are provisioned with 2 vCPU, 1.5 GB of reserved memory for Windows 7 and 2vCPU, 2 GB of reserved memory for Windows 8.
- NetApp FAS 3240 storage array

Acronyms

Acronym	Description
AD	Active Directory
DHCP	Dynamic Host Configuration Protocol

Acronym	Description
DNS	Domain Name System
FCOE	Fiber Channel Over Ethernet
LUN	Logical Unit Number
MLC	Multi Level Cell
OS	Operating System
SUT	Server Under Test
UCS	Unified Computing System
UCSM	Unified Computing System Manager
VDI	Virtual Desktop Infrastructure
VM	Virtual Machine
VSI	Virtual session Indexer



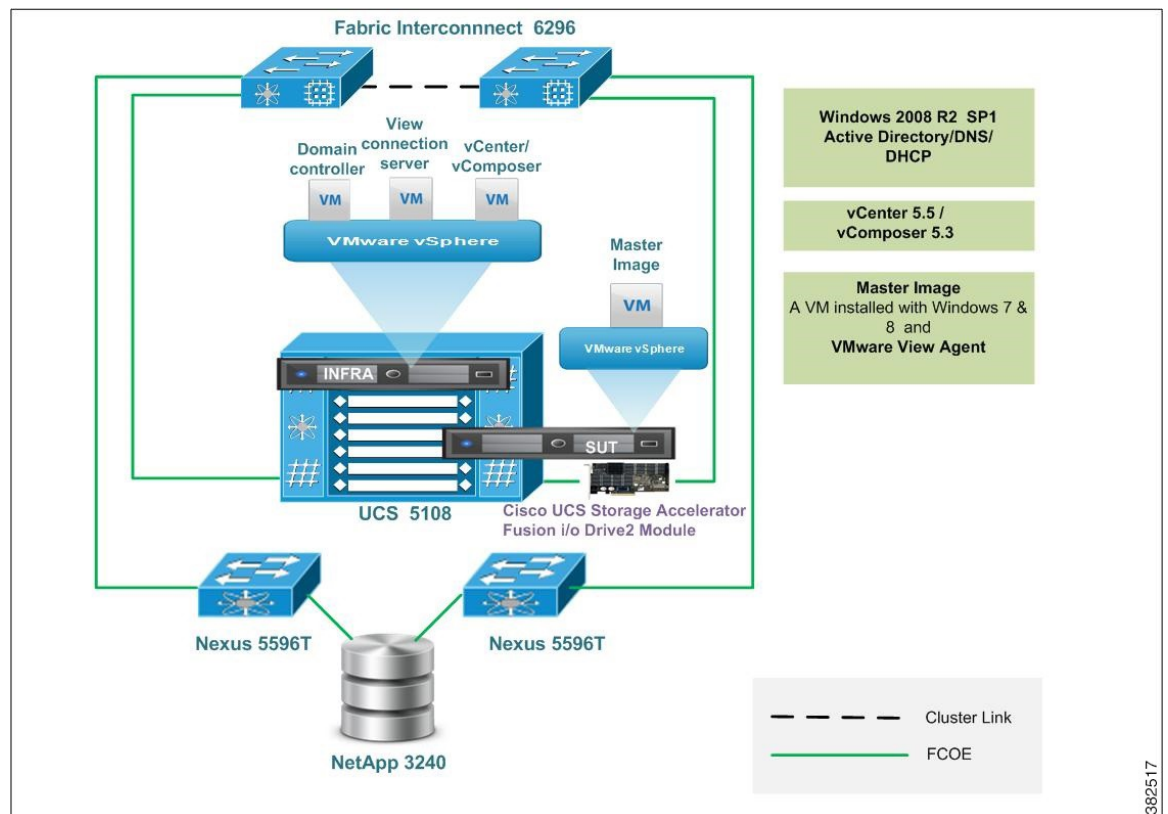
CHAPTER 2

Test Topology and Environment Matrix

- [Test Topology, page 3](#)
- [Environment Matrix, page 4](#)

Test Topology

Figure 1: Topology in Use



Environment Matrix

Infra Components

Component	Version
UCS Blade server	UCS B200 M3 (for SUT and Infra)
UCSM	2.2(1d)
Hypervisor	
ESXi	VMware ESXi 5.5.0 (1331820)
Operating System	
Windows Server OS	Windows Server 2008 R2 SP1 x64 (Japanese/English)
Windows Desktop OS	Windows 7 and 8 Enterprise x64 (Japanese/English)
Storage	
Cisco UCS Storage Accelerator (Cisco UCS 785-GB MLC Fusion-io ioDrive 2 Adapters)	7.1.15
NetApp FAS 3240	8.0.2
FCoE Switch	
Nexus 5596 T	6.0(2)N2(3)
Virtual Desktop Delivery Component	
VMware Horizon View	5.3
VDI Scalability measuring Tool	
Login VSI	4.0.11
Active Directory & DHCP	Windows 2008 R2 SP1 server x64 (Japanese/English)
Login VSI Launcher, Analyzer and VSI share	Windows 2008 R2 SP1 server x64 (Japanese/English)

SUT Components

Component	Type
CPUs	
Vendor	Intel® Corporation
Name	Intel(R) Xeon(R) E5-2697 v2
Core Frequency (GHz)	2.7
Platform	
Vendor	Cisco

Component	Type
BIOS Settings	2.2(1d)
Memory modules	
Total RAM in the system (GB)	384
Type	DDR3
Speed (MHz)	1866
Size (GB)	16
Number of RAM modules	24
Chip organization	Double sided
Rank	Dual
Hypervisor	
Name	VMware ESXi 5.5.0
Build number	1331820
Operating System Power Profile	Maximum Performance
Adapters	
Cisco UCS Storage Accelerator	Cisco UCS 785-GB MLC Fusion-io ioDrive 2 Adapter
IO Adapter	Cisco UCS VIC 1240

Tested Windows 7 VM Configuration

Components of VM	English	Japanese
Virtual Desktop - vCPU	2	2
Virtual Desktop - RAM	1.5 GB	1.5 GB
Virtual Desktop - HardDisk	32GB (Thin Provisioned)	32GB (Thin Provisioned)
Virtual Desktop -NetworkAdapter	Intel e1000	Intel e1000
OS Build No	677651	677662

Tested Windows 8 VM Configuration

Components of VM	English	Japanese
Virtual Desktop - vCPU	2	2
Virtual Desktop - RAM	2 GB	2 GB
Virtual Desktop - HardDisk	35GB (Thin Provisioned)	35GB (Thin Provisioned)

Components of VM	English	Japanese
Virtual Desktop -NetworkAdapter	Intel e1000	Intel e1000
OS Build No	917522	917919



Implementation Steps and Test Execution Details

- [Implementation steps for VMware Horizon View, page 7](#)
- [Test Execution Details, page 8](#)

Implementation steps for VMware Horizon View

- Infra components such as Active Directory/DNS and DHCP server, vCenter server, View composer and View connections server are deployed as Virtual machines on Cisco UCS B200 M3 server.
- Cisco UCS 785-GB multilevel cell (MLC) Fusion-io ioDrive-2 Adapter is installed on the Server Under Test(Cisco UCS B200 M3).
- Master image created on the Server Under Test (Cisco UCS B200 M3) and installed with Windows 8 (English/Japanese) resides on the Fusion-io Flash memory module. Additional 2TB LUN is provided from NetApp storage to the SUT server for VM provisioning.
- Login VSI Launcher is deployed as Virtual machine to incrementally login the users to the Virtual desktop sessions (created from master image) and begin the workload (Light, Medium, heavy) on each.

Cisco UCS Storage Accelerator

The Cisco UCS B200 M3 Blade Server offers on-server cache storage solution known as Cisco UCS Storage Accelerator. The Cisco UCS Storage Accelerator is an excellent server caching solution for delivering uncompromised I/O to support a guaranteed number of users at lower cost and with more predictable performance than a SAN-based infrastructure. Instead of relying on back-end shared storage to host the golden master image and associated clone images for users, the same image can now be stored locally on a Cisco UCS 785-GB multilevel cell (MLC) Fusion-io ioDrive 2 Adapter installed on the Cisco UCS B200 M3 Blade Server.

Because the on-server cache storage approach uses a directly mapped flash storage cache that supports many more IOPS than conventional disk-based storage, VDI environments can boot transparently without bottlenecks and in a fraction of the time and cost required for networked storage solutions. In a VMware VDI solution, the Cisco UCS Storage Accelerator hosts the write cache (and optionally the virtual disk [vDisk]) for optimal performance and scalability.

Test Execution Details

Login VSI helps to test and compare the performance of different software and hardware solutions in VDI environment. Login VSI used to measure the maximum capacity of current infrastructure in a quick and easy way. The simulated users work with the same applications as your average employee such as Word, Excel, Outlook and Internet Explorer and also can easily add our own custom applications to the tests

Light Workload

The light workload runs fewer applications and starts/stops them less frequently. This results in lower CPU, memory and IO usage.

Medium Workload

Medium workload is the default workload in Login VSI. The standard Login VSI medium workload designed to run on 2vCPU's per desktop VM. This workload emulates a medium knowledge worker using Office, IE, PDF and Java/ FreeMind.

- Once a session has been started the workload will repeat (loop) every 48 minutes. The loop is divided in 4 segments, each consecutive Login VSI user logon will start a different segments. This ensures that all elements in the workload are equally used throughout the test.
- During each loop the response time is measured every 3-4 minutes. The medium workload opens up to 5 applications simultaneously. The keyboard type rate is 160 ms for each character. Approximately 2 minutes of idle time is included to simulate real- - world users.

