VMWare Horizon View 6 VDI Scalability Testing on Cisco 240c M4 HyperFlex Cluster System

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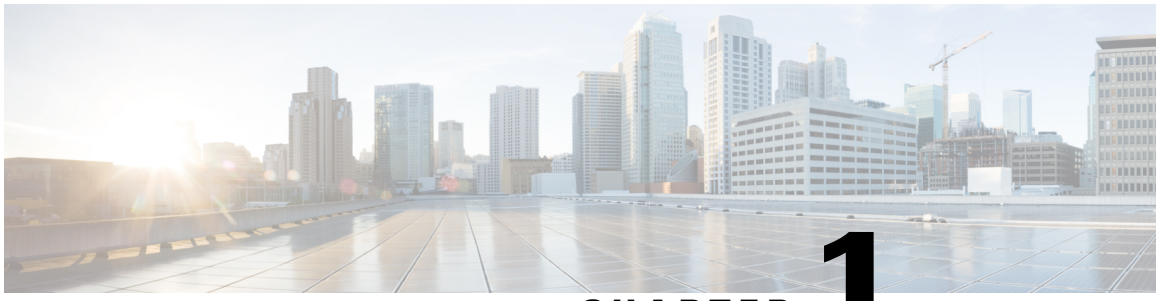


CHAPTER 1

VMWare VDI Scalability Testing on Cisco HX240c M4 Node HyperFlex System

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.

Cisco UCS 6296UP FI is the ideal solution for customers who need fewer servers but still want the comprehensive management capabilities provided by Cisco UCS Manager. Cisco UCS 6296UP FI delivers servers, storage, and 10-Gigabit networking in an easy-to-deploy, compact form factor.

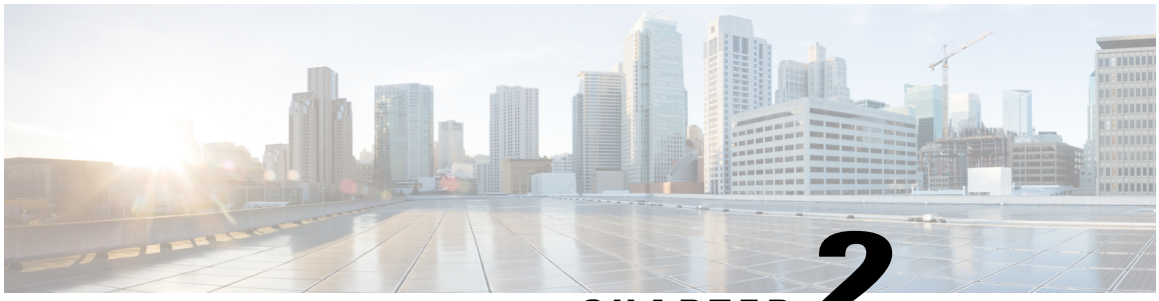
To find the virtual desktop capacity of a Cisco HX240c M4 HyperFlex system clustered of 3 nodes with UCS 6296UP FI, we used the Login Consultants Virtual Session Indexer (Login VSI) 4.1.4 benchmark. The Login VSI workload we used to perform a range of tasks to simulate a typical knowledge worker. The 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 6296UP FI
- Cisco HX240c M4 Hyperflex system with Intel(R) Xeon(R) E5 2698 V3 processor
- Cisco UCS C220 M4 server with Intel(R) Xeon(R) E5 2699 V3 processor
- Cisco-HX-Data-Platform-Installer-v1.7.1
- VMware vSphere 6.0 U1b Cisco Custom image for HyperFlex VDI
- A VMware Horizon View 6.2.2 virtual desktop linked clone pool consisting of Microsoft Windows 7SP1 x86 VMs with Compression and De-duplication enabled
- All Virtual machines in the Desktop Pool are provisioned with 2 vCPU, 2 GB of reserved memory and 30GB HDD, 3GB Non-Persistent Disk Storage for Windows 7 SP1 x86
- All the VMs are created on the 8 TB Datastore provided from Cisco HX Data platform Cluster storage

Acronyms

Acronym	Description
AD	Active Directory
BIOS	Basic Input Output System
CPU	Central Processing Unit
DHCP	Dynamic Host Configuration Protocol
DNS	Domain Name System
FI	Fabric Interconnect
GB	Giga Byte
HD	High Definition
HDD	Hard disk Drive
IO	Input Output
IOPS	Input Output Per Second
MB	Mega Byte
NTP	Network Time Protocol
OS	Operating System
RAM	Random access Memory
TB	Tera Byte
UCS	Unified Computing System
UCSM	Unified Computing System Manager
VDI	Virtual Desktop Infrastructure
VIC	Virtual Interface Card
VM	Virtual Machine
VSI	Virtual Session Index

