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Cisco HxBench Getting Started Guide

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Americas Headquarters

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CHAPTER

Cisco HxBench

• Introduction, on page 1

Introduction

Cisco HxBench is a storage performance testing tool that can be used to measure the storage infrastructure performance using defined test scenarios and workloads. HxBench uses the industry standard Vdbench storage performance benchmarking tool. HxBench is provided as a virtual appliance to deploy and run tests. HxBench simplifies performance benchmarking for virtualized environments.

This document describes the process of configuring a host, deploying and configuring an HxBench virtual application, setting up the HxBench virtual application on Hyper-V, configuring a virtual machine, and using the HxBench application.

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Prerequisites

- Prerequisites for ESXi, on page 3
- Prerequisites for Hyper-V, on page 4

Prerequisites for ESXi

ESXi Installation Prerequisites

Before installing HxBench, review the following installation and configuration requirements:

HxBench Controller OVA	
vCPU	8
RAM	8 GB
OS Disk	16 GB
Access Credentials	Username: appadmin
	Password: Default is password
HxBench Test OVA	
vCPU	1
RAM	2 GB
OS Disk	8 GB
Data Disk	As provisioned by user for testing.
Number of test VMs	As defined by user for testing.
Access Credentials	Username: appadmin
	Password: Default is password

Open Virtual Appliance (OVA) Size

Credentials to Access vCenter

Username	<root admin="" or=""> username</root>
Password	<root admin="" or=""> password</root>

Supported Browsers

Chrome	Chrome version 50 or higher.
Firefox	Not supported.
Internet Explorer	Not supported.
Safari	Not supported.

Prerequisites for Hyper-V

Hyper-V Installation Prerequisites

Before installing HxBench, review the following installation and configuration requirements.

Virtual Hard Disk (VHDX) Size

The following table lists the prerequisites for setting up the HxBench Virtual Application on Hyper-V:

HxBench Controller VHDX		
vCPU	8	
RAM	8 GB	
OS Disk	16 GB	
Access Credentials	Username: appadmin	
	Password: Default is password	
HxBench Test VHDX		
vCPU	1	
RAM	2 GB	
OS Disk	8 GB	
Data Disk	As provisioned by user for testing.	
Number of test VMs	As defined by user for testing.	

Access Credentials	Username: appadmin
	Password: Default is password

Supported Browsers

Chrome	Chrome version 50 or higher.
Firefox	Not supported.
Internet Explorer	Not supported.
Safari	Not supported.

Related Topics

Hyper-V Network Prerequisites, on page 5

Hyper-V Network Prerequisites

Hyper-V Network Prerequisites

Complete the following Hyper-V network prerequisites:

- 1. From the HyperV Manager, under Actions of the HyperV server, click Virtual Switch Manager.
- 2. Under the tab New virtual network switch choose the External network switch, then click Create Virtual Switch.
- 3. Specify the name of the switch as HxBench Private.
- 4. Click Apply then OK.

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Overview

The HxBench application is delivered in the form of an Open Virtual Appliance (OVA) package. Setting up an application involves deploying a virtual machine, configuring the virtual machine, and configuring the HxBench application.

- Set Up an HxBench Virtual Application, on page 7
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- Deploy the vCenter Controller, on page 9
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Set Up an HxBench Virtual Application

ESXi Network Recommendation

This section describes how to set up the network to deploy the test virtual machines successfully and to run storage performance testing. You can set up the network manually to run the tests. This section provides the step-by-step tasks for manual network creation.

Datacenter or Cluster with Multiple Hosts

For a datacenter or cluster with multiple hosts, segment the network that connects to subordinate VMs as shown in the figure below. The HxBench Controller assigns static IP addresses to the test VMs and provides IP addresses to the subordinate VMs.