Each loop will open and use:

- Outlook, browse messages.
- Internet Explorer, browsing different webpages and a YouTube style video (480p movie trailer) is opened three times in every loop.
- Word, one instance to measure response time, one instance to review and edit a document.
- Doro PDF Printer & Acrobat Reader, the word document is printed and reviewed to PDF.
- Excel, a very large randomized sheet is opened. Documentation

Heavy Workload

The heavy workload is based on the medium workload except that the heavy workload:

- Begins by opening 4 instances of Internet Explorer. These instances stay open throughout the workload loop.
- Begins by opening 2 instances of Adobe Reader. These instances stay open throughout the workload loop
- There are more PDF printer actions in the workload.
- Instead of 480p videos a 720p and a 1080p video are watched.
- Increased the time the workload plays a flash game.
- The idle time is reduced to 2 minutes.



CHAPTER 4

VMware Horizon View VDI Scalability Testing on Cisco UCS B200 M3 server

- [Comparison of Windows 7 performance in Japanese and English Environment, page 9](#)
- [Comparison of Windows 8 performance in Japanese and English Environment, page 18](#)
- [Related Documentation, page 27](#)

Comparison of Windows 7 performance in Japanese and English Environment

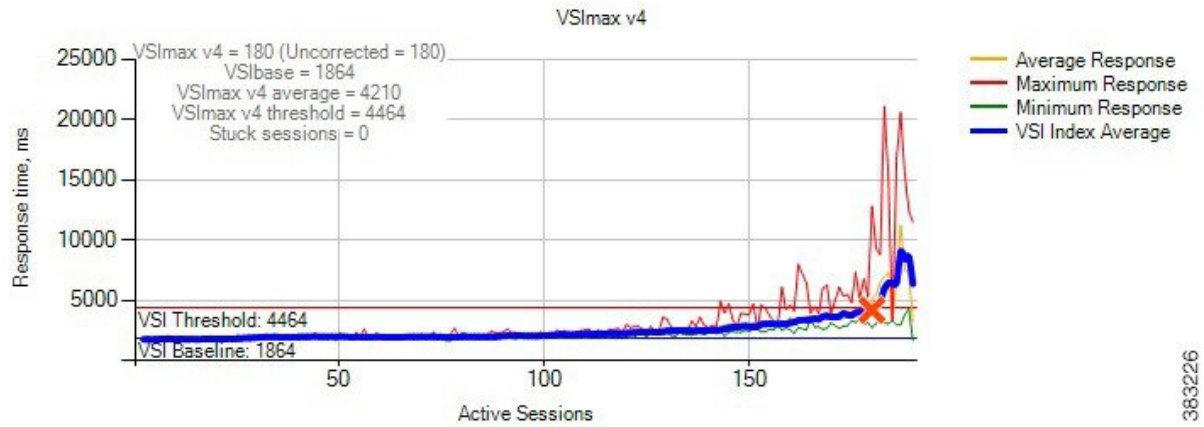
VSIMAX Result		
Type of Workload	English	Japanese
Light	180	175
Medium	144	139
Heavy	134	129

Light Workload Result

Light		
Desktop OS	No.of Launched Sessions	VSIMax
English	200	180
Japanese	200	175

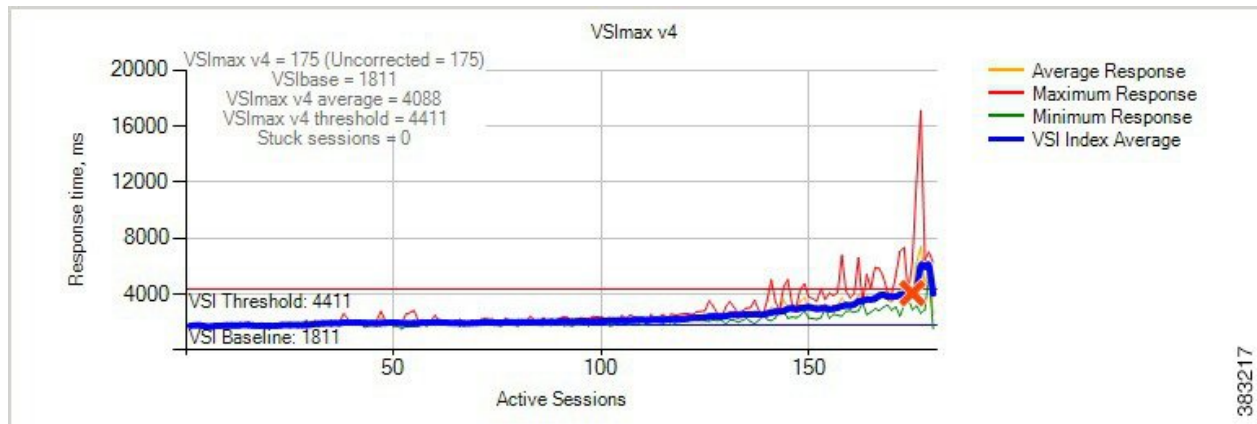
Login VSIMax

Figure 2: English



383226

Figure 3: Japanese

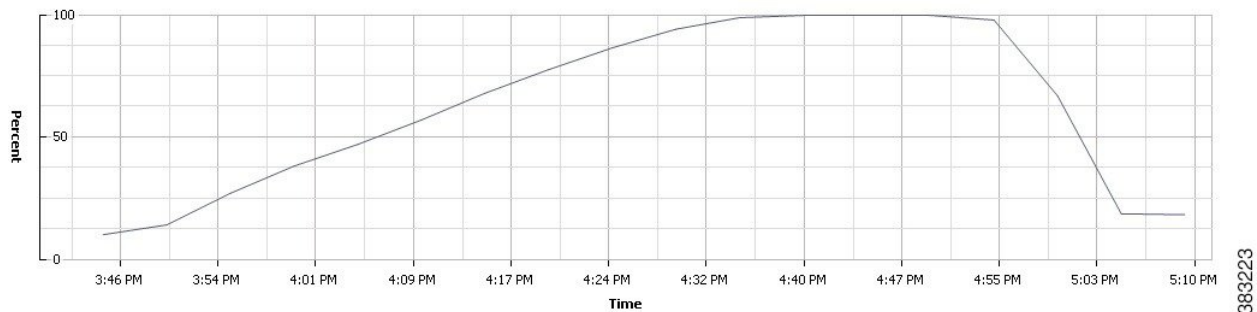


383217

Fig 2 and 3: Average virtual desktop response times at various number of virtual desktops on the Cisco UCS B200 M3 server

