



## **Citrix VDI Scalability Testing on Cisco UCS B200 M3 server**

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# Citrix VDI Scalability Testing on Cisco UCS B200 M3 server

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## Overview

When deploying 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 Blade Server, we used Login VSI 4.0.8 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 Unified Computing System (UCS) B200 M3 Blade Server with Intel Xeon processor E5-2690
- VMware vSphere 5.1.0
- Citrix Provisioning Services 7 Flex Cast Streamed VHD delivery model
- A Citrix Xen Desktop 7 virtual desktop pool consisting of 200 Microsoft Windows 8 x64 VMs
- All Virtual machines in the Desktop Pool are provisioned with 2 vCPU and 2 GB of memory
- 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
VHD	Virtual Hard Disk
VSI	Virtual session Indexer



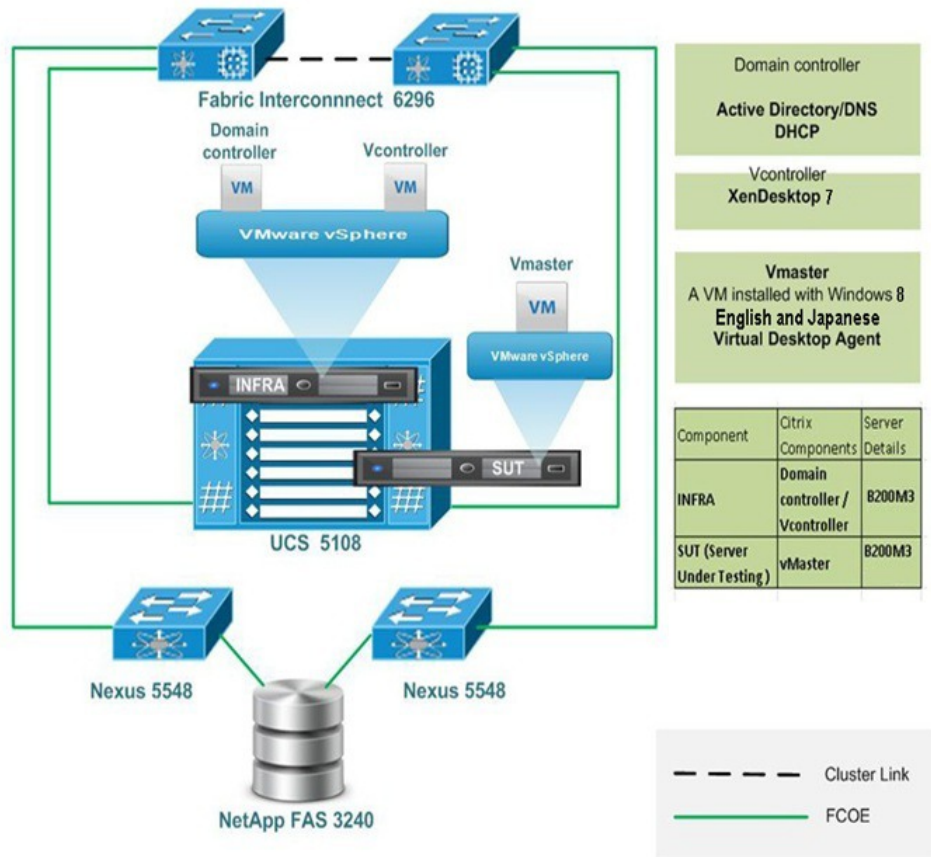
## Test Topology and Environment Matrix

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- [Test Topology, page 4](#)
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# Test Topology

Figure 1: Topology in Use



# Environment Matrix

## Infra Components

Component	Version
UCS Blade server	Cisco UCS B200 M3 (for both Infra and SUT)
UCSM	2.1(3a)
<b>Operating System</b>	
Windows Server OS	Windows Server 2012 x64 (Japanese/English)
Windows Desktop OS	Windows 8 Enterprise x64 (Japanese/English)



Component	Version
<b>Hypervisor</b>	
ESXi	VMware ESXi 5.1 799733
<b>Storage</b>	
NetApp FAS 3240	8.0.2
<b>FCoE Switch</b>	
Nexus 5548 UP	6.0(2)N2(2)
<b>Virtual Desktop Delivery Component</b>	
Citrix Xen Desktop	7
<b>VDI Scalability measuring Tool</b>	
Login VSI	4.0.8
Active Directory & DHCP	Windows 2012 server x64 (Japanese/English)
Login VSI Launcher, Analyzer and VSI share	Windows 2012 server x64 (Japanese/English)

**SUT Components**

Component	Type
<b>CPUs</b>	
Vendor	Intel® Corporation
Name	Intel® Xeon® E5-2690
Core Frequency (GHz)	2.9
<b>Platform</b>	
Vendor	Cisco UCS B200 M3
BIOS Settings	2.1(3a)
<b>Memory modules</b>	
Total RAM in the system (GB)	384
Vendor	Samsung
Type	DDR3
Speed (MHz)	1600
Size (GB)	16
Number of RAM modules	24
Chip organization	Double sided

<b>Component</b>	<b>Type</b>
Rank	Dual
<b>Hard Disk</b>	
Vendor number	Seagate Technology LLC
Number of Disks in the System	2
Size (GB)	300
<b>Operating System</b>	
Name	VMWare ESXi 5.1.0
Build number	799733
Operating System Power Profile	Maximum Performance
<b>IO Adapters</b>	
Vendor and Model number	UCS VIC 1280

