



VMWare Horizon View VDI Scalability Testing on Cisco HXAF240c M4SX Node HyperFlex System

First Published: 2017-07-24

Last Modified: 2017-07-28

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VMWare Horizon View VDI Scalability Testing on Cisco HXAF240c M4SX Node HyperFlex System

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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.

Cisco UCS 6332-16UP 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 6332-16UP FI delivers server, storage and 40-Gigabit networking in an easy-to-deploy, compact form factor.

To find the virtual desktop capacity of a Cisco HXAF240c M4SX Node HyperFlex system clustered of 3 nodes with UCS 6332-16UP FI, we used the Login Consultants Virtual Session Indexer (Login VSI) 4.1.25.6 benchmark. The LoginVSI workload we used to perform a range of tasks to simulate typical workloads. 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 6332-16UP FI
- Cisco HXAF240c M4SX Node Hyperflex system with Intel(R) Xeon(R) E5-2658 v4 processor
- Cisco-HX-Data-Platform-Installer
- HX-VMware-ESXi-6.0U3 Cisco Custom image
- VMware Horizon View 6.2.3 virtual desktop linked clone pool consisting of Windows 10 VMs
- All VMs in the Desktop Pool are provisioned with 2 vCPU, 4 GB RAM and 32GB HDD, 2GB Non-Persistent Disk Storage
- All VMs are provisioned on the Cisco HX Data platform cluster datastore

Acronyms

Acronym	Description
AD	Active Directory
ADDC	Active Directory Domain Controller
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
HXDP	HyperFlex Data Platform
IO	Input Output
IOPS	Input Output Per Second
MB	Mega Byte
MLOM	Modular LAN On Motherboard
MS	Microsoft
NTP	Network Time Protocol
OS	Operating System
RAM	Random Access Memory
SUT	Server Under Test
TB	Tera Byte
UCS	Unified Computing System
UCSM	Unified Computing System Manager
VCPU	Virtual Central Processing Unit
VDI	Virtual Desktop Infrastructure
VIC	Virtual Interface Card
VM	Virtual Machine
VSI	Virtual Session Index