Processor And Memory Utilization throughout the test

Figure 4: English



383223

Figure 5: Japanese

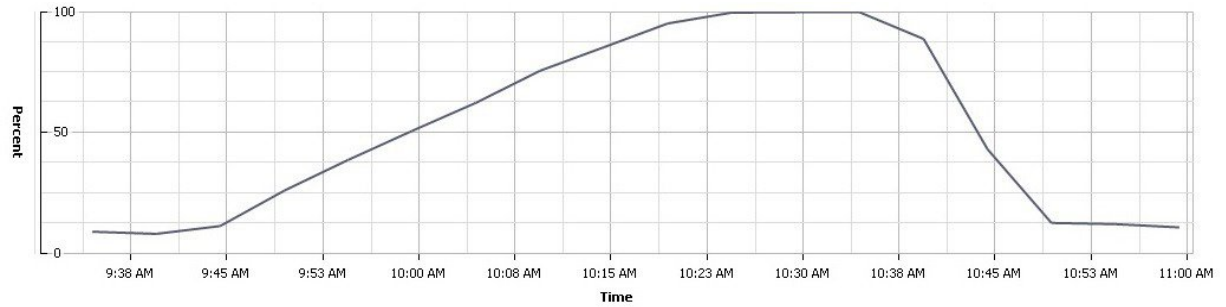


Figure 4 and 5 : CPU utilization throughout the test

Figure 6: English

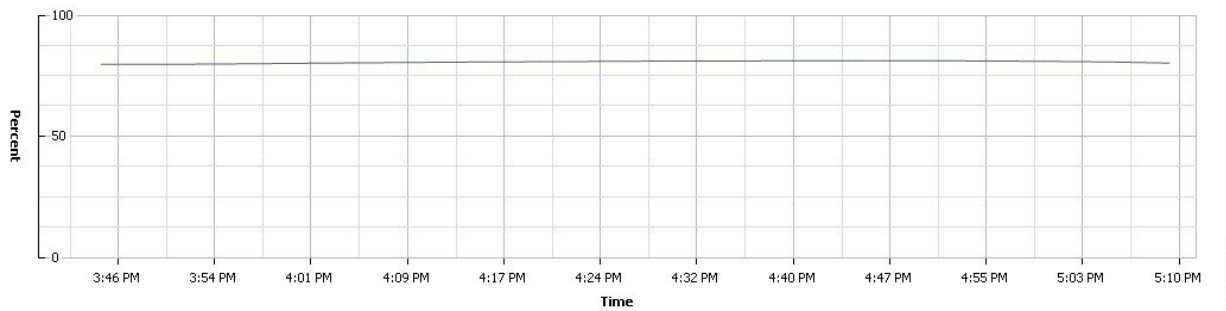


Figure 7: Japanese

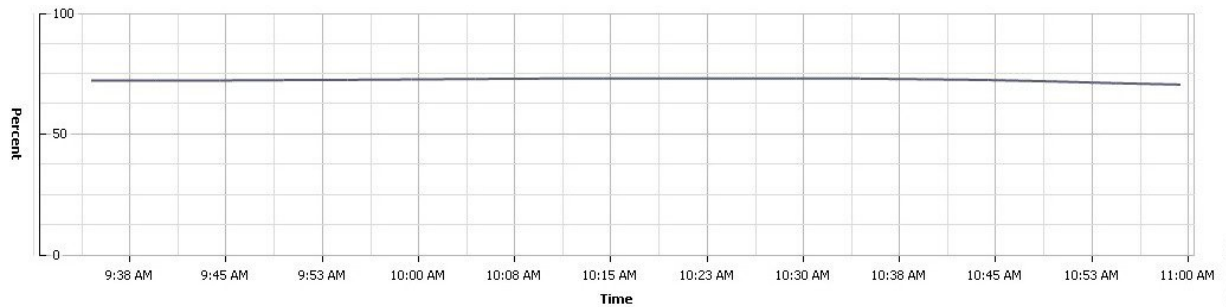


Figure 6 and 7 : Memory usage throughout the test

Network and Storage Utilization throughout the Test

Figure 8: English

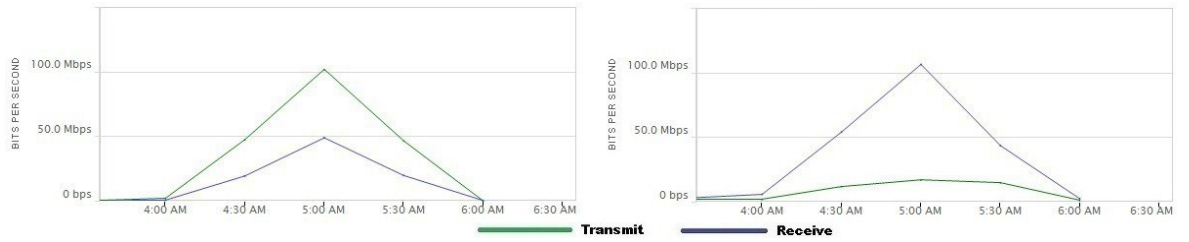


Figure 9: Japanese

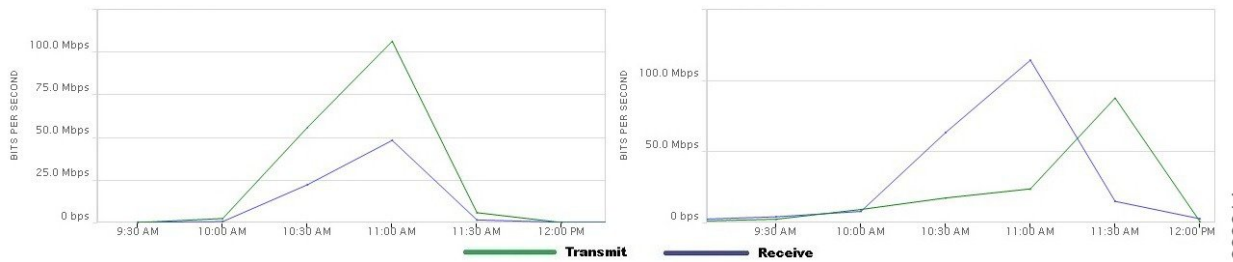


Figure 8 and 9 : Provisioning Services Network and Storage usage throughout the test

Medium Workload Result

Medium		
Desktop OS	No.of Launched Sessions	VSIMax
English	175	144
Japanese	175	139

Login VSIMax

Figure 10: English

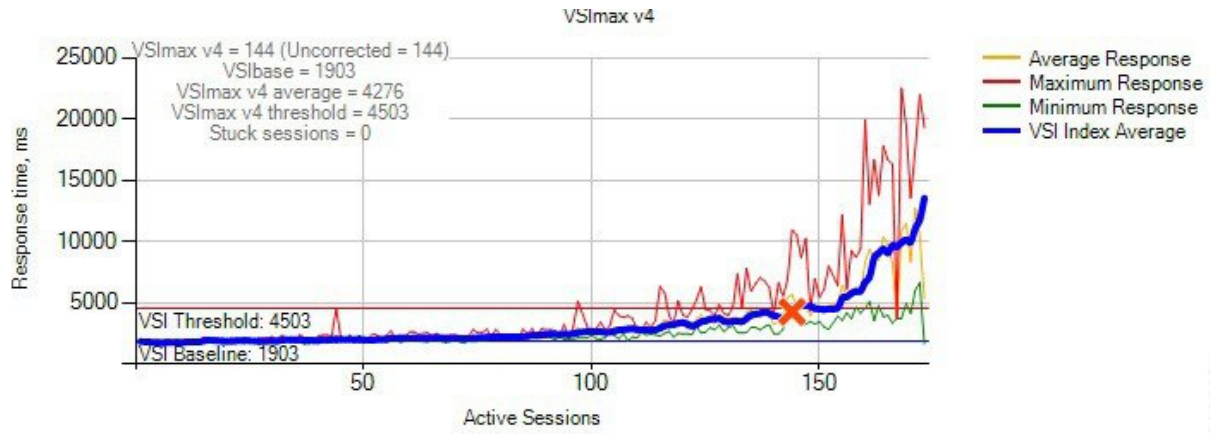


Figure 11: Japanese

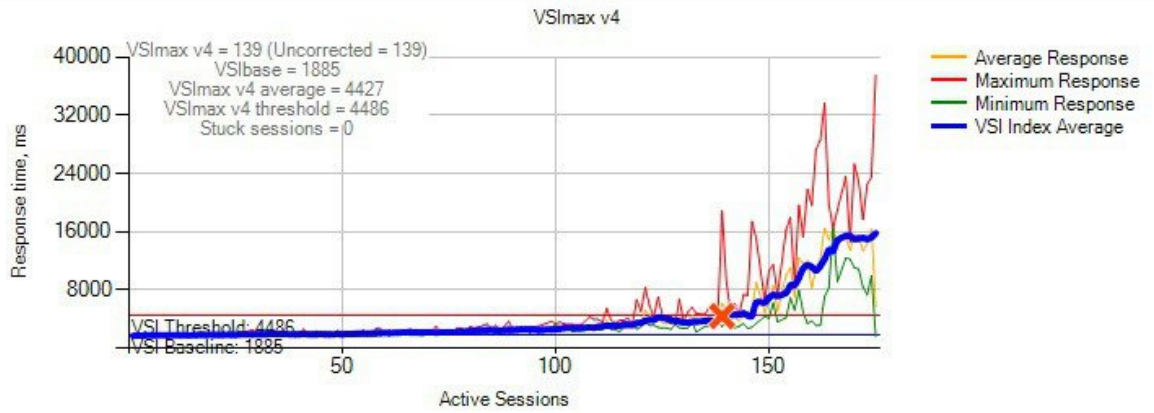


Fig 10 and 11: Average virtual desktop response times at various number of virtual desktops on the Cisco UCS B200 M3 server

Processor And Memory Utilization throughout the test

Figure 12: English

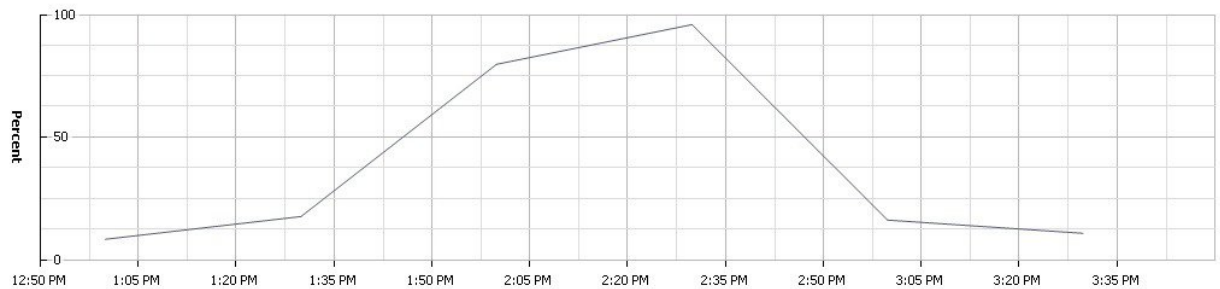
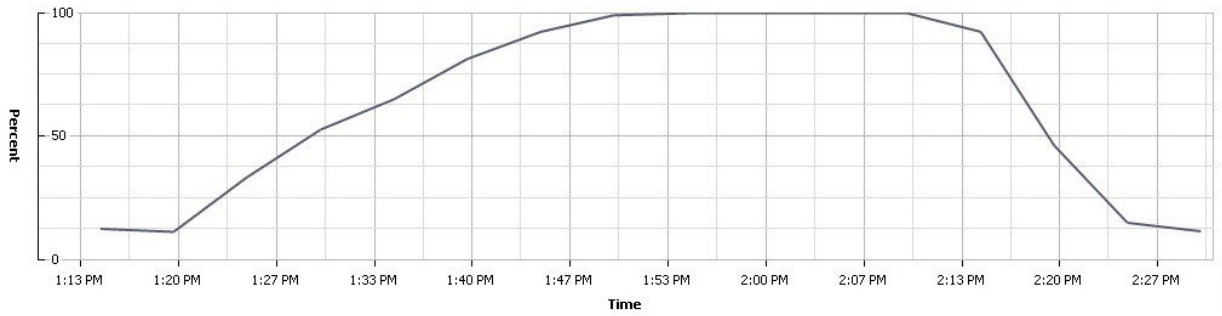


