Citrix VDI Scalability Testing on Cisco UCS B200 M3 server with Storage Accelerator

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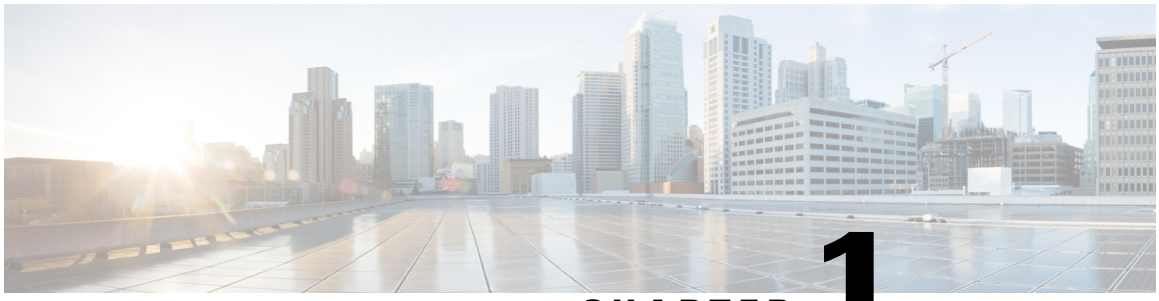
CONTENTS



CHAPTER 1

Citrix VDI Scalability Testing on Cisco UCS B200 M3 server with Storage Accelerator

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 with Storage accelerator, we used Login VSI 4.0.9 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.

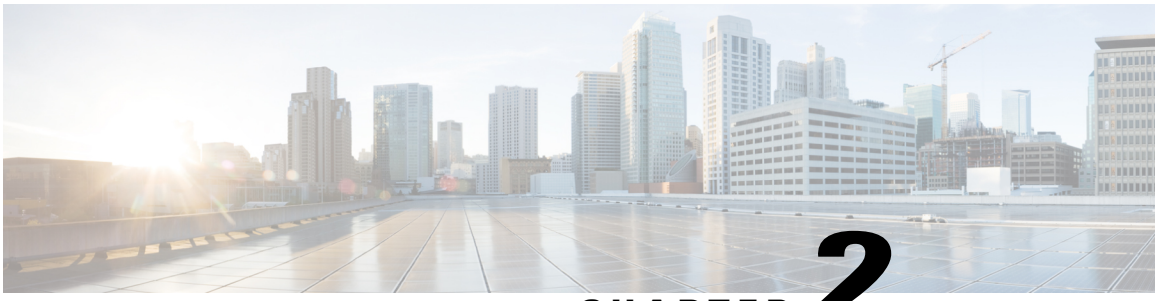
We set out to examine such a virtual desktop solution that consisted of the following components:

- Cisco Unified Computing System (UCS) B200 M3 Blade Server with Intel Xeon processor E5-2690 and powered with Cisco Storage accelerator
- 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

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
VHD	Virtual Hard Disk
VSI	Virtual session Indexer

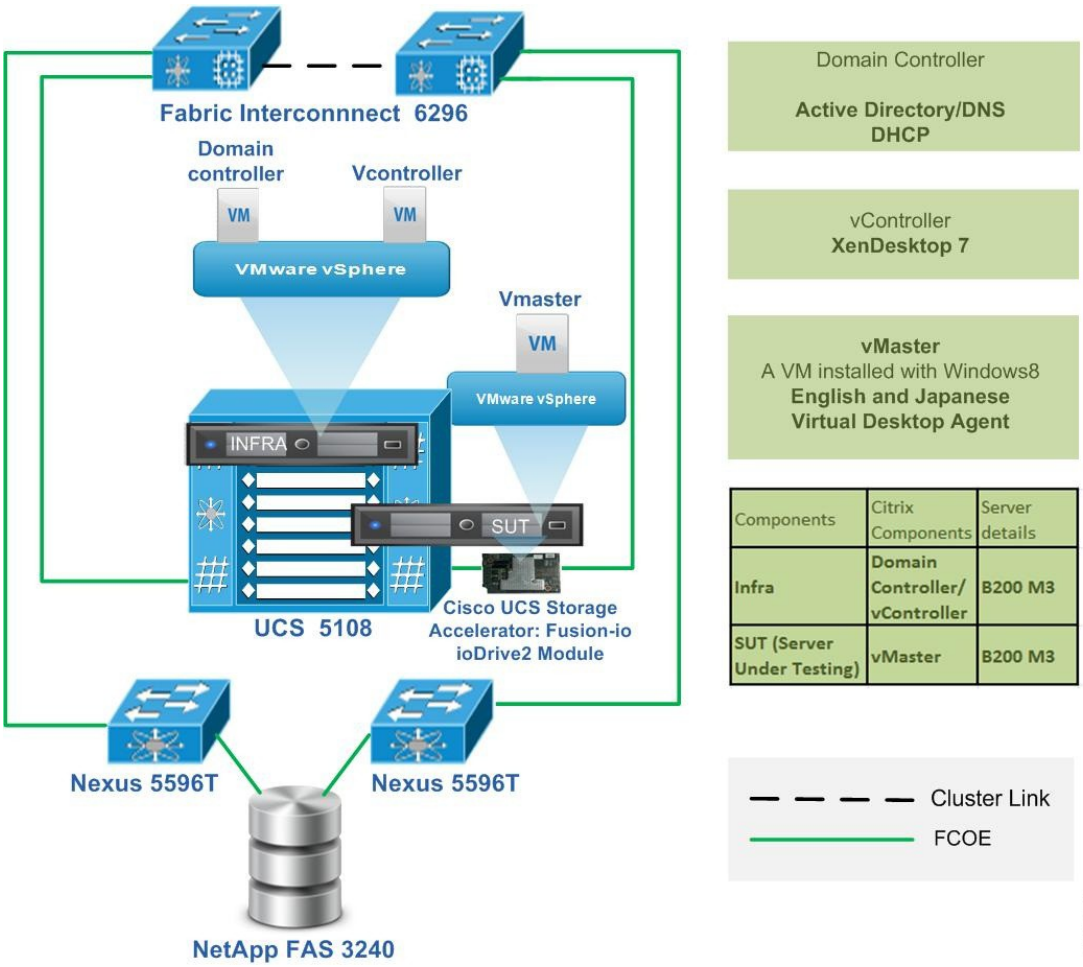


CHAPTER 2

Test Topology and Environment Matrix

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	2.2(1b)
Operating System	
Windows Server OS	Windows Server 2012 x64 (Japanese/English)

Component	Version
Hypervisor	
ESXi	VMware ESXi 5.1 799733
Storage	
Cisco UCS Storage Accelerator (Cisco UCS 785-GB MLC Fusion-io ioDrive 2 Adapters)	7.1.13
NetApp FAS 3240	8.0.2
FCoE Switch	
Nexus 5596 T	6.0(2)N2(3)
Virtual Desktop Delivery Component	
Citrix Xen Desktop	7
VDI Scalability measuring Tool	
Login VSI	4.0.9
Active Directory & DHCP	Windows 2012 server x64 (Japanese/English)
Login VSI Launcher, Analyzer and VSI share	Windows 2012 server x64 (Japanese/English)

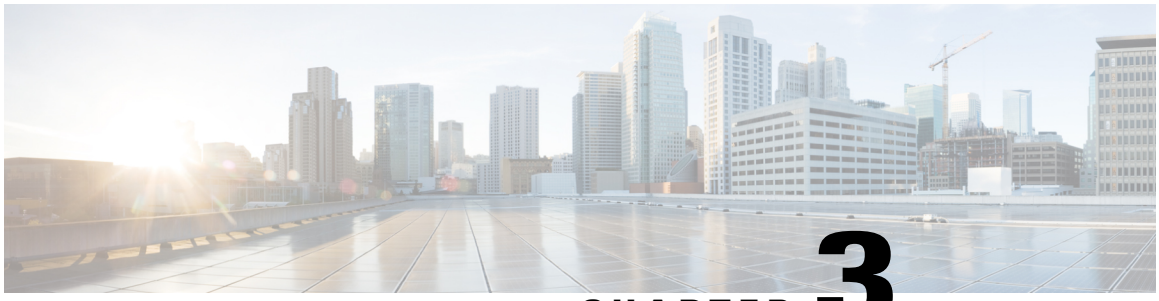
SUT Components

Component	Type
CPUs	
Vendor	Intel® Corporation
Name	Intel® Xeon® E5-2690
Core Frequency (GHz)	2.9
Platform	
Vendor	Cisco UCS B200 M3
BIOS Settings	2.2(1b)B
Memory modules	
Total RAM in the system (GB)	384
Vendor	Samsung
Type	DDR3
Speed (MHz)	1600
Size (GB)	16
Number of RAM modules	24

Component	Type
Chip organization	Double sided
Rank	Dual
Hypervisor	
Name	VMWare ESXi 5.1.0
Build number	799733
Power Profile	Maximum Performance
IO Adapters	
Vendor and Model number	UCS VIC 1240

Tested VM Configuration

Components of VM	English	Japanese
Virtual Desktop - vCPU	2	2
Virtual Desktop - RAM	2 GB	2 GB
Virtual Desktop - HardDisk	32GB(Thin Provisioned)	32GB(Thin Provisioned)
Virtual Desktop - Network Adapter	Intel e1000	Intel e1000
Operating System	Windows 8 Enterprise x64 (917522)	Windows 8 Enterprise x64 (917919)



CHAPTER 3

Implementation Steps And Test Execution Details

Implementation steps for Citrix VDI

- Infra components such as Active Directory/DNS and DHCP server, XenDesktop Delivery Controller and vCenter 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(B200 M3).
- Master image created on the Server Under Test (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 Citrix XenDestkop 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.

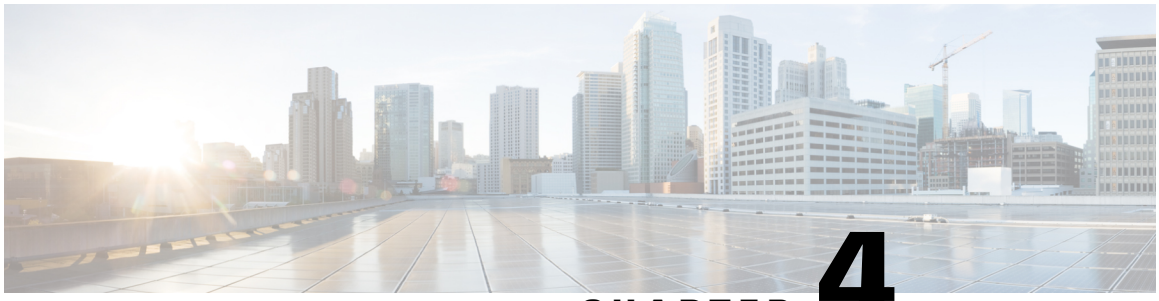
Each loop will open and use:

- 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

Citrix VDI Scalability Testing on Cisco UCS B200 M3 server with Storage Accelerator

Comparison of Japanese and English Environment performance

VSIMAX Result		
Type of Workload	**English**	**Japanese**
Light	170	160
Medium	131	124
Heavy	116	103

Light Workload Result

Light		
Server OS	**No.of Launched Sessions**	**VSIMax**
English	190	170
Japanese	190	160

Login VSIMax

Figure 2: English

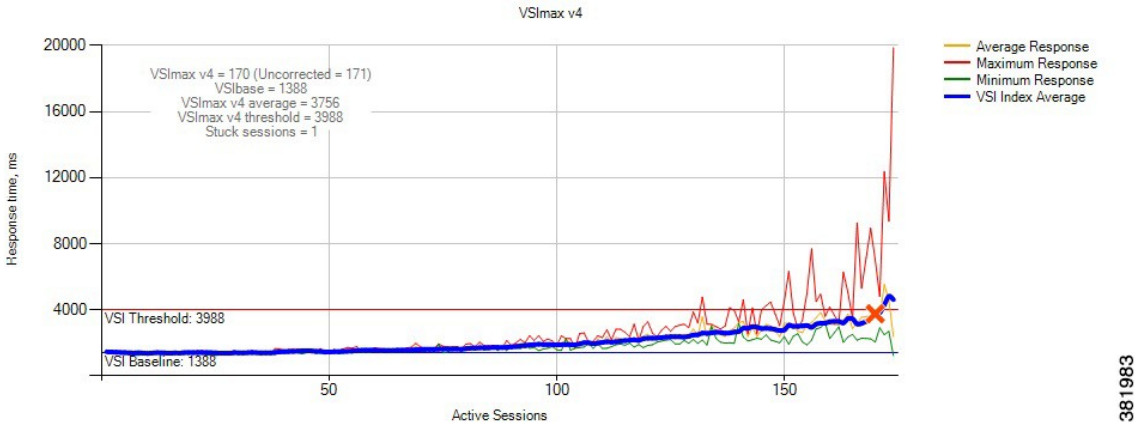


Figure 3: Japanese

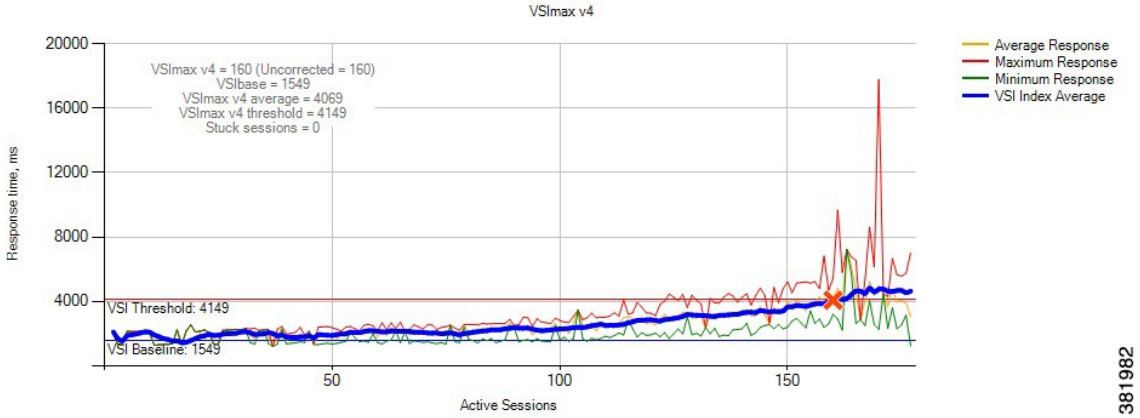


Fig 2 and 3: Average virtual desktop response times at various number of virtual desktops on the Cisco UCS B200 M3 server with Storage Accelerator

Processor And Memory Utilization throughout the test

Figure 4: English

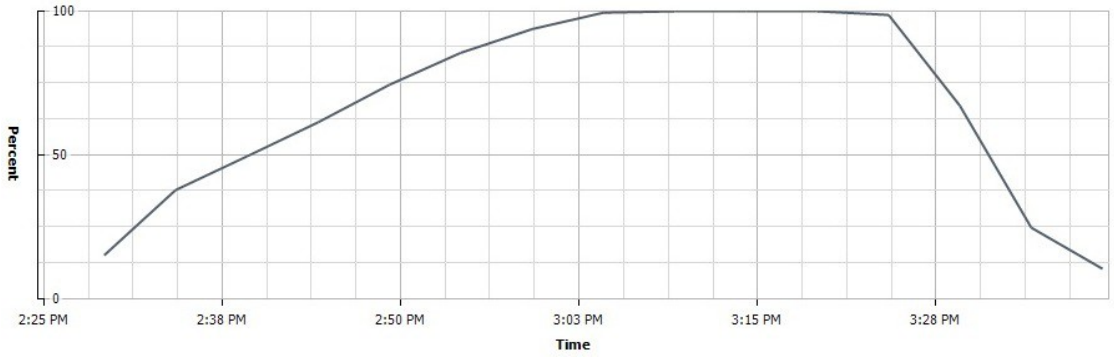


Figure 5: Japanese

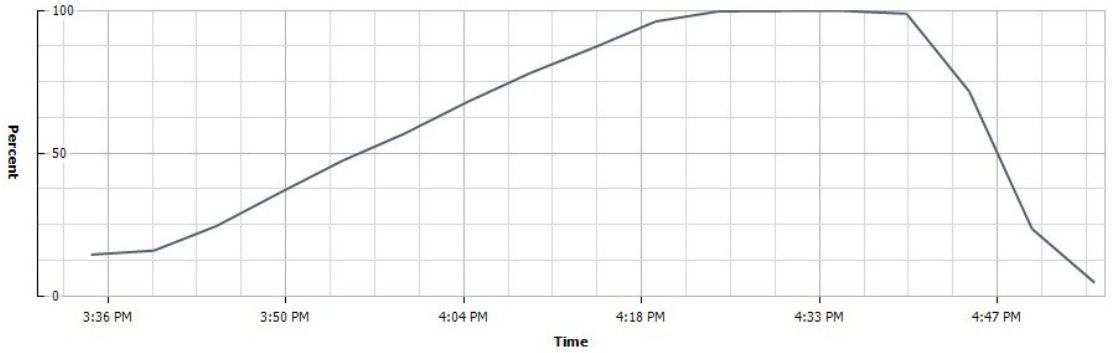


Figure 4 and 5 : CPU utilization throughout the test

Figure 6: English

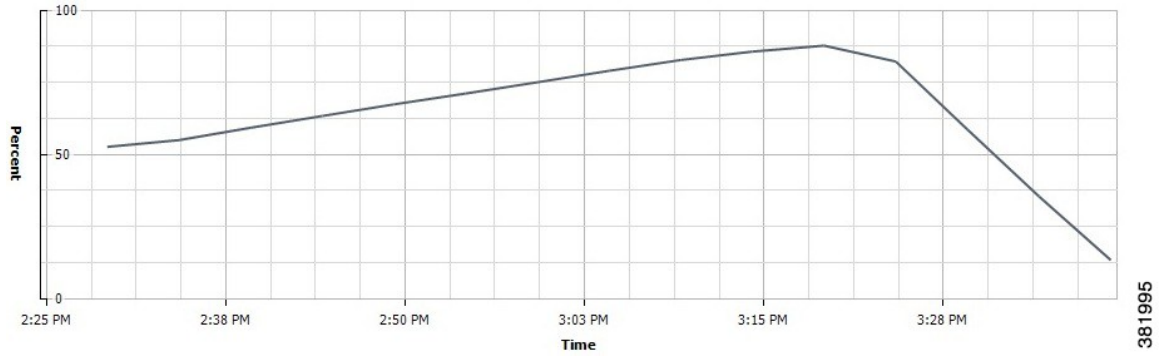


Figure 7: Japanese

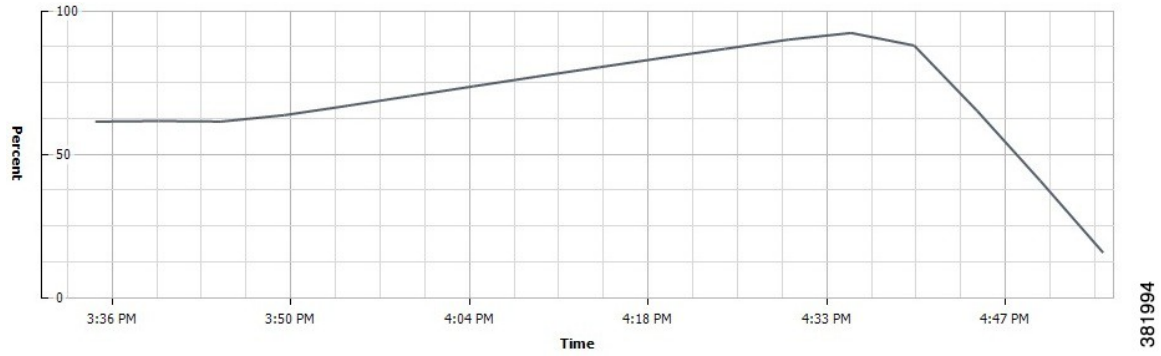


Figure 6 and 7 : Memory usage throughout the test

Network and Storage Utilization throughout the Test

Figure 8: English

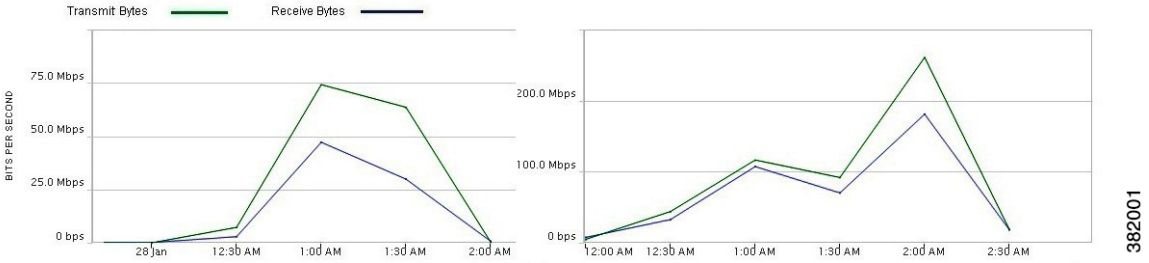


Figure 9: Japanese

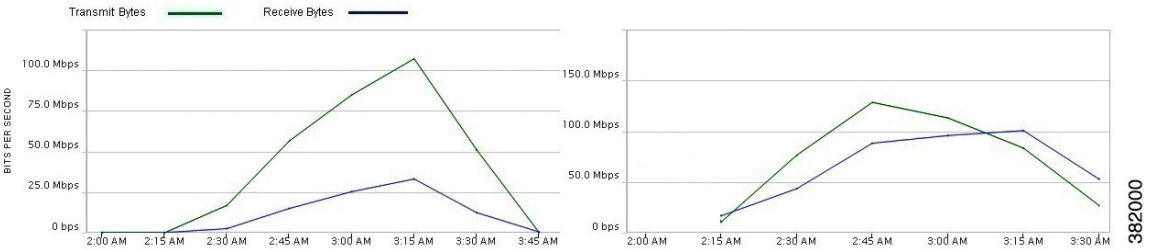


Figure 8 and 9 : Provisioning Services Network and Storage usage throughout the test

Medium workload Result

Medium		
Server OS	**No.of Launched Sessions**	**VSIMax**
English	150	131
Japanese	150	124

Login VSIMax

Figure 10: English

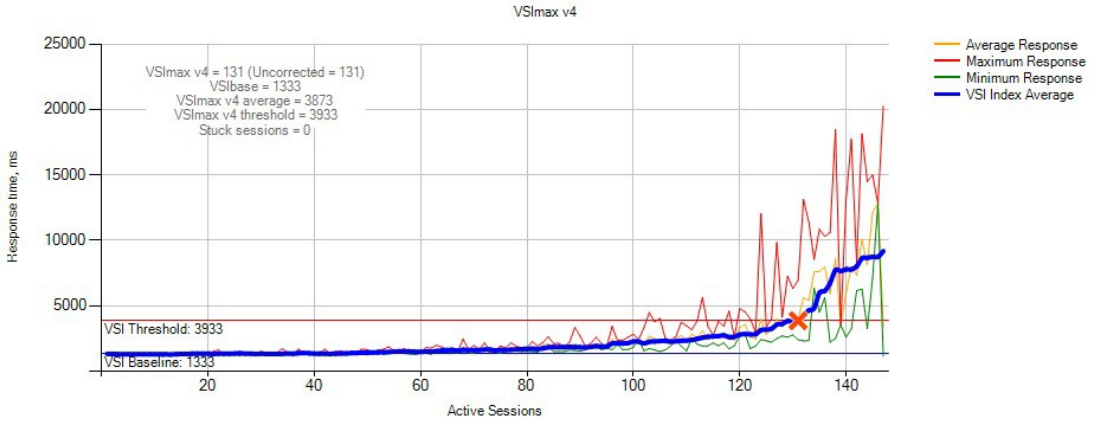


Figure 11: Japanese

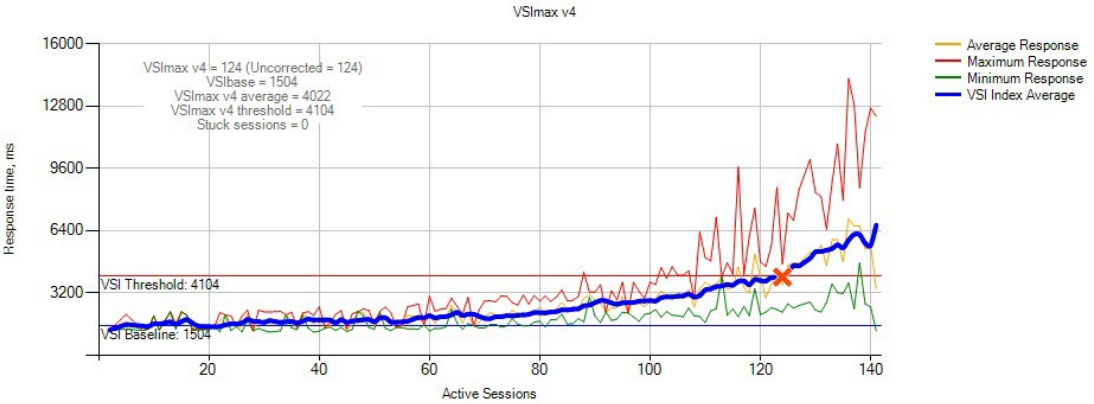


Fig.10 and 11 : Average virtual desktop response times at various number of virtual desktops on the Cisco UCS B200 M3 server with Storage Accelerator

Processor And Memory Utilization throughout the test

Figure 12: English

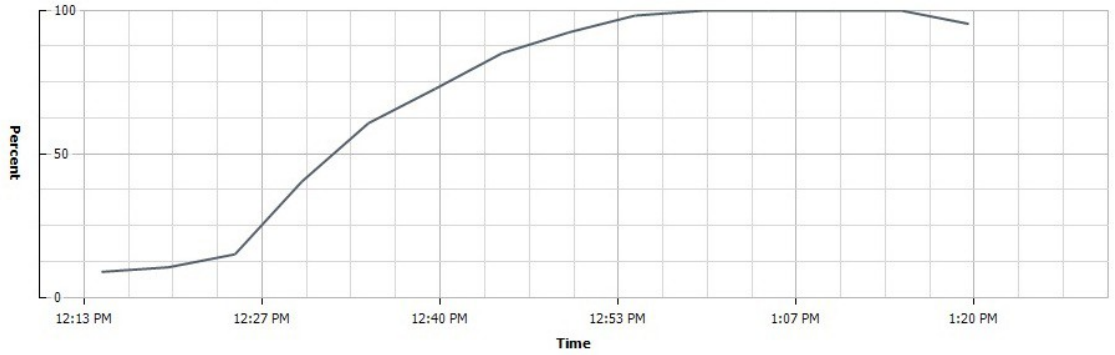


Figure 13: Japanese

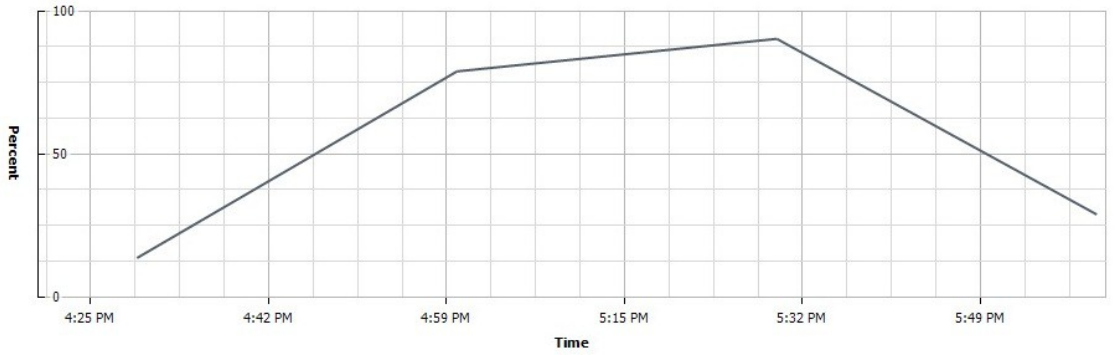


Figure 12 and 13 : CPU utilization throughout the test

Figure 14: English

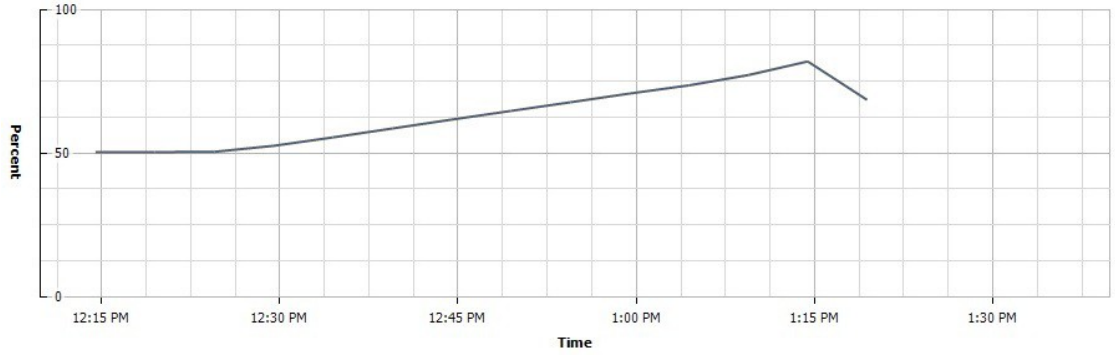


Figure 15: Japanese

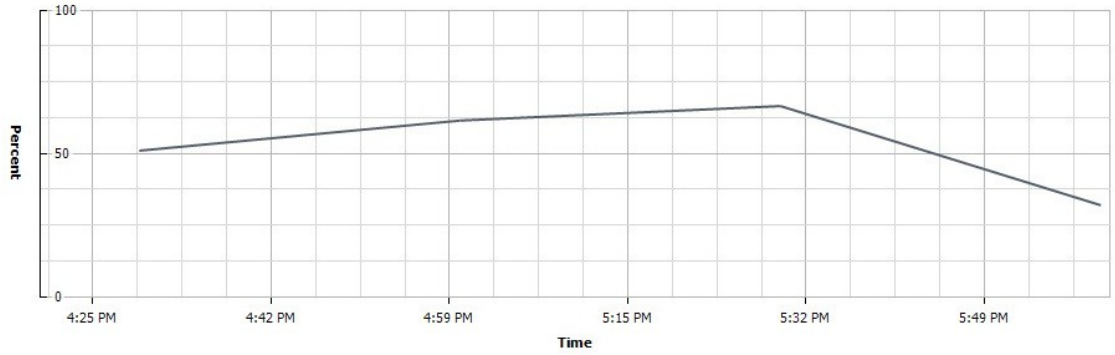


Figure 14 and 15 : Memory usage throughout the test

Network And Storage Utilization throughout the test

Figure 16: English

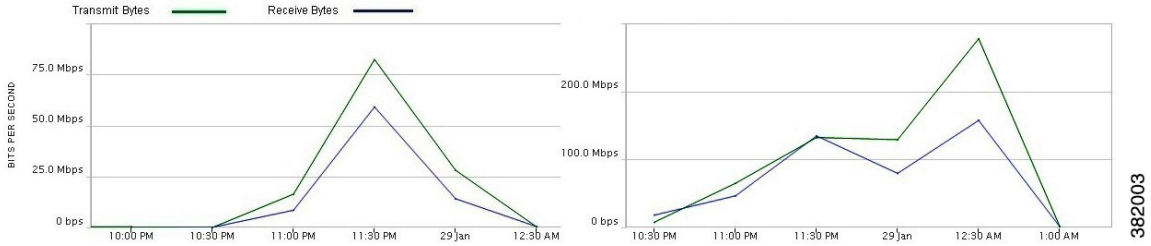


Figure 17: Japanese

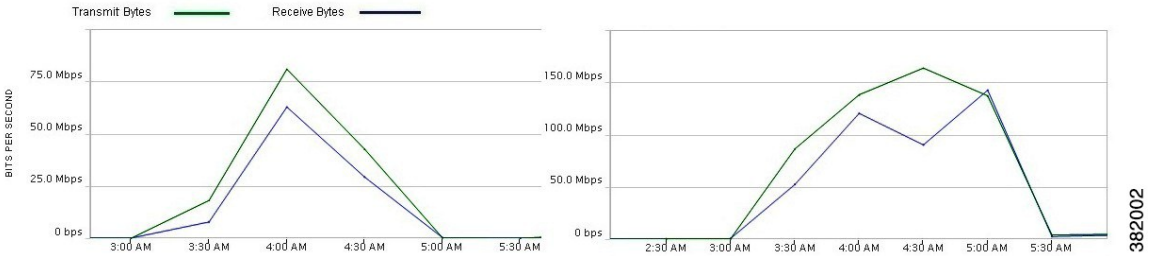


Figure 16 and 17 : Provisioning Services Network and Storage usage throughout the test

Heavy workload Result

Heavy		
Server OS	**No.of Launched Sessions**	**VSIMax**
English	130	116
Japanese	130	103

Login VSIMax

Figure 18: English

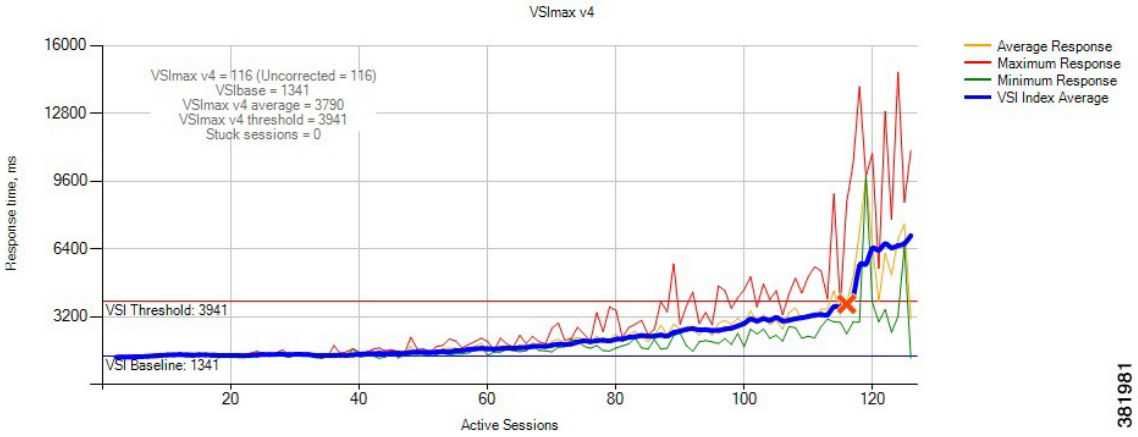


Figure 19: Japanese

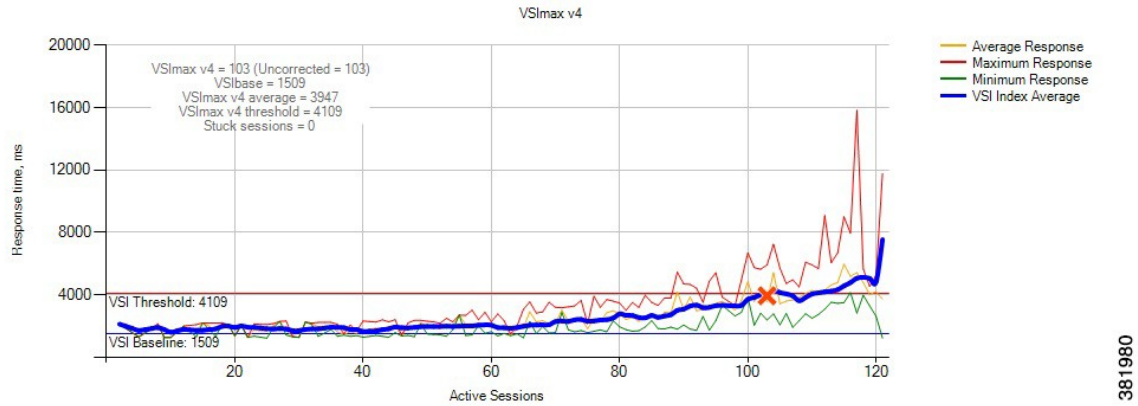


Fig.18 and 19 : Average virtual desktop response times at various number of virtual desktops on the Cisco UCS B200 M3 server with Storage Accelerator

Processor And Memory Utilization throughout the test

Figure 20: English

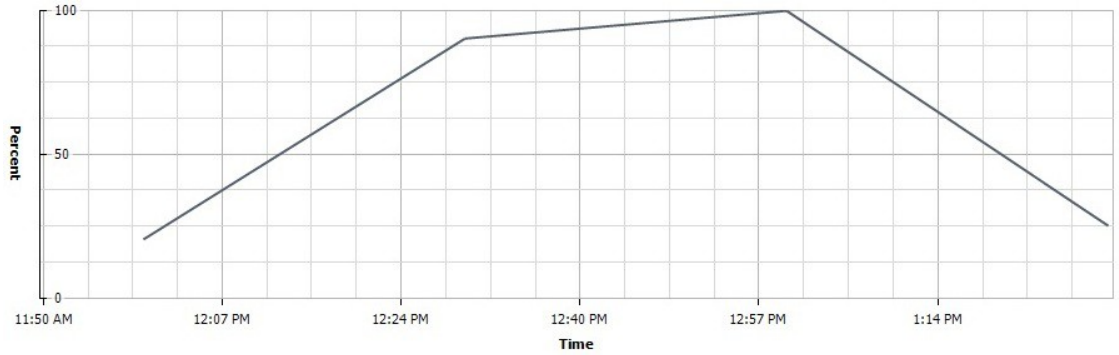


Figure 21: Japanese

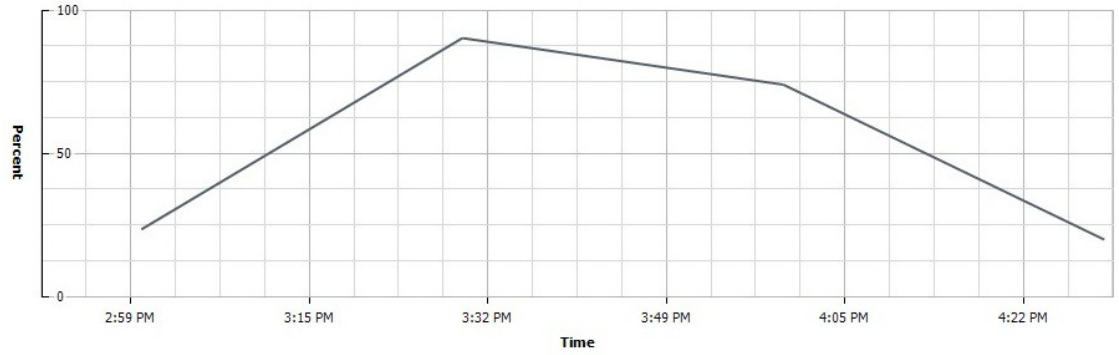


Figure 20 and 21 : CPU utilization throughout the test

Figure 22: English

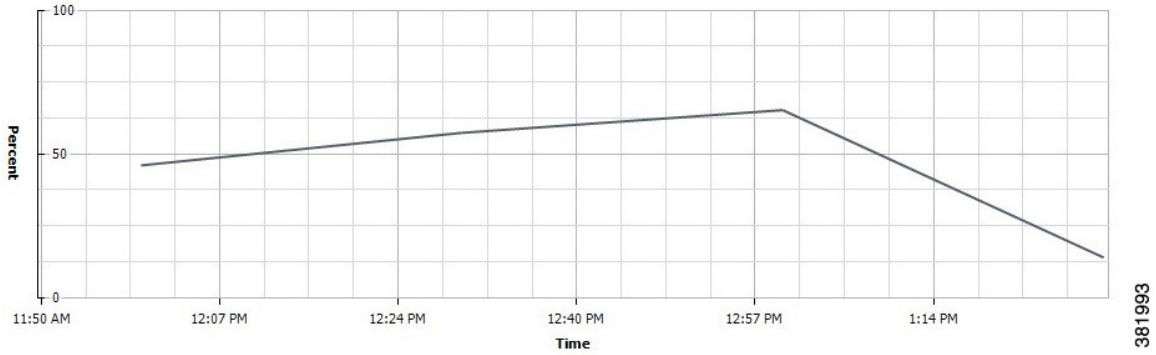


Figure 23: Japanese

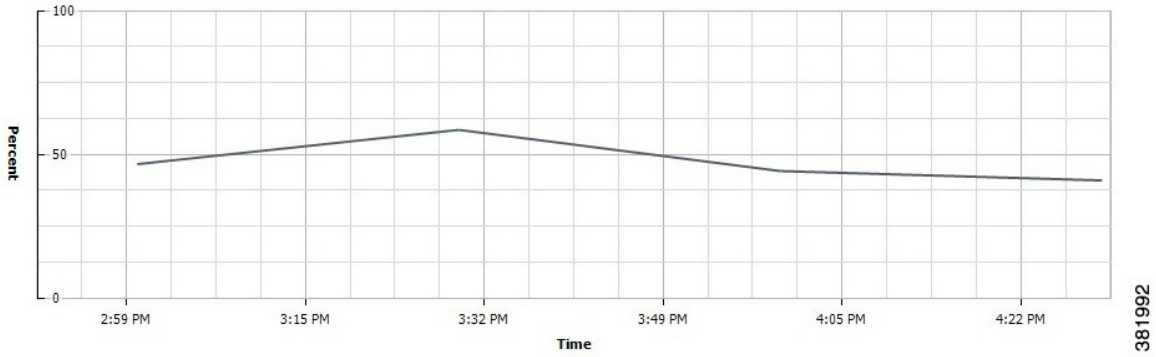


Figure 22 and 23: Memory usage throughout the test

Network and Storage Utilization throughout the test

Figure 24: English

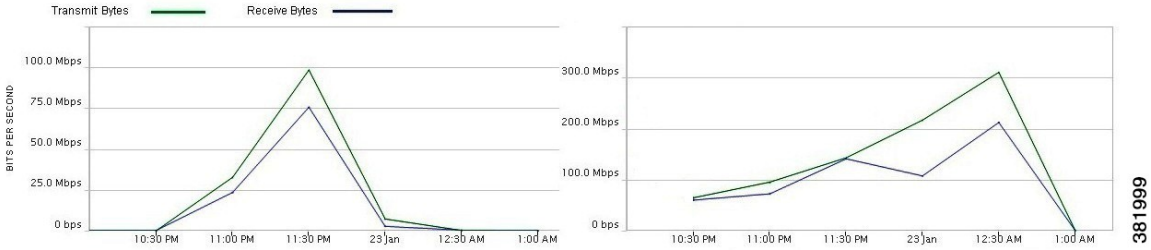


Figure 25: Japanese

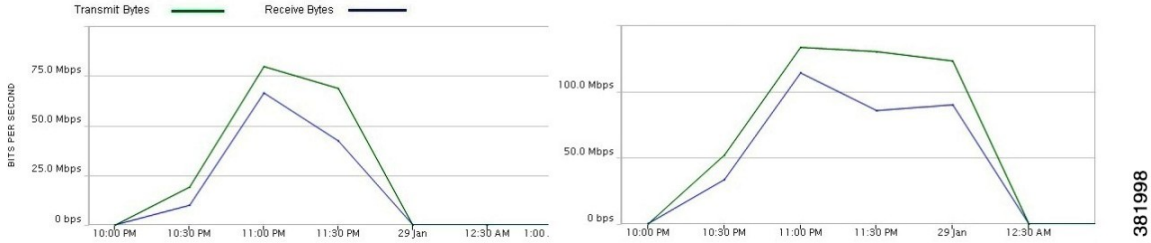


Figure 24 and 25 : Provisioning Services Network and Storage usage throughout the test

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

Citric 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

VMware

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

Cisco UCS Storage Accelerator

http://www.cisco.com/c/dam/en/us/solutions/collateral/borderless-networks/advanced-services/whitepaper_C22-726648.pdf