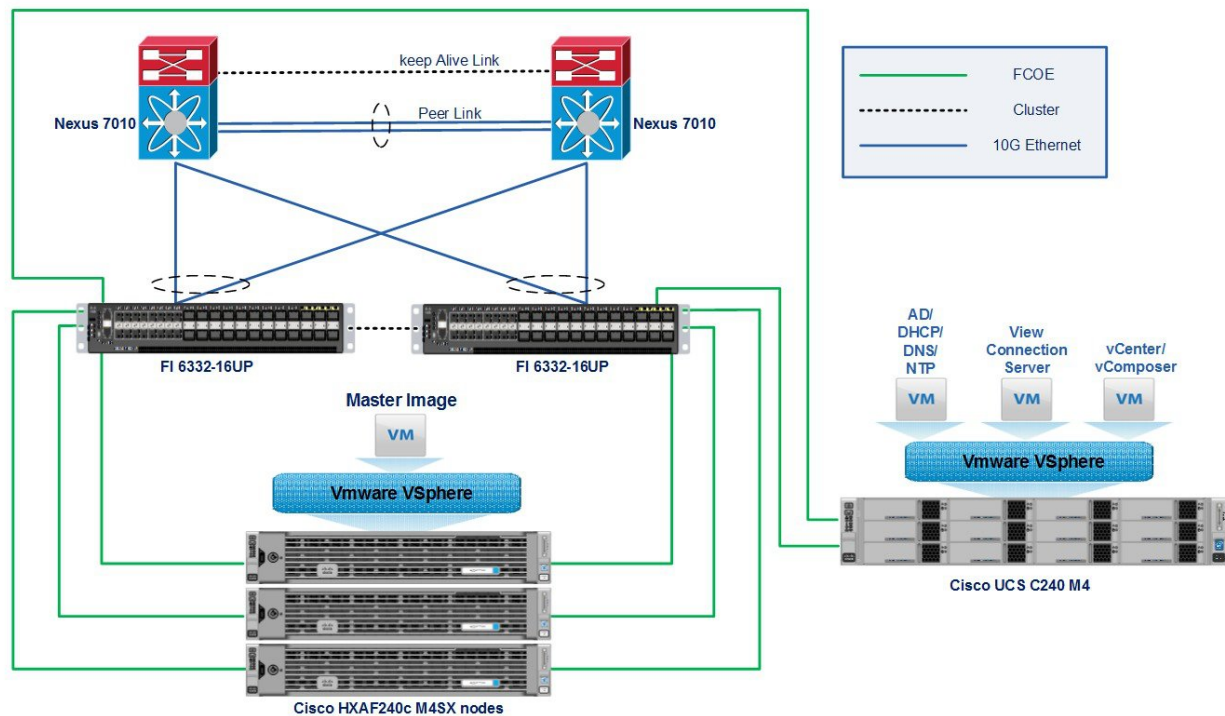


Test Topology and Environment Matrix

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Test Topology

Figure 1: Topology in use



Environment Matrix

Infra Components

Components	Version
UCS Server	Cisco UCS C240 M4
UCSM	3.1(2g)
Cisco-HX-Data-Platform-Installer	2.1(1b)
Hypervisor	
ESXi	VMWare ESXi 6.0 U2-2494585
Operating System	
Windows Server OS	Windows Server 2012 R2 x64 (Japanese)
Virtual Desktop Delivery Component	
VMWare Horizon View Composer	6.2.3.4123264
VMWare Horizon View Connection Server	6.2.3.4126346
VMWare vCenter Server	VMWare vCenter 6.0 Build no-5112506
VDI Scalability Measuring Tool	
Login VSI	4.1.25.6

SUT Components

Component	Version/ Type
HyperFlex System	Cisco HXAF240c M4SX Node
UCSM	3.1(2g)
CPUs	
Vendor	Intel [®] Corporation
Name	Intel(R) Xeon(R) E5-2658 v4
CPU Cores	28 CPUs x 2.294 GHz
Processor Sockets	2
Cores per Socket	14
Logical Processors	56
Platform	
Vendor	Cisco
BIOS Settings	3.1(2g)

Component	Version/ Type
Memory Modules per Node	
Total RAM in the system	576 GB
Type	DDR4
Speed (MHz)	2400
Number of RAM Modules loaded	18
Per RAM Capacity (GB)	32
Vendor	Samsung
Rank	Dual
Cluster Configuration	
Total No of Nodes	3
Total Memory Capacity	1728 GB
Total CPU Capacity	192 GHz
Total Storage Capacity	6.33 TB
Hypervisor	
Name	VMWare ESXi 6.0 U3
Build Number	5050593
Operating System	
Windows Desktop OS	Windows_10_enterprise_version_1607_updated_jan_2017_x64_dvd_9714397
Adapters	
IO Adapter	4.1(2e) / Cisco UCS MLOM 1227

Virtual Machine Image Attributes- SUT

Attribute	Version/ Type
Desktop operating system	Windows_10_enterprise_version_1607_updated_jan_2017_x64_dvd_9714397
Hardware	VMWare Virtual Hardware Version 11
vCPU	2
Memory	4 GB
Video RAM	4 MB (default)
NIC	1
Virtual Network Adapter	VMXNet3 Adapter
Virtual SCSI Controller	LSI Logic SAS

Attribute	Version/ Type
Virtual Disk: VMDK 1	32 GB
Virtual Disk: VMDK 2 (non-persistent disk)	2 GB
Applications	<ul style="list-style-type: none">• LoginVSI 4.1.25.6 Application• Adobe Acrobat 11• Adobe Flash Player 11• Doro PDF 1.82• MS Internet Explorer 11• MS Office 2016 Professional Plus• 1080p and 720p HD Videos
VMWare Tools	Release 10.0.9.3917699
VMWare View Agent	Release 6.2.3.4126745



Design and Implementation

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Design and Implementation

- ADDC deployed as VM and DNS, DHCP, NTP are configured as integrated services with the ADDC.
- VMWare vCenter and View Connection Server are also deployed as VMs.
- VMWare View Composer is deployed in linked mode with the vCenter Server.
- HXDP is deployed as VM.
- 3-Node Cluster and Datastore is configured, deployed and managed through HXDP.
- VM Master Image is deployed under the 3 node cluster Datastore.
- 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).

Login VSI Workload 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 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.