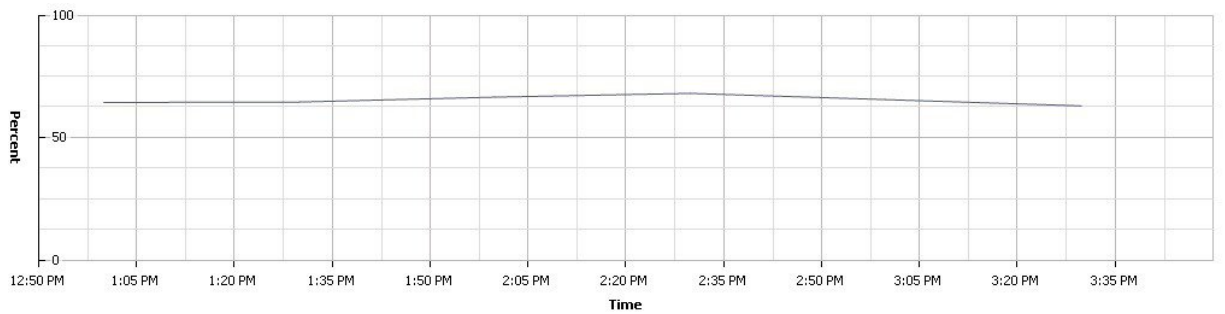
Figure 13: Japanese



383209

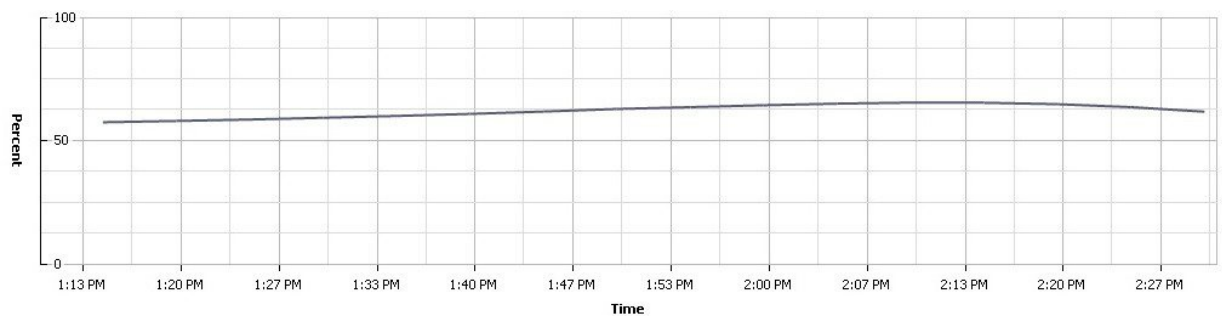
Figure 12 and 13 : CPU utilization throughout the test

Figure 14: English



383208

Figure 15: Japanese



383212

Figure 14 and 15 : Memory usage throughout the test

Network and Storage Utilization throughout the Test

Figure 16: English

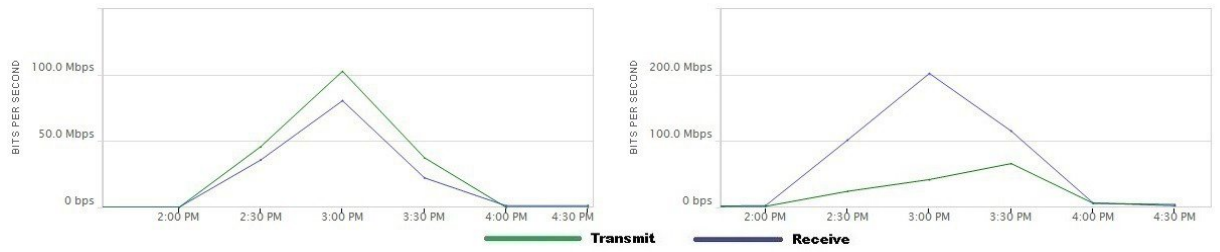


Figure 17: Japanese

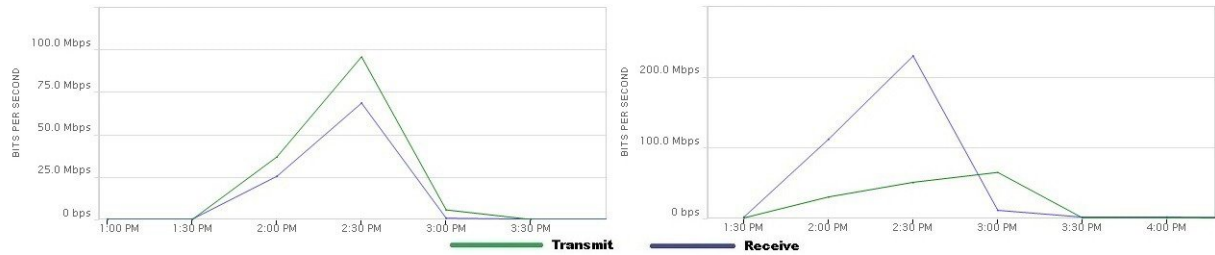


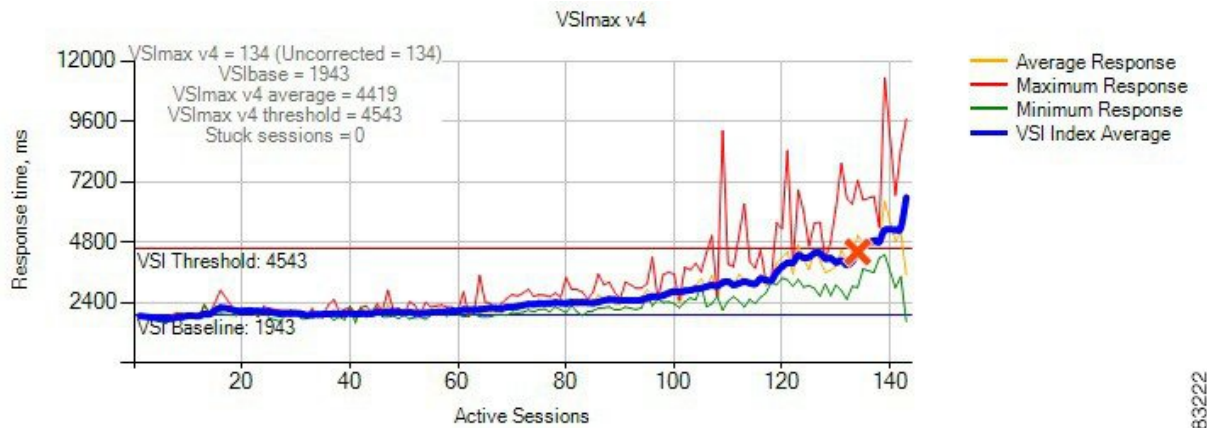
Figure 16 and 17 : Provisioning Services Network and Storage usage throughout the test

Heavy Workload Result

Heavy		
Desktop OS	No.of Launched Sessions	VSIMax
English	150	134
Japanese	150	129

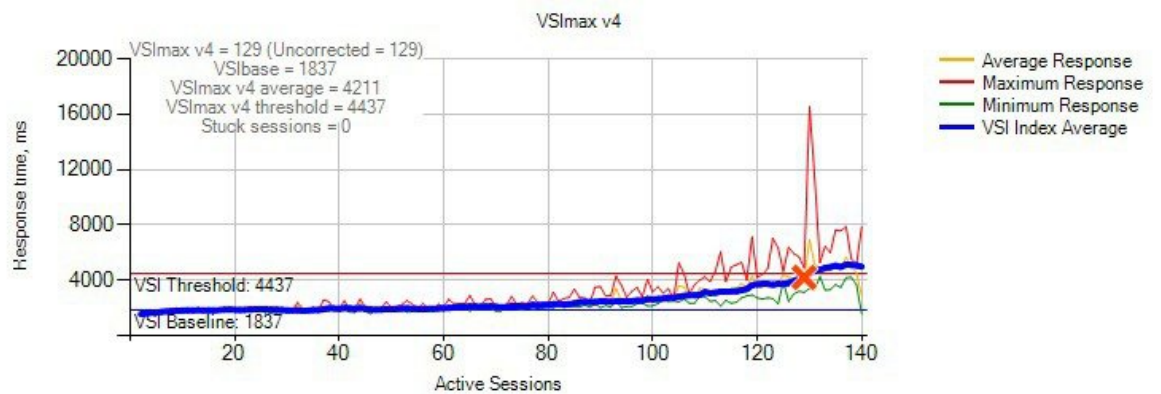
Login VSIMax

Figure 18: English



383222

Figure 19: Japanese

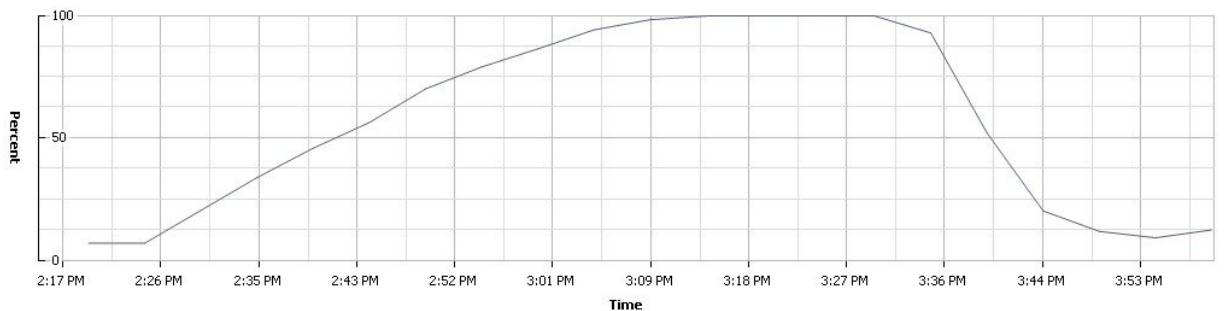


383216

Fig 18 and 19: Average virtual desktop response times at various number of virtual desktops on the Cisco UCS B200 M3 server