**Tested VM Configuration**

<b>Components of VM</b>	<b>English</b>	<b>Japanese</b>
Virtual Desktop - vCPU	2	2
Virtual Desktop - RAM	2 GB	2 GB
Virtual Desktop - HardDisk	35 GB (Thin Provisioned)	35 GB (Thin Provisioned)
Virtual Desktop - Network Adapter	Intel e1000	Intel e1000
OS Build No	917522	917919



## Implementation Steps And Test Execution Details

- [Implementation steps for Citrix VDI, page 7](#)
- [Test Execution details, page 7](#)

### Implementation steps for Citrix VDI

- Infra components such as Active Directory/DNS and DHCP server, XenDesktop Delivery Controller, vCenter server are deployed as Virtual machines on Cisco UCS B200 M3 server.
- 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.
- Master image created on the Server Under Test (B200 M3) is installed with Windows 8 (English/Japanese). 4TB LUN is provided from NetApp storage to the SUT server for VM provisioning

### 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**

# Citrix VDI Scalability Testing on Cisco UCS B200 M3 server

- [Comparison of Japanese and English Environment performance, page 9](#)
- [Light Workload Result, page 9](#)
- [Medium workload Result, page 13](#)
- [Heavy workload Result, page 17](#)
- [Related Documentation, page 21](#)

## Comparison of Japanese and English Environment performance

<b>VSIMAX result</b>		
<b>Type of Workload</b>	<b>English</b>	<b>Japanese</b>
Light	169	151
Medium	131	119
Heavy	114	100

## Light Workload Result

<b>Light</b>		
<b>Server OS</b>	<b>No.of Launched sessions</b>	<b>VSIMax</b>
English	200	169
Japanese	200	151

Login VSIMax

Figure 2: English

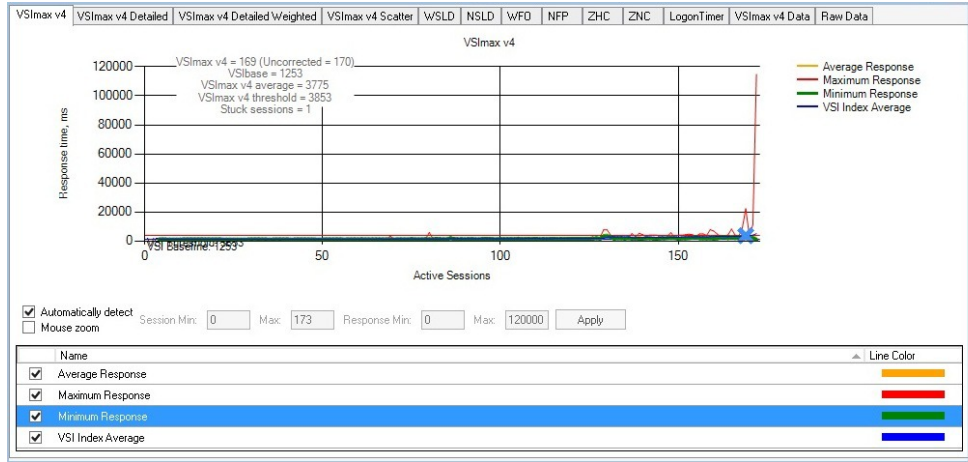


Figure 3: Japanese

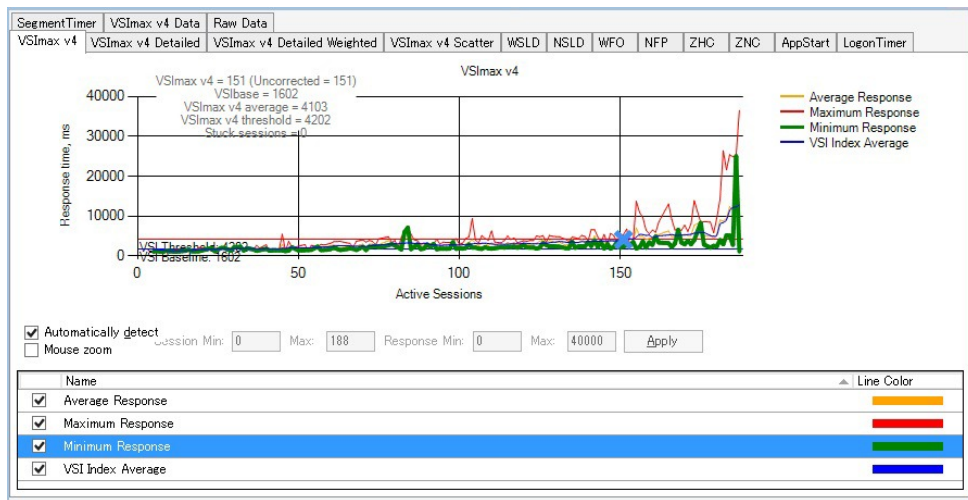
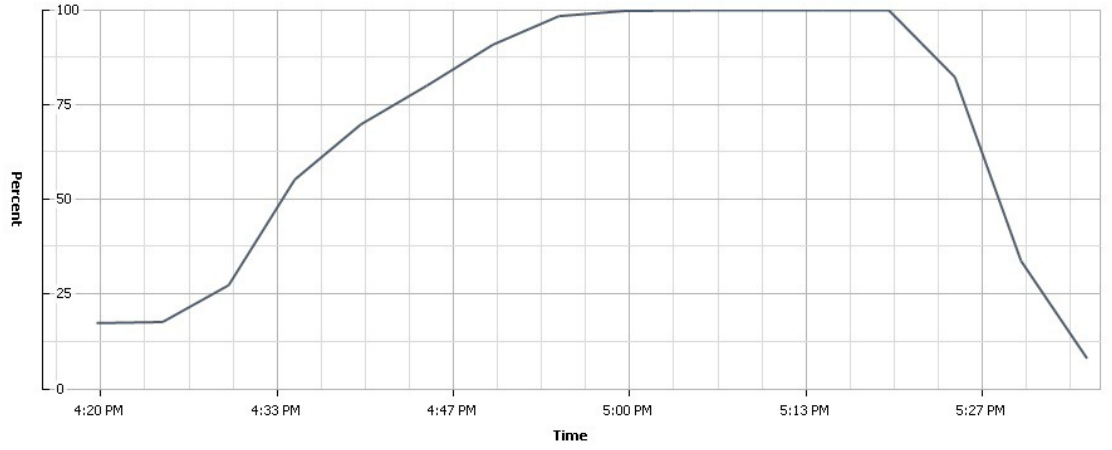