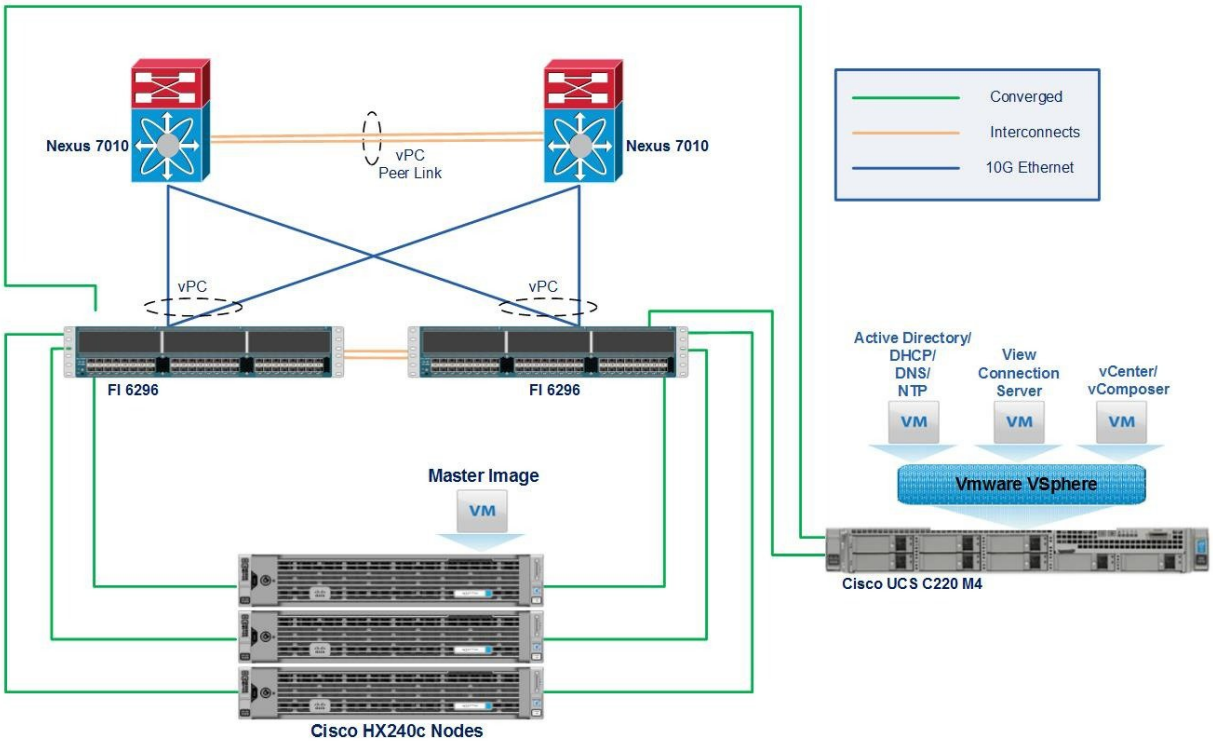


CHAPTER 2

Test Topology and Environment Matrix

Test Topology

Figure 1: Topology in use



Environment Matrix

Infra Components

Components	Version
UCS Server	Cisco UCS C220 M4
UCSM	2.2(6f)
Cisco-HX-Data-Platform-Installer	1.7.1
Hypervisor	
ESXi	VMWare ESXi 6.0 U1
Operating System	
Windows Server OS	Windows Server 2012 R2 x64 (Japanese)
Virtual Desktop Delivery Component	
VMWare Horizon View Composer	6.2.2
VMWare Horizon View Composer	6.2.2
VMWare vCenter Server	VMWare vCenter 6.0- Buil no- 3040890
VDI Scalability Measuring Tool	
Login VSI	4.1.4
AD, DHCP, DNS, NTP	Windows Server 2012 R2 x64 (Japanese)
Login VSI Launcher, Analyzer and VSI share	Windows Server 2012 R2 x64 (Japanese)
Switches	
Nexus 7010	7.2(1)D1(1)

SUT Components

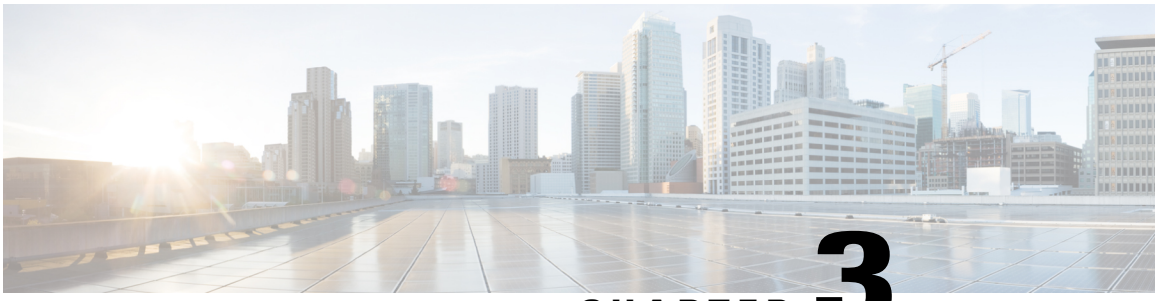
Componenet	Version/ Type
HyperFlex System	Cisco HX 240c M4 Node
UCSM	2.2(6f)
CPUs	
Vendor	Intel ® Corporation
Name	Intel(R) Xeon(R) E5-2698 v3
CPU Cores	32 CPUs x 2.294 GHz
Processor Sockets	2
Cores per Socket	16

Componenet	Version/ Type
Logical Processors	64
Platform	
Vendor	Cisco
BIOS Settings	2.2(6f)
Memory Modules per Node	
Total RAM in the system	512 GB
Type	DDR4
Speed (MHz)	2133
Number of RAM Modules	8
Size (GB)	64
Chip organization	Double sided
Rank	Quad
Cluster Configuration	
Total No of Nodes	3
Total Memory Capacity	1536 GB
Total CPU Capacity	193.59 GHz
Total Storage Capacity	17.33 TB
Hypervisor	
Name	VMWare ESXi 6.0 U1b
Build Number	3380124
Operating System Power Profile	Maximum Performance
Operating System	
Windows Desktop OS	Windows 7 SP1 x86 (Japanese)
Adapters	
IO Adapter	Cisco UCS VIC 1227 - 4.0(8c)