Processor And Memory Utilization throughout the test

Figure 20: English



383219

Figure 21: Japanese

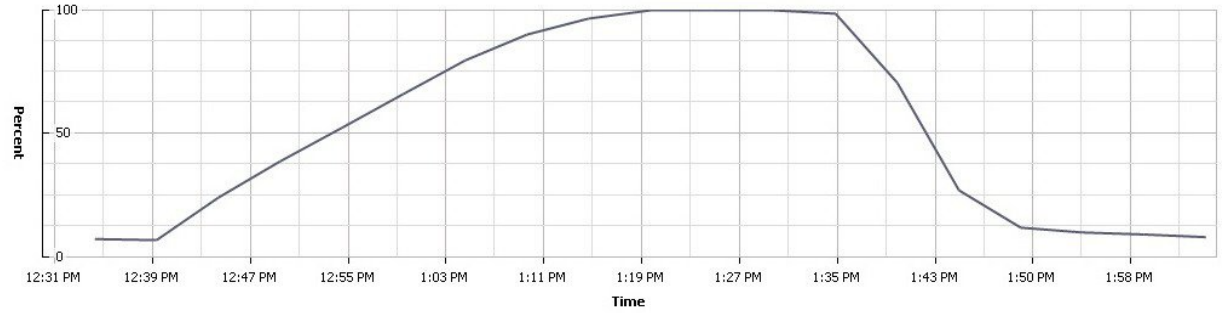


Figure 20 and 21 : CPU utilization throughout the test

Figure 22: English

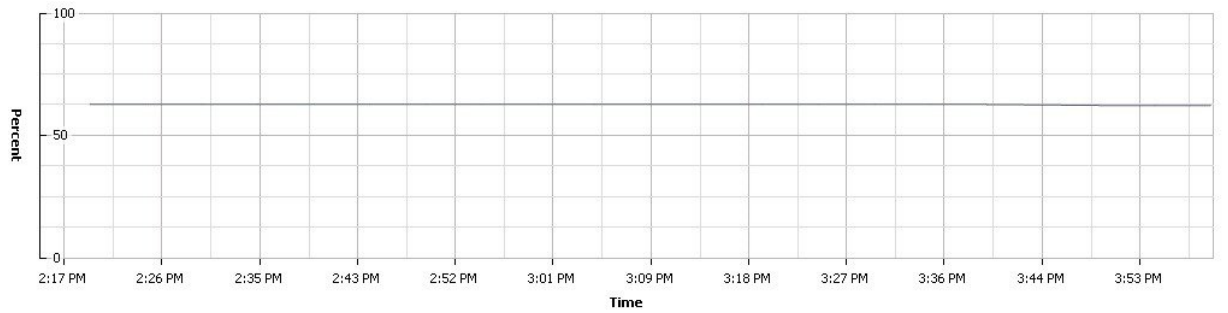


Figure 23: Japanese

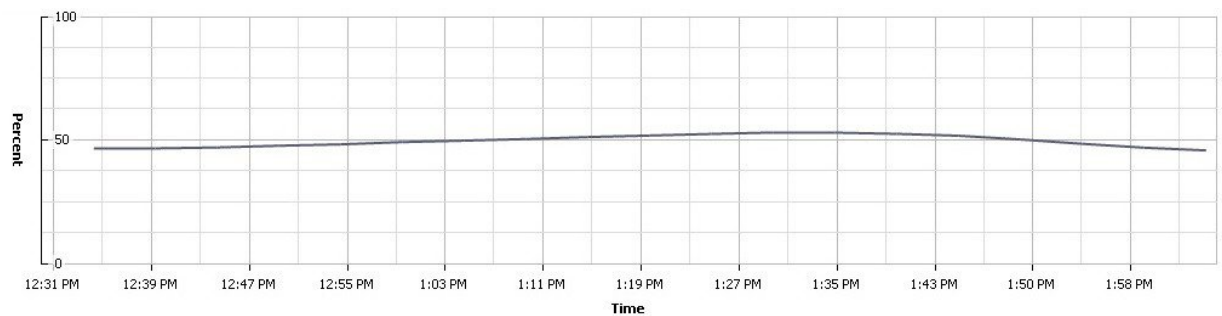


Figure 22 and 23 : Memory usage throughout the test

Network and Storage Utilization throughout the Test

Figure 24: English

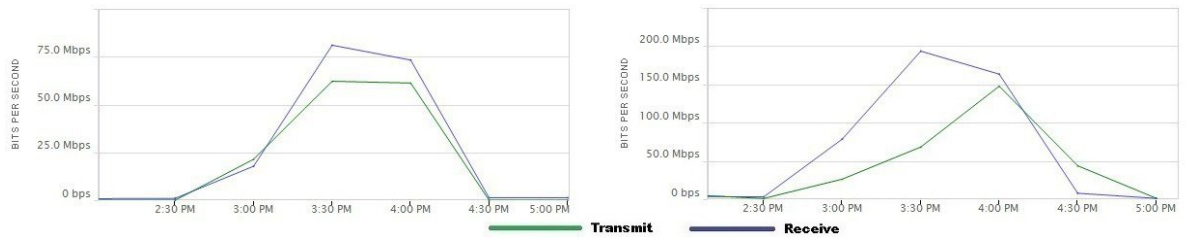


Figure 25: Japanese

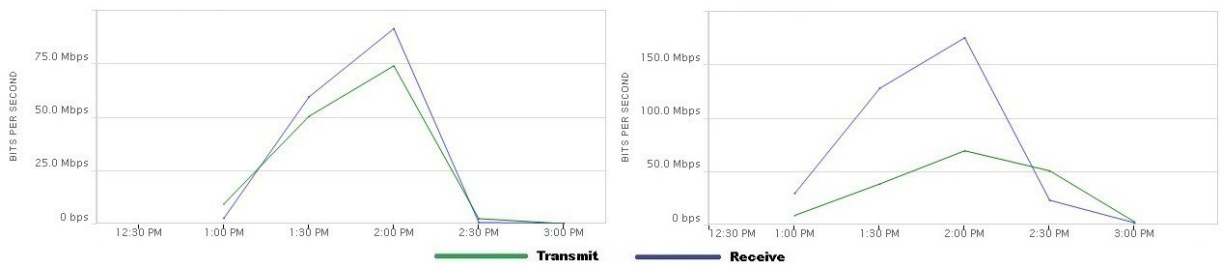


Figure 24 and 25 : Provisioning Services Network and Storage usage throughout the test

Comparison of Windows 8 performance in Japanese and English Environment

VSIMAX Result		
Type of Workload	English	Japanese
Light	140	124
Medium	110	96
Heavy	99	90

Light Workload Result

Light		
Desktop OS	No.of Launched Sessions	VSIMax
English	150	140
Japanese	150	124

Login VSIMax

Figure 26: English

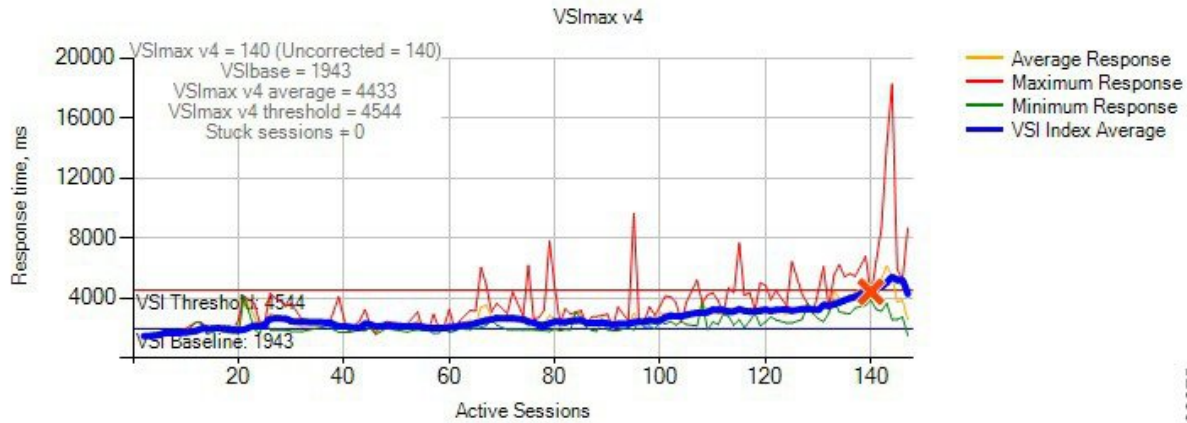


Figure 27: Japanese

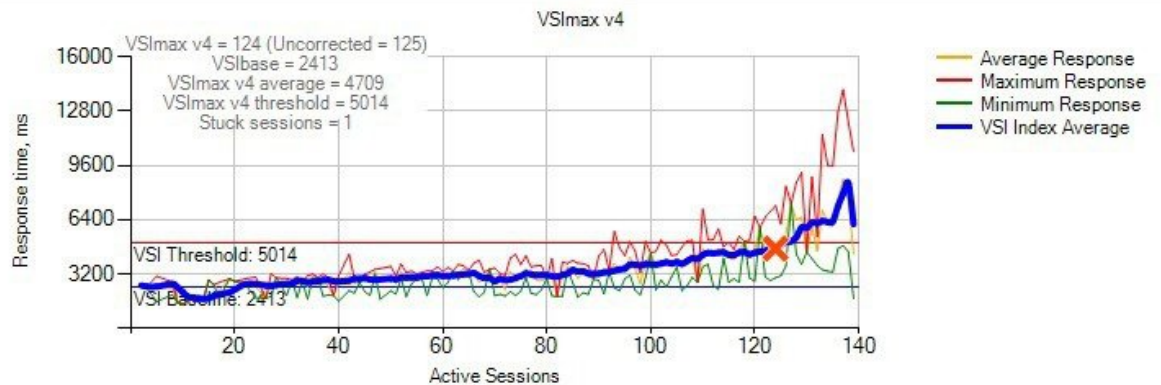
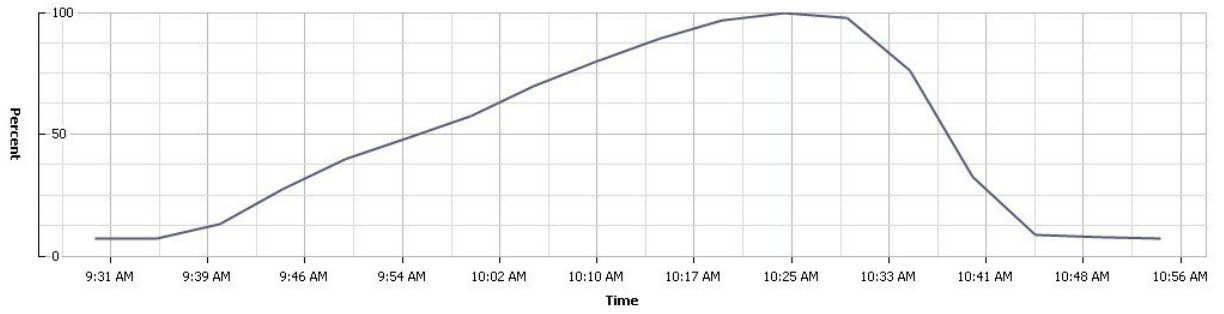