Fig 2 And 3: Average virtual desktop response times at various numbers of virtual desktops on the Cisco UCS B200 M3 Blade Server

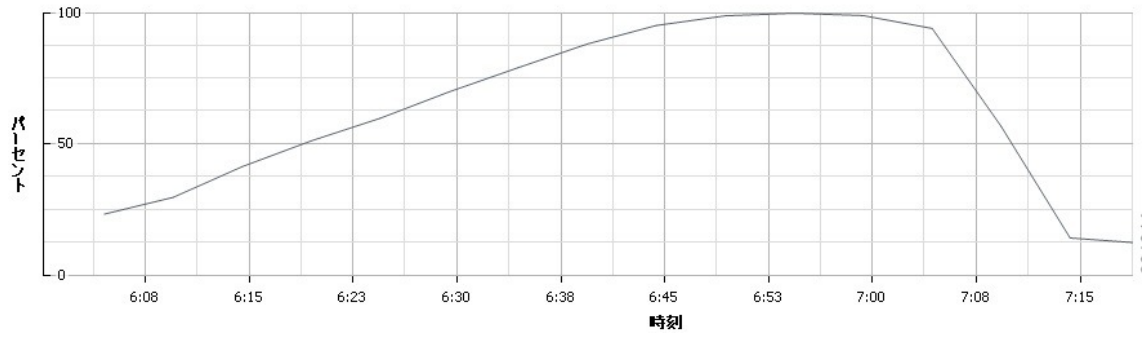
### Processor And Memory Utilization throughout the test

Figure 4: English



381685

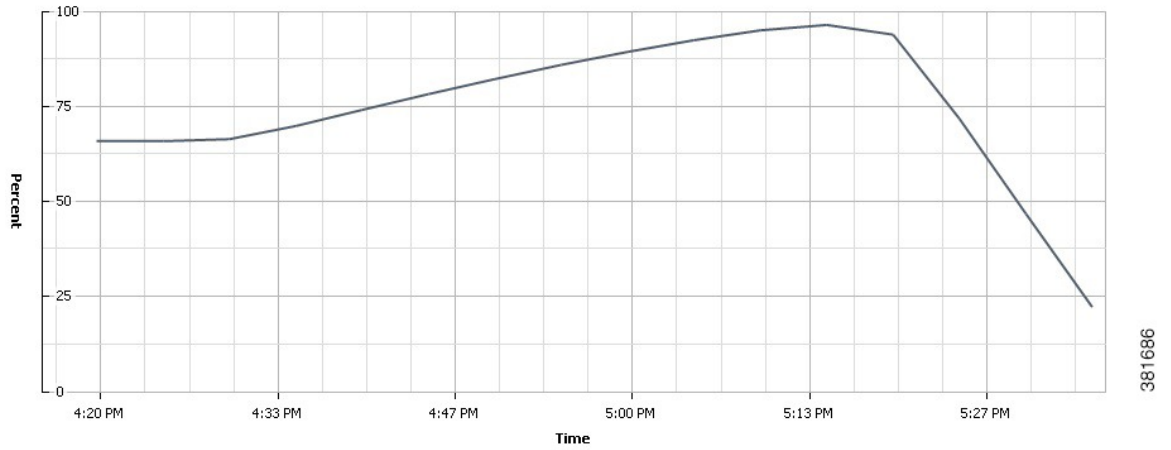
Figure 5: Japanese



381844

Figure 4 And 5 : CPU utilization throughout the test.

**Figure 6: English**



**Figure 7: Japanese**

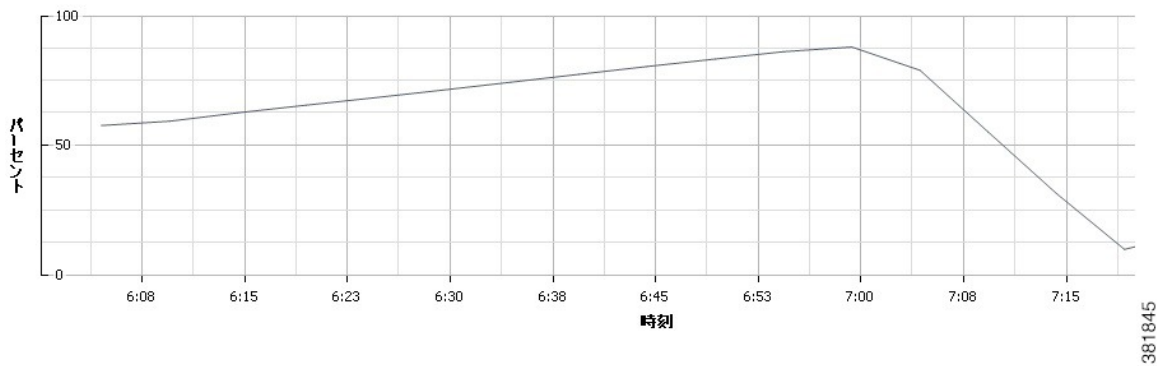
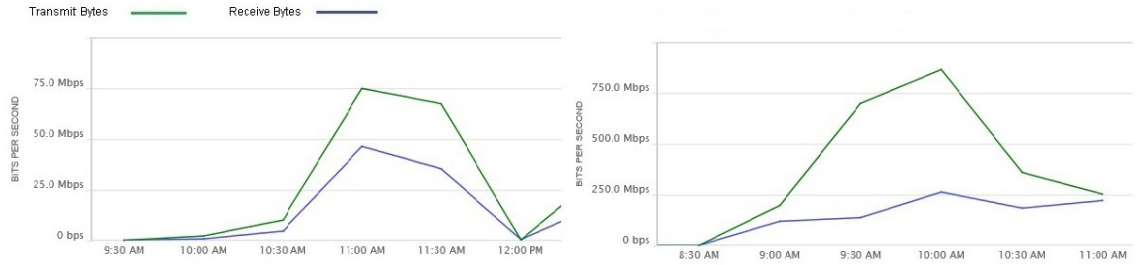