Virtual Machine Image Attributes- SUT

Attribute	Linked Clones
Desktop operating system	Microsoft Windows 7 Enterprise SP1 x86 (Japanese)
Hardware	VMware Virtual Hardware Version 11
vCPU	2

Attribute	Linked Clones
Memory	2 GB
Video RAM	35 MB
NIC	1
Virtual Network Adapter	VMXNet3 Adapter
Virtual SCSI Controller	Paravirtual
Virtual Disk: VMDK 1	30 GB
Virtual Disk: VMDK 2 (nonpersistant disk)	3 GB
Applications	• LoginVSI 4.1.4 Application Installation • Adobe Acrobat 11 • Adobe Flash Player 11 • Doro PDF 1.82 • Microsoft Internet Explorer 11 • Microsoft Office 2013 SP2 • 1080p and 720p HD Videos
VMWare Tools	Release 10.0.0.3000743
VMWare View Agent	Release 6.2.2.3526061



CHAPTER 3

Implementation Steps and Test Execution Details

Implementation steps

- Infra components such as AD, DNS, DHCP, NTP(Integrated services), vCenter Server, View Composer(Integrated services) and View Connection Server are deployed as Virtual machines on UCSM Integrated Cisco UCS C220 M4 Server.
- Master image created on Server Under Test with Cisco HX240C M4SX 3-Node cluster in UCS 6296UP FI and installed with Windows 7 SP1 x86 resides on 8 TB Datastore provided from Cisco HX Data platform Cluster storage.
- LoginVSI Launchers are deployed as VMs to incrementally login the Users Virtual desktop sessions (created from master image) and begin the workload (Light, Medium, Heavy).

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 ideal time is included in simulate real-world users.

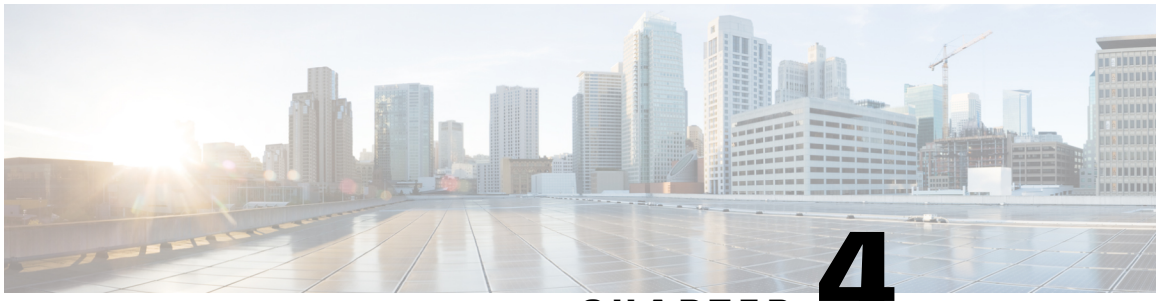
Each loop will open and use:

- Outlook, browse messages.
- Internet Explorer, browsing different web pages and a YouTube style video(480p Movie Trailer) is opened 3 times in every loop.
- Word, one instance to measure response time, one instance to review and edit the document.
- Doro PDF Printer & Acrobat reader, the word document is printed and reviewed to PDF.
- Excel, a very large randomized sheet is opened.

Heavy Workload

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

- Begins by opening 4 instance 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 videos are watched.
- Increased the time the workload plays the flash game.
- The ideal time is reduced to 2minutes.



CHAPTER 4

VMWare Horizon View Scalability Testing on Cisco UCS 240c M4 HyperFlex System

Windows 7 SP1 x86 Performance in Japanese Environment

VSIMax Results

Type of workload	VSIMax Value
Light	360
Medium	351
Heavy	316

Light Workload Result

Light Workload Result		
Desktop OS	**No.of Launched Sessions**	**VSIMax**
Japanese	400	360

Login VSIMax

Figure 2:

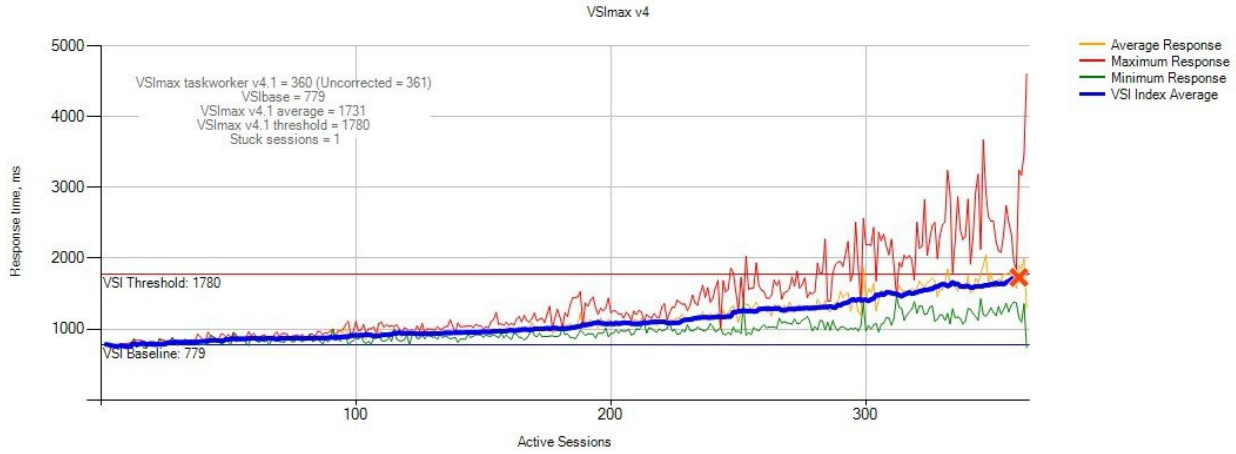


Figure 2: Average virtual desktop response times at various number of virtual desktops on the Cisco HX240c M4 3-Node Cluster