Fig 26 and 27: Average virtual desktop response times at various number of virtual desktops on the Cisco UCS B200 M3 server

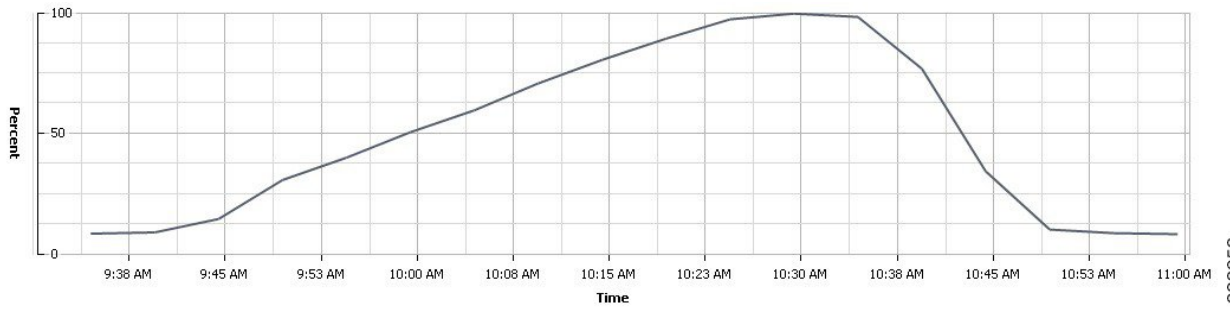
Processor And Memory Utilization throughout the test

Figure 28: English



383273

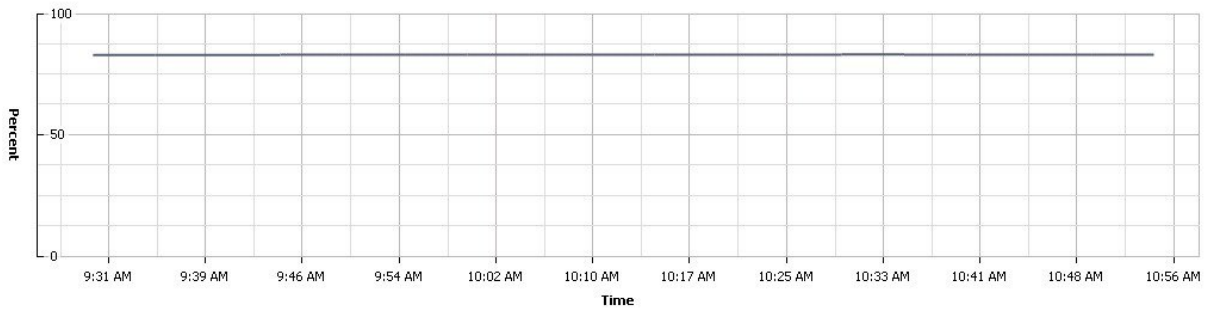
Figure 29: Japanese



383253

Figure 28 and 29 : CPU utilization throughout the test

Figure 30: English



383274

Figure 31: Japanese

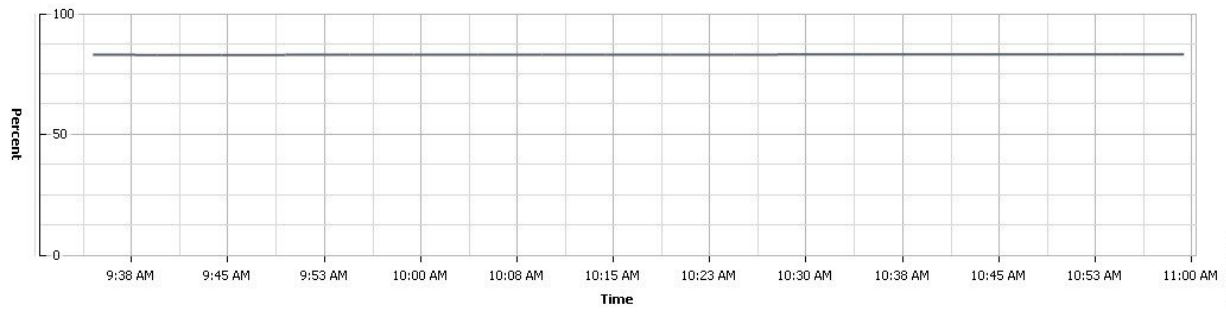


Figure 30 and 31 : Memory usage throughout the test
Network and Storage Utilization throughout the Test

Figure 32: English

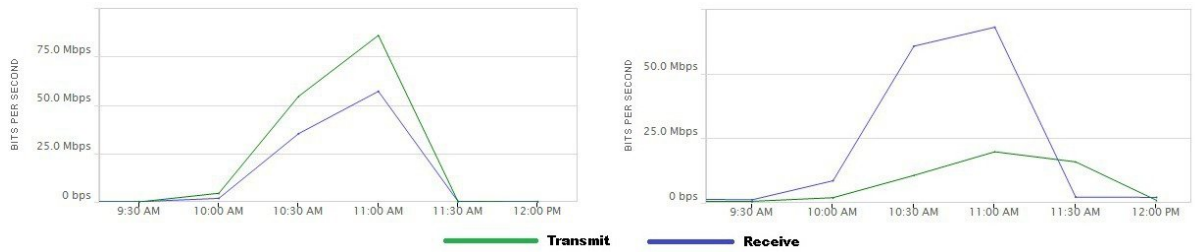


Figure 33: Japanese

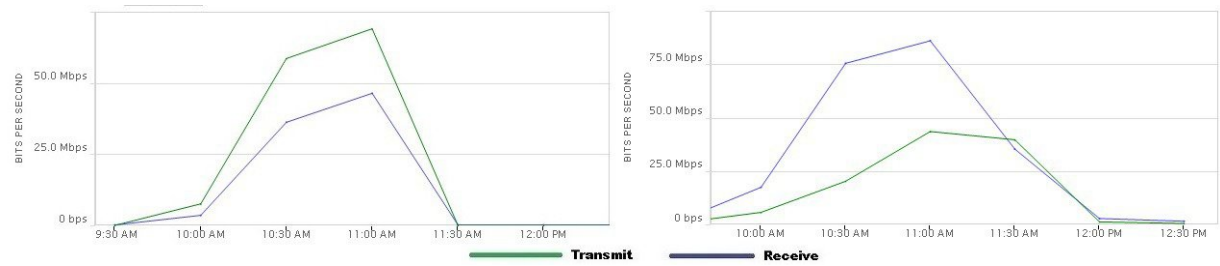


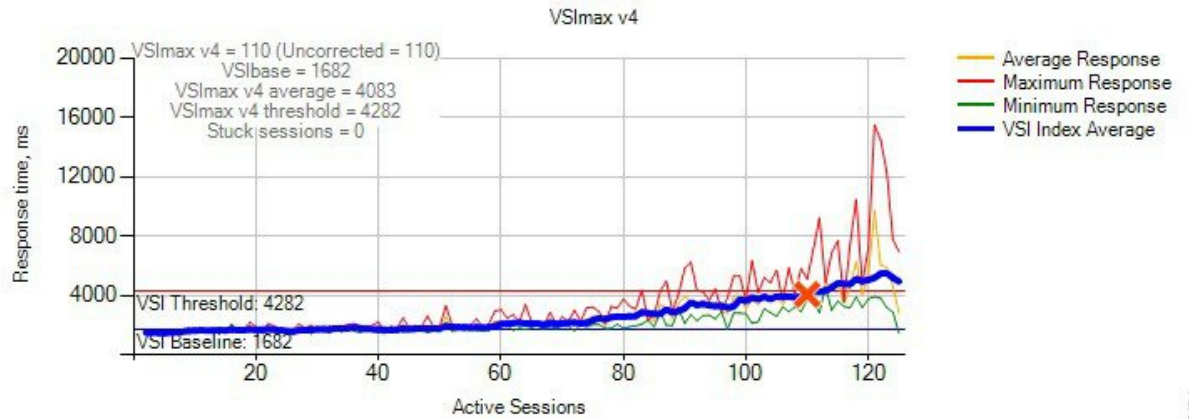
Figure 32 and 33 : Provisioning Services Network and Storage usage throughout the test

Medium Workload Result

Medium		
Desktop OS	No.of Launched Sessions	VSIMax
English	125	110
Japanese	125	96

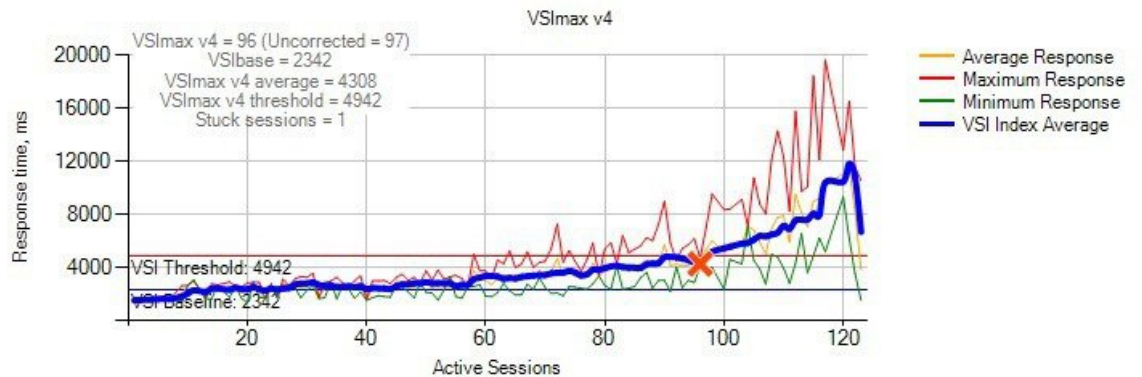
Login VSIMax

Figure 34: English



383271

Figure 35: Japanese



383263

Fig 34 and 35: Average virtual desktop response times at various number of virtual desktops on the Cisco UCS B200 M3 server