Figure 6 And 7 : Memory usage throughout the test



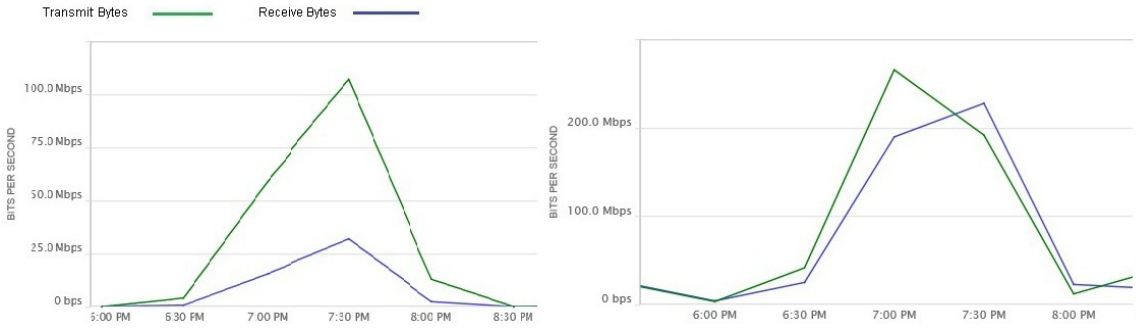
**Network And storage Utilization throughout the test**

**Figure 8: English**



381834

**Figure 9: Japanese**



381847

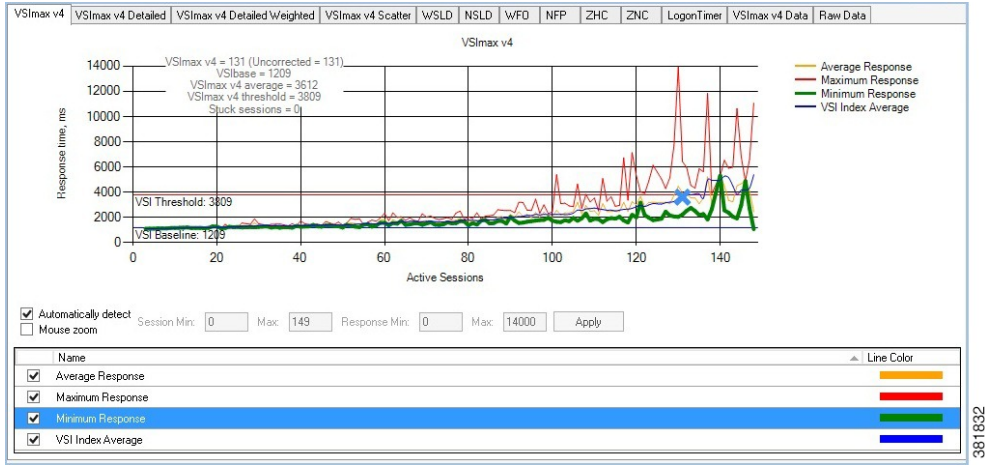
Figure 8 And 9 : Provisioning Services Network And storage usage throughout the test

# Medium workload Result

Medium		
Server OS	No.of Launched sessions	VSIMax
English	150	131
Japanese	150	119