The Light workload is mostly around Excel actions and Internet explorer actions and it is more diverse and focused more than two applications.

Each cycle will open

- MS Outlook and browse mails
- Adobe reader to open pdf files
- Copy and zip actions
- Word to open and edit the documents

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 2 minutes.



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Windows 10 x64 Performance in Japanese Environment

[Light Workload Result](#), on page 9

[Medium Workload Result](#), on page 11

[Heavy Workload Result](#), on page 13

VSIMax Results

Type of workload	VSIMax Value
Light	302
Medium	276
Heavy	247

Light Workload Result

Desktop OS	No.of Launched Sessions	No. of Active Sessions	VSIMax
Japanese	325	321	302

Login VSIMax

Figure 2:

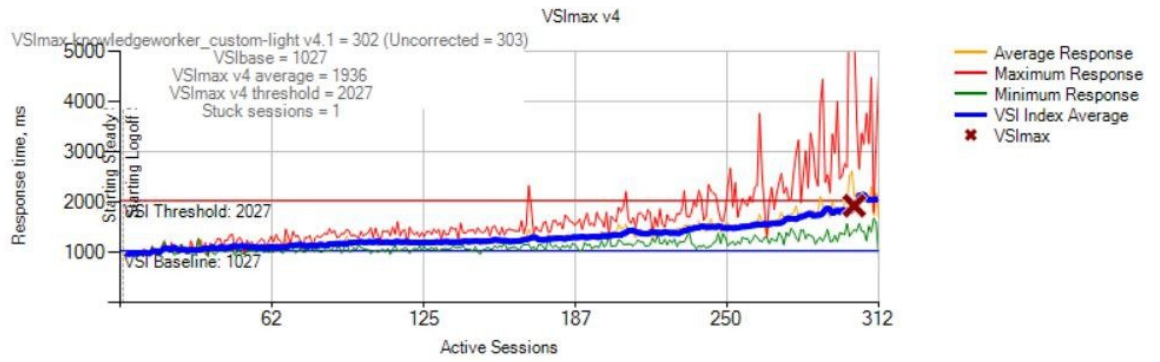


Figure 2: Average virtual desktop response times at various number of virtual desktops on the Cisco HX240c M4 3-Node Cluster

Processor And Memory Utilization throughout the test

Figure 3:

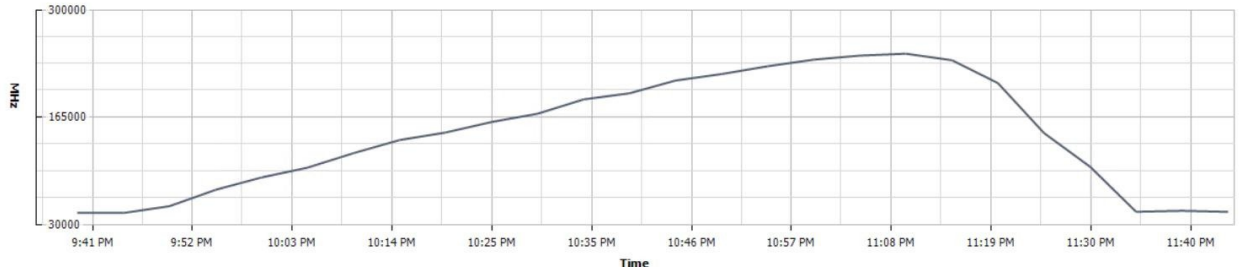


Figure 3: CPU Utilization throughout the test

Figure 4:

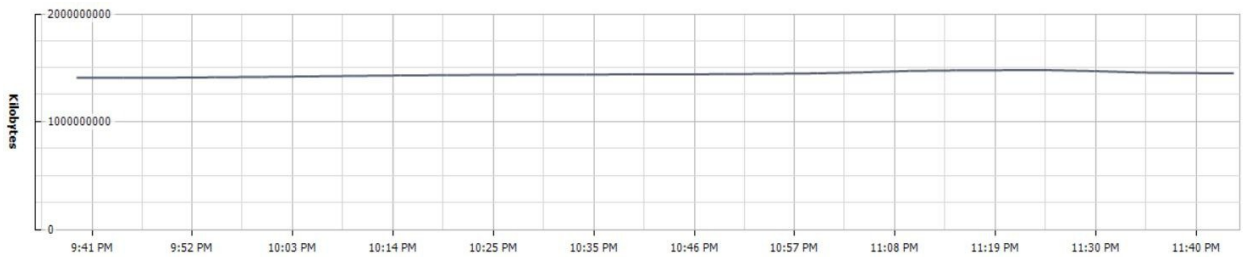


Figure 4: Memory usage throughout the test

IO throughout the test

Figure 5:

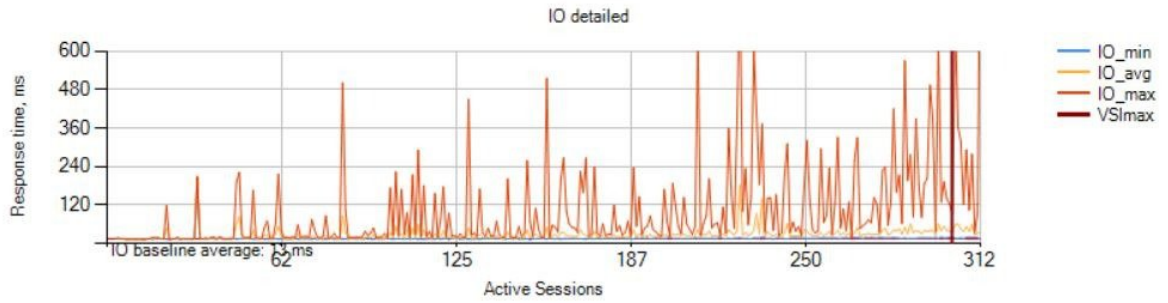


Figure 5: IO throughtout the test

IOPS, Throughput and Latency throughout the test

Figure 6:

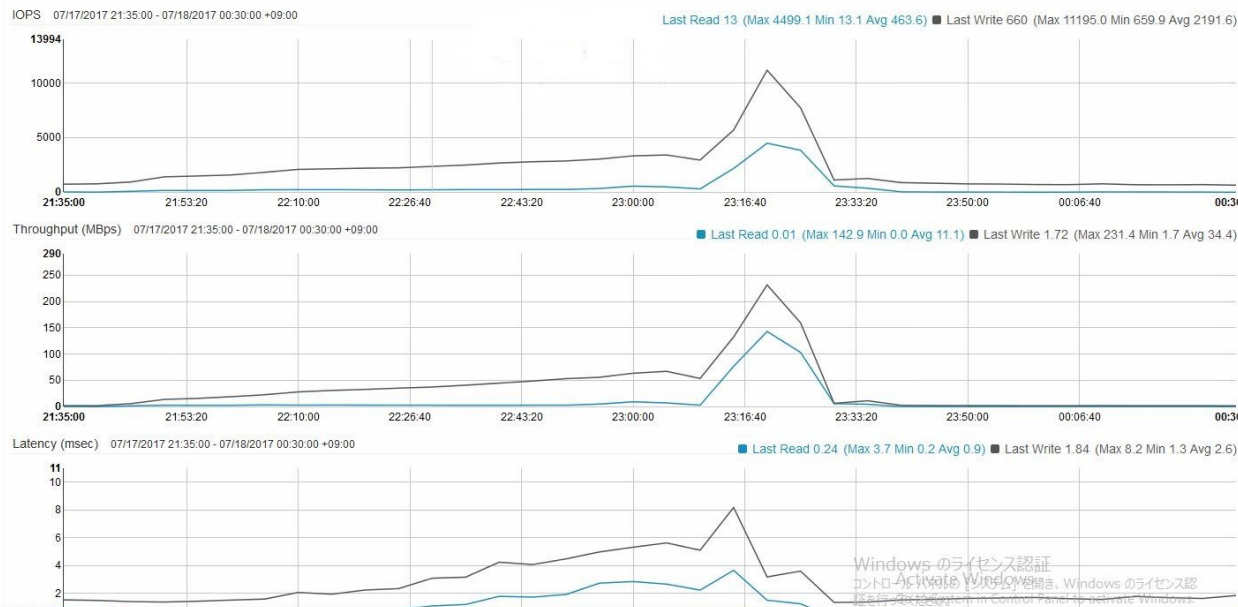


Figure 6: IOPS, Throughput and Latency throughout the test

Medium Workload Result

Desktop OS	No.of Launched Sessions	No. of Active Sessions	VSIMax
Japanese	300	295	276

