



## **VMware Horizon View 6 VDI Scalability Testing on Cisco UCS B200 M4 with E5-2699 v3 processor**

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# VMWare VDI Scalability Testing on Cisco UCS B200 M4 Server

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## 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 M4 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 B200 M4 Blade Server with Intel(R) Xeon(R) E5-2699 v3.
- VMware vSphere 5.5 U2.
- A VMware Horizon View 6.0.2 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 2 vCPU, 2 GB of reserved memory for Windows 8.
- NetApp FAS 3240 storage array.

### Acronyms

Acronym	Description
AD	Active Directory
DHCP	Dynamic Host Configuration Protocol
DNS	Domain Name System

<b>Acronym</b>	<b>Description</b>
FCOE	Fiber Channel Over Ethernet
LUN	Logical Unit Number
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



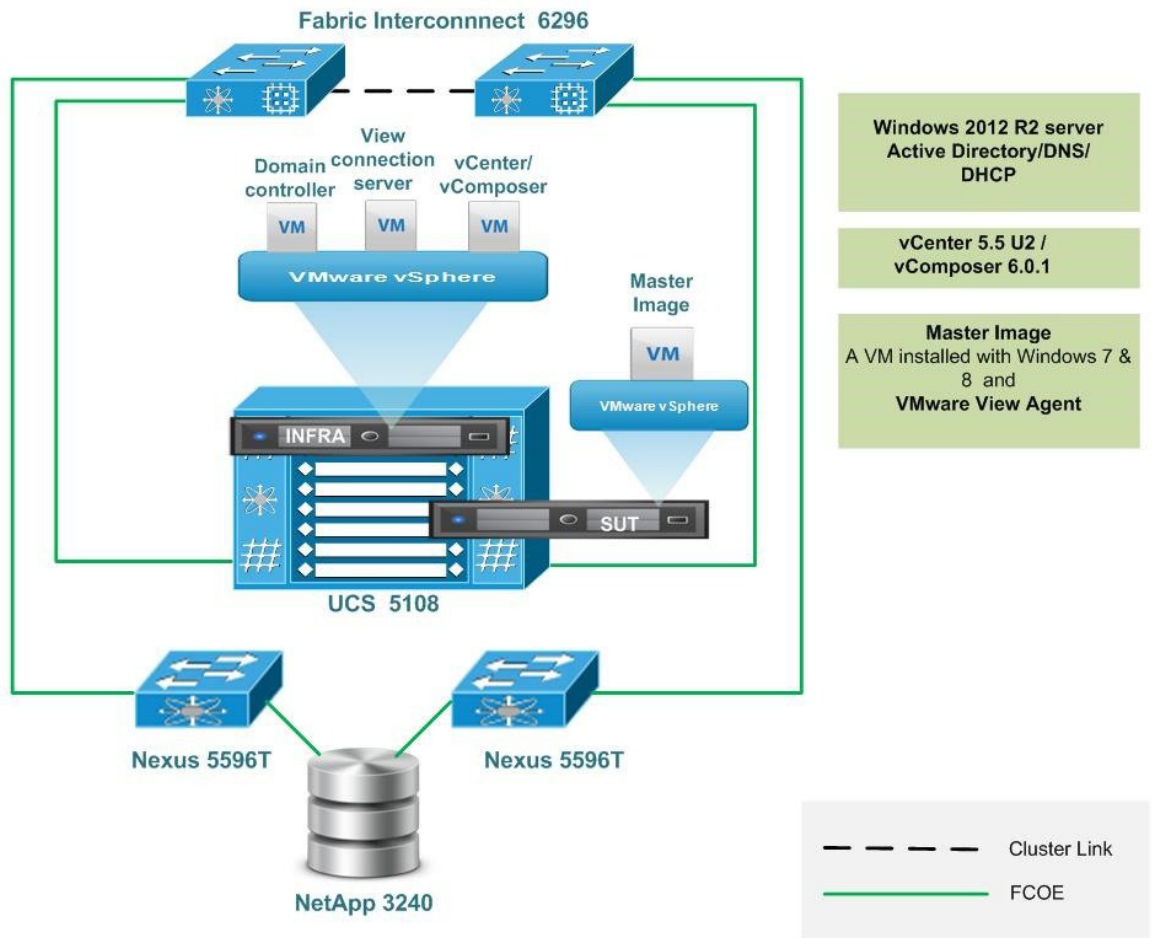
## Test Topology and Environment Matrix

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- [Test Topology, page 3](#)
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### Test Topology

*Figure 1: Topology in Use*



# Environment Matrix

## Infra Components

Component	Version
UCS Blade server	UCS B200 M4 (for SUT and Infra)
UCSM	2.2(3d)
<b>Hypervisor</b>	
ESXi	VMware ESXi 5.5 U2 (2068190)
<b>Operating System</b>	
Windows Server OS	Windows Server 2012 R2 x64 (Japanese/English)
Windows Desktop OS	Windows 7 and 8 Enterprise x64 (Japanese/English)
<b>Storage</b>	



Component	Version
NetApp FAS 3240	8.0.2
<b>FCoE Switch</b>	
Nexus 5596 T	6.0(2)N2(3)
<b>Virtual Desktop Delivery Component</b>	
VMware Horizon View	6.0.2
<b>VDI Scalability measuring Tool</b>	
Login VSI	4.0.11
Active Directory & DHCP	Windows 2012 R2 SP1 server x64 (Japanese/English)
Login VSI Launcher, Analyzer and VSI share	Windows 2012 R2 SP1 server x64 (Japanese/English)

**SUT Components**

Component	Type
<b>CPUs</b>	
Vendor	Intel® Corporation
Name	Intel(R) Xeon(R) E5-2699 v3
Core Frequency (GHz)	2.3
<b>Platform</b>	
Vendor	Cisco
BIOS Settings	2.2(3d)
<b>Memory modules</b>	
Total RAM in the system (GB)	384
Type	DDR4
Speed (MHz)	2133
Size (GB)	32
Number of RAM modules	12
Chip organization	Double sided
Rank	Quad
<b>Hypervisor</b>	
Name	VMware ESXi 5.5.0
Build number	2068190
Operating System Power Profile	Maximum Performance

Component	Type
<b>Adapters</b>	
IO Adapter	Cisco UCS VIC 1340

**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)
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 7](#)

### 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.
- Master image created on the Server Under Test (Cisco UCS B200 M4) and installed with Windows 7 and Windows 8 (English/Japanese) resides on 2.5 TB LUN 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.

### 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 M4 server

- [Comparison of Windows 7 performance in Japanese and English Environment, page 9](#)
- [Comparison of Windows 8 performance in Japanese and English Environment, page 17](#)
- [Related Documentation, page 26](#)

### Comparison of Windows 7 performance in Japanese and English Environment

VSIMAX Result		
Type of Workload	English	Japanese
Light	273	260
Medium	210	198
Heavy	197	179

#### Light Workload Result

Light		
Desktop OS	No.of Launched Sessions	VSIMax
English	290	273
Japanese	280	260