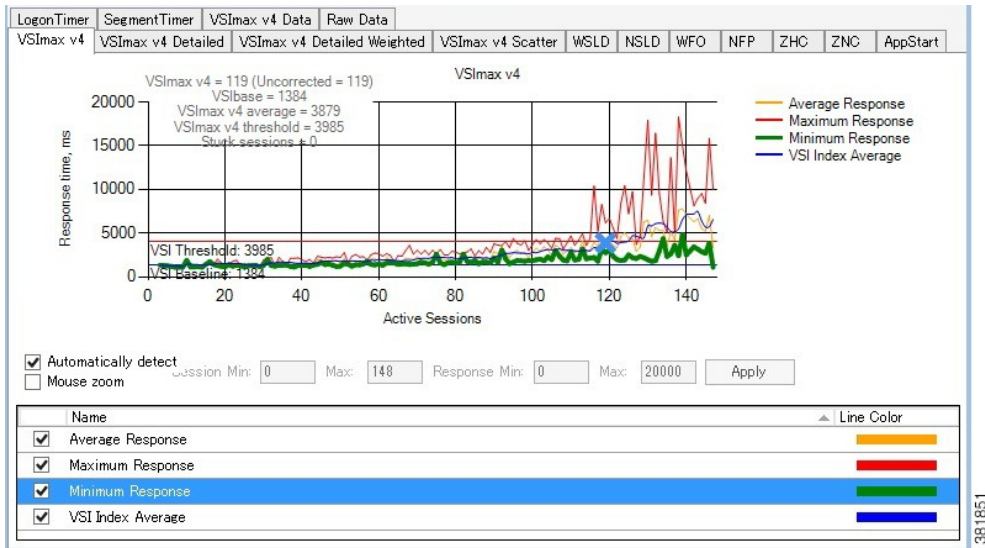
Login VSIMax

Figure 10: English



381832

Figure 11: Japanese

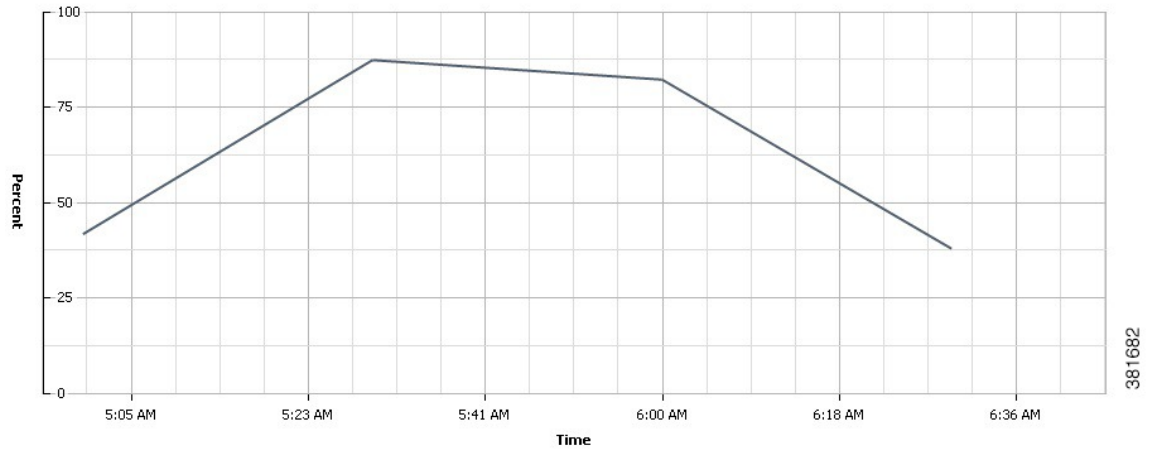


381851

Fig.10 And 11 : Average virtual desktop response times at various numbers of virtual desktops on the Cisco UCS B200 M3 Blade Server

**Processor And Memory Utilization throughout the test**

**Figure 12: English**



**Figure 13: Japanese**

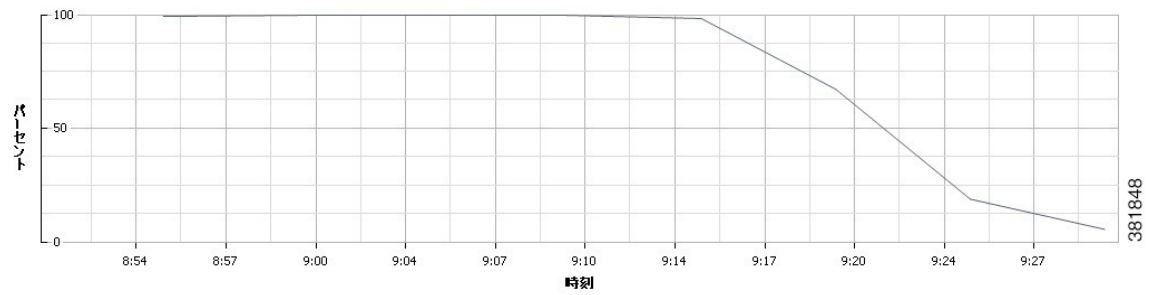
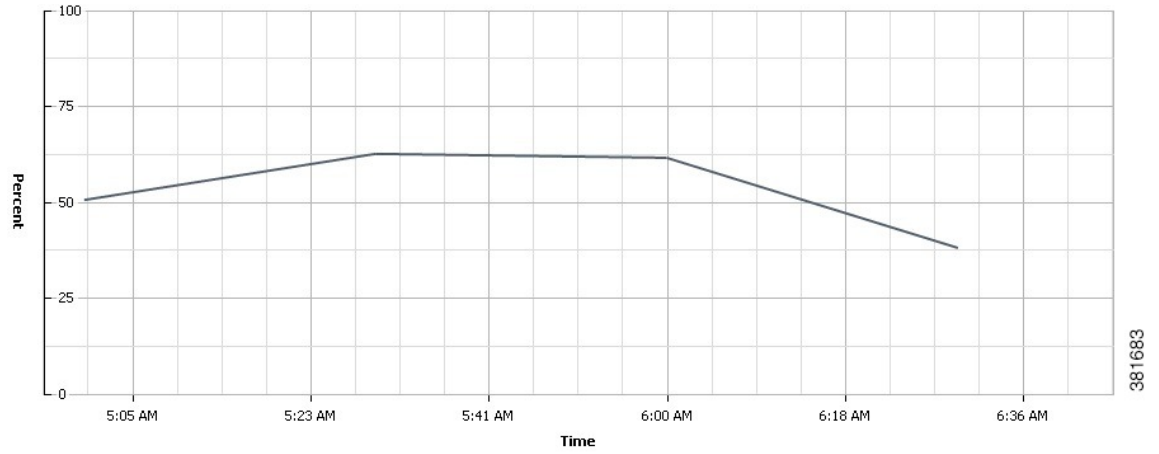


Figure 12 And 13 : CPU utilization throughout the test.