Processor And Memory Utilization throughout the test

Figure 3:

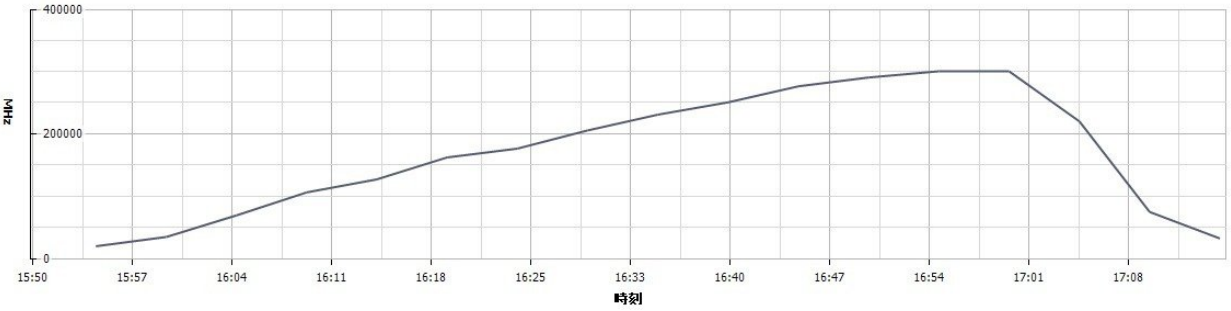


Figure 3: CPU Utilization throughtout the test

Figure 4:

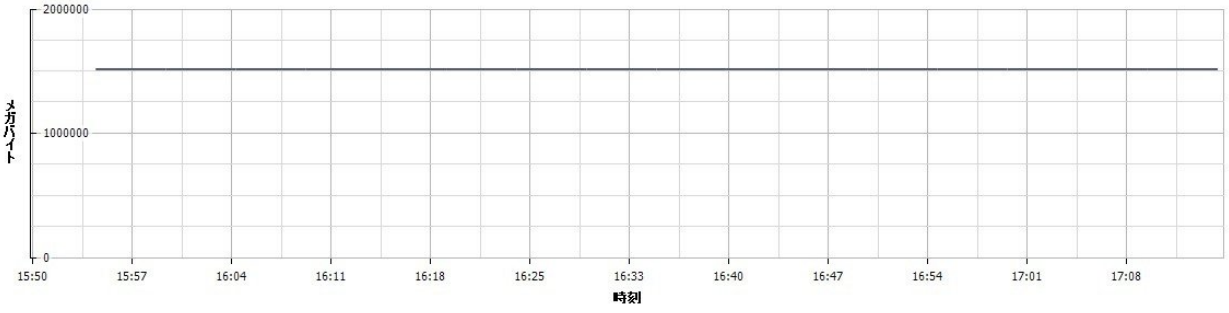


Figure 4: Memory usage throughout the test

IO throughtout the test

Figure 5:

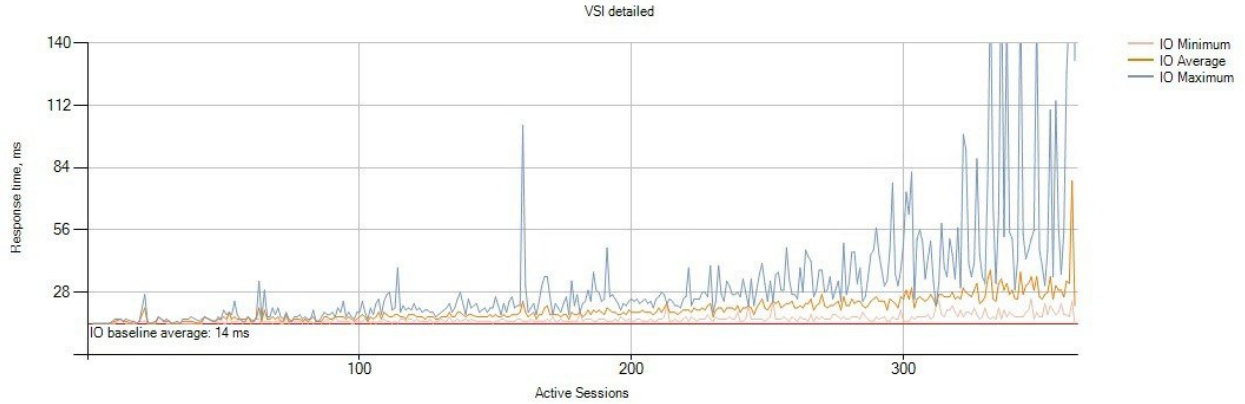


Figure 5: IO throughtout the test

IOPS, Throughput and Latency throughout the test

Figure 6:

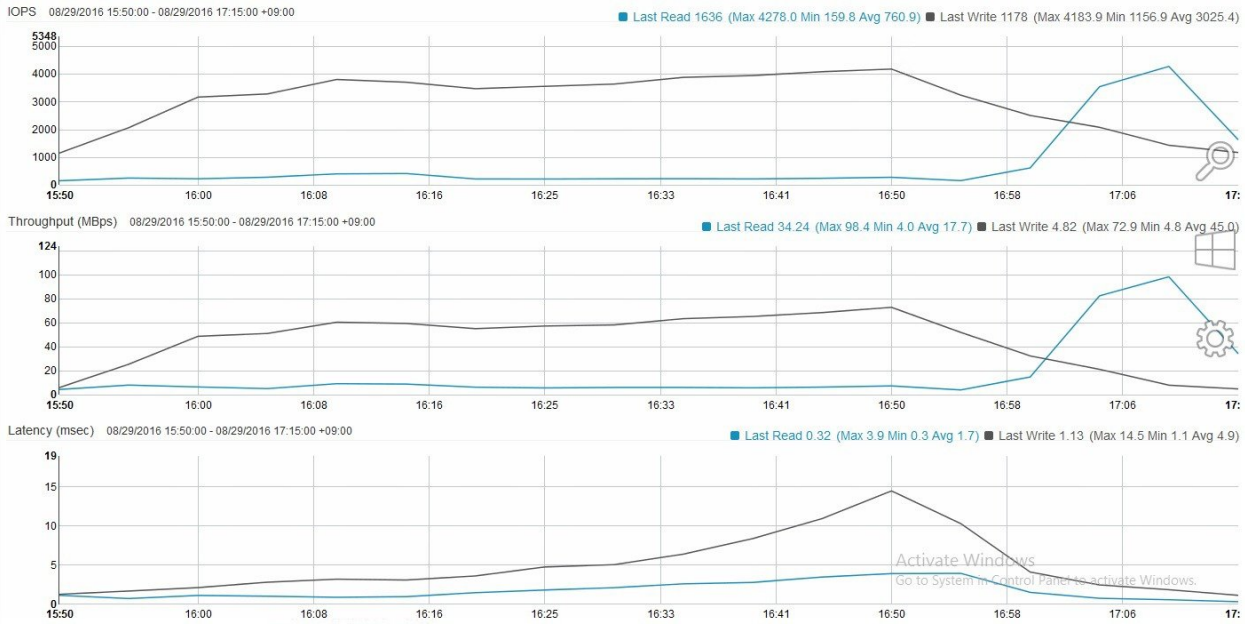


Figure 6: IOPS, Throughput and Latency throughout the test

Medium Workload Result

Medium Workload Result		
Desktop OS	**No.of Launched Sessions**	**VSIMax**
Japanese	425	351

Login VSIMax

Figure 7:

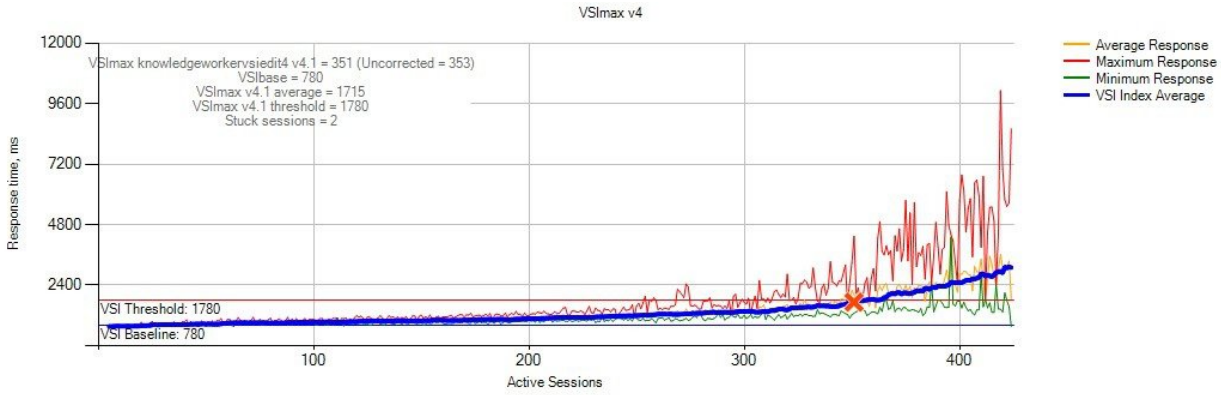


Figure 7: Average virtual desktop response times at various number of virtual desktops on the Cisco HX240c M4 3-Node Cluster

Processor And Memory Utilization throughout the test

Figure 8:

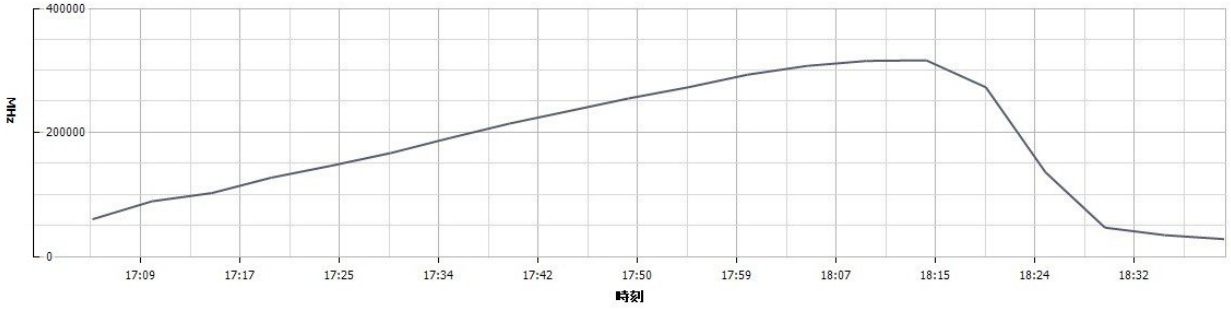


Figure 8: CPU Utilization throughtout the test

Figure 9:

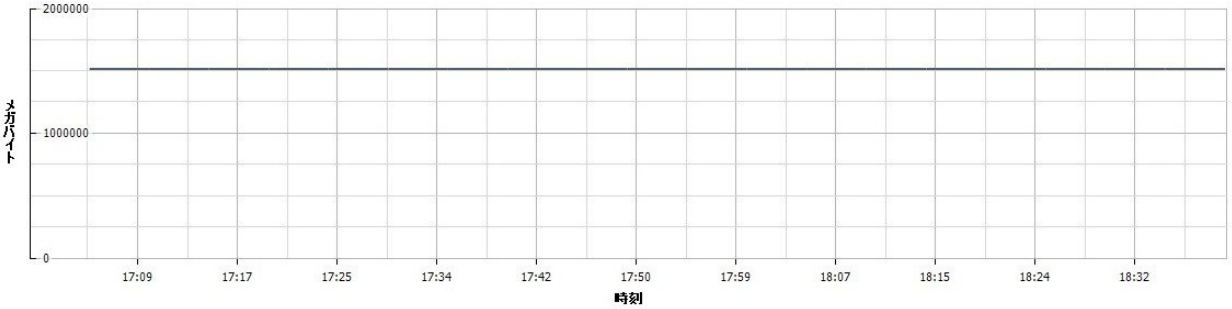


Figure 9: Memory usage throughout the test

IO throughtout the test

Figure 10:

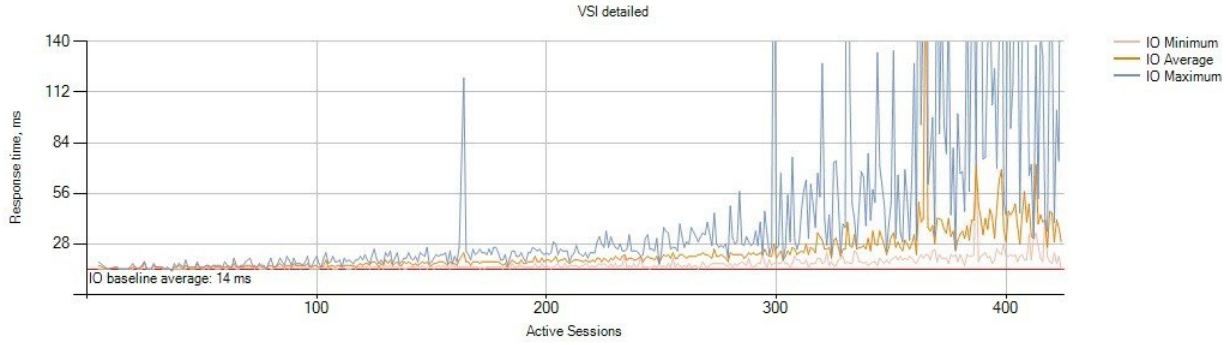


Figure 10: IO throughtout the test

IOPS, Throughput and Latency throughout the test

Figure 11:

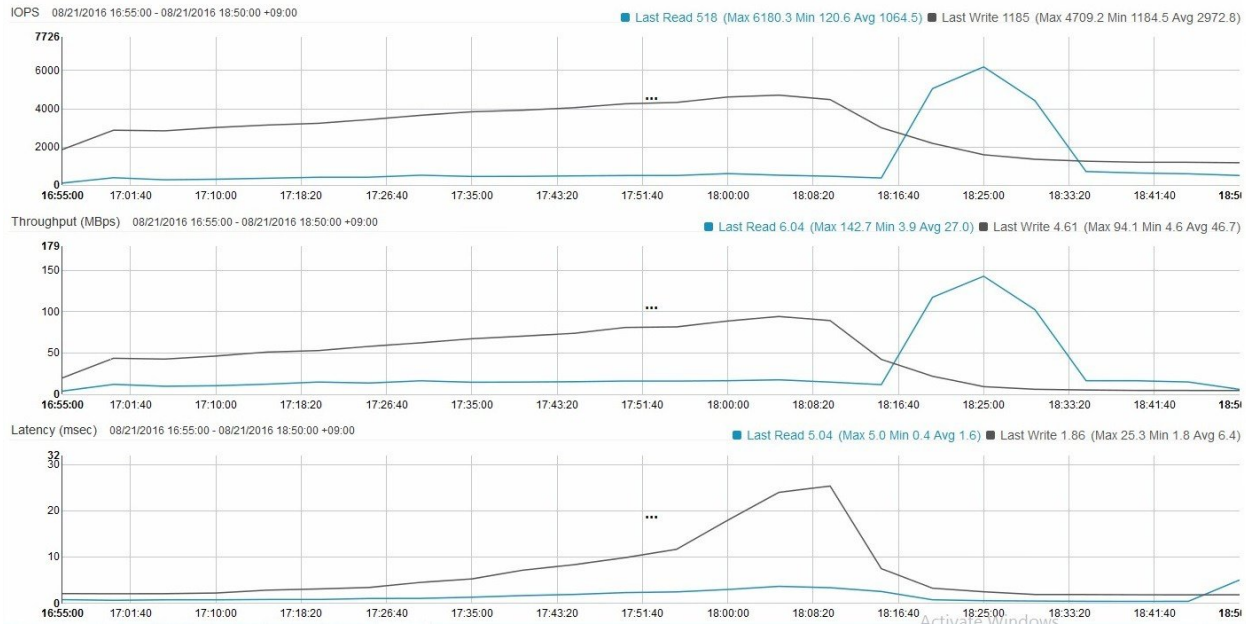


Figure 11: IOPS, Throughput and Latency throughout the test

Heavy Workload Result

Heavy Workload Result		
Desktop OS	**No.of Launched Sessions**	**VSIMax**
Japanese	375	316

Login VSIMax

Figure 12:

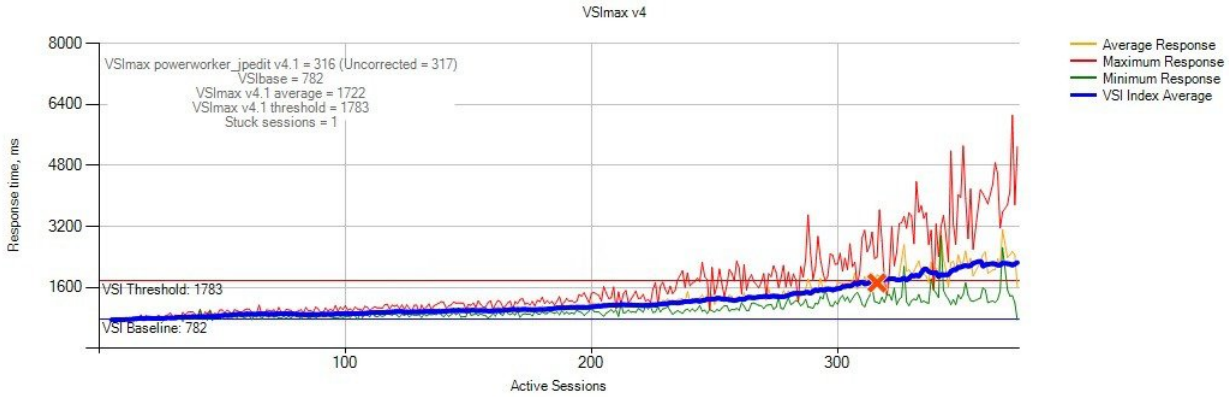


Figure 12: Average virtual desktop response times at various number of virtual desktops on the Cisco HX240c M4 3-Node Cluster

Processor And Memory Utilization throughout the test

Figure 13:

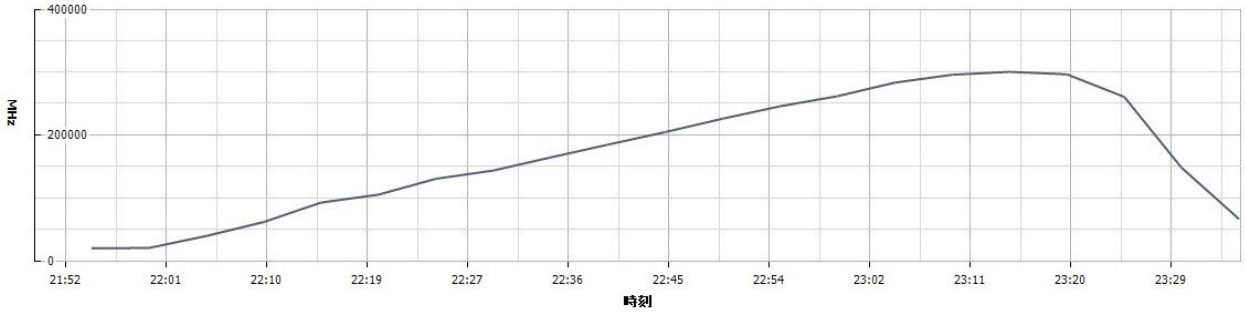


Figure 13: CPU Utilization throughtout the test

Figure 14:

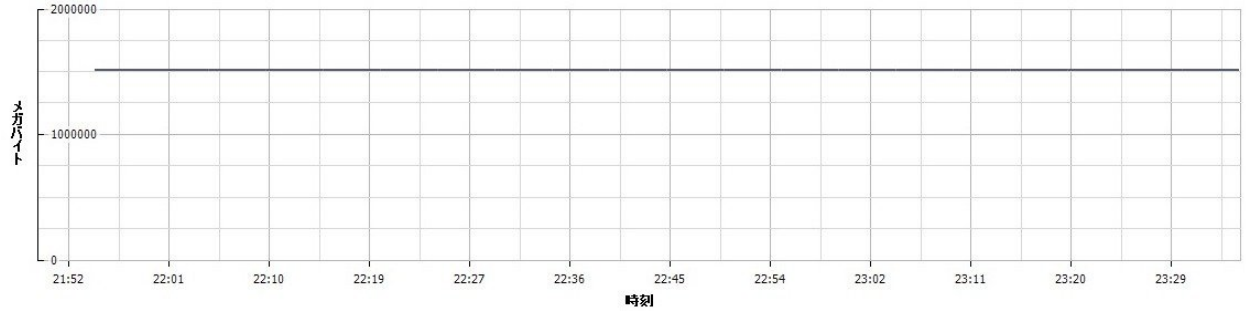


Figure 14: Memory usage throughout the test

IO throughtout the test

Figure 15:

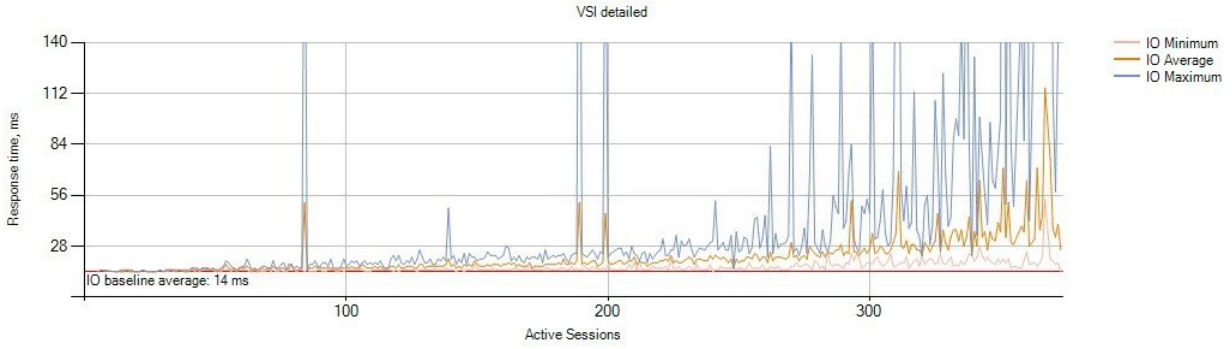


Figure 15: IO throughtout the test

IOPS, Throughput and Latency throughout the test

Figure 16:

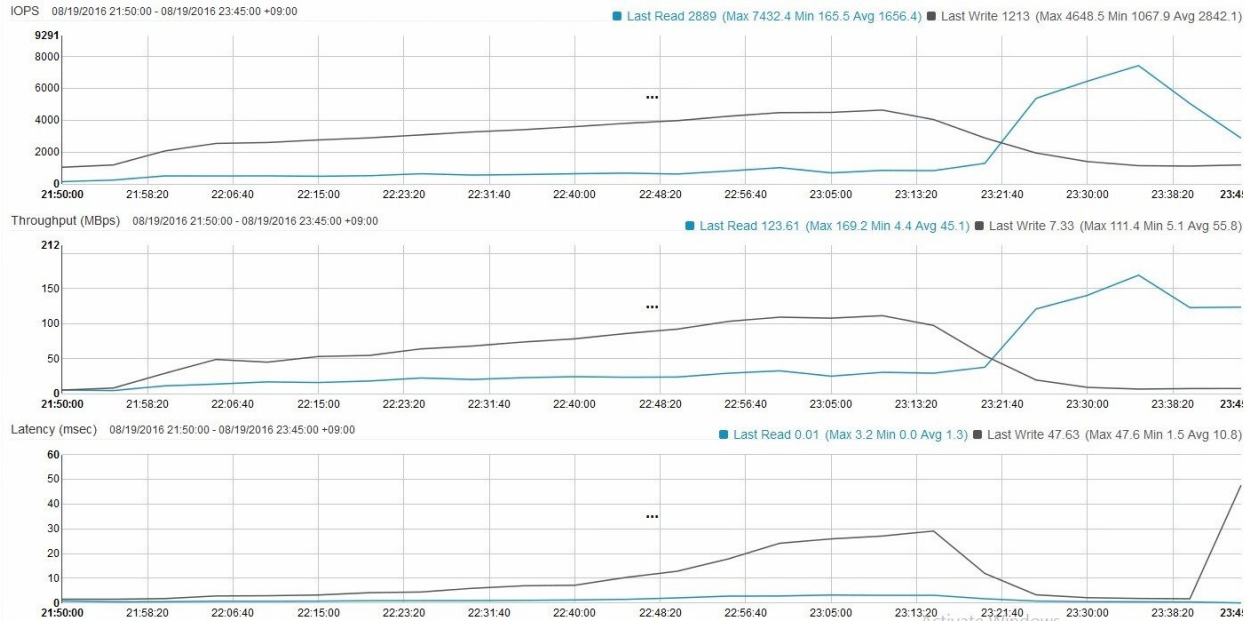
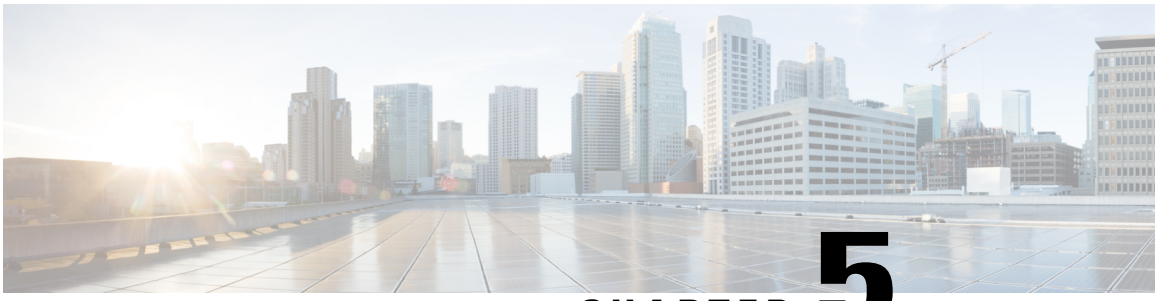


Figure 16: IOPS, Throughput and Latency throughout the test



CHAPTER 5

Issues and Related Documentation

Issues

S.No	Bug ID	Description
1	CSCva97518	HX-Native-Clone(Ready-Clone) failed to update Guest Name for cloned VM's Version (Max5): 1.7(1)
2	CSCva57687	Incorrect VLAN config on one of the vNICs error during SP Association

Related Documentation

Cisco HyperFlex

http://www.cisco.com/c/dam/en/us/products/collateral/hyperconverged-infrastructure/hyperflex-hx-series/solution-overview-c22-736815.pdf

Software Downloads

https://software.cisco.com/download/release.html?mdfid=286305544&softwareid=286305994&release=1.7.1-14835&relind=AVAILABLE&rellifecycle=&reltype=latest

LoginVSI

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

VMWare Horizon View

https://pubs.vmware.com/Release_Notes/en/horizon-6-view/horizon-622-view-release-notes.html