Processor And Memory Utilization throughout the test

Figure 36: English

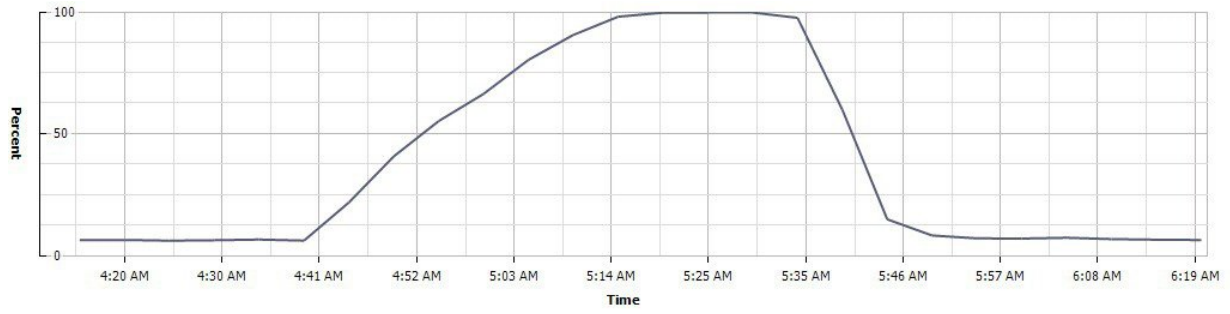


Figure 37: Japanese

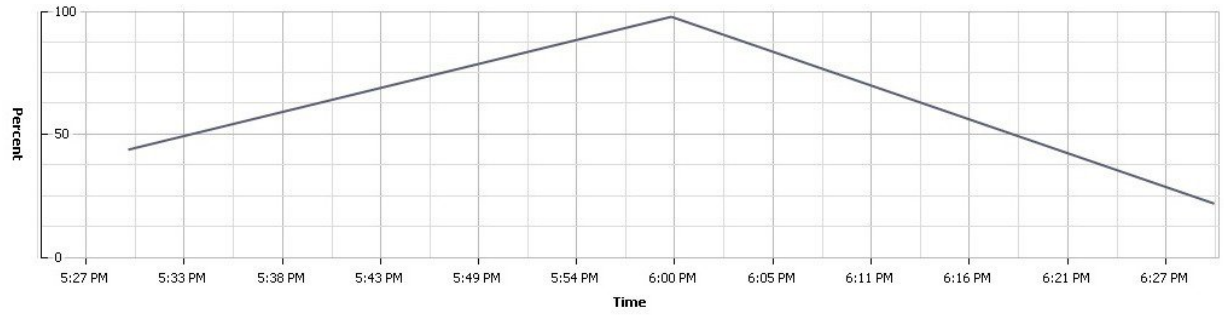


Figure 36 and 37 : CPU utilization throughout the test

Figure 38: English

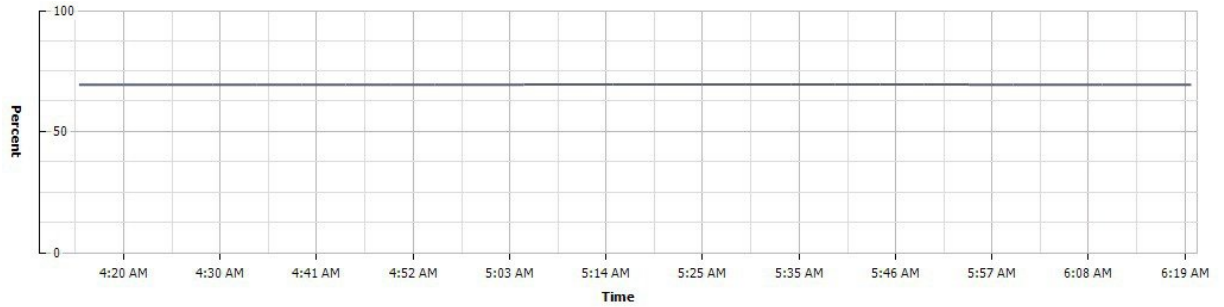
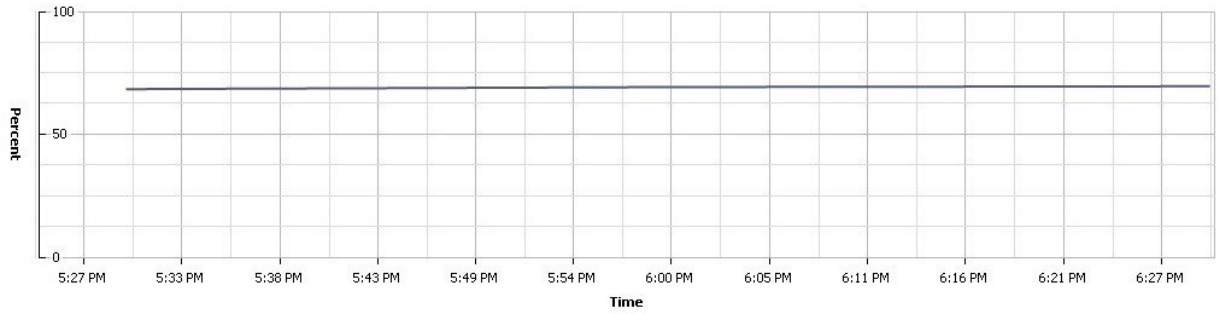


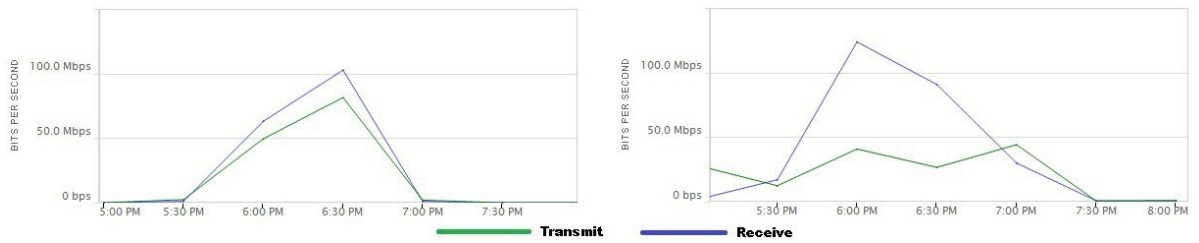
Figure 39: Japanese



383257

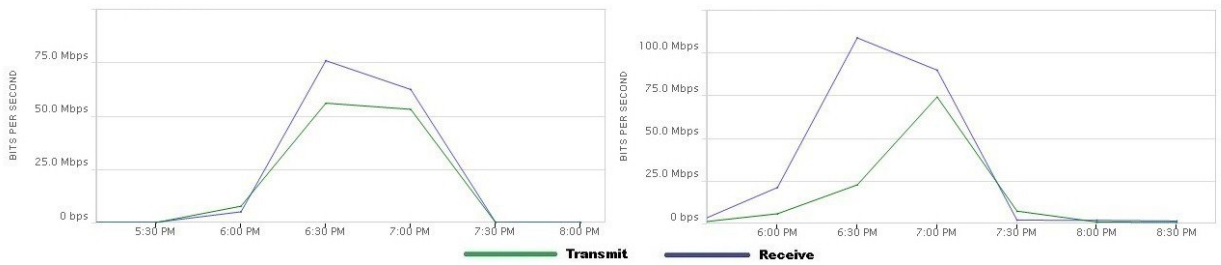
Figure 38 and 39 : Memory usage throughout the test
Network and Storage Utilization throughout the Test

Figure 40: English



383266

Figure 41: Japanese



383260

Figure 40 and 41 : Provisioning Services Network and Storage usage throughout the test