Figure 1: Network Consideration—Datacenter or Cluster with Multiple Hosts for Raw Disk



Figure 2: Network Consideration—Datacenter or Cluster with Multiple Hosts for iSCSI Block Storage



Follow these steps to create the required Standard / Distributed Switch and Port Group for HxBench:

- 1. Create a Standard / Distributed Switch with an uplink connected to a physical switch. Alternatively, you can select an existing Standard / Distributed Switch with uplink connected to the switch.
- 2. Using vSphere Web Client, create a **Port Group** labeled *HxBench Private* on the newly created Standard / Distributed Switch or on the selected Standard / Distributed Switch with a valid VLAN ID.
- 3. Repeat steps 1 and 2 on all the hosts in the cluster.
- 4. During OVA deployment, map NIC-2 of the HxBench Controller to the newly created HxBench Private Port Group.
- 5. Using vSphere Web Client, update the VLAN ID of the *HxBench Private* Port Group. Click Edit > Properties. On the HxBench Private Properties page, under the General tab, configure VLAN ID from the drop-down list.

6. Make sure that the VLAN ID is updated in the physical switch configuration and that the switch is configured to process traffic based on specific VLAN IDs.

Security	Network label	HXBench P	ivate	
Traffic shaping Teaming and failover	There are virtual machines on this host connected to the network 'HXBench Private'. If you port group, vCenter Server will map it to a standard network with the specified new name. should reconnect all virtual machines to the new standard network.			
	VLAN ID	410	~	

Note For procedural steps on manual network creation for a Datacenter or cluster with a single host, refer to Deploy Cluster on a Single Host at the end of this guide.

Deploy the vCenter Controller

Deploy the vCenter Controller as follows:

```
Step 1 From the vSphere Web Client Navigator, select File > Deploy OVF Template.
```



Step 2 Select the **OVA template** file you want to deploy from the disk.



Step 3 Specify a **Name** for the VM. Click **Next**.

1 Select an OVF template 2 Select a name and folder	Select a name and folder Specify a unique name and target location
3 Select a compute resource 4 Review details 5 Select storage	Virtual machine name: Cisco-HxBench
6 Select networks	Select a location for the virtual machine.

The name has an 80 character limit and must be unique within the inventory folder.

Step 4 Select the **computer resource** where you want to deploy the VM. Click **Next**.

2 Select a name and folder	Select a compute resource Select the destination compute resource for this operation
3 Select a compute resource	
4 Review details	
5 Select storage	
6 Select networks	
7 Ready to complete	
	Compatibility
	 Compatibility checks succeeded.



elect virtual disk format: M Storage Policy: Name	Capacity	Thick Provision La	zy Zeroed 🗸		
M Storage Policy:	Capacity	Datast	ore Default		
Name	Capacity		Datastore Default		
0		Provisioned	Free	Typ	
	10 TB	2.39 TB	8.26 TB	NF	
	10 TB	9.52 TB	2.79 TB	NF	
8	111.75 GB	108.51 GB	3.24 GB	VN	
	1 GB	67.23 GB	0 B	NF	
ompatibility	_			•	
✓ Compatibility checks	succeeded.				
	ompatibility Compatibility checks	 it its 111.75 GB 1 GB ompatibility Compatibility checks succeeded. 	ompatibility ✓ Compatibility checks succeeded. CANCEL	In the state of the state o	

Step 6 Select the **Disk Format**. Click **Next**.

1 Select an OVF template 2 Select a name and folder 3 Select a compute resource	Select storage Select the storage for the configuration and disk files					
4 Review details	Encrypt this virtual machine (Requires Key Management Server)					
 Select storage 6 Select networks 7 Ready to complete 	Select virtual disk format:		Thin Provision	~		
	VM Storage Policy:		Thick Provision Laz Thick Provision Eag	v		
	Name	Capacity	Thin Provision		Typ	
		10 TB	2.39 TB	8.26 TB	NF ^	
		10 TB	9.52 TB	2.79 TB	NF	
		111.75 GB	108.51 GB	3.24 GB	VN	
	4				• •	
	Compatibility					
	 Compatibility checks 	ucceeded.				

Step 7 Under Select networks, select HxBench Private.