**Figure 14: English**



**Figure 15: Japanese**

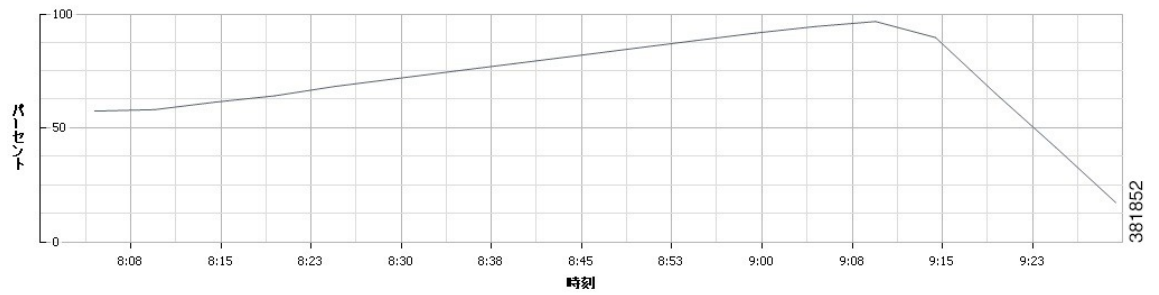
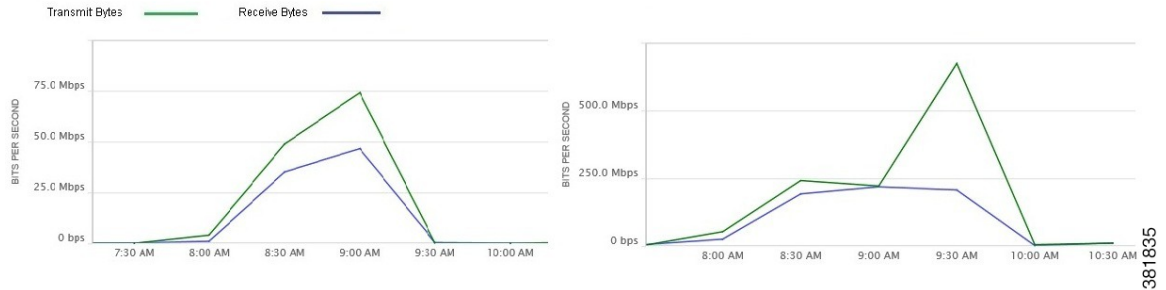


Figure 14 And 15 : Memory usage throughout the test

**Network And storage Utilization throughout the test**

**Figure 16: English**



**Figure 17: Japanese**

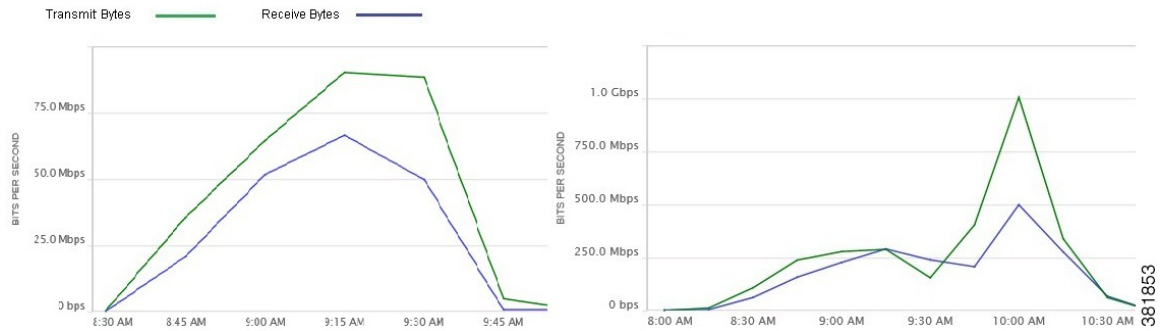


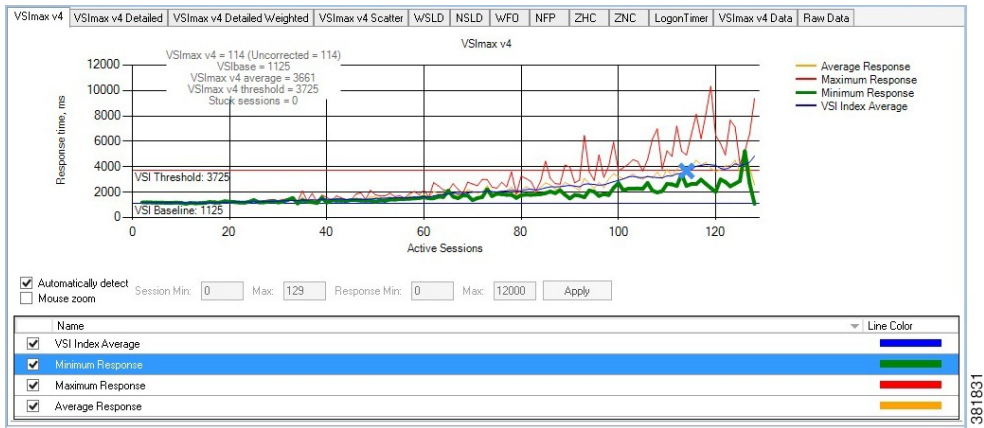
Figure 16 And 17 : Provisioning Services network And storage usage throughout the test

# Heavy workload Result

Heavy		
Server OS	No.of Launched sessions	VSIMax
English	130	114
Japanese	130	100