#### Login VSIMax

Figure 2: English

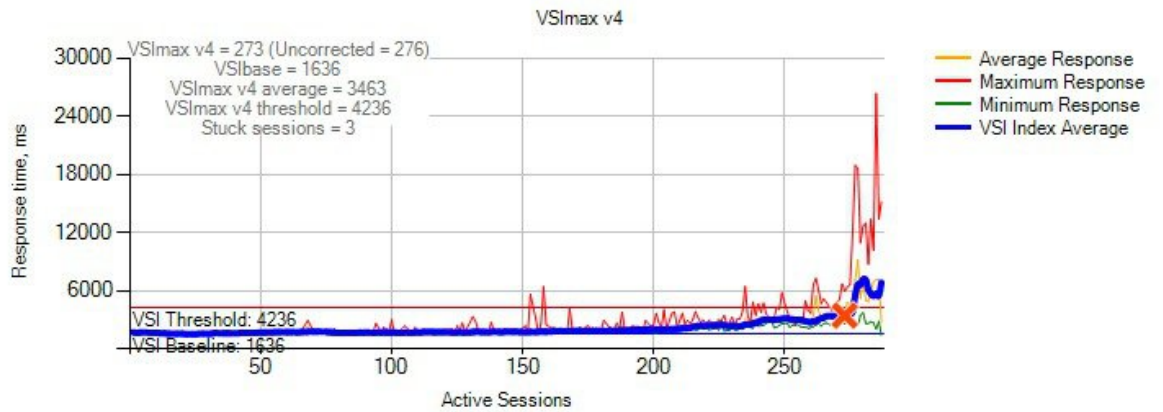


Figure 3: Japanese

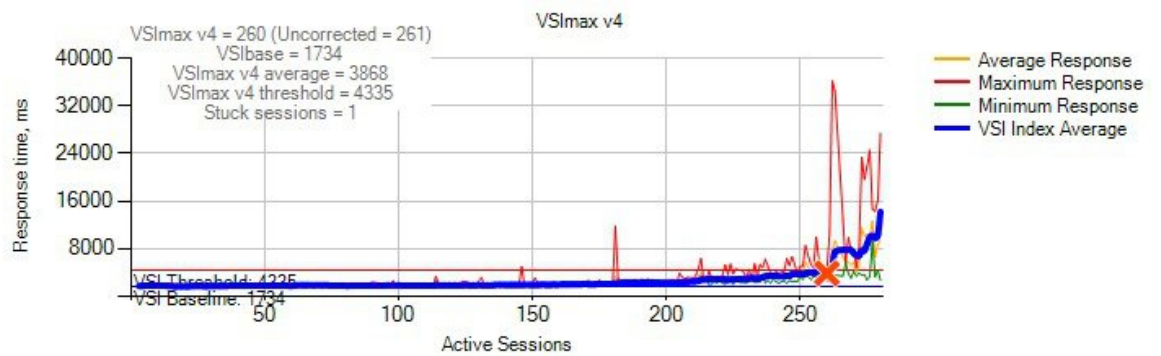
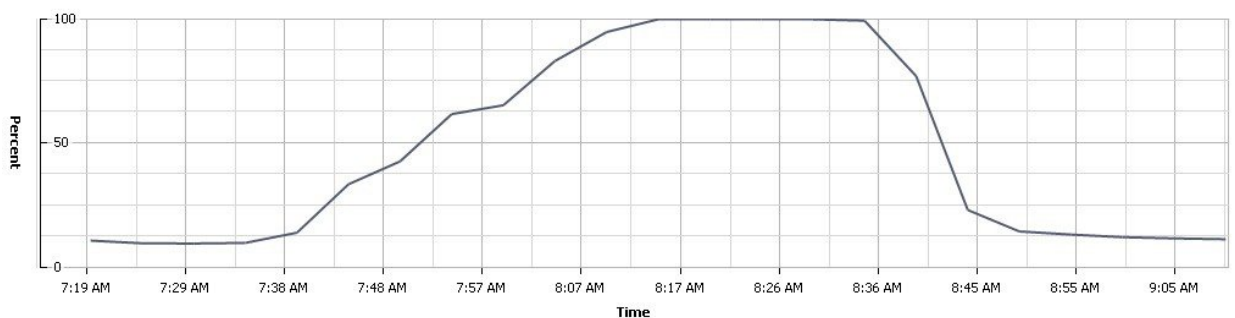


Fig 2 and 3: Average virtual desktop response times at various number of virtual desktops on the Cisco UCS B200 M4 server

Processor And Memory Utilization throughout the test

Figure 4: English



**Figure 5: Japanese**

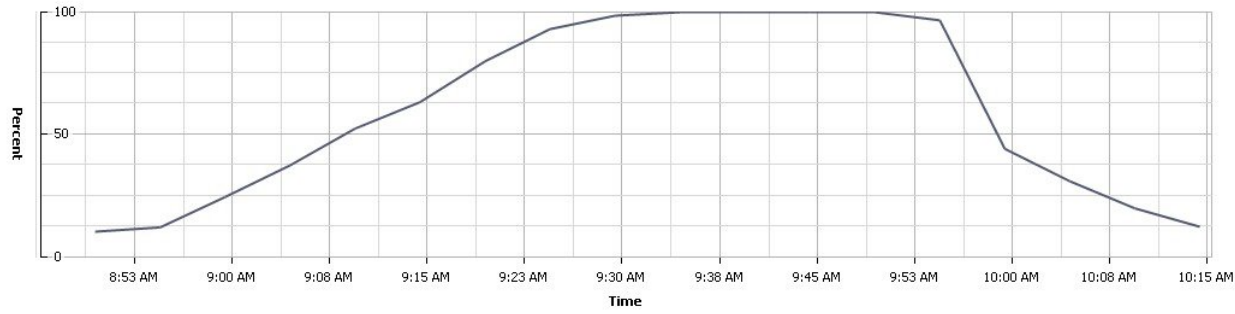
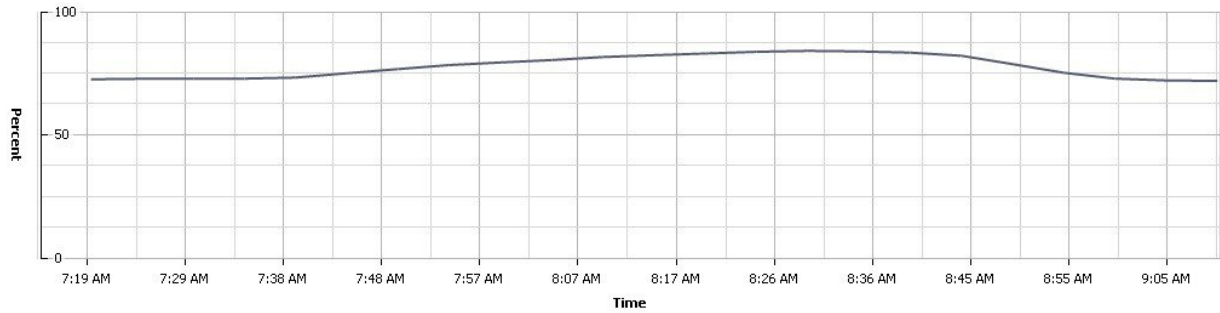


Figure 4 and 5 : CPU utilization throughout the test

**Figure 6: English**



**Figure 7: Japanese**

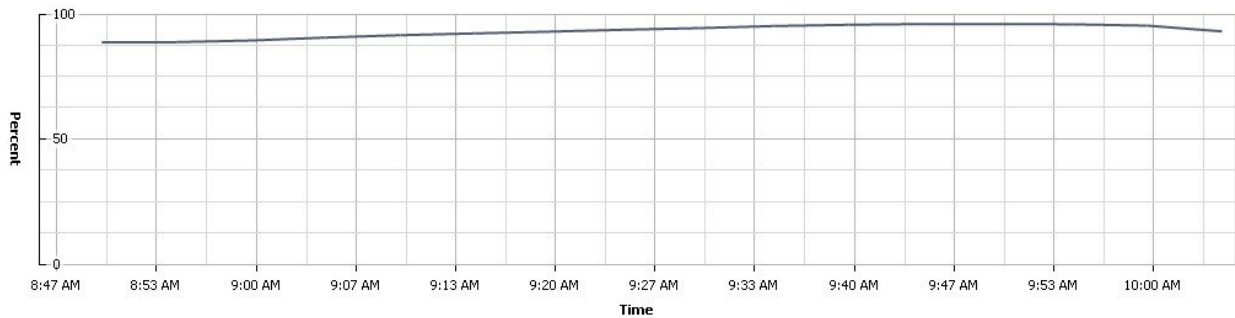
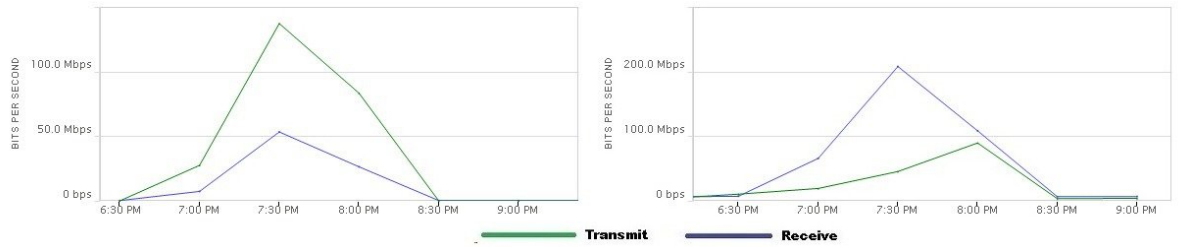


Figure 6 and 7 : Memory usage throughout the test

**Network and Storage Utilization throughout the Test**

**Figure 8: English**



**Figure 9: Japanese**

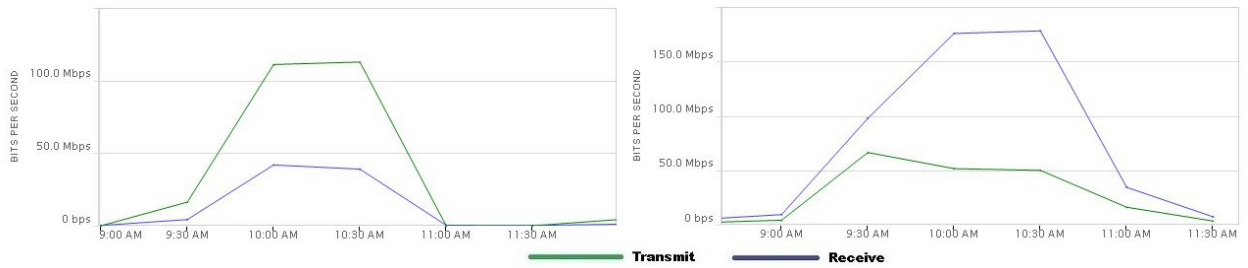


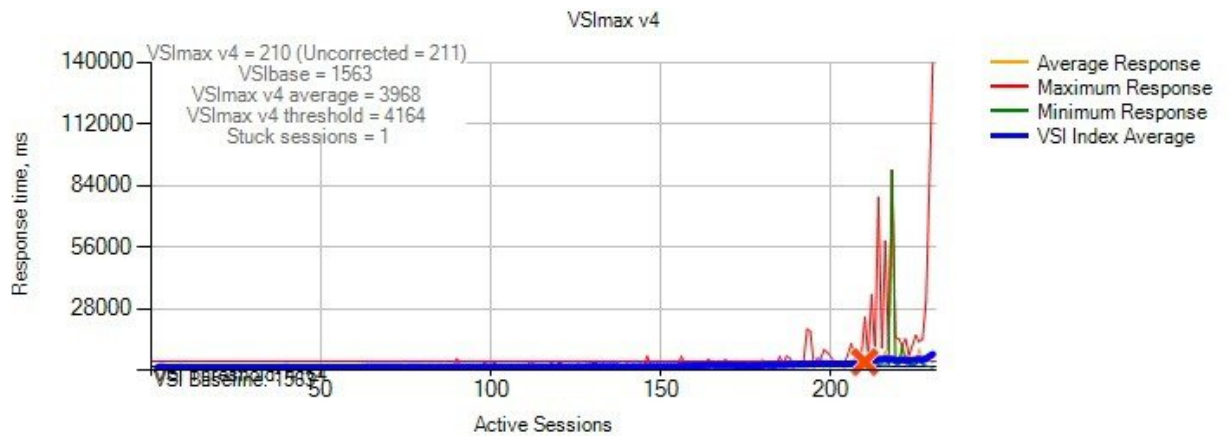
Figure 8 and 9 : Provisioning Services Network and Storage usage throughout the test