2 Select a name and folder	Select networks Select a destination network for each source network.				
4 Review details	Source Network	Ŧ	Destination Network		Ŧ
5 Select storage	VM Network		VM Network		~
6 Select networks	HXBench Private		HXBench Private		~
7 Customize template				2	items
8 Ready to complete					
	IP Allocation Settings				
	IP allocation:	Static - Ma	anual		`
	IP protocol:	IPv4			

Step 8 Under **Customize template**, configure the Network settings. You can configure either DHCP or a Static IP address for the VM.

Deploy OVF Template		
✓ 1 Select an OVF template	V Network	5 settings
 2 Select a name and folder 3 Select a compute resource 4 Review details 5 Select storage 	DNS	ex:8.8.8.8/ Leave this blank if dhcp is enabled
6 Select networks 7 Customize template 8 Ready to complete	Public Network Gateway	ex:10.11.0.1/Leave this blank if dhcp is enabled
	Public Network IP	ex:10.11.0.137/ Leave this blank if dhcp is enable
	Public Network Netmask	
	ex:255.255.0.0/ Leave this blank	if dhcp is enabled
	Public Network Type	STATIC V
	v Root Credential	1 settings
	System Password	
	Provide password for appadmin	user(minimum 8 characters)
		CANCEL BACK NEXT

Field	Description
DNS field	Leave this space empty if DHCP is used.
	For example, 8.8.8.8
Public Network Gateway field	Leave this space empty if DHCP is used.
	For example, 10.11.0.1
Public Network IP field	Leave this space empty if DHCP is used.
	For example, 10.11.0.120
Public Network Netmask field	Leave this space empty if DHCP is used.
	For example, 255.255.0.0
Public Network Type field	From the drop-down list, select DHCP or Static .

Review the selected options to start deploying the OVA. Click Next.

Step 9 Select **Ready to complete** and click **Finish**.

✓ 1 Select an OVF template	Provisioning type	Deploy from template
 2 Select a name and folder 	Name	Cisco-HXBench-1.3.10
 3 Select a compute resource 4 Review details 	Template name	Cisco-HXBench-1.3.10
✓ 5 Select storage	Download size	2.6 GB
 ✓ 6 Select networks ✓ 7 Customize template 	Size on disk	50.0 GB
8 Ready to complete	Folder	
	Resource	
	Storage mapping	1
	All disks	Datastore:
	Network mapping	2
	VM Network	VM Network
	HXBench Private	HXBench Private
	IP allocation settings	
	IP protocol	IPV4
	IP allocation	Static - Manual
		CANCEL BACK FINISH

What to do next

Wait for the deployment task to complete.

After completion, a success message appears.

Deploy the Hyper-V Controller

To deploy the Hyper-V controller:

- Step 1 Extract the zip file Cisco-HxBench-2.0.zip and copy the vhdx file Cisco-HxBench-2.0-HyperV.vhdx to the HyperV server.
- Step 2 From the HyperV Manager, select the HyperV server where HxBench Controller is to be deployed and select New > Virtual Machine.

₿a		Hyper-V N	lanager			x	- 0 X
Eile Action View Help							Q
Hyper-V Manager	Virtual Machines				Actions SCVMMHOSTSERVER	• ^	
	Name A	State	CPU Usage	Assigned Memor	New		Virtual Machine
	Courtering and a	Running Running	3% 0%	2646 MB 2048 MB	 Import Virtual Machine Hyper-V Settings 		Hard Disk Floppy Disk

The New Virtual Machine Wizard appears. Follow the prompts to configure the new Virtual Machine.

a) Specify the Name of the VM, then click Next.

3 e	New Virtual Machine Wizard
Specify Na	ame and Location
Before You Begin Specify Name and Location Specify Generation Assign Memory Configure Networking Connect Virtual Hard Disk	Choose a name and location for this virtual machine. The name is displayed in Hyper-V Manager. We recommend that you use a name that helps you easily identify this virtual machine, such as the name of the guest operating system or workload. Name: HXBench-Controller You can create a folder or use an existing folder to store the virtual machine. If you don't select a folder, the virtual machine is stored in the default folder configured for this server. Store the virtual machine in a different location
Summary	Location: C:\ProgramData\Microsoft\Windows\Hyper-V\ Browse If you plan to take checkpoints of this virtual machine, select a location that has enough free space. Checkpoints include virtual machine data and may require a large amount of space.
	< Previous Next > Finish Cancel

b) Select Generation 1 for the VM generation.