Heavy Workload Result

Heavy		
Desktop OS	No.of Launched Sessions	VSIMax
English	100	99
Japanese	100	90

Login VSIMax

Figure 42: English

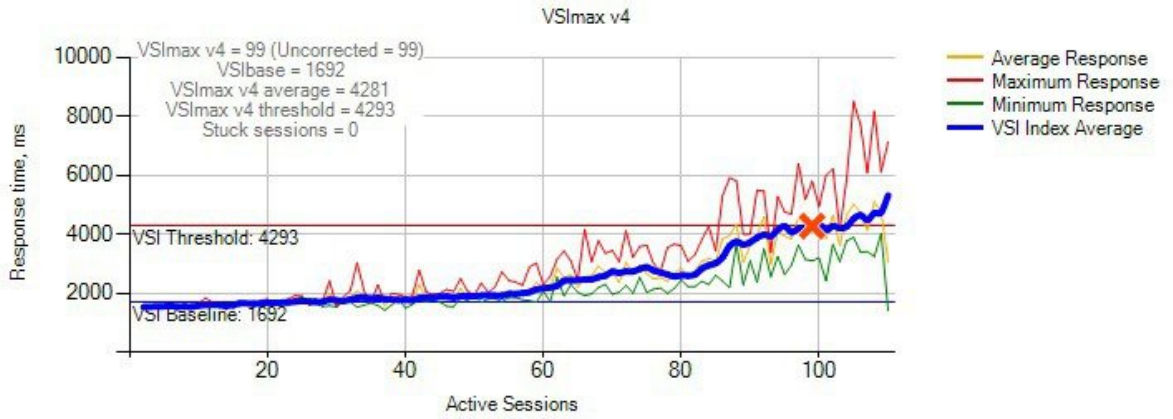


Figure 43: Japanese

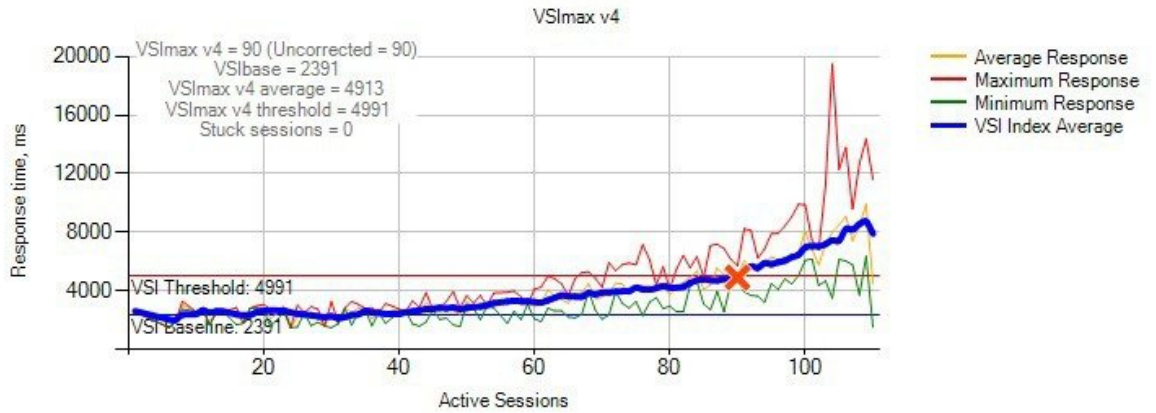
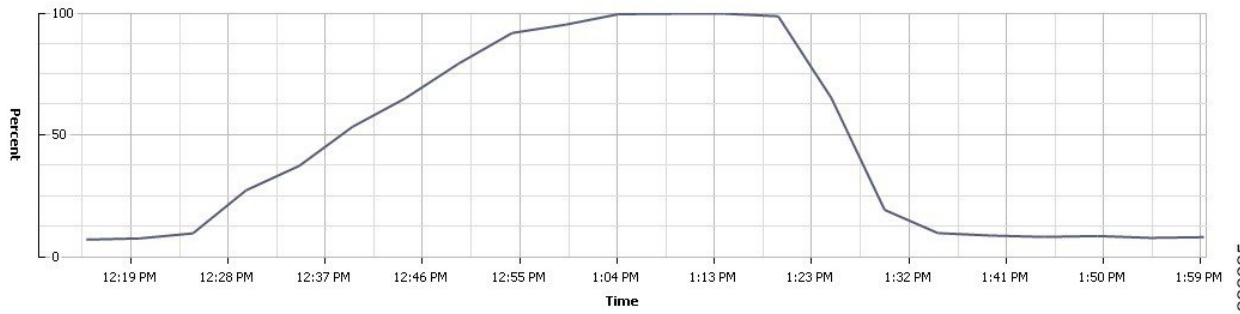


Fig 42 and 43: Average virtual desktop response times at various number of virtual desktops on the Cisco UCS B200 M3 server

Processor And Memory Utilization throughout the test

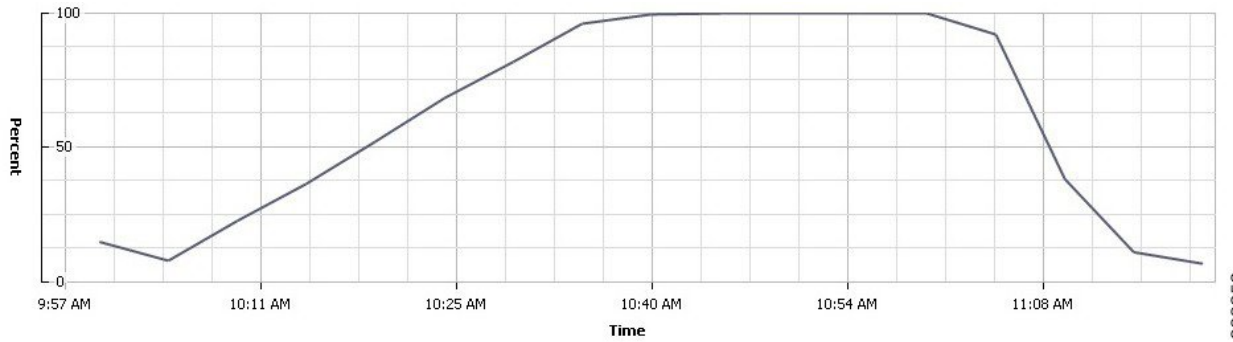
Figure 44: English

Comparison of Windows 8 performance in Japanese and English Environment



383285

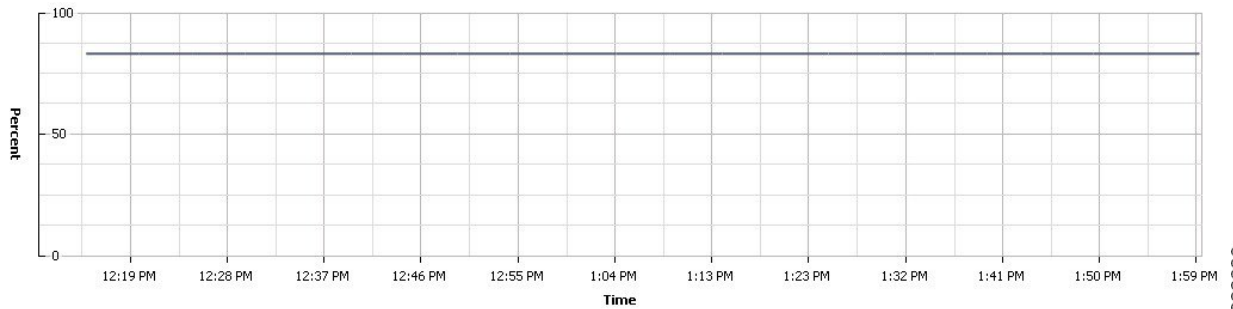
Figure 45: Japanese



383252

Figure 44 and 45 : CPU utilization throughout the test

Figure 46: English



383286

Figure 47: Japanese

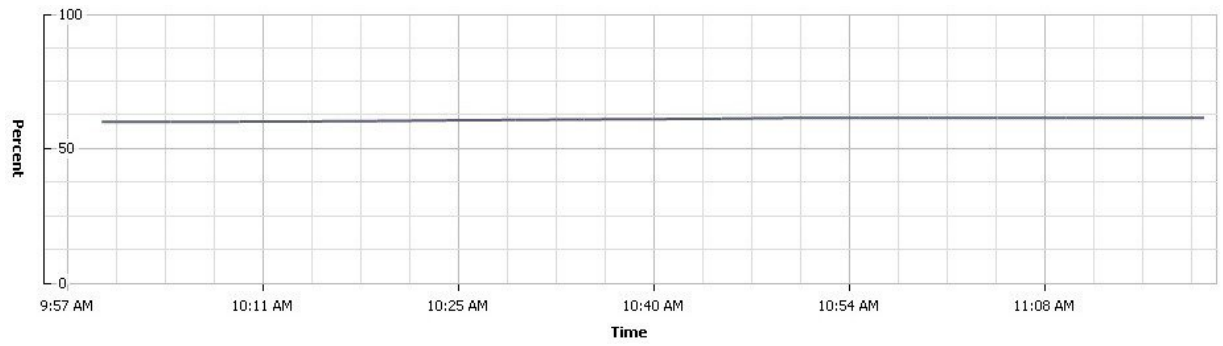


Figure 46 and 47 : Memory usage throughout the test
Network and Storage Utilization throughout the Test

Figure 48: English

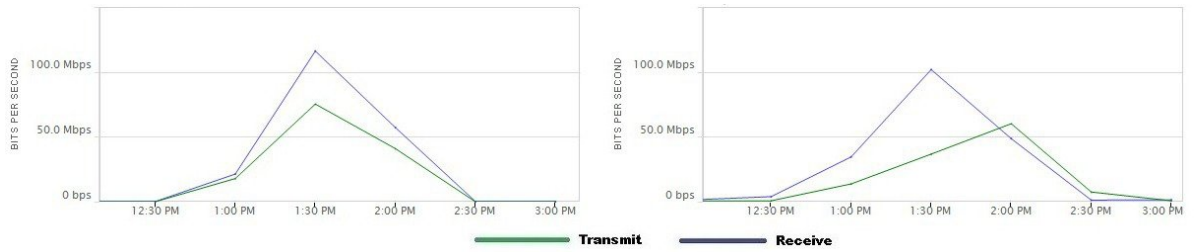


Figure 49: Japanese

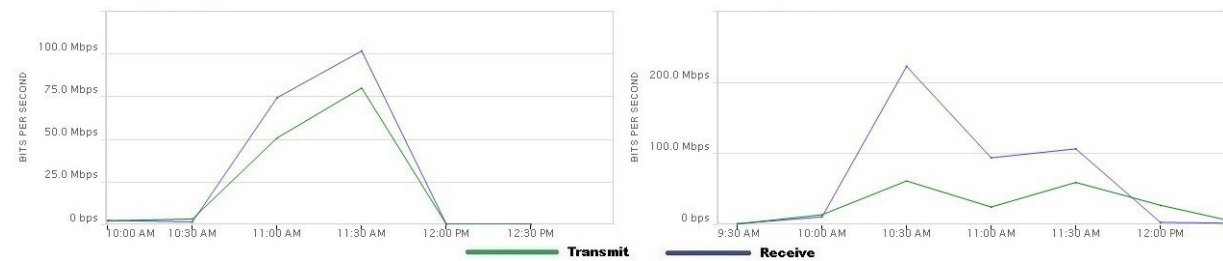


Figure 48 and 49 : Provisioning Services Network and Storage usage throughout the test

Related Documentation

Cisco Unified computing

<http://www.cisco.com/en/US/products/ps10265/index.html>

http://www.cisco.com/en/US/prod/collateral/ps10265/ps10280/ps12288/data_sheet_c78-700625.html

Login VSI

http://www.loginvsi.com/documentation/index.php?title=Main_Page

VMware Horizon View

<https://www.vmware.com/pdf/horizon-view/horizon-view-53-feature-pack-document.pdf>