**Medium Workload Result**

Medium		
Desktop OS	No.of Launched Sessions	VSIMax
English	225	210
Japanese	225	198

**Login VSIMax**

**Figure 10: English**





**Figure 11: Japanese**

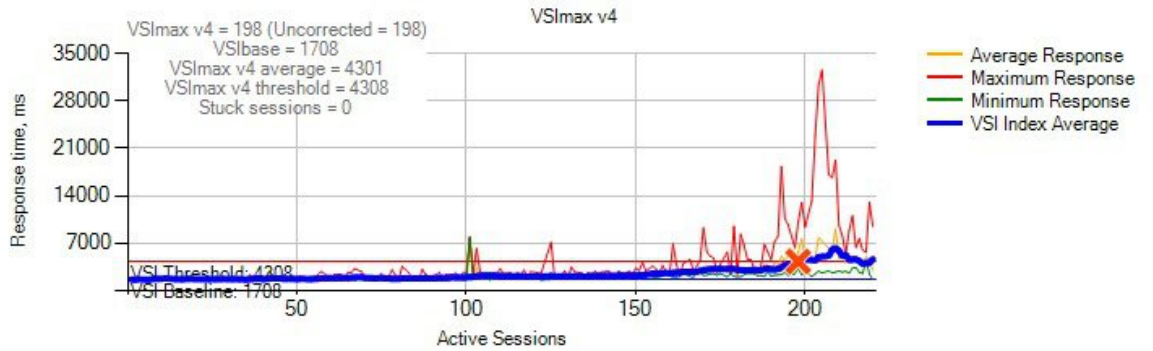
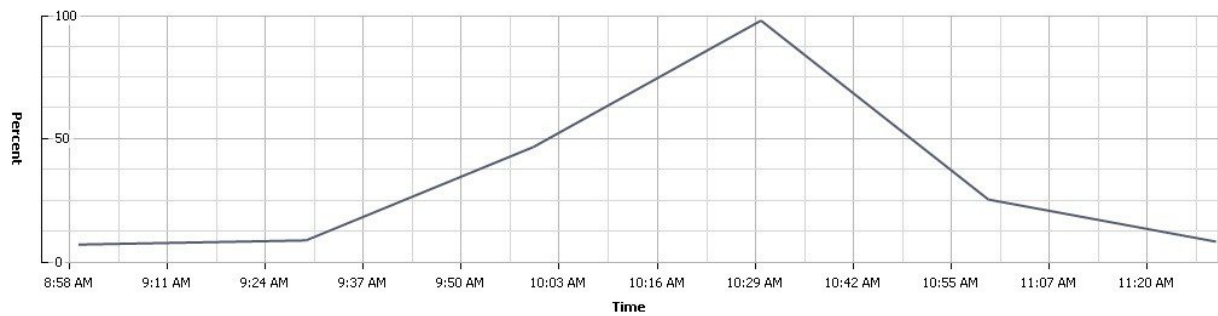


Fig 10 and 11: Average virtual desktop response times at various number of virtual desktops on the Cisco UCS B200 M4 server

**Processor And Memory Utilization throughout the test**

**Figure 12: English**



**Figure 13: Japanese**

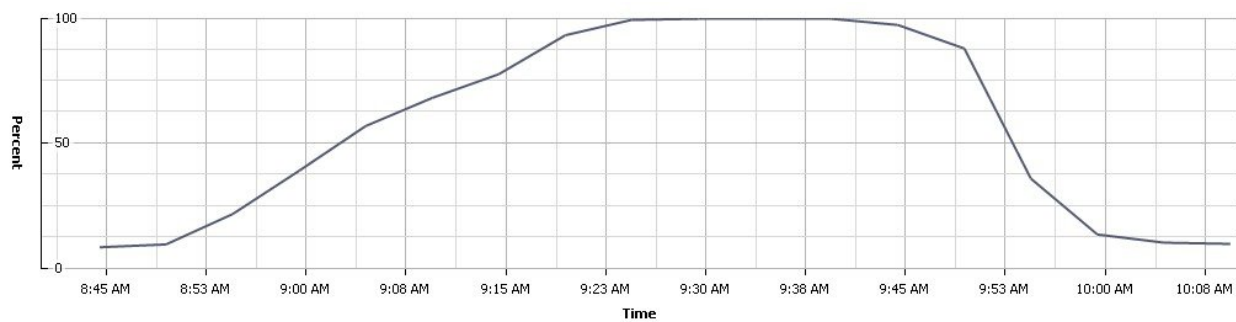
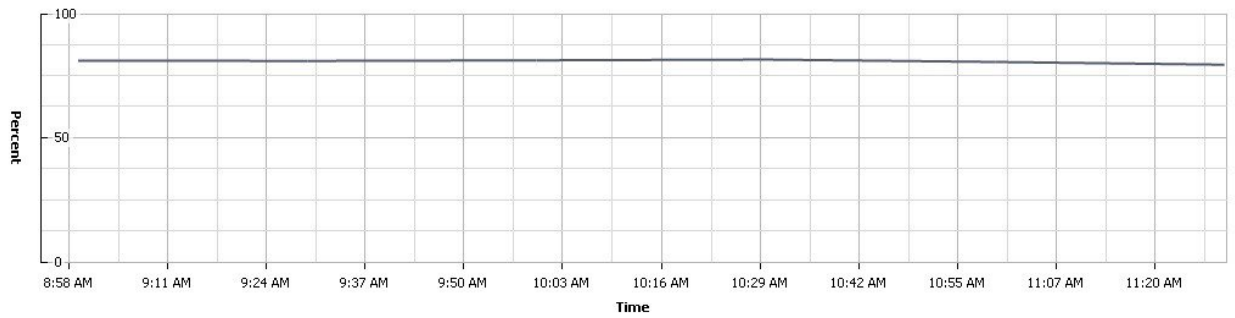


Figure 12 and 13 : CPU utilization throughout the test

**Figure 14: English**



**Figure 15: Japanese**

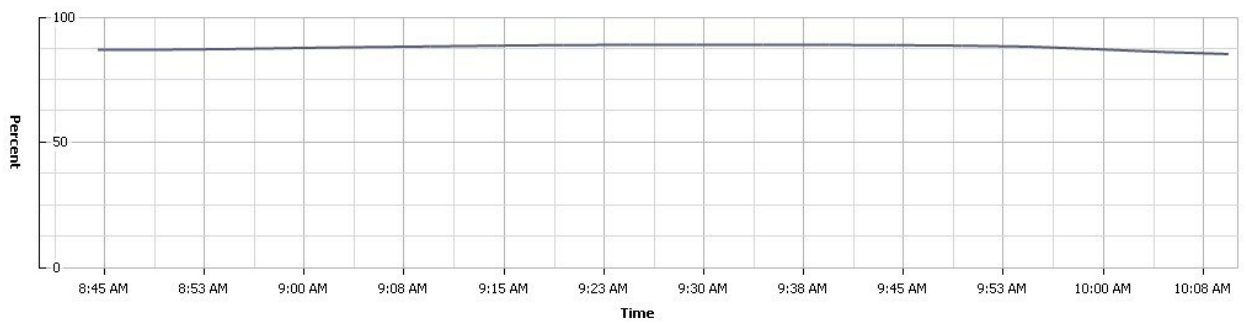
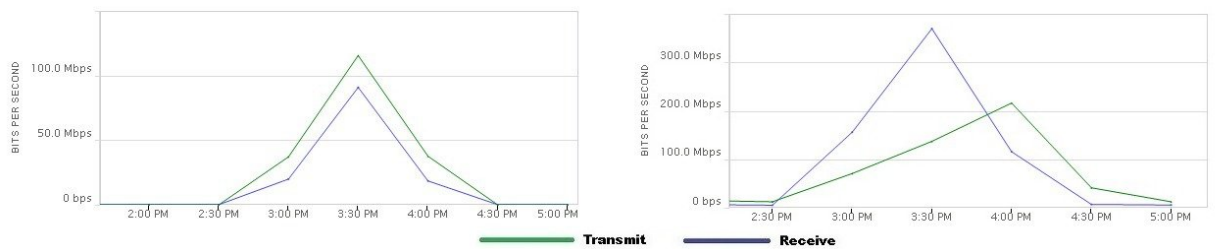


Figure 14 and 15 : Memory usage throughout the test  
**Network and Storage Utilization throughout the Test**