Login VSIMax

Figure 7:

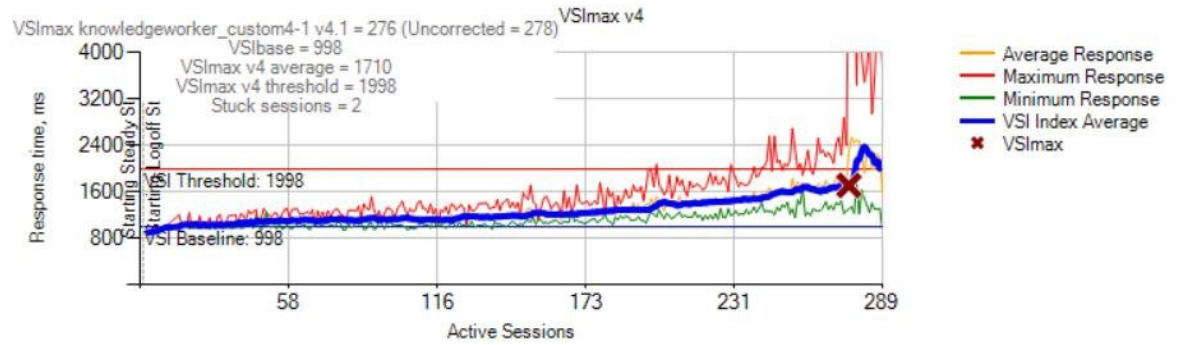


Figure 7: Average virtual desktop response times at various number of virtual desktops on the Cisco HX240c M4 3-Node Cluster

Processor And Memory Utilization throughout the test

Figure 8:

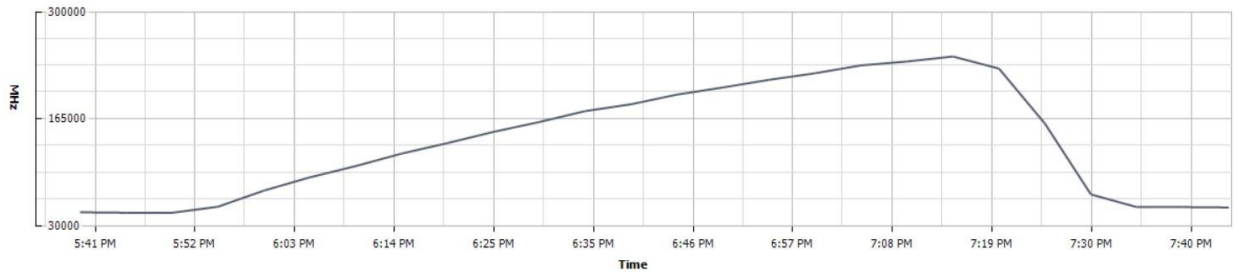


Figure 8: CPU Utilization throughout the test

Figure 9:

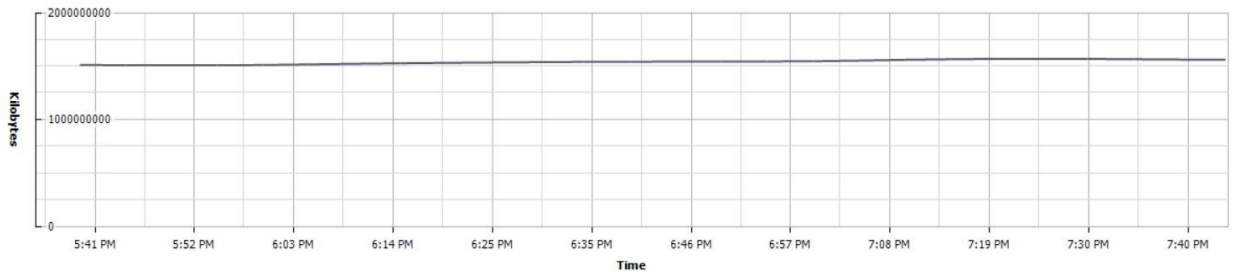


Figure 9: Memory usage throughout the test

IO throughout the test

Figure 10:

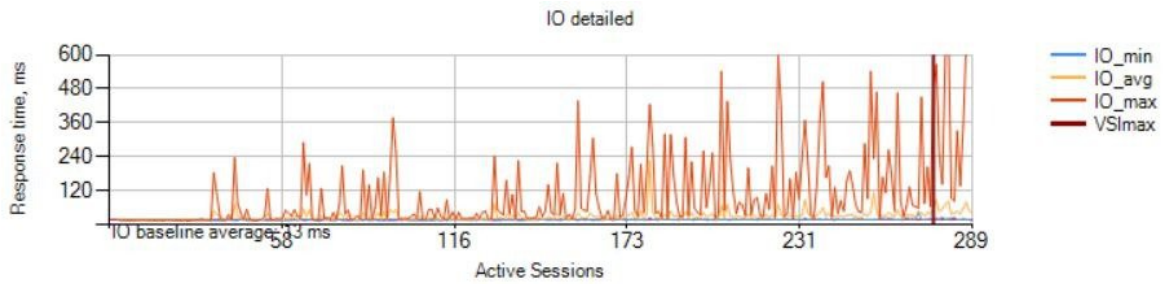


Figure 10: IO throughtout the test

IOPS, Throughput and Latency throughout the test

Figure 11:

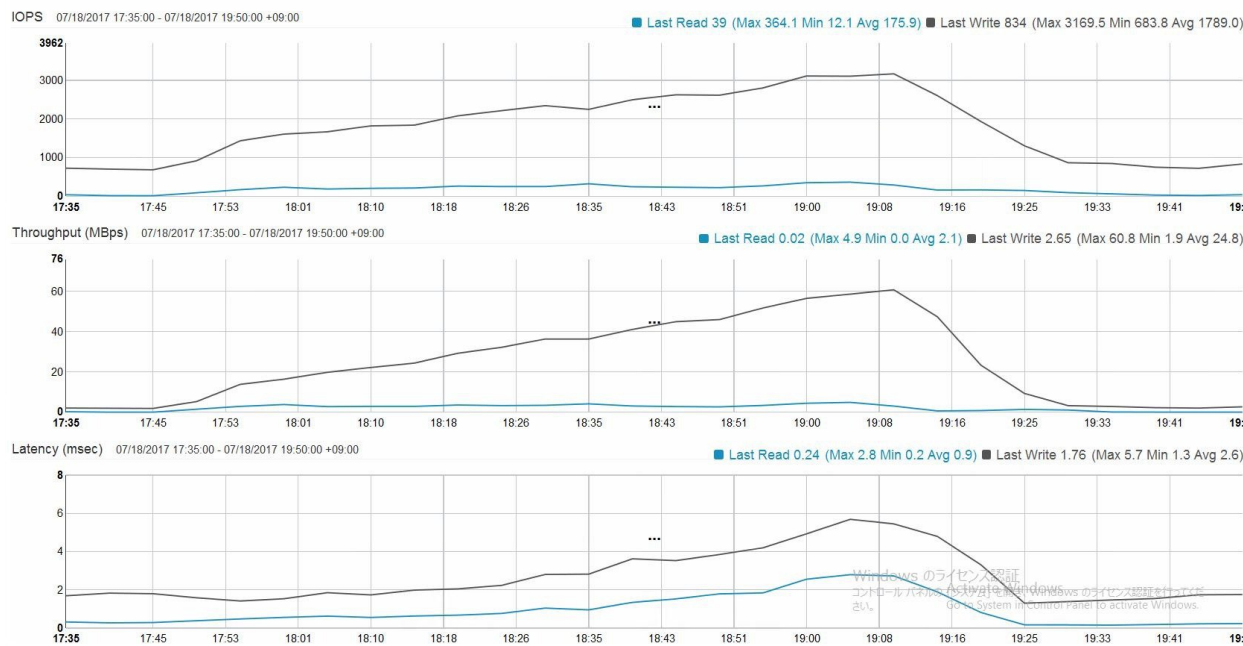


Figure 11: IOPS, Throughput and Latency throughout the test

Heavy Workload Result

Desktop OS	No. of Launched Sessions	No. of Active Sessions	VSIMax
Japanese	265	262	247

Login VSIMax

Figure 12:

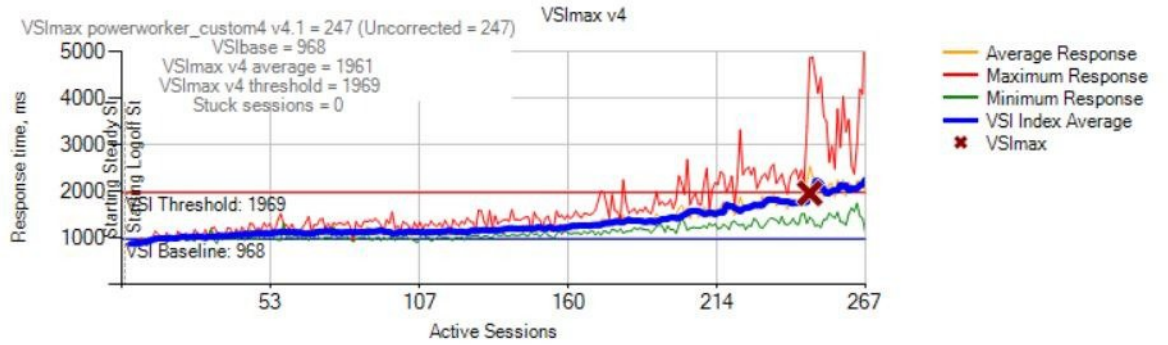


Figure 12: Average virtual desktop response times at various number of virtual desktops on the Cisco HX240c M4 3-Node Cluster

Processor And Memory Utilization throughout the test

Figure 13:

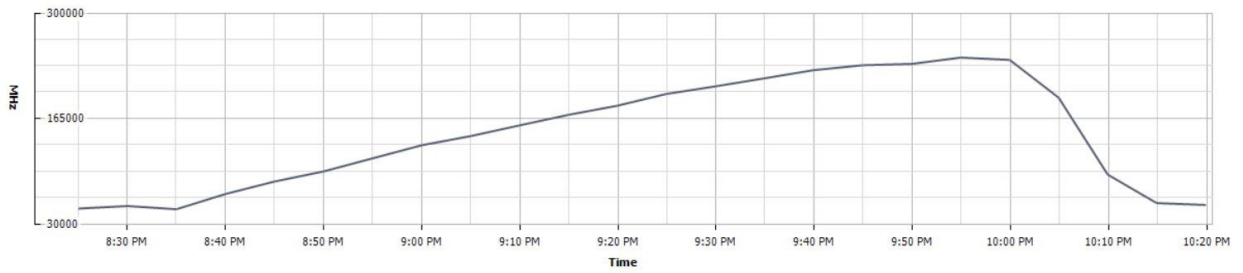


Figure 13: CPU Utilization throughout the test

Figure 14:

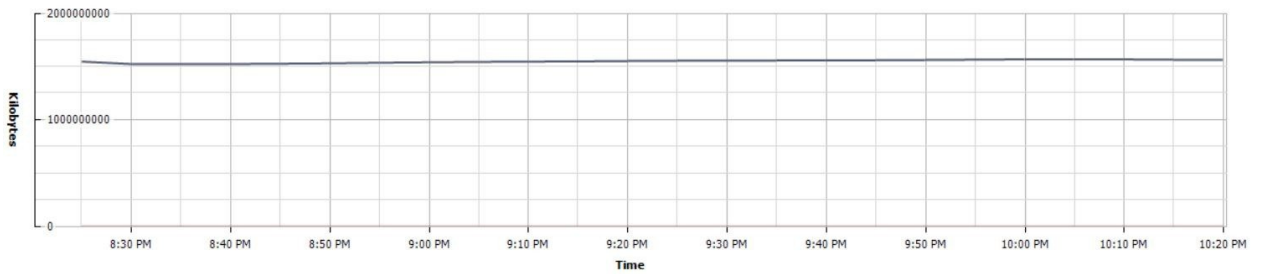


Figure 14: Memory usage throughout the test

IO throughout the test

Figure 15:

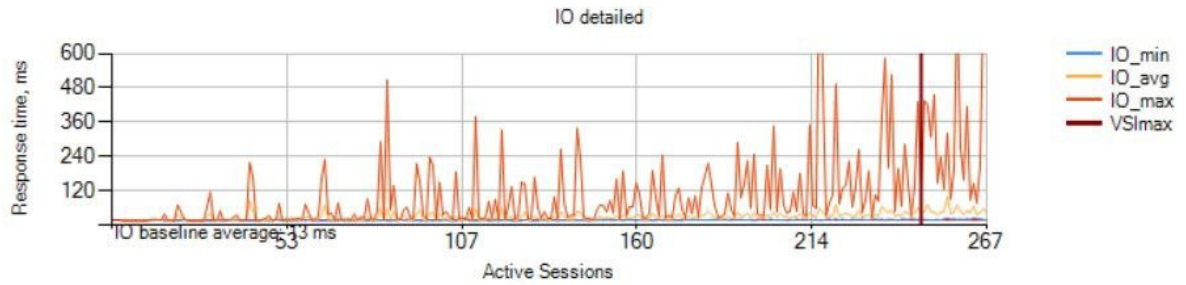


Figure 15: IO throughtout the test

IOPS, Throughput and Latency throughtout the test

Figure 16:

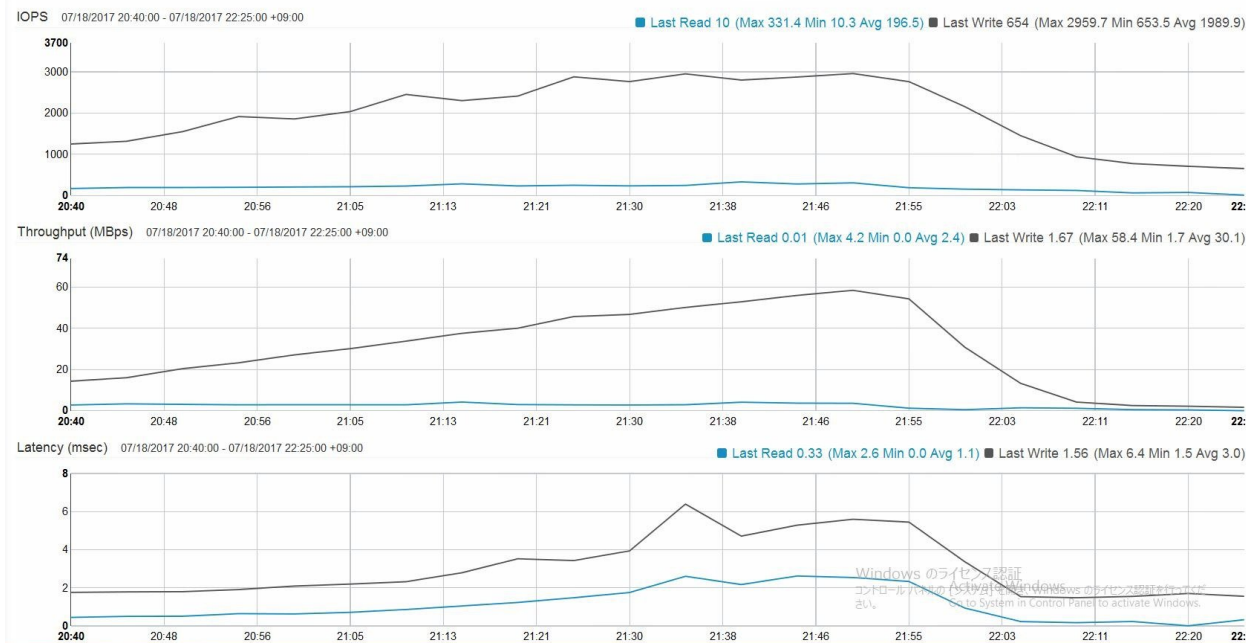


Figure 16: IOPS, Throughput and Latency throughtout the test

Related Documentation

Cisco HyperFlex

http://www.cisco.com/c/dam/en/us/products/collateral/hyperconverged-infrastructure/hyperflex-hx-series/HXAF240c_M4_SpecSheet.pdf

Software Downloads

[https://software.cisco.com/download/release.html?mdfid=286305544&softwareid=286305994&release=2.1\(1b\)&reind=AVAILABLE&rellifecycle=&reltype=latest](https://software.cisco.com/download/release.html?mdfid=286305544&softwareid=286305994&release=2.1(1b)&reind=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-623-view-release-notes.html