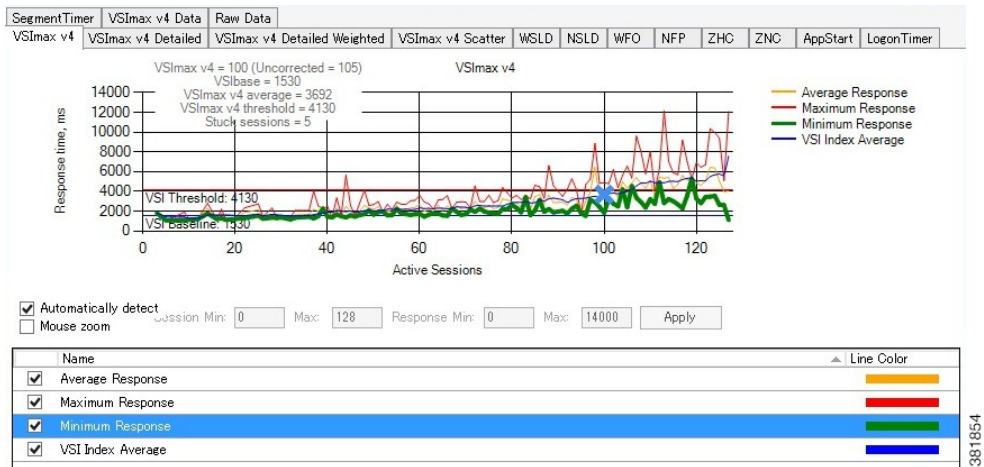
Login VSIMax

Figure 18: English



381831

Figure 19: Japanese



381854

Fig.18 And 19 : Average virtual desktop response times at various numbers of virtual desktops on the Cisco UCS B200 M3 Blade Server

Processor And Memory Utilization throughout the test

Figure 20: English

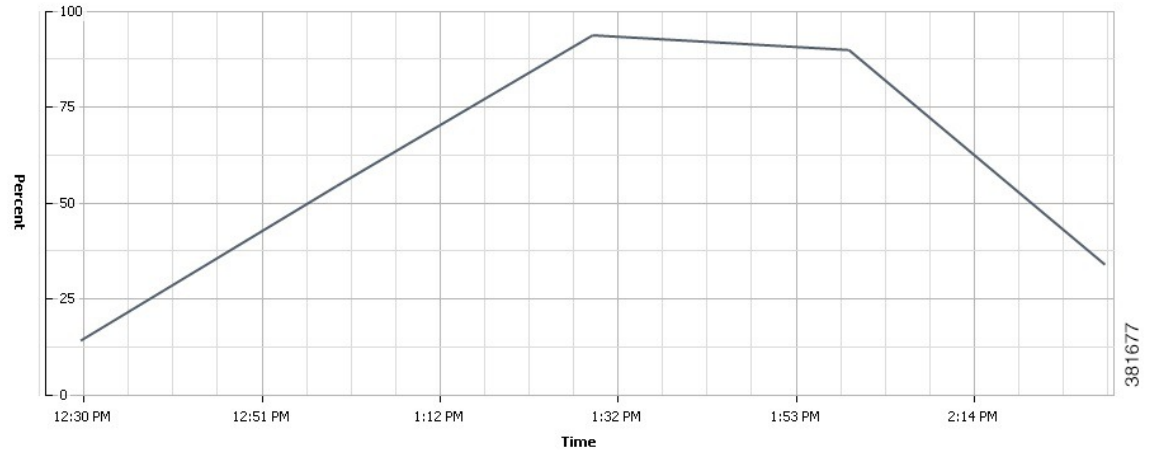


Figure 21: Japanese

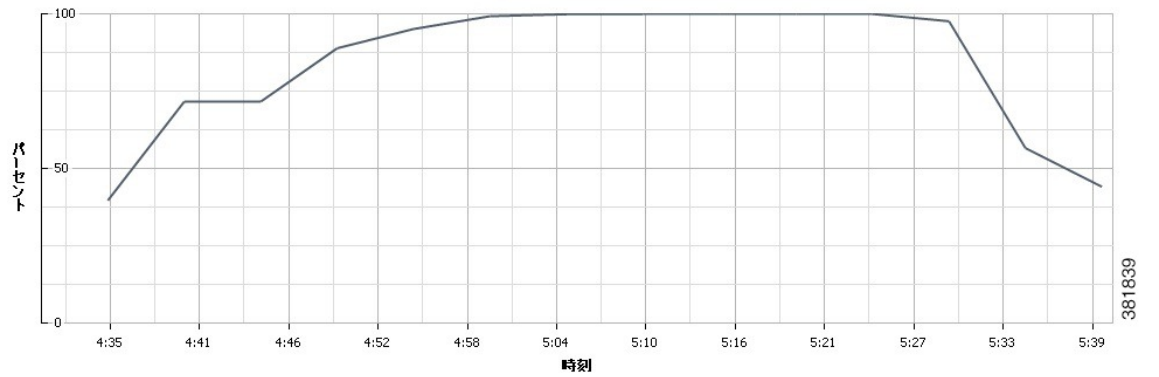
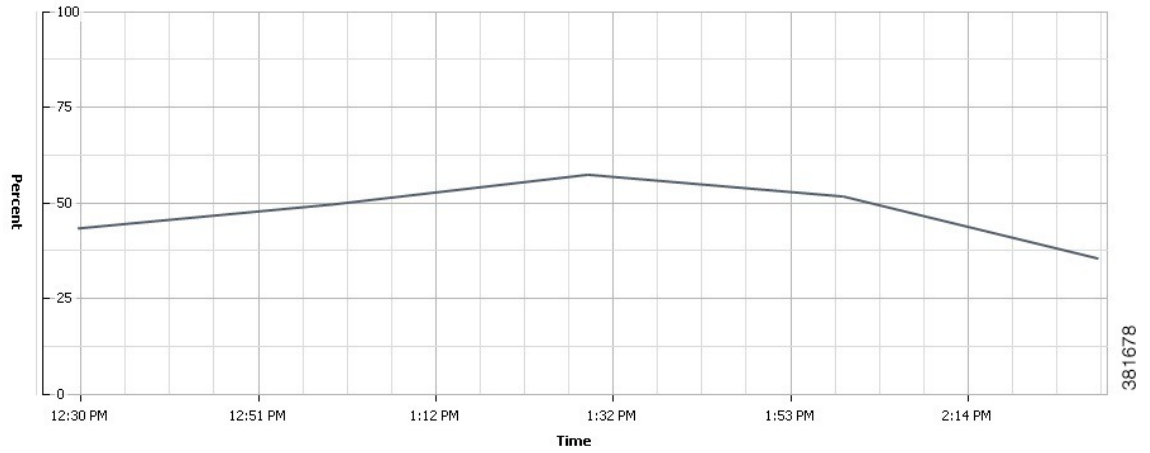


Figure 20 And 21 : CPU utilization throughout the test.

**Figure 22: English**



**Figure 23: Japanese**

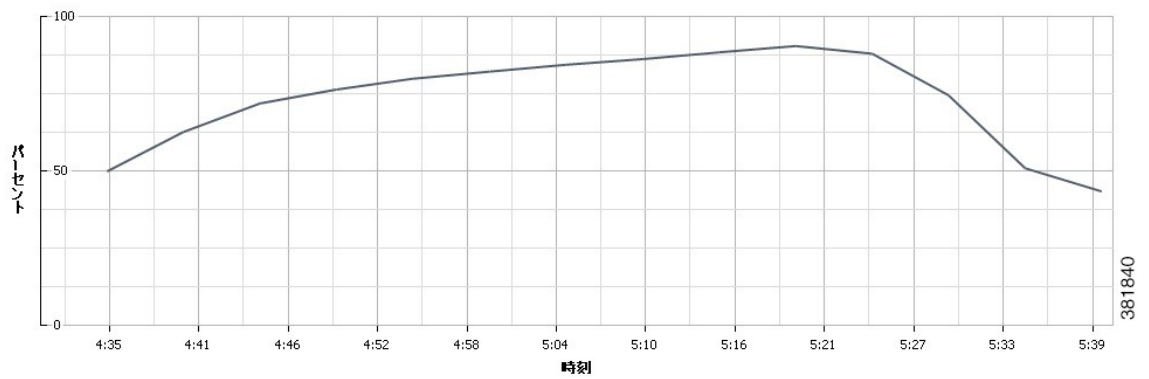
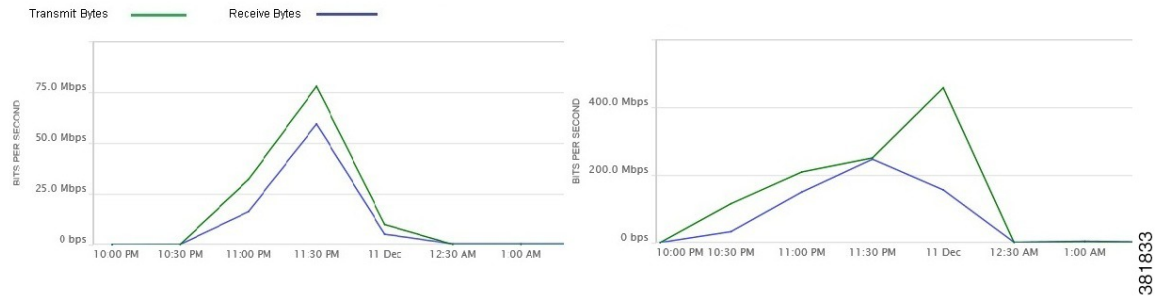


Figure 22 And 23: Memory usage throughout the test



## Network And storage Utilization throughout the test

**Figure 24: English**



**Figure 25: Japanese**

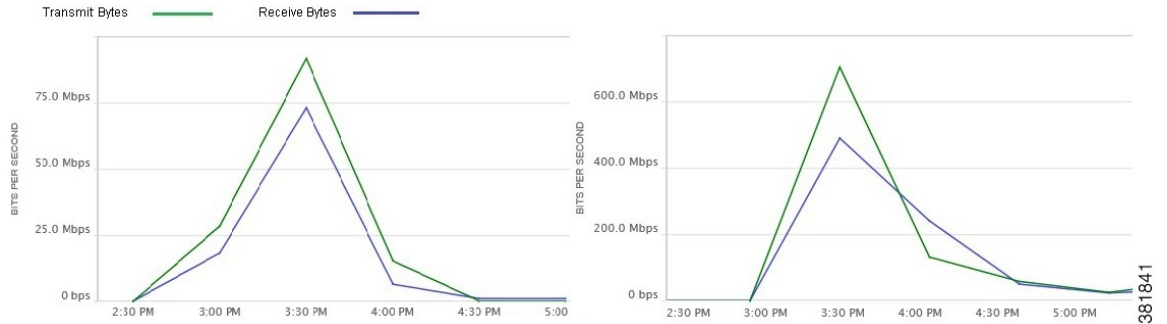


Figure 24 And 25 : Provisioning Services network And storage usage throughout the test

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

### Citrix Xen desktop

<http://support.citrix.com/proddocs/topic/xendesktop/xd-library-wrapper.html>

### Login VSI

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

### VMware

<http://pubs.vmware.com/vsphere-51/index.jsp#com.vmware.vsphere.doc/GUID-1B959D6B-41CA-4E23-A7DB-E9165D5A0E80.html>