**Figure 16: English**



**Figure 17: Japanese**

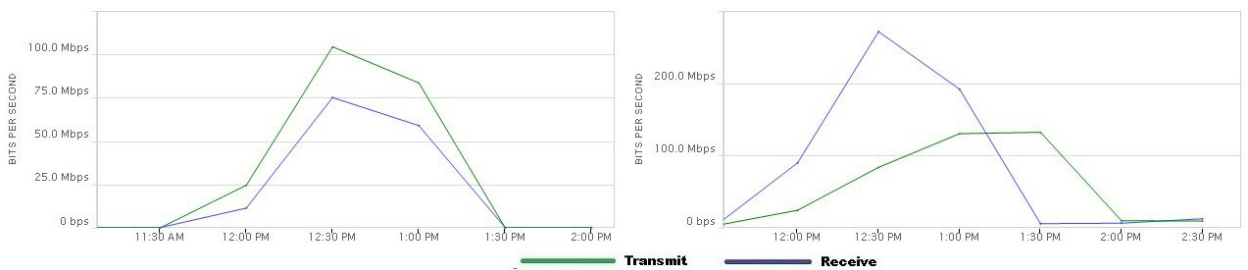


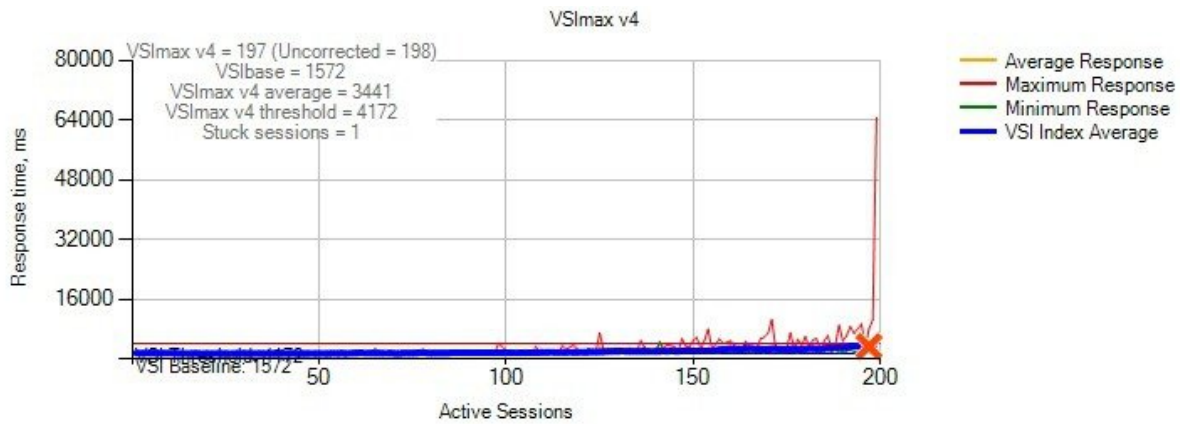
Figure 16 and 17 : Provisioning Services Network and Storage usage throughout the test

**Heavy Workload Result**

Heavy		
Desktop OS	No.of Launched Sessions	VSIMax
English	200	197
Japanese	200	179

**Login VSIMax**

**Figure 18: English**



**Figure 19: Japanese**

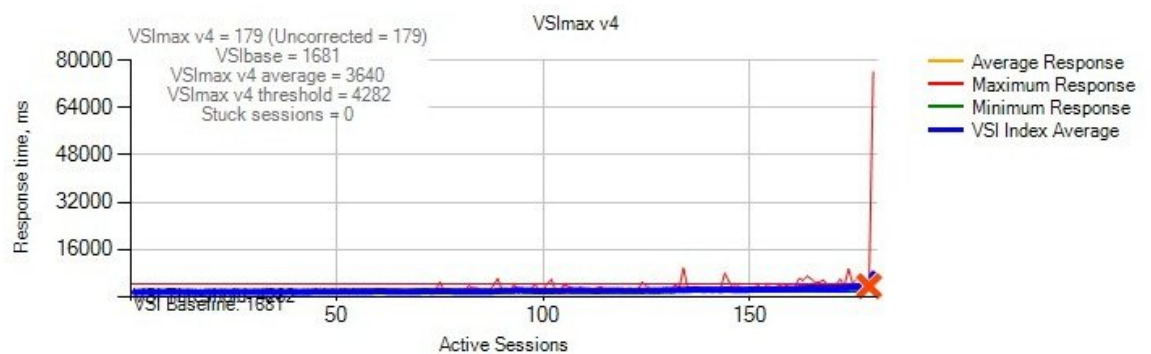
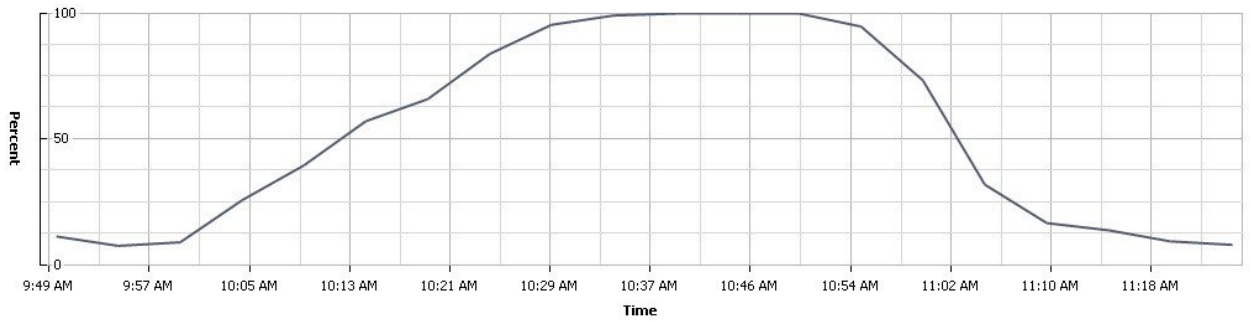


Fig 18 and 19: Average virtual desktop response times at various number of virtual desktops on the Cisco UCS B200 M4 server

**Processor And Memory Utilization throughout the test**

**Figure 20: English**



**Figure 21: Japanese**

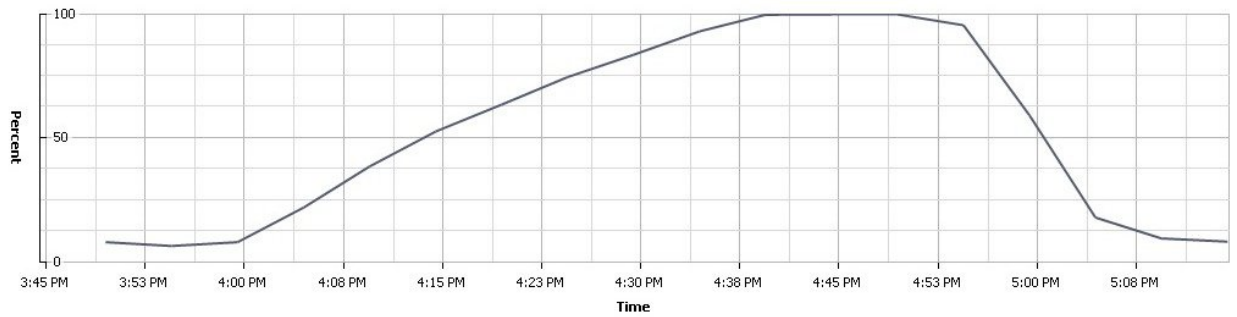


Figure 20 and 21 : CPU utilization throughout the test

**Figure 22: English**

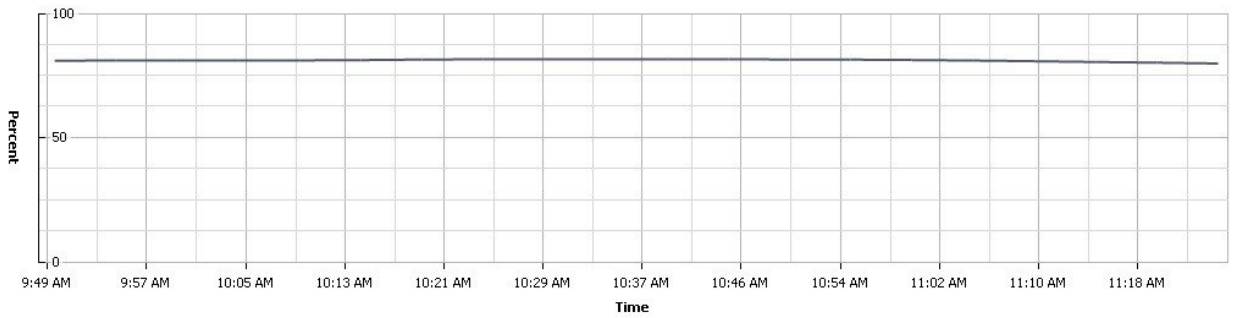


Figure 23: Japanese

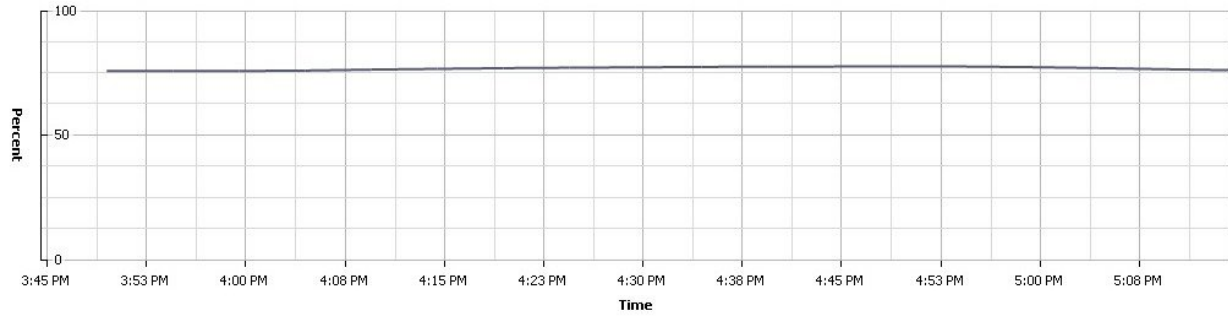


Figure 22 and 23 : Memory usage throughout the test  
 Network and Storage Utilization throughout the Test