80	New Virtual Machine Wizard
Specify Gene	eration
Before You Begin Specify Name and Location Specify Generation Assign Memory Configure Networking Connect Virtual Hard Disk Installation Options Summary	 Choose the generation of this virtual machine. ● Generation 1 This virtual machine generation provides the same virtual hardware to the virtual machine as in previous versions of Hyper-V. O Generation 2 This virtual machine generation provides support for features such as Secure Boot, SCSI boot, and PXE boot using a standard network adapter. Guest operating systems must be running at least Windows Server 2012 or 64-bit versions of Windows 8. ① Once a virtual machine has been created, you cannot change its generation.
	< Previous Next > Finish Cancel

c) Specify **8192 MB** as the memory size, then click **Next**.

80	New Virtual Machine Wizard
Assign Memo	ory
Before You Begin Specify Name and Location Specify Generation Assign Memory Configure Networking Connect Virtual Hard Disk Installation Options Summary	Specify the amount of memory to allocate to this virtual machine. You can specify an amount from 32 MB through 61464 MB. To improve performance, specify more than the minimum amount recommended for the operating system. Startup memory: 8193 MB Use Dynamic Memory for this virtual machine. When you decide how much memory to assign to a virtual machine, consider how you intend to use the virtual machine and the operating system that it will run.
	< Previous Next > Finish Cancel

d) Select Network connection Public Network for HxBench VM, then click Next.

8	New Virtual Machine Wizard
Configure Ne	etworking
Before You Begin Specify Name and Location Specify Generation Assign Memory Configure Networking Connect Virtual Hard Disk Installation Options Summary	Each new virtual machine includes a network adapter. You can configure the network adapter to use a virtual switch, or it can remain disconnected.
	< Previous Next > Finish Cancel

e) Select Use an existing virtual hard disk, browse and select the copied Cisco-HxBench-2.0-HyperV.vhdx, then click Next.

8	New Virtual Machine Wizard
Connect Vir	tual Hard Disk
Before You Begin Specify Name and Location Specify Generation Assign Memory	A virtual machine requires storage so that you can install an operating system. You can specify the storage now or configure it later by modifying the virtual machine's properties. O Create a virtual hard disk Use this option to create a VHDX dynamically expanding virtual hard disk.
Configure Networking Connect Virtual Hard Disk Summary	Name: HXBench-Controller.vhdx Location: C:\Users\Public\Documents\Hyper-V\\Virtual Hard Disks\ Size: 127 GB (Maximum: 64 TB) Isse an existing virtual hard disk Use an existing virtual hard disk Use this option to attach an existing virtual hard disk, either VHD or VHDX format.
	Location: C:\hyperv-2.0\Virtual Hard Disks\cisco-hxbench-2.0.vhdx Browse O Attach a virtual hard disk later Use this option to skip this step now and attach an existing virtual hard disk later.
	< Previous Next > Finish Cancel

f) Review the selected options to start deploying the vhdx, then click **Finish**.

30	New Virtual Machine Wizard
Completing	the New Virtual Machine Wizard
Before You Begin Specify Name and Location Specify Generation	You have successfully completed the New Virtual Machine Wizard. You are about to create the following virtual machine. Description:
Assign Memory Configure Networking Connect Virtual Hard Disk Summary	Name: HXBench-Controller Generation: Generation 1 Memory: 8192 MB Network: VM Network Hard Disk: C: \hyperv-2.0\Virtual Hard Disks\cisco-hxbench-2.0.vhdx (VHDX, dynamically expanding)
	III > To create the virtual machine and close the wizard, click Finish.
	< Previous Next > Finish Cancel

Step 3 After the completion of the VM deployment, click VM Settings. Under the Add Hardware tab, select Network Adapter, then click Add.

😰 Setting	s for Cisco-hxbench-1.3.7 on SCVMMHOSTSERVER
Cisco-hxbench-1.3.7	
 ★ Hardware Memory BIOS Boot from CD ■ Memory 8192 MB ■ Processor 1 Virtual processor IDE Controller 0 ■ Hard Drive cisco-hxbench-2.0.vhdx ■ IDE Controller 1 Ø DVD Drive 	Add Hardware You can use this setting to add devices to your virtual machine. Select the devices you want to add and click the Add button. SCSI Controller Network Adapter Legacy Network Adapter Fibre Channel Adapter RemoteFX 3D Video Adapter Add A network adapter requires drivers that are installed when you install integration centries in the quest operation system
SCSI Controller SCSI Controller Network Adapter VM Network Network Adapter VM Network	=

Step 4 Choose **Public Network for HXBench VM** under the Virtual Switch. Click **Apply**, then click **OK**.

Step 5 Assign a VLAN ID to both networks, if enabled.

isco-hxbench-1.3.7 V	4 🕨 😡
Hardware Add Hardware Add Hardware BIOS Boot from CD Memory 8192 MB Processor 1 Virtual processor IDE Controller 0 Hard Drive cisco-hxbench-2.0.vhdx IDE Controller 1 DVD Drive None	Network Adapter
SCSI Controller Image: SCSI Controller Image: Network Adapter VM Network Image: Network Adapter VM Network Image: Network Adapter None Image: Note Connected None	Enable bandwidth management Specify how this network adapter utilizes network bandwidth. Both Minimum Bandwidth and Maximum Bandwidth are measured in Megabits per second. Minimum bandwidth:
None None None None None None None None	To remove the network adapter from this virtual machine, dick Remove. Remove Use a legacy network adapter instead of this network adapter to perform a network-based installation of the guest operating system or when integration services are not installed in the guest operating system.

- **Step 6** Power on the VM by clicking **Start**.
- **Step 7** Click **Start** to power on the VM and then click **Connect** to connect via the console.
- **Step 8** Change the password from the console. While changing the password, use the default username and password as appadmin/password.
- **Step 9** Configure the static or DHCP IP from terminal for the first login. Follow the instructions prompted in the terminal.
- **Step 10** After IP configuration, enter the new password as prompted in terminal. The machine will not reboot if DHCP and reboots with static IP selection.
- **Step 11** After all IP configuration changes, if any changes are required or any wrong entry IP is entered, edit the interfaces file using VIM editor: /etc/network/interfaces to update the details
- Step 12 If the previous step is done manually, then reboot/reset the machine using Hyper-V manager.

Configure the Virtual Machine

Step 1 Power on the virtual machine.

Step 2 Log in to the virtual machine from the HxBench Web Interface.

Username	<appadmin></appadmin>
Password	Use the Changed password during Hyper-V Controller deployment

Step 3 If you selected DHCP during deployment, the HxBench Application starts running when the VM boots up with the assigned DHCP address. Make a note of the IP address assigned to the VM.

If you selected static IP address, use the same to access the HxBench Controller and the HxBench Web Interface.

Access the HxBench Web Interface

To access the HxBench Web Interface, enter *http://<IPaddressof theVM>:8000/hxbench/index.html* in your browser.

Log in to the HxBench Web Interface using the following credentials:

Username	appadmin
Password	Use the Changed password during Hyper-V Controller deployment

Configure the Host in Hyper-V

Before running the test, configure the host as follows:

Note Perform the following steps on all hosts.

Step 1 From the Powershell CLI, enter:

>Set-ExecutionPolicy Unrestricted
>enable-wsmancredssp -role "Server" -Force

- Step 2 Using windows powershell in administrator mode, copy and run the following file: "/home/appadmin/host_configuration.ps1" from the deployed HXBench Controller to all Windows HyperV Host and in Powershell execute the following: ./host_configuration.ps1.
- **Step 3** Use the same to access the HXBench Controller and the HXBench Web Interface.

HX Bench picks up the hostname and tries to deploy VMs on the same. If it fails to resolve the hostname, then VM deployment fails.

If this occurs, perform the following steps:

a) Add DNS IP and FQDN of the host to /etc/hosts file in the controller using the below commands:

sudo vi /etc/hosts
<IP-address> <FQDN>

Configure the Host in vCenter

HxBench picks up the hostname and tries to deploy VMs on the same. If it fails to resolve the hostname, then VM deployment fails.

Add DNS IP and FQDN of the host to /etc/hosts file in the controller using the below commands:

```
sudo vi /etc/hosts
<IP-address> <FQDN>
```

Configure the HxBench Application

During initial login to the HxBench application after the installation, perform the following steps.

Step 1 Upload Vdbench software to the HxBench controller.

- a) Download Vdbench software version 5.04.07 from the Oracle website. Download the vdbench50407.zip file from the link: http://www.oracle.com/technetwork/server-storage/vdbench-downloads-1901681.html.
- b) Click Start. Upload the vdbench50407.zip file to the HxBench controller using the Upload button.
 - **Note** Uploading Vdbench software to the HxBench controller is a one time activity.
- **Step 2** Upon successful completion of Vdbench software upload, click **Next**. Provide your server details (vCenter or Hyper-V, shown as follows) where the tests should run. Complete the following fields and click **Save**.

Note Use an account that has administrator privileges to create or delete a virtual machine.

Table 1: vCenter Server Details

Field	Description
Host Name	vCenter hostname
User Name	<i><admin></admin></i> username

Field	Description
Password	<admin> password</admin>

Table 2: Hyper-V Server Details

Field	Description
Node Name	Name of Hyper-V cluster
Host Name	Hyper-V hostname (use Add option for adding more hosts)
User Name	<i><admin></admin></i> username
Password	<admin> password</admin>
Controller Type	Select HX or Non-HX as the Controller Type:
	When selecting the HX controller type, add the follwing fields:
	• Controller IP
	Controller Username
	Controller Password

Note The user of the host should have all access to that host, and be able to create a session from powershell.

What to do next

After successful addition of vCenter, you will be redirected to the Run Test workflow.

Validate the Network on vCenter Controller

After adding the vCenter server, validate the network setup by performing the following checks:

- Query the network port group details of NIC2 in the HxBench controller.
- Check the type of switch to which the port group is associated.
- If the port group is connected to Virtual Distributed Switch (VDS), check whether all the hosts in the cluster are connected to the VDS and NIC2 port group.



Note If the hosts are not connected to the VDS, you will see a warning that the network setup is partial. In such case, test VMs will be deployed to hosts only after the network setup is complete. You can manually update the configuration to connect all the hosts to a specific port group and VDS.

- If the port group is connected to the Virtual Standard Switch (VSS), the validation check will query the network and VLAN details of all the host switches.
 - If all the hosts are configured with the same port group and VLAN ID, the validation is successful and HxBench controller redirects to the Run Test workflow.
 - If some of the hosts are not configured with same port group and VLAN ID, the validation status is marked as **PARTIAL**. You can either continue to use the partial setup or alternatively, or you can create a new network setup on all hosts. Click **Cancel** to use the partial setup.

If you choose to create a new network setup on all hosts, provide the following details and click **Create Network**.

Field	Description
VLAN ID	If the network switch is configured to allow traffic from specific VLAN IDs, make sure to update this VLAN ID to the configuration.
Host Name	For example, 10.11.1.xxx
Switches	Choose vSwitch from the drop-down list.

• The HxBench controller assigns static IP addresses to all the test virtual machines. The static IP address is assigned from a private IP address range of *169.254.0.xxx*.



Configure and Run Tests

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Run a Raw Test

To test the storage performance in HxBench, select the **Bench Tests** tab and click the **Create Test** button. The **Create** page appears. This is the first of three pages that guide you through creating a bench test.

Step 1 On the **Test Profile** page, complete the following fields:

Field Name	Description
Test Name field	Type a unique name into the field. The test name is used to associate test parameters and test results into user-defined reports.
Test Type list	Select Raw Disk from the list.

a) Select the desired **Profile Type** for the named test from the following options:

Profile Type	Description
Select Existing	Use an existing profile from the list of available Test Profiles.

Profile Type	Description
Create New	Create a new test. Complete the Vdbench test parameter values to define a new custom test:
	Test Parameters
	• Read Mix (%): Valid range is 1-100%. The default is 60%.
	• IO Type list: Valid values are Random and Sequential. The default is Random.
	• IO Block Size (KB): Valid range is 0-99. The default is 8.
	• Threads per VM: Value must be greater than 1. The default is 32.
	Data Set
	• Deduplication (%) : Valid range is 0-99%. The default is 50%.
	• Compression (%): Valid range is 0-99%. The default is 50%.
	• Dataset per VM (GB): Value must be greater than 1. The default is 100.
	• Working Set (% of Dataset): Valid range is 0-100%. The default is 100%.
	Loadpoint and Run Time
	• Select the Loadpoint: Fixed Load (only 100% loadpoint) or Stepwise Load (Initial calibration, 10%, 50%, 75% 90%, 100% load point)
	• Run Time (min): Length of time of the test: Value must be greater than 1.
Upload File	Click the Browse button to navigate to upload Vdbench test parameters from a file.

- b) Click Next to continue to the VM Group.
- **Step 2** On the VM Group page, provide the infrastructure details of the virtual machines you want to test.
 - a) Select the infrastructure to run the tests.

Infrastructure Type	Description
Use Existing VM Group	To use the existing infrastructure to run the tests, select the VM from the Select VM Group list.

To create a new infrastructure, select Create New VMs and complete the following fields:
• VM Name Prefix: Name of the VM.
• vCenter: Pre-populated values. You cannot edit or change the values.
• Datastore list: List of datastores in the vCenter that are queried at runtime.
• Number of VMs: Valid value range is 1 to 4 VMs. The default is 4.
• Stretched Cluster: Enable Stretched Cluster; If you are benchmarking a Stretched Cluster complete the additional fields:
• HX Connect IP: HX Connect IP address
• HX Connect Username: HX Connect Username
• HX Connect Password: HX Connect Password.
• Fetch Data Store: After entering HX Connect details click on this button to fetch Datastore details.

b) Click Next.

c) Upon successful selection of Define Test and Define Infra, click **Start Test** to start the test. As the test progresses, it will automatically transition through the following work flow progress pages.

Work flow Page	Description
Create Infra	View the Test VMs created with the given specifications. Use the Log Details tab to view the progress.
Validate Infra	VM infrastructure is validated for its availability and reachability.
Create Data Set	Data disk priming is carried out to run the test. The VM infrastructure is ready upon the completion of data disk priming. Now, the Vdbench tool is triggered to run the storage performance test using the provided test inputs on the VM infrastructure.
Run Tests	Performance metrics are captured and updated as the test progresses.
Completed	When the test is successfully Completed , the status turns green. The fields under Aggregate Test Results are updated.

Testing iSCSI Storage for HyperFlex

Testing iSCSI Storage: HyperFlex Cluster

To test HyperFlex storage performance in HxBench, perform the following steps:

- **Step 1** On the **Bench Tests** tab, click **Create Test**. The **Test Profile** page appears. This is the first of three pages that guide you through creating a bench test.
- **Step 2** On the **Test Profile** page, complete the following fields:

Field Name	Description
Test Name field	Type a unique name into the field. The test name is used to associate test parameters and test results into user-defined reports.
Test Type list	Select iSCSI Block Storage Workload – HX from the list.

- **Profile Type** Description Select Existing Use an existing profile from the list of available Test Profiles. Create a new test. Complete the Vdbench test parameter values to define a new custom Create New test: **Test Parameters** • Read Mix (%): