



Citrix VDI Scalability Testing on Cisco UCS B200 M3 server

First Published: April 28, 2014

Last Modified: April 29, 2014

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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 4.0.11 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 Unified Computing System (UCS) B200 M3 Blade Server with Intel Xeon processor E5-2697 v2 and powered
- 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 240 Microsoft Windows 7 x64 and Windows 8 x64 VMs
- All Virtual machines in the Desktop Pool are provisioned with 2 vCPU and 1.5 GB (for Windows 7) and 2 GB (for Windows 8) of memory
- NetApp FAS 3240 storage array

Acronyms

Acronym	Description
AD	Active Directory

Acronym	Description
DHCP	Dynamic Host Configuration Protocol
DNS	Domain Name System
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

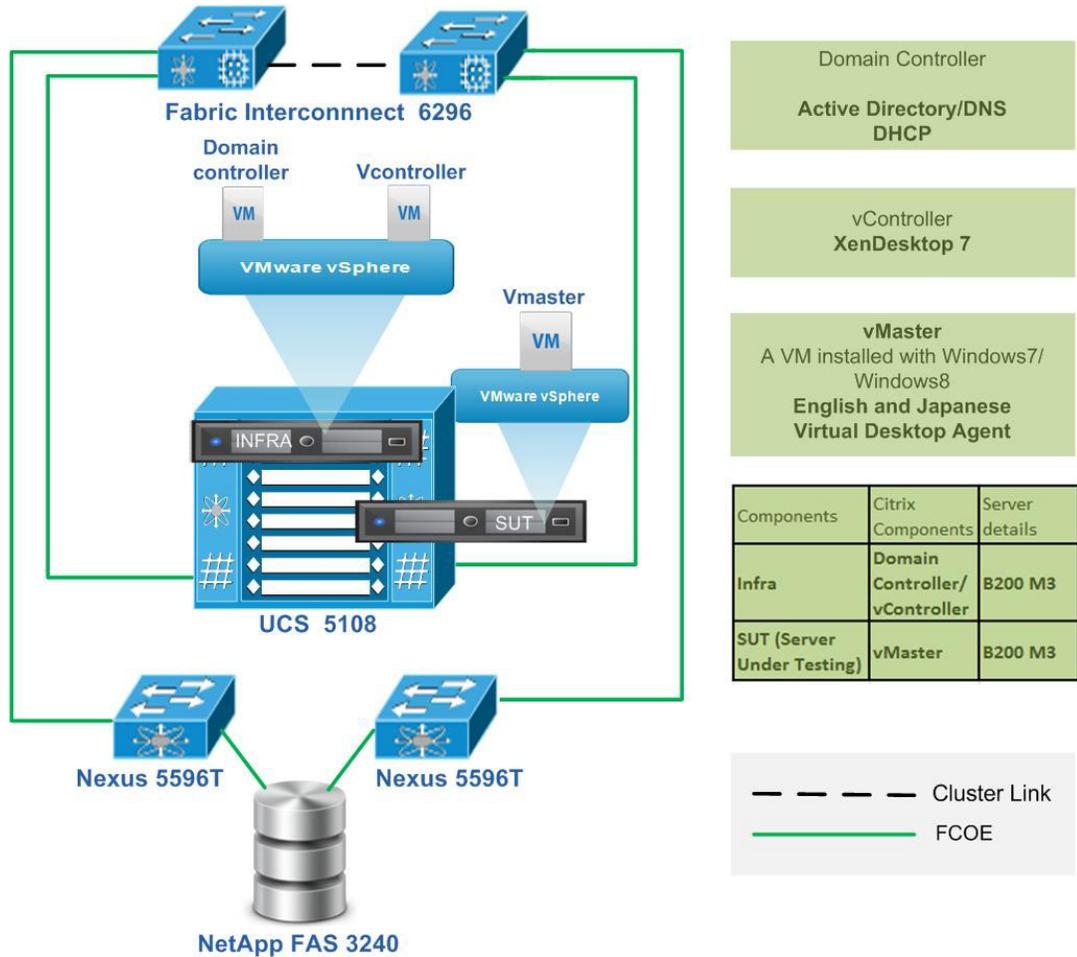


Test Topology and Environment Matrix

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

Test Topology

Figure 1: Topology in Use



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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	
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	4.0.11
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®E5-2697 v2
Core Frequency (GHz)	2.7
Platform	
Vendor	Cisco UCS B200 M3
BIOS Settings	2.2(1b)B
Memory modules	
Total RAM in the system (GB)	384
Vendor	Hynix
Type	DDR3
Speed (MHz)	1866
Size (GB)	16
Number of RAM modules	24
Chip organization	Double sided

Component	Type
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 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	32 GB (Thin Provisioned)	32 GB (Thin Provisioned)
Virtual Desktop - Network Adapter	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	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 7 (English/Japanese) and Windows 8 (English/Japanese). 6TB 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.



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- [Comparison of Windows 7 performance in Japanese and English Environment, page 9](#)
- [Comparison of Windows 8 Performance in Japanese and English Environment, page 21](#)
- [Related Documentation, page 33](#)

Comparison of Windows 7 performance in Japanese and English Environment

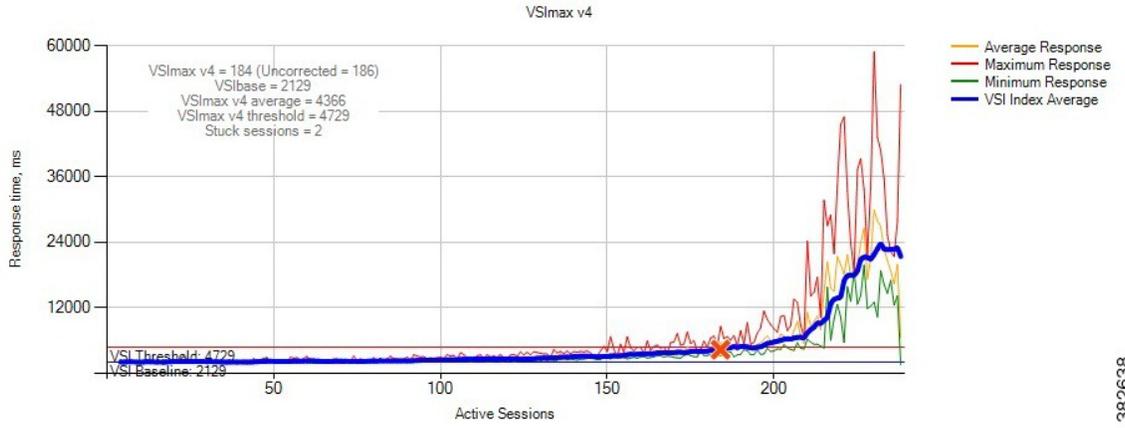
VSIMax Result		
Type of Workload	English	Japanese
Light	184	181
Medium	141	136
Heavy	127	123

Light Workload Result

Light		
Server OS	No.of Launched Sessions	VSIMax
English	240	184
Japanese	200	181

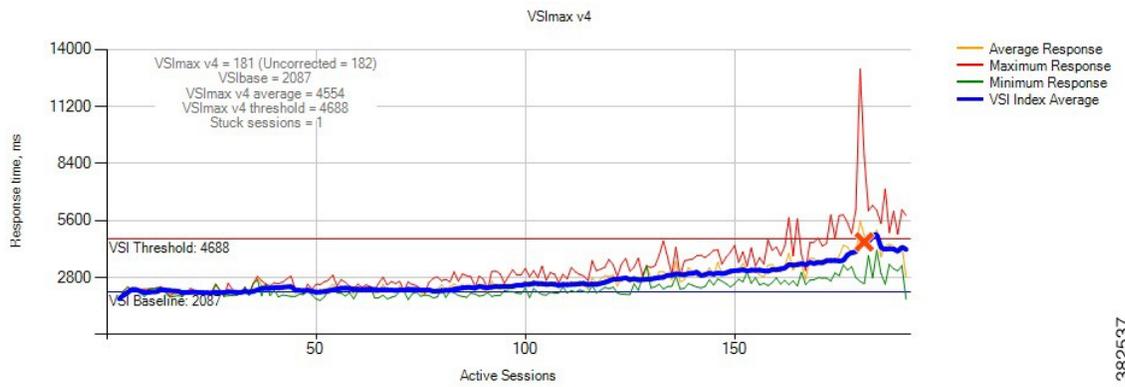
Login VSIMax

Figure 2: English



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Figure 3: Japanese

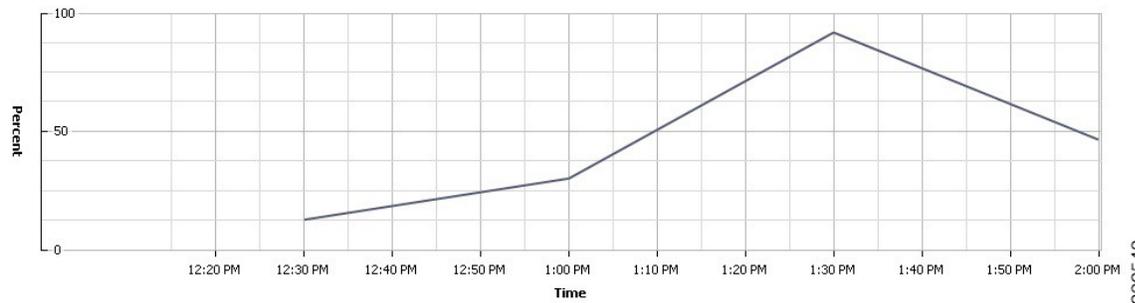


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Fig 2 and 3: Average virtual desktop response times at various number of virtual desktops on the Cisco UCS B200 M3 server

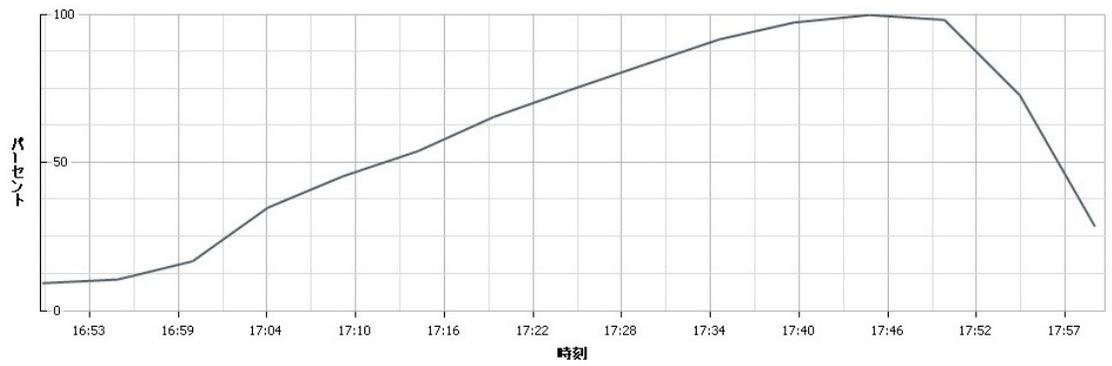
Processor And Memory Utilization throughout the test

Figure 4: English



382548

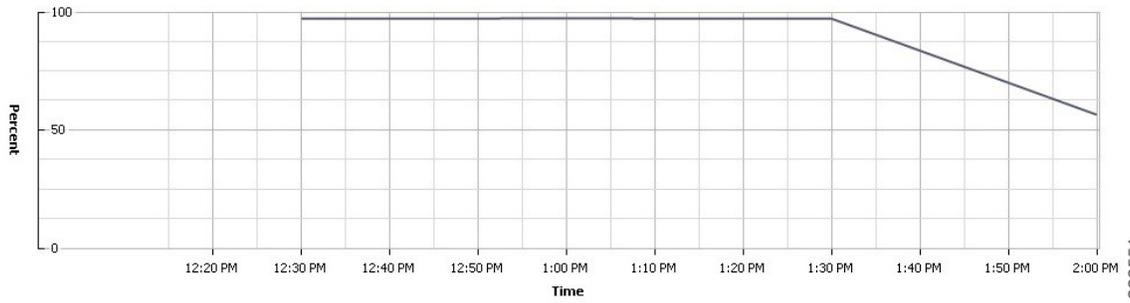
Figure 5: Japanese



382538

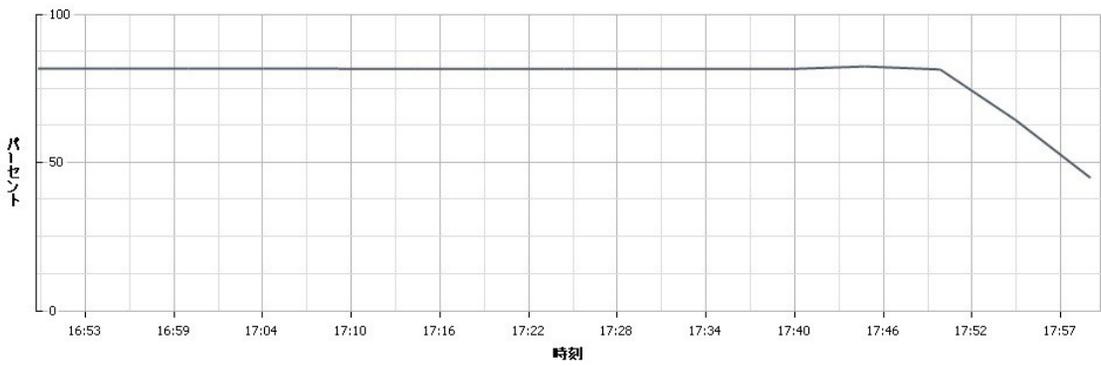
Figure 4 and 5 : CPU utilization throughout the test

Figure 6: English



382551

Figure 7: Japanese



382539

Figure 6 and 7 : Memory usage throughout the test

Network and Storage Utilization throughout the Test

Figure 8: English

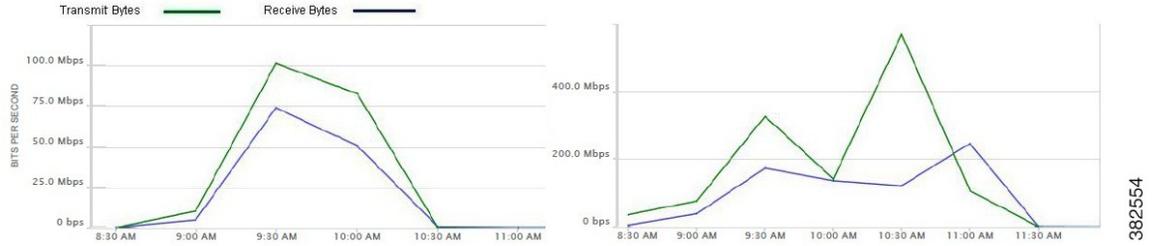


Figure 9: Japanese

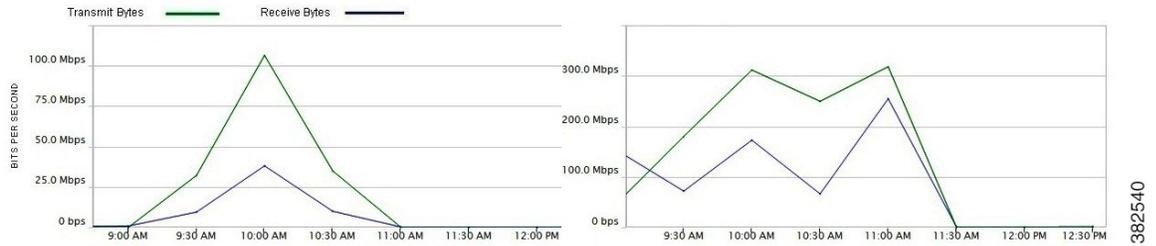


Figure 8 and 9 : Provisioning Services Network and Storage usage throughout the test

Medium workload Result

Medium		
Server OS	No.of Launched Sessions	VSIMax
English	150	141
Japanese	150	136

Login VSIMax

Figure 10: English

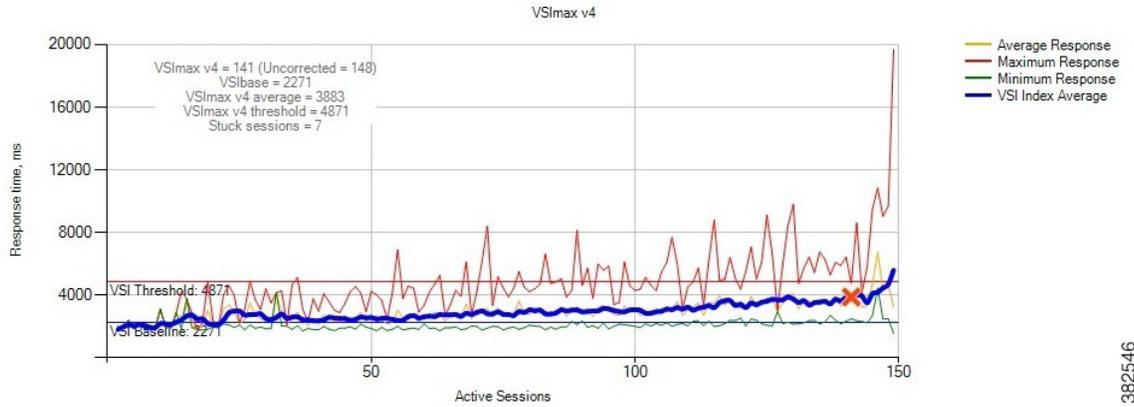


Figure 11: Japanese

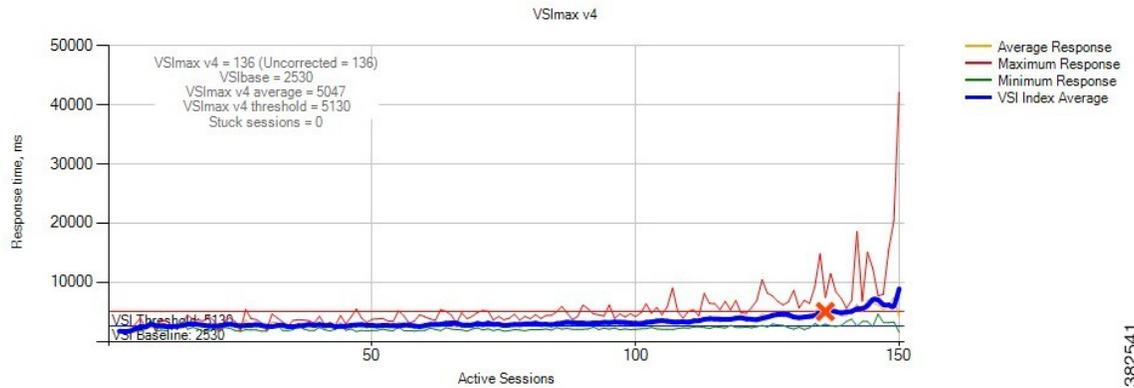
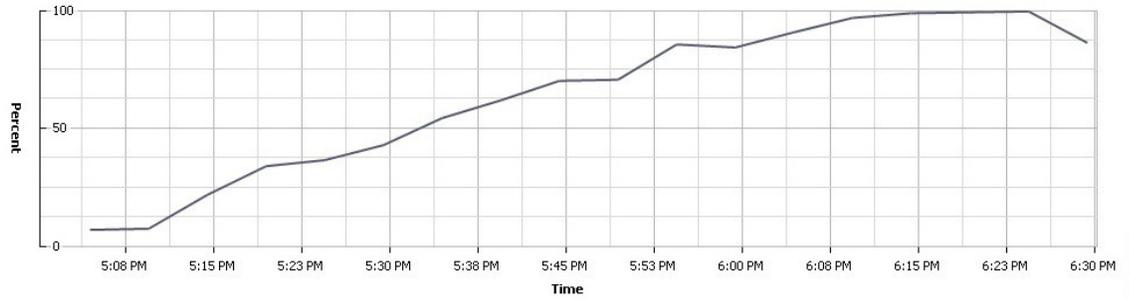


Fig.10 and 11 : Average virtual desktop response times at various number of virtual desktops on the Cisco UCS B200 M3 server

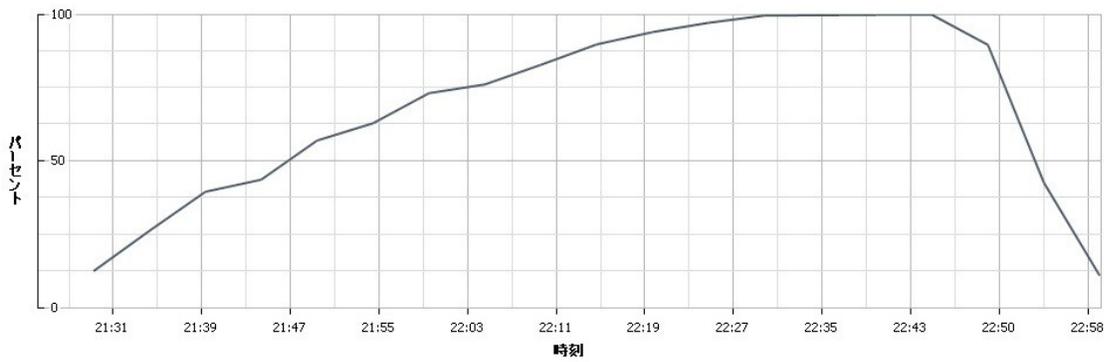
Processor And Memory Utilization throughout the test

Figure 12: English



382549

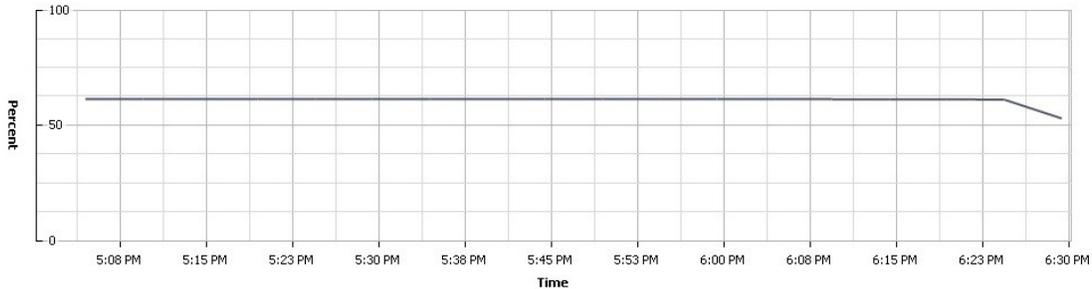
Figure 13: Japanese



382542

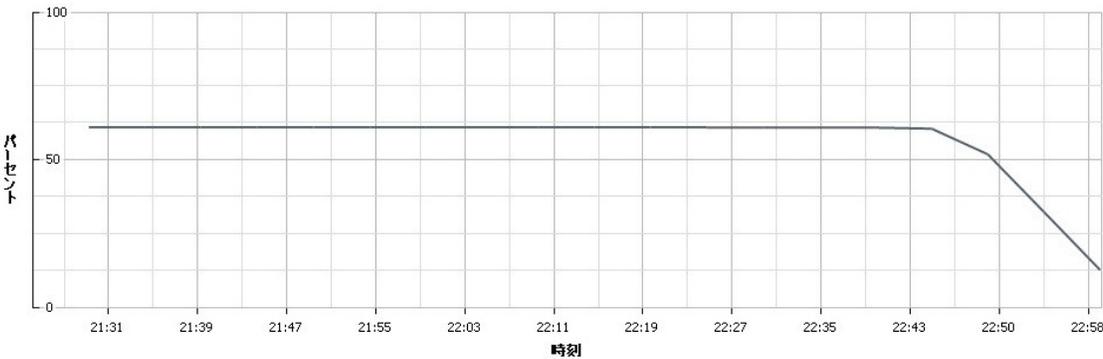
Figure 12 and 13 : CPU utilization throughout the test

Figure 14: English



382552

Figure 15: Japanese



382543

Figure 14 and 15 : Memory usage throughout the test

Network And Storage Utilization throughout the test

Figure 16: English

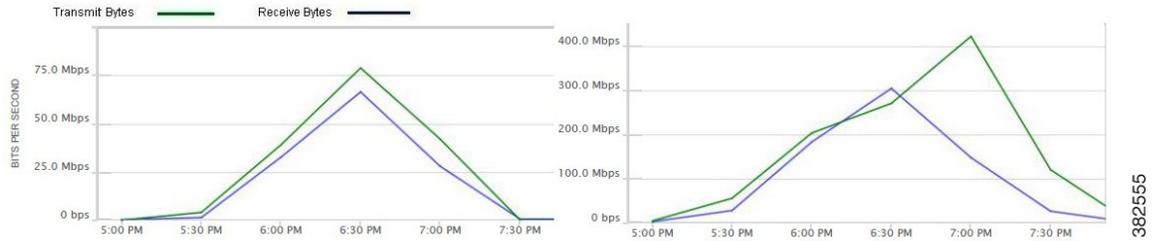


Figure 17: Japanese

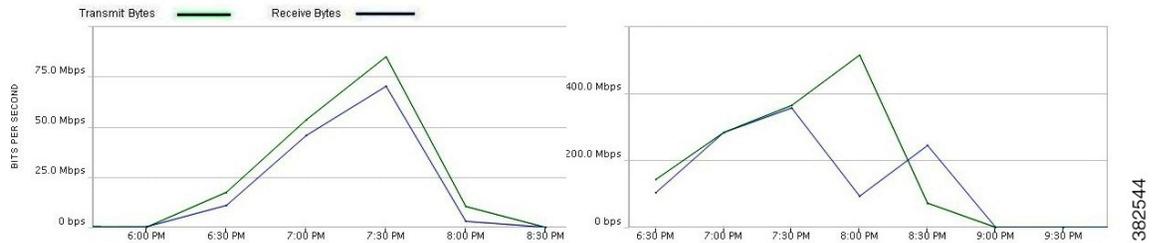


Figure 16 and 17 : Provisioning Services Network and Storage usage throughout the test

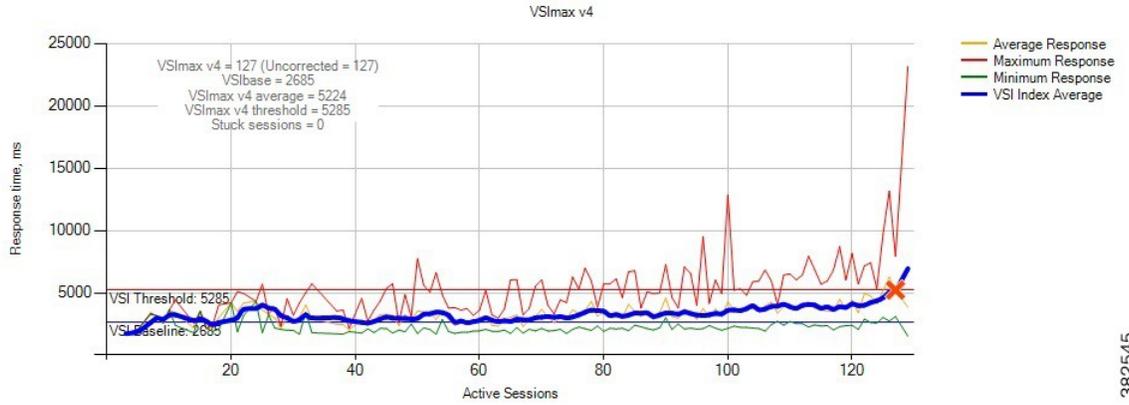
Login VSIMax

Heavy workload Result

Heavy		
Server OS	No.of Launched Sessions	VSIMax
English	130	127
Japanese	130	123

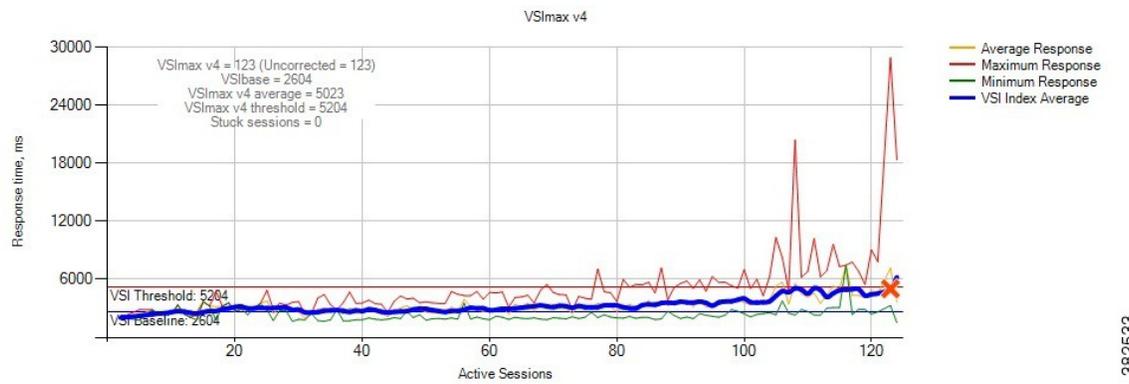
Login VSIMax

Figure 18: English



382545

Figure 19: Japanese

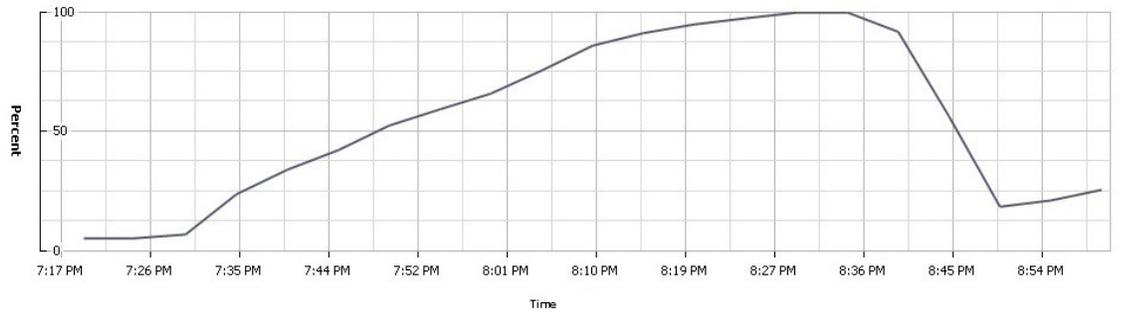


382533

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

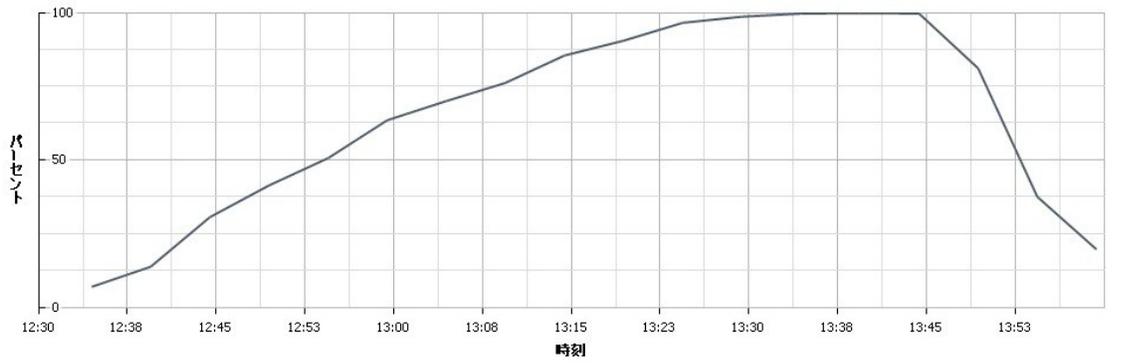
Processor And Memory Utilization throughout the test

Figure 20: English



362547

Figure 21: Japanese



362534

Figure 20 and 21 : CPU utilization throughout the test

Figure 22: English

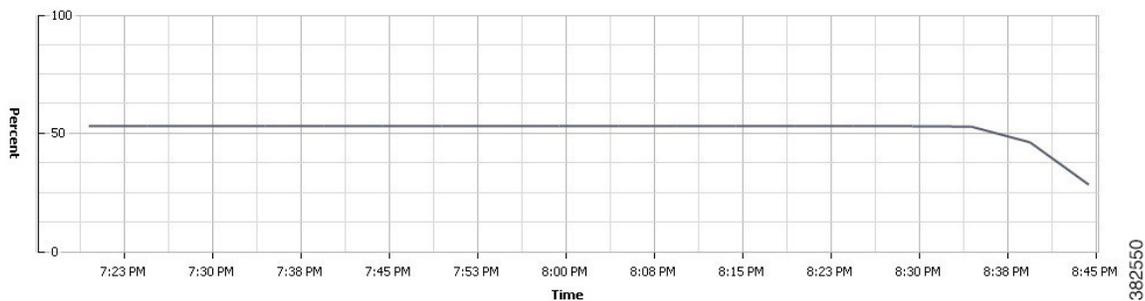


Figure 23: Japanese

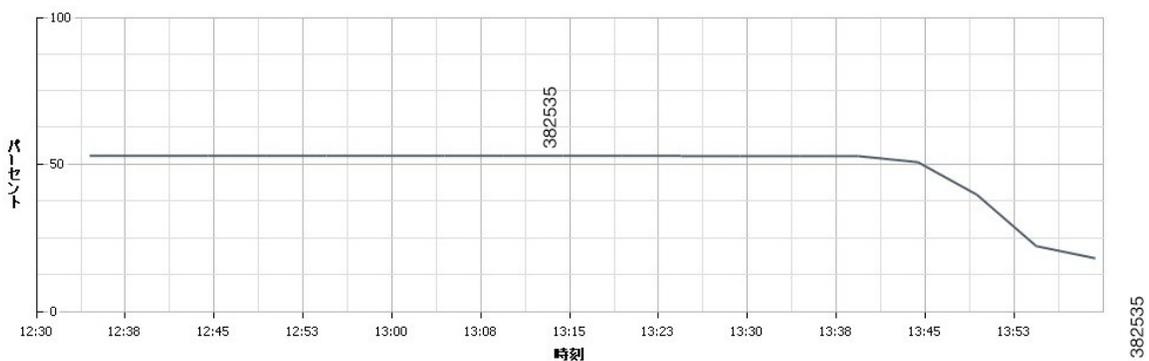


Figure 22 and 23: Memory usage throughout the test

Network and Storage Utilization throughout the test

Figure 24: English

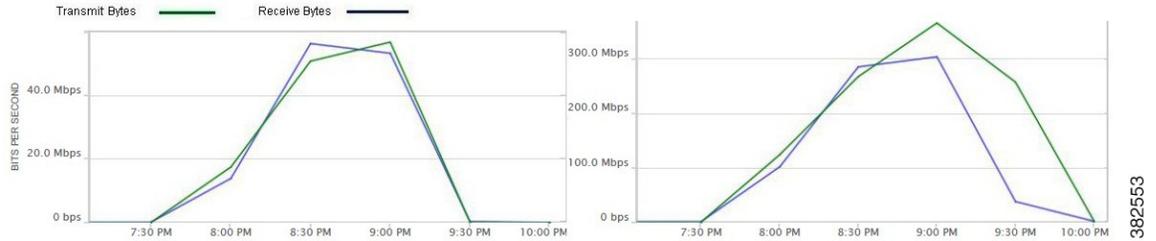


Figure 25: Japanese

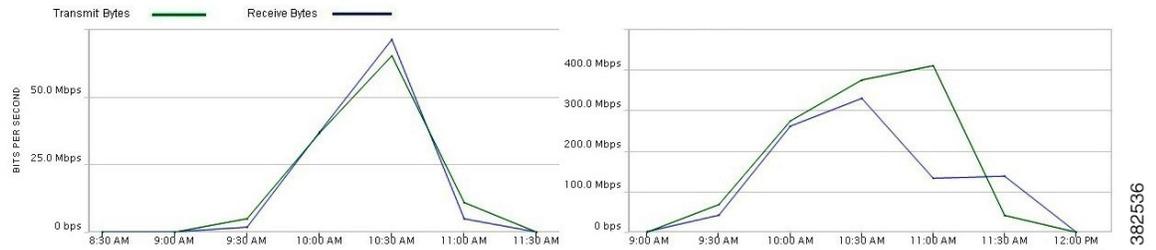


Figure 24 and 25 : Provisioning Services Network and Storage usage throughout the test

Comparison of Windows 8 Performance in Japanese and English Environment

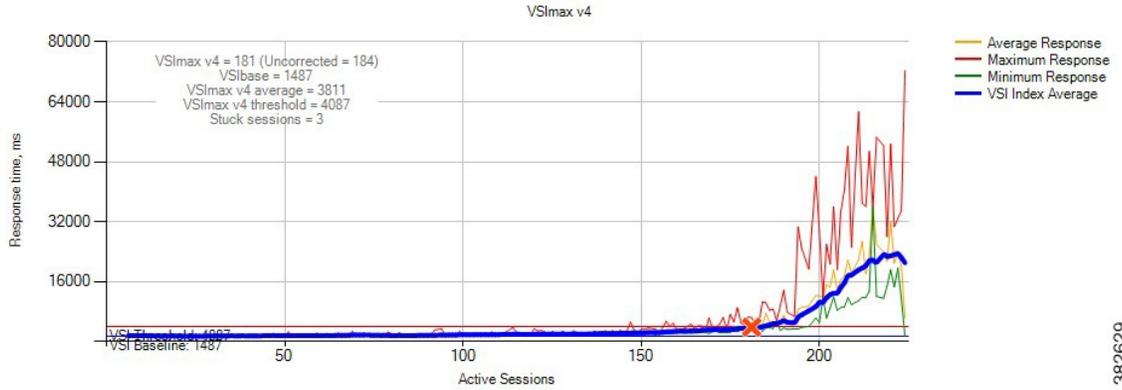
VSIMax Result		
Type of Workload	English	Japanese
Light	181	179
Medium	167	163
Heavy	158	154

Light Workload Result

Light		
Server OS	No.of Launched Sessions	VSIMax
English	240	181
Japanese	240	179

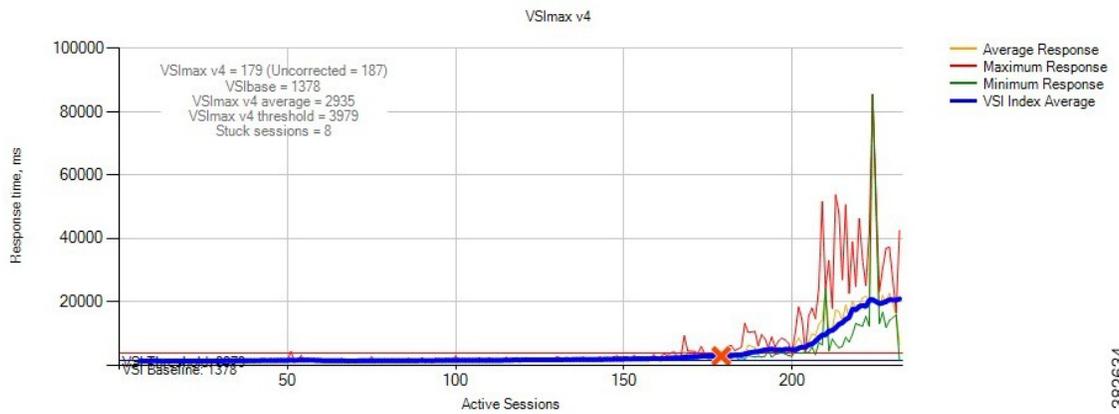
Login VSIMax

Figure 26: English



382629

Figure 27: Japanese

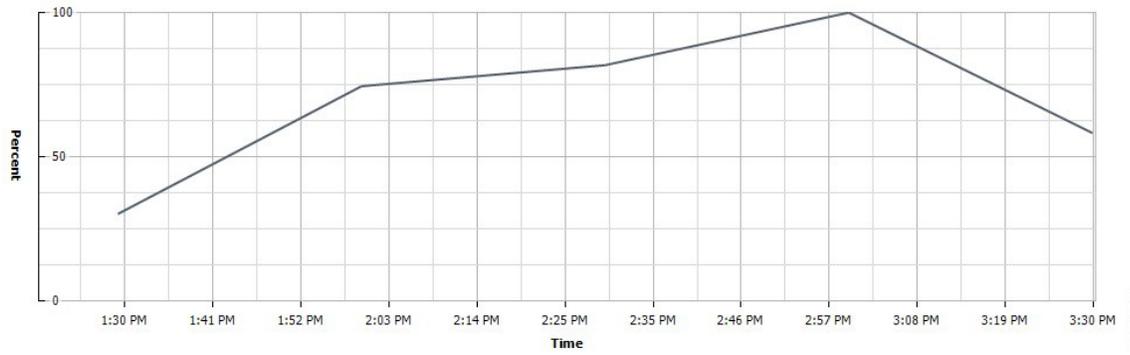


382634

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

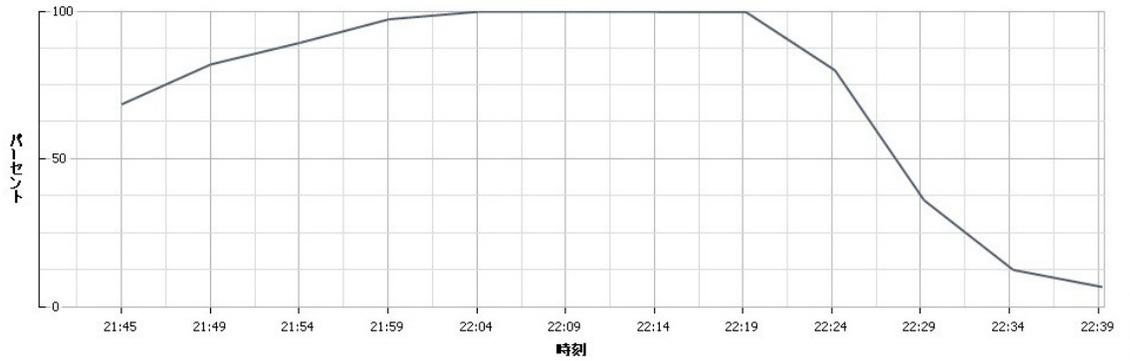
Processor And Memory Utilization throughout the test

Figure 28: English



382631

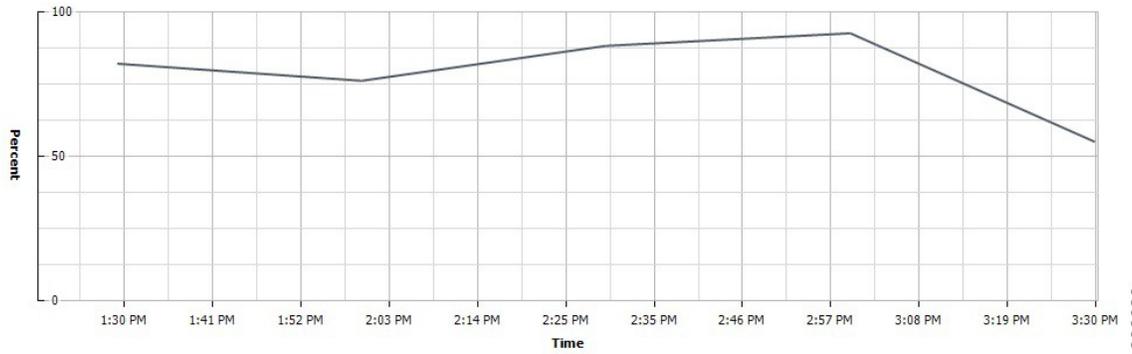
Figure 29: Japanese



382635

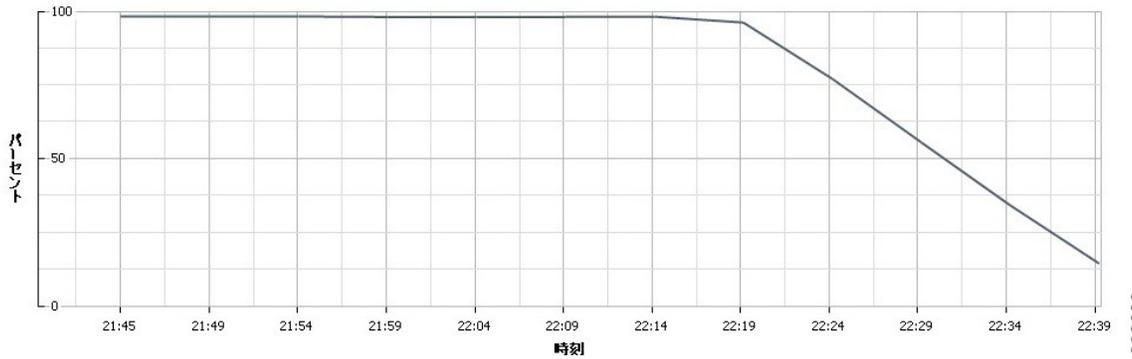
Figure 28 and 29 : CPU utilization throughout the test

Figure 30: English



382632

Figure 31: Japanese



382636

Figure 30 and 31 : Memory usage throughout the test

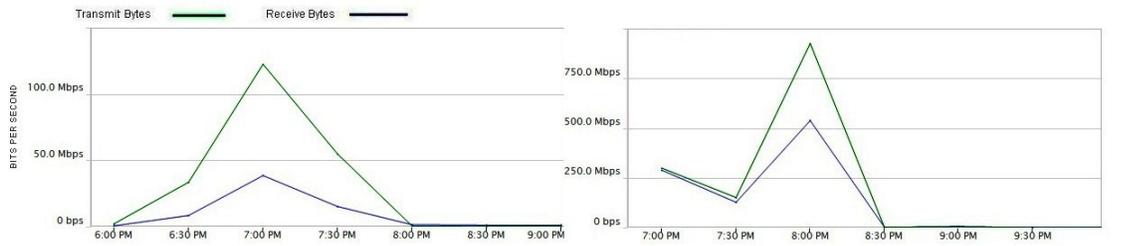
Network and Storage Utilization throughout the Test

Figure 32: English



382633

Figure 33: Japanese



382637

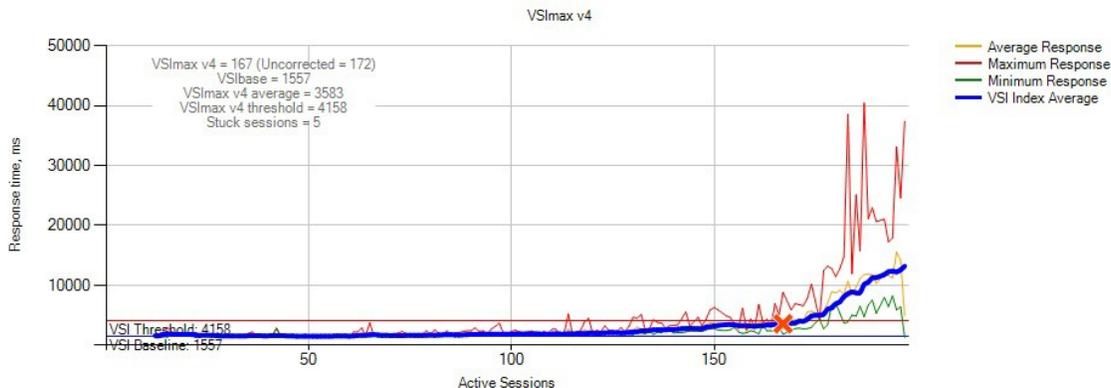
Figure 32 and 33 : Provisioning Services Network and Storage usage throughout the test

Medium workload Result

Medium		
Server OS	No.of Launched Sessions	VSIMax
English	200	167
Japanese	200	163

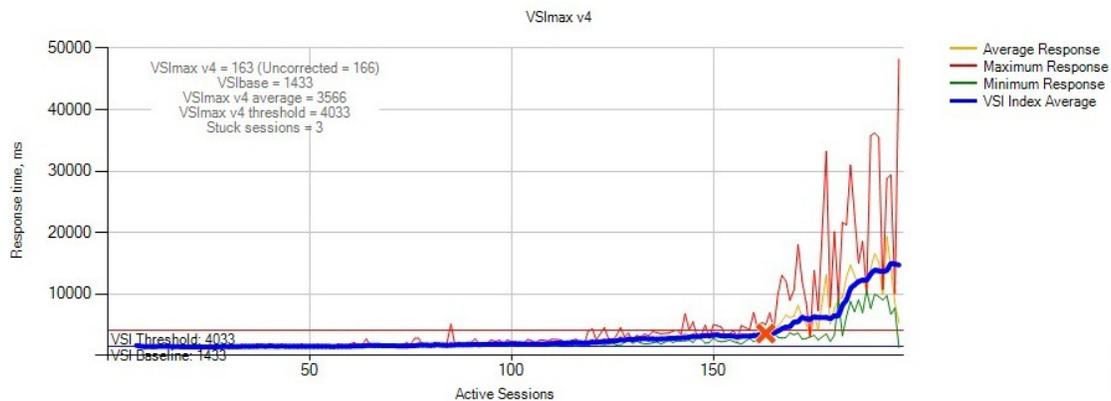
Login VSIMax

Figure 34: English



382630

Figure 35: Japanese

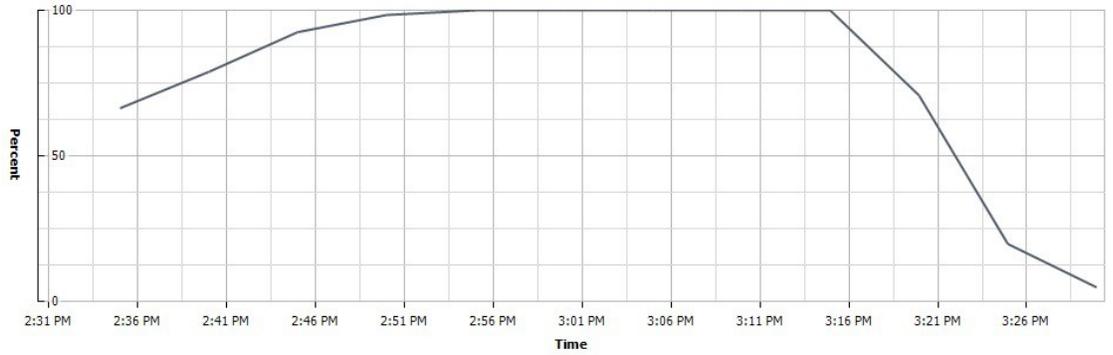


382594

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

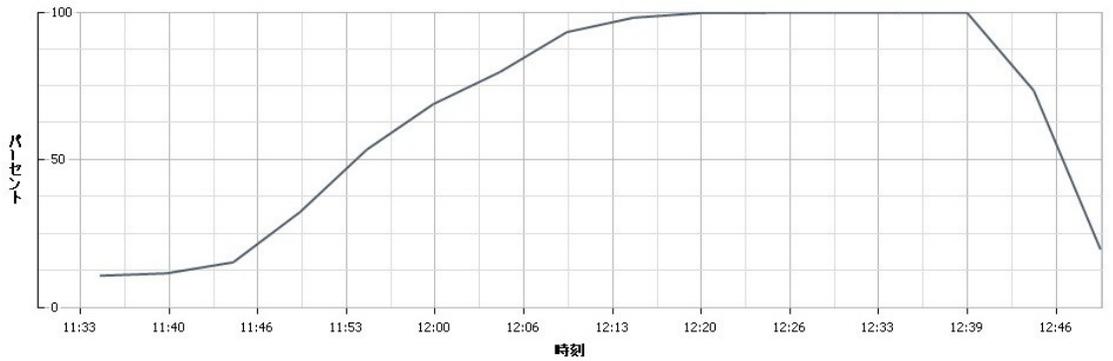
Processor And Memory Utilization throughout the test

Figure 36: English



382609

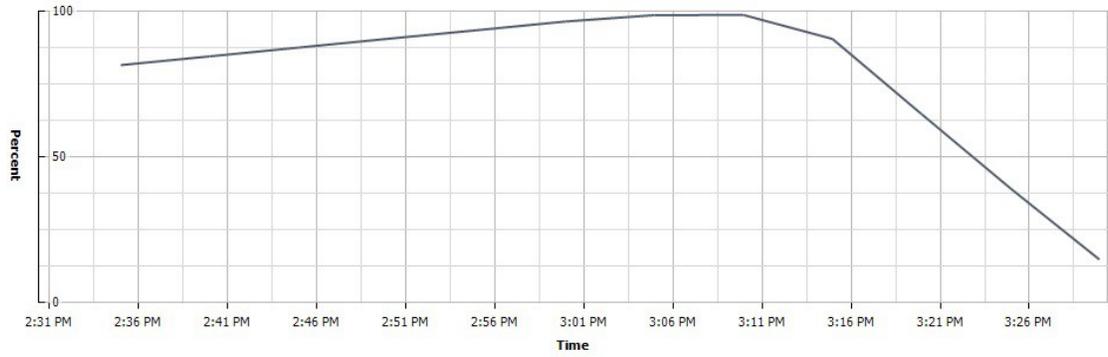
Figure 37: Japanese



382595

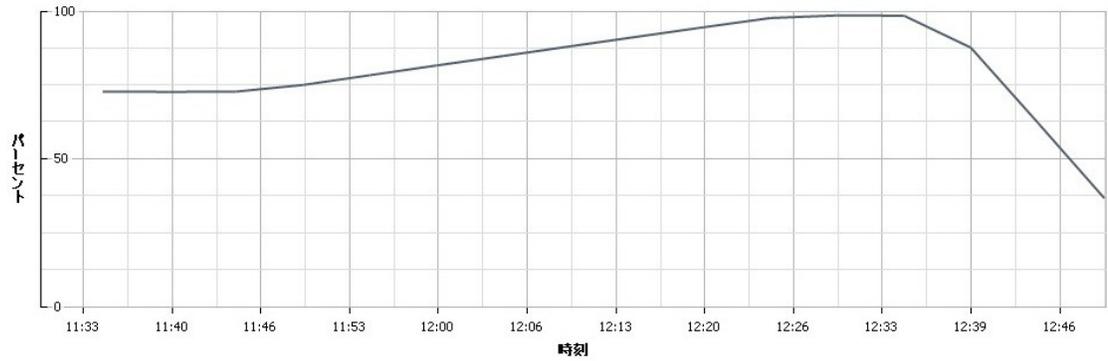
Figure 36 and 37 : CPU utilization throughout the test

Figure 38: English



3822610

Figure 39: Japanese



382596

Figure 38 and 39 : Memory usage throughout the test

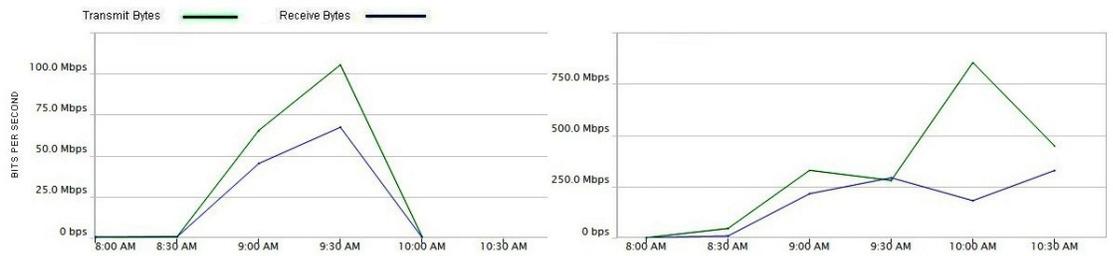
Network and Storage Utilization throughout the Test

Figure 40: English



382611

Figure 41: Japanese



382597

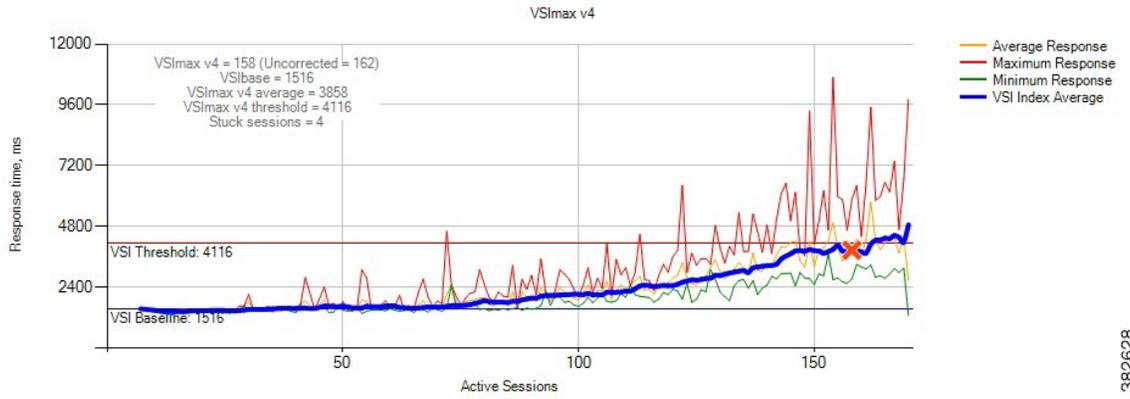
Figure 40 and 41 : Provisioning Services Network and Storage usage throughout the test

Heavy Workload Result

Heavy		
Server OS	No.of Launched Sessions	VSIMax
English	190	158
Japanese	190	154

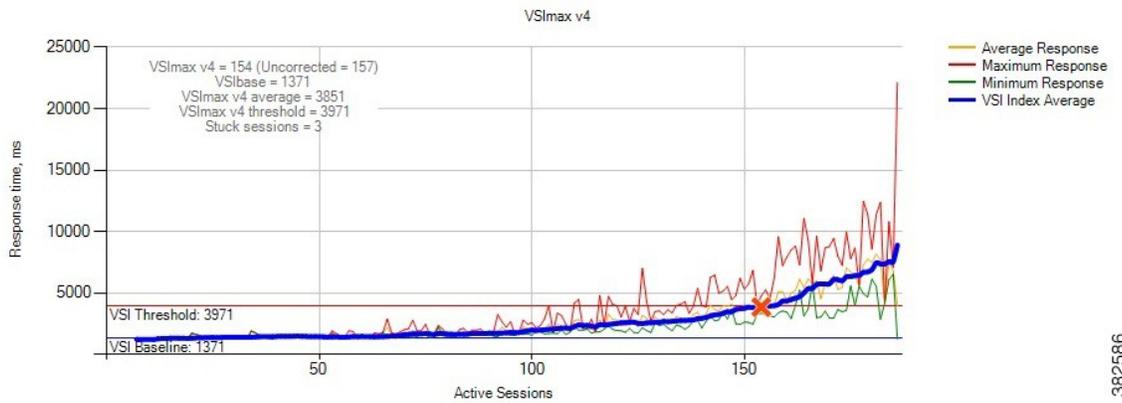
Login VSIMax

Figure 42: English



382628

Figure 43: Japanese

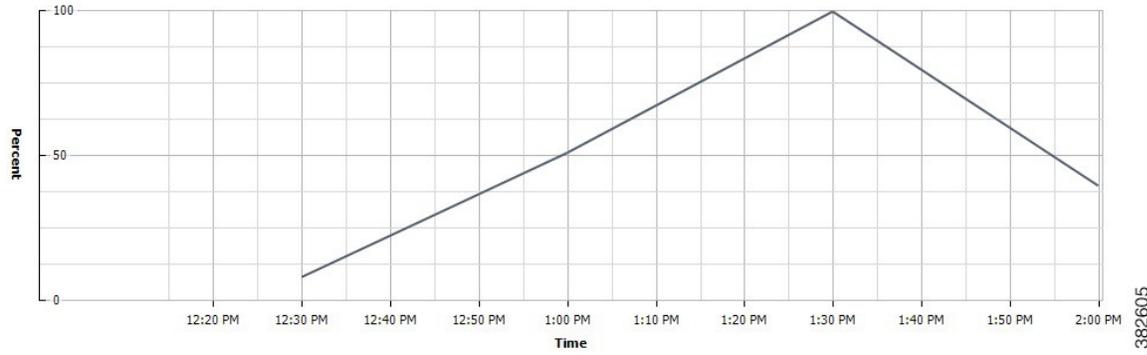


382586

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

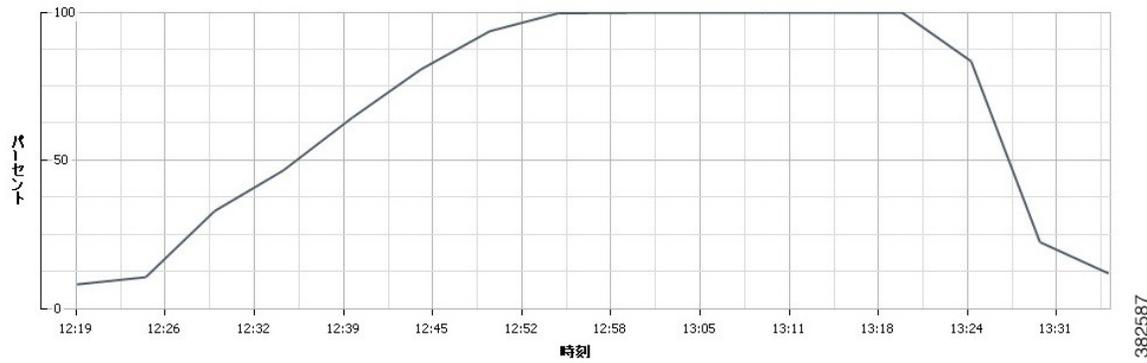
Processor And Memory Utilization throughout the test

Figure 44: English



382605

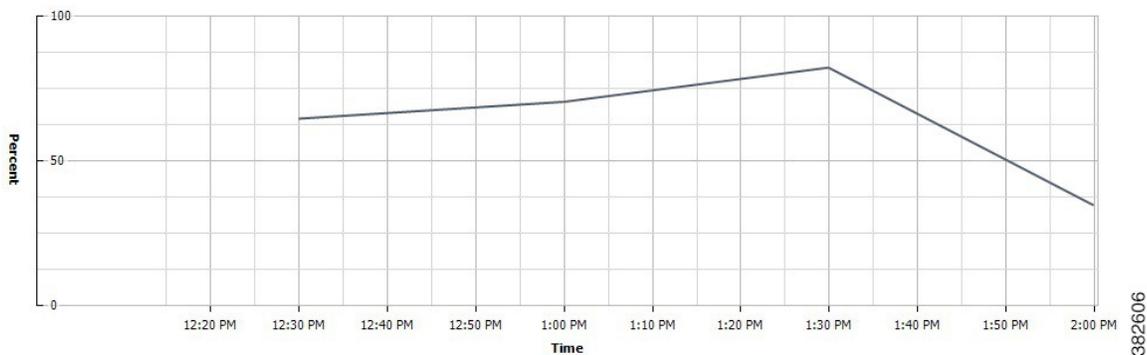
Figure 45: Japanese



382587

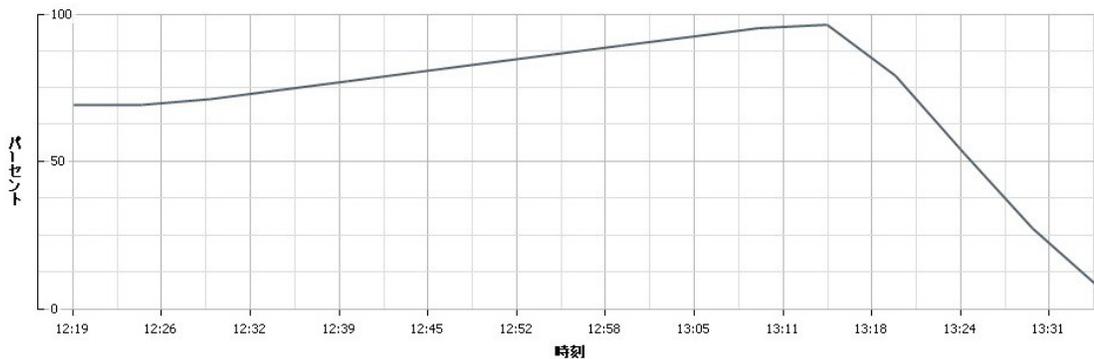
Figure 44 and 45 : CPU utilization throughout the test

Figure 46: English



382606

Figure 47: Japanese



382588

Figure 46 and 47 : Memory usage throughout the test

Network and Storage Utilization throughout the Test

Figure 48: English

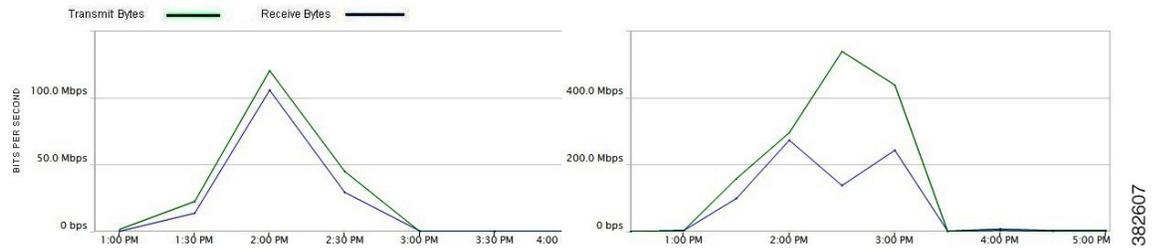


Figure 49: Japanese

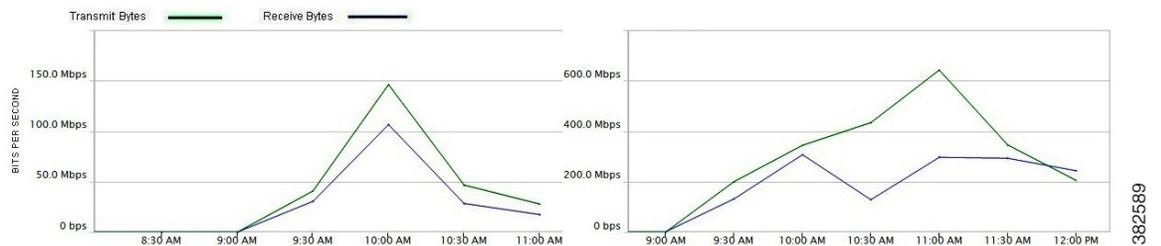


Figure 48 and 49 : Provisioning Services Network and Storage usage throughout the test

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

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

VMware

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