Figure 24: English

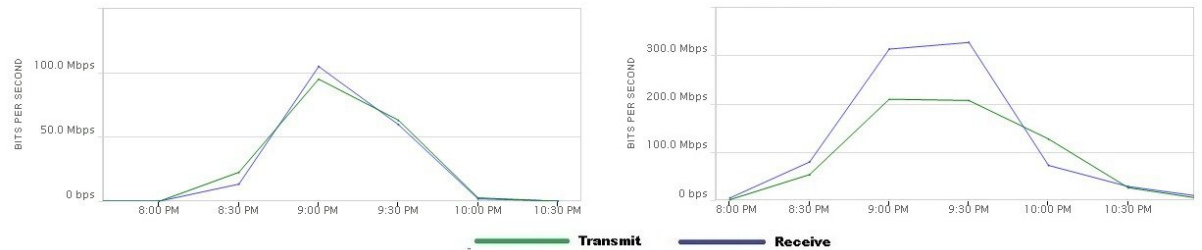


Figure 25: Japanese

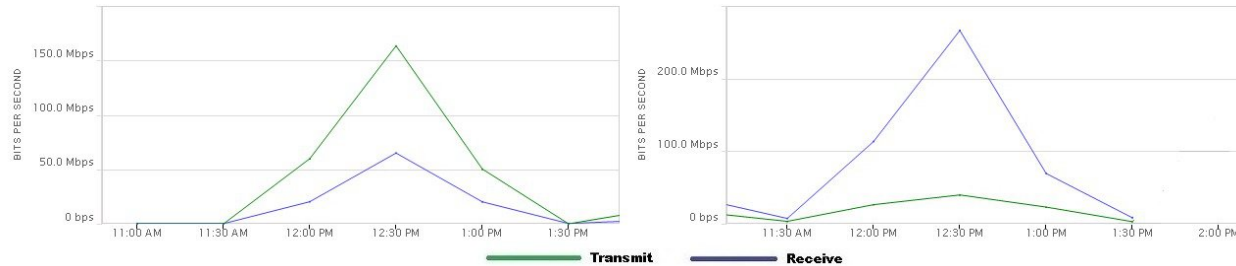


Figure 24 and 25 : Provisioning Services Network and Storage usage throughout the test

# Comparison of Windows 8 performance in Japanese and English Environment

VSIMAX Result		
Type of Workload	English	Japanese
Light	160	132
Medium	137	107

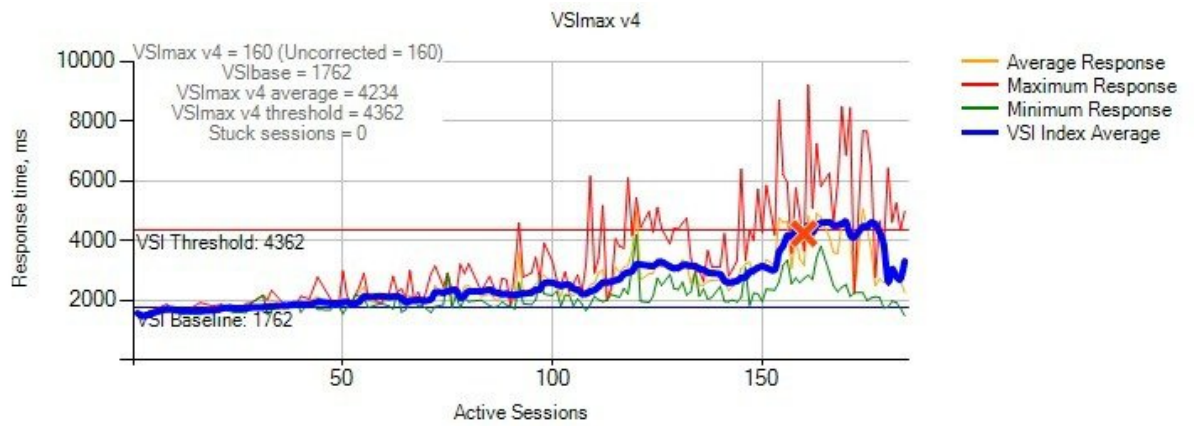
VSIMAX Result		
Heavy	121	100

**Light Workload Result**

Light		
Desktop OS	No.of Launched Sessions	VSIMax
English	180	160
Japanese	180	132

**Login VSIMax**

**Figure 26: English**



**Figure 27: Japanese**

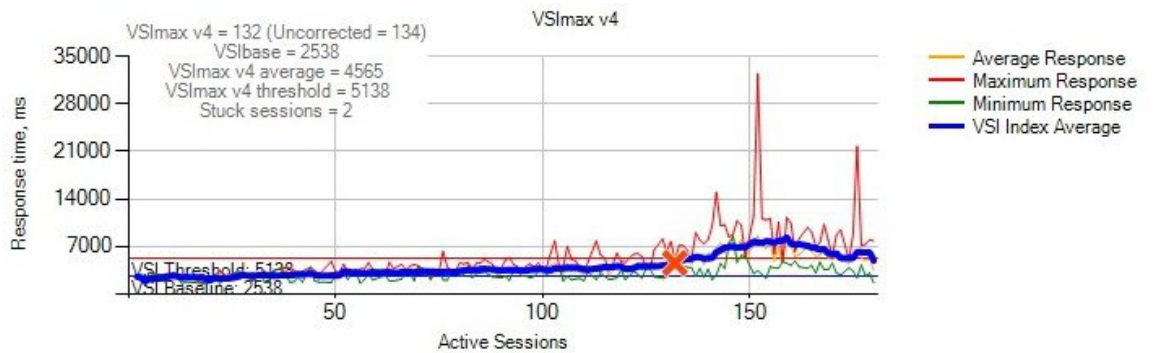


Fig 26 and 27: Average virtual desktop response times at various number of virtual desktops on the Cisco UCS B200 M4 server

Processor And Memory Utilization throughout the test

Figure 28: English

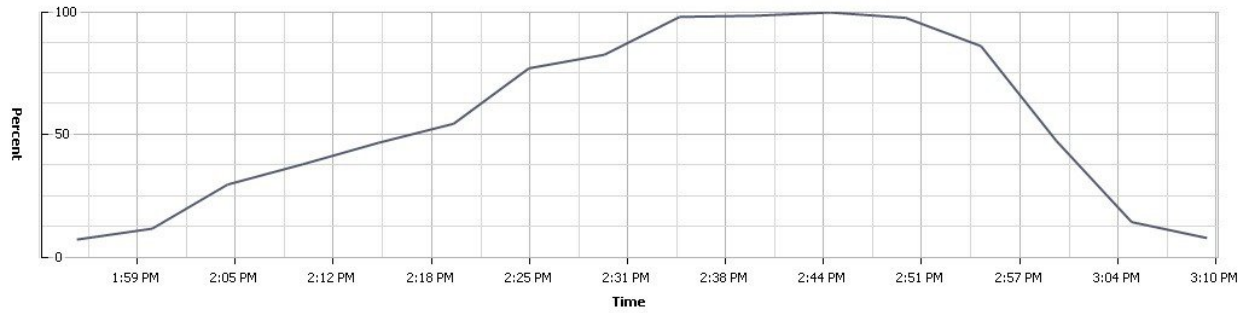


Figure 29: Japanese

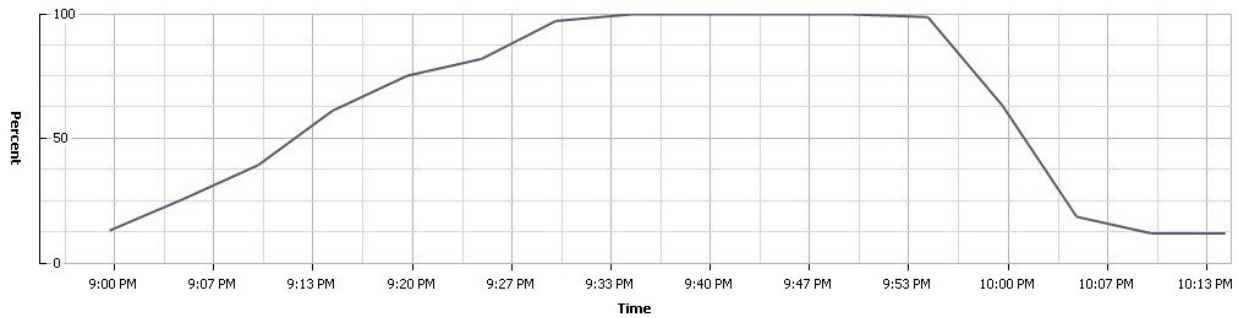
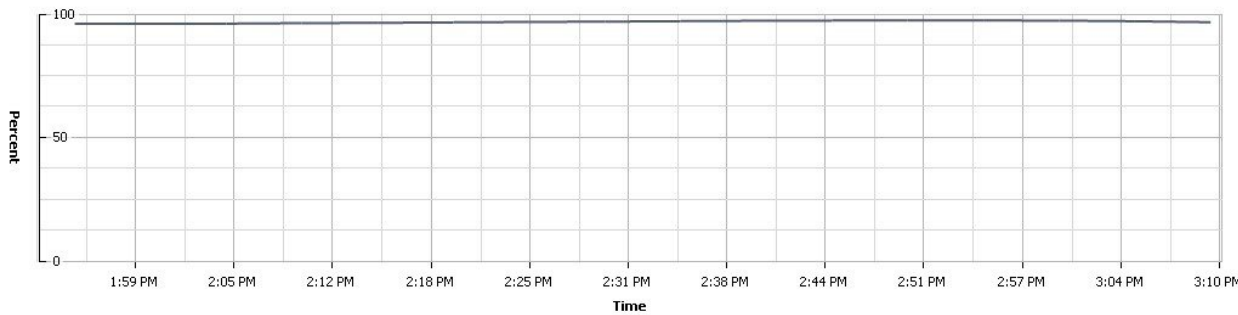


Figure 28 and 29 : CPU utilization throughout the test

Figure 30: English



**Figure 31: Japanese**

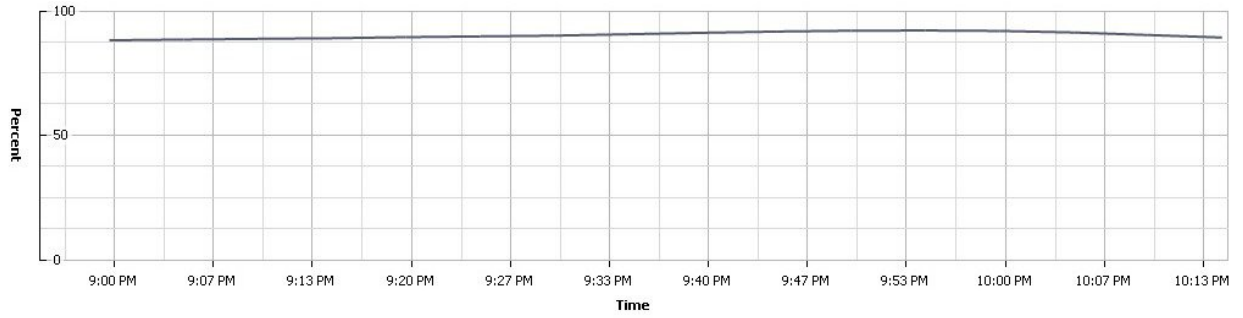
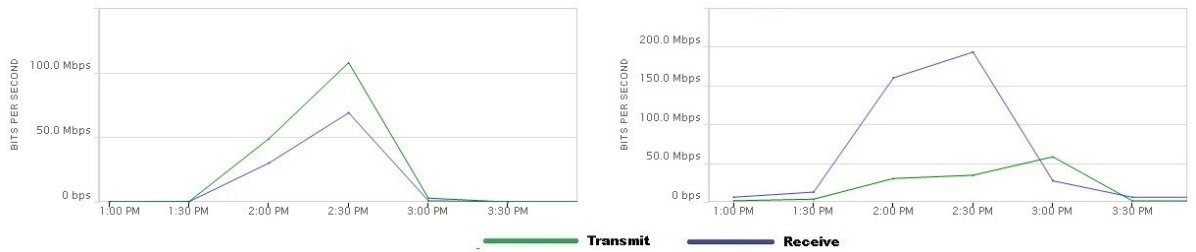


Figure 30 and 31 : Memory usage throughout the test

**Network and Storage Utilization throughout the Test**

**Figure 32: English**



**Figure 33: Japanese**

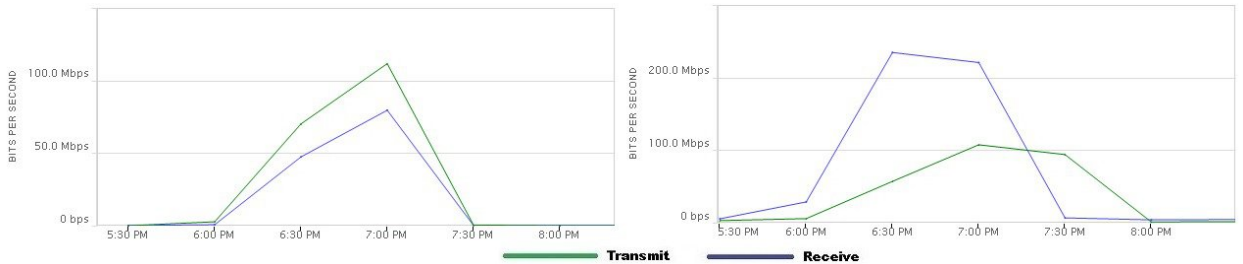


Figure 32 and 33 : Provisioning Services Network and Storage usage throughout the test

**Medium Workload Result**

Medium		
Desktop OS	No.of Launched Sessions	VSIMax
English	150	137
Japanese	150	107

**Login VSIMax**



Figure 34: English

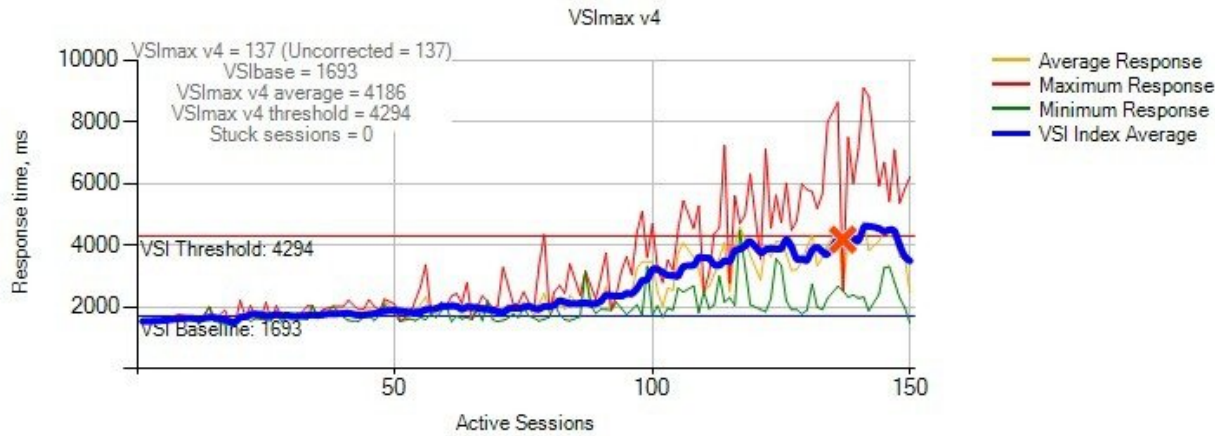


Figure 35: Japanese

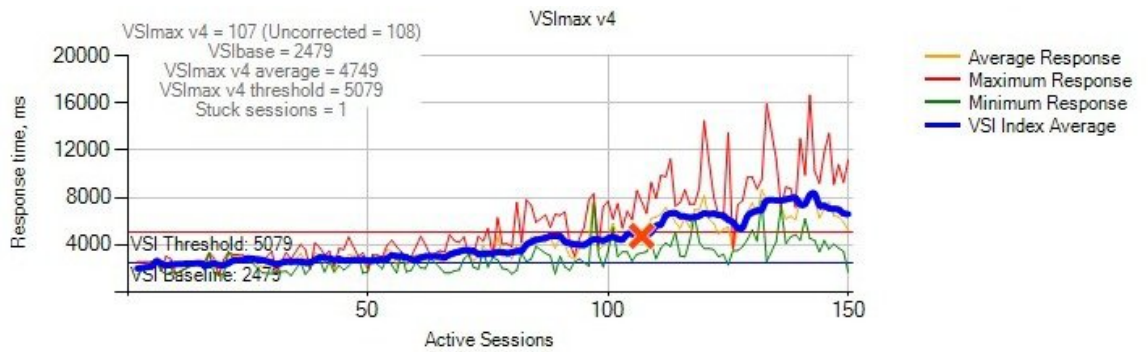
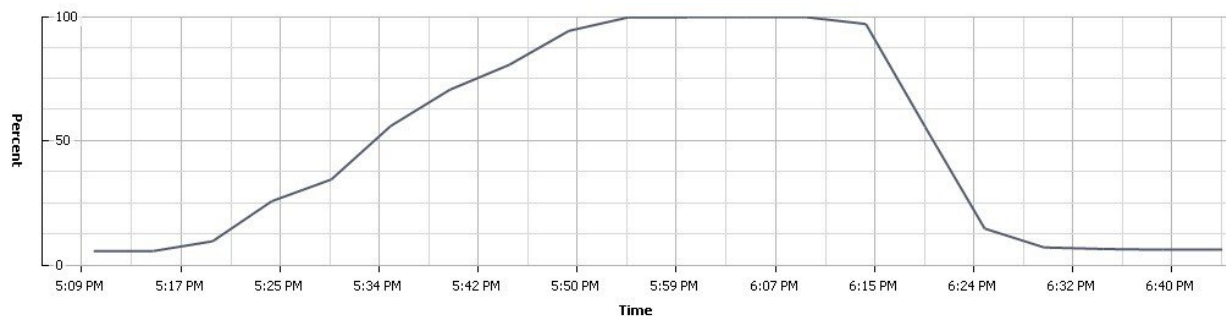


Fig 34 and 35: Average virtual desktop response times at various number of virtual desktops on the Cisco UCS B200 M4 server

Processor And Memory Utilization throughout the test

Figure 36: English



**Figure 37: Japanese**

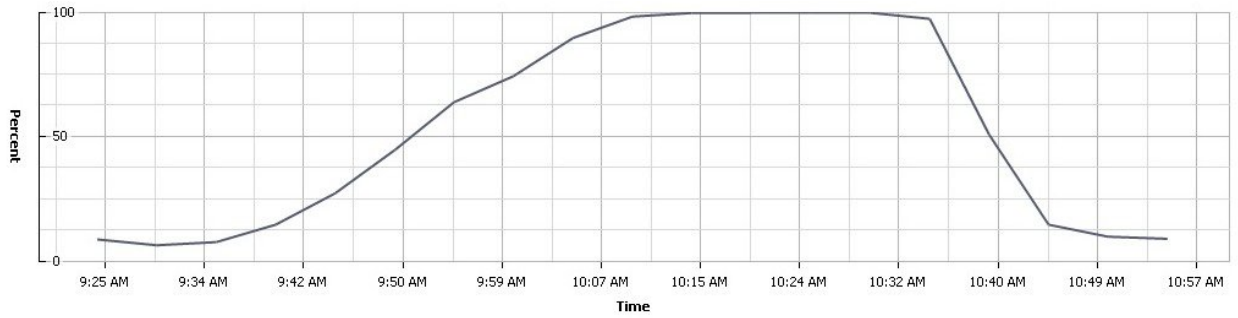
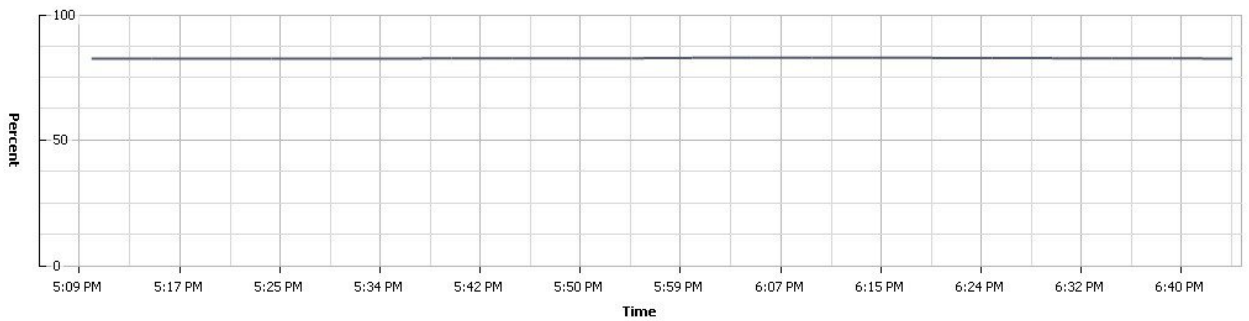


Figure 36 and 37 : CPU utilization throughout the test

**Figure 38: English**



**Figure 39: Japanese**

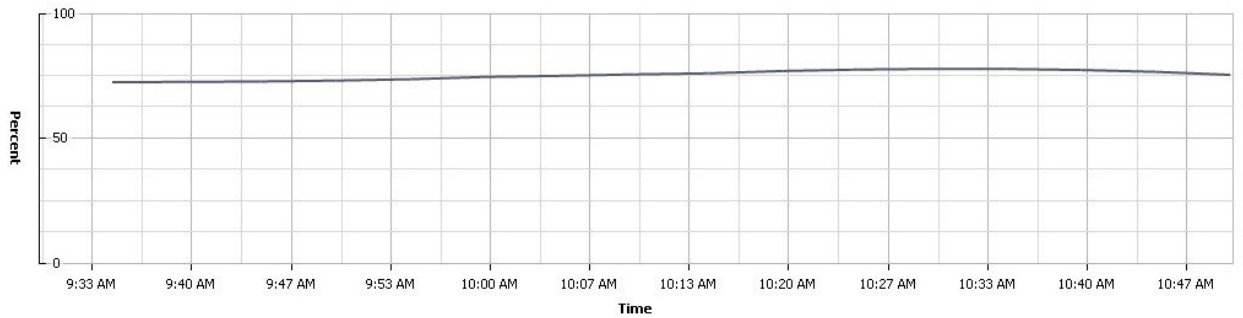


Figure 38 and 39 : Memory usage throughout the test

**Network and Storage Utilization throughout the Test**

Figure 40: English

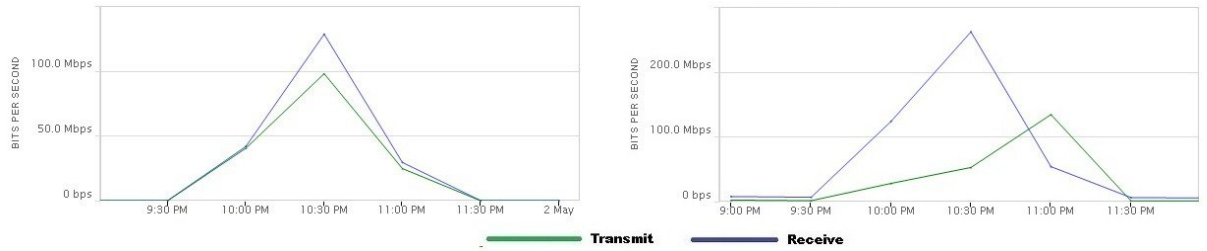


Figure 41: Japanese

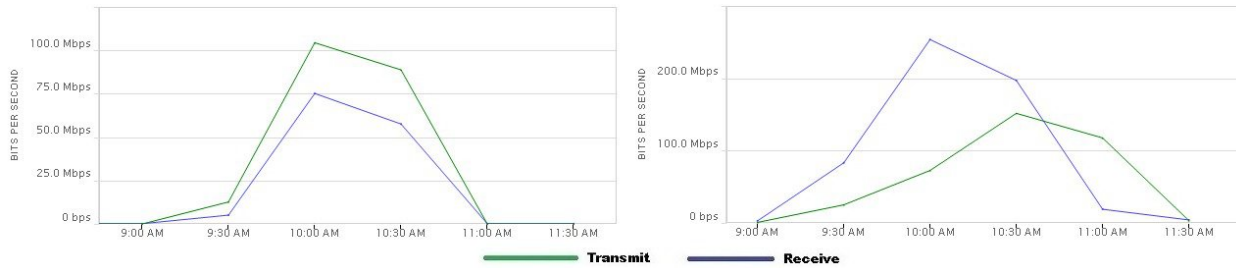


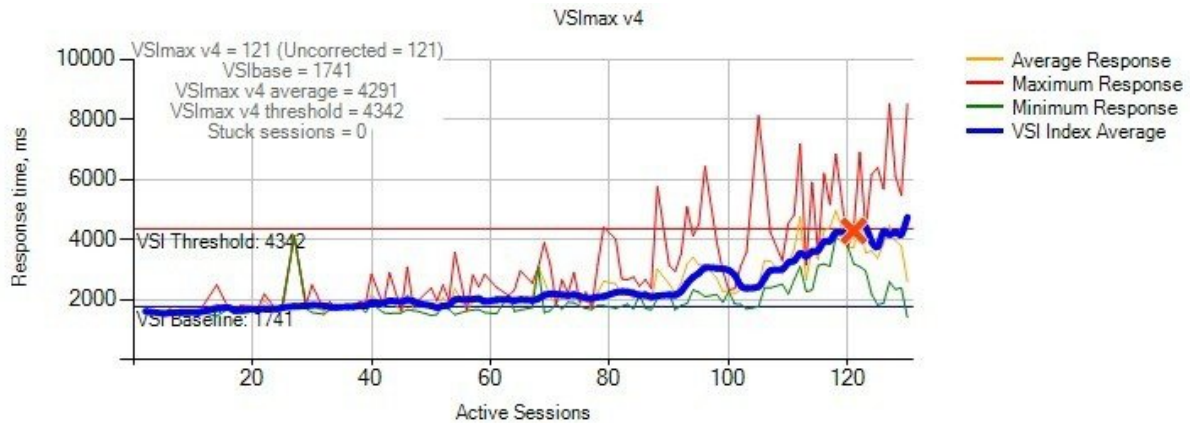
Figure 40 and 41 : Provisioning Services Network and Storage usage throughout the test

Heavy Workload Result

Heavy		
Desktop OS	No.of Launched Sessions	VSIMax
English	130	121
Japanese	130	100

Login VSIMax

Figure 42: English



**Figure 43: Japanese**

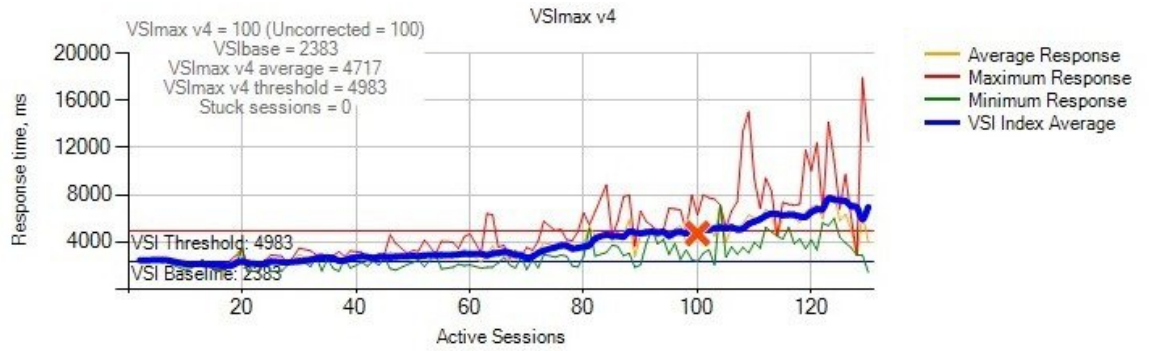
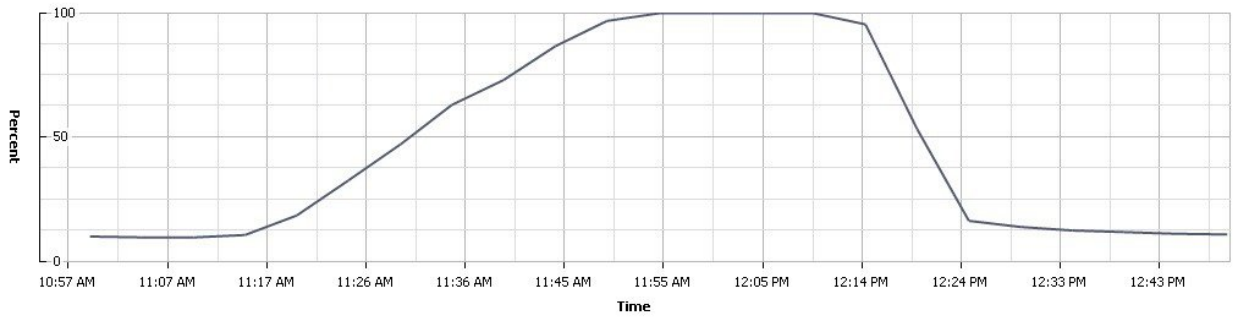


Fig 42 and 43: Average virtual desktop response times at various number of virtual desktops on the Cisco UCS B200 M4 server

**Processor And Memory Utilization throughout the test**

**Figure 44: English**



**Figure 45: Japanese**

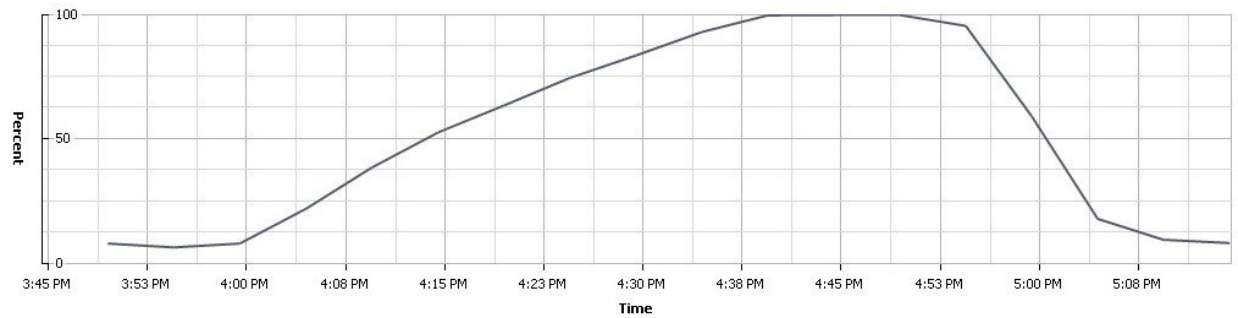
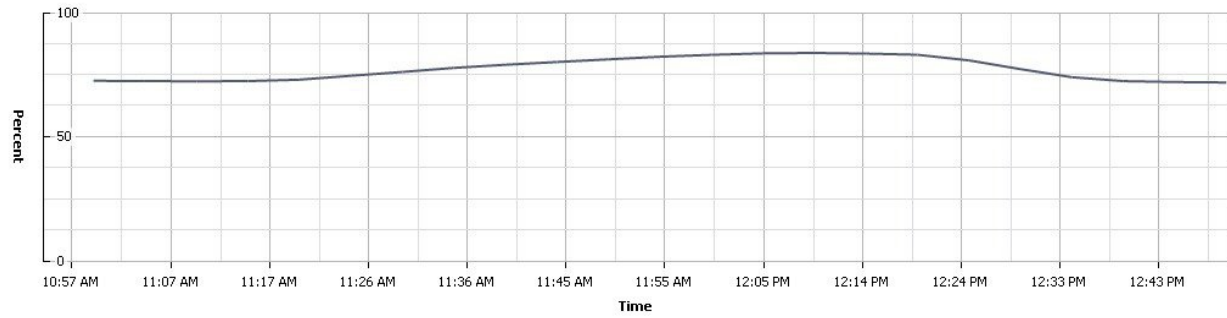


Figure 44 and 45 : CPU utilization throughout the test

**Figure 46: English**



**Figure 47: Japanese**

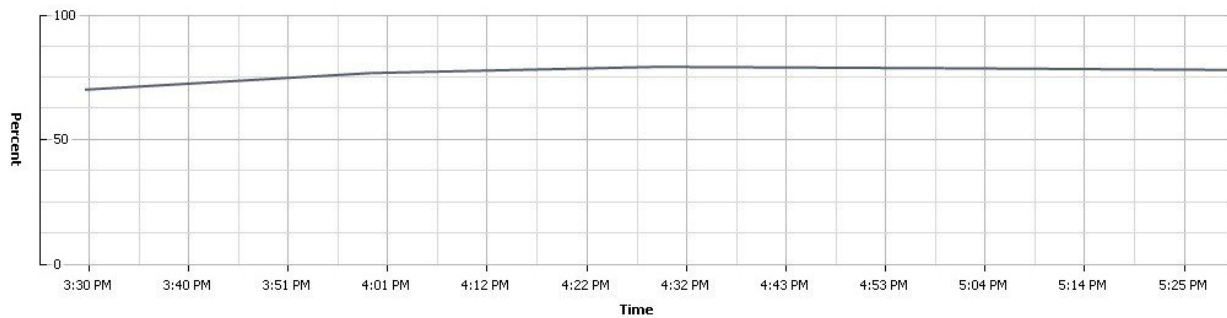
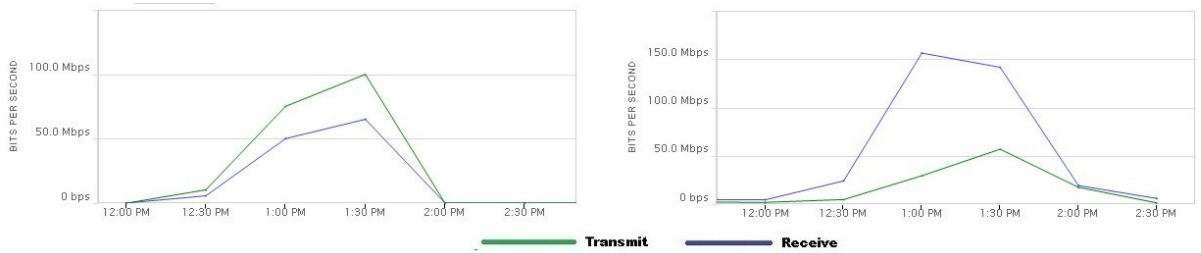


Figure 46 and 47 : Memory usage throughout the test  
**Network and Storage Utilization throughout the Test**

**Figure 48: English**



**Figure 49: Japanese**

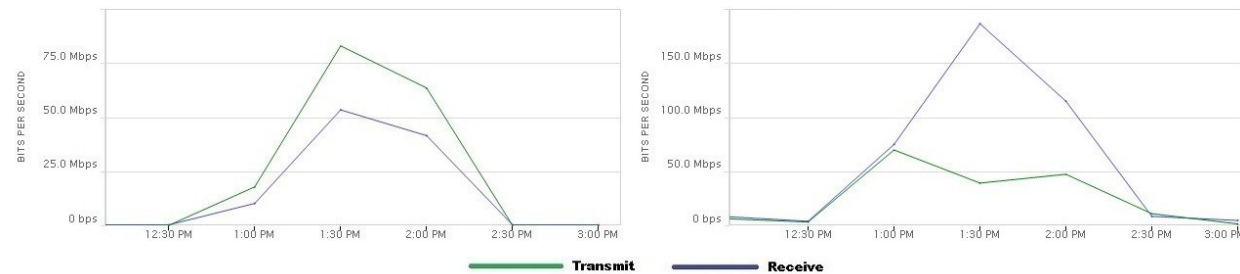


Figure 48 and 49 : Provisioning Services Network and Storage usage throughout the test

## Related Documentation

### Cisco Unified computing

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

<http://www.cisco.com/c/en/us/products/collateral/servers-unified-computing/ucs-b200-m4-blade-server/datasheet-c78-732434.html>

### Login VSI

[http://www.loginvsi.com/documentation/index.php?title=Main\\_Page](http://www.loginvsi.com/documentation/index.php?title=Main_Page)

### VMware Horizon View

<https://pubs.vmware.com/horizon-61-view/index.jsp?topic=%2Fcom.vmware.horizon-view.installation.doc%2FGUID-37D39B4F-5870-4188-8B11-B6C41AE9133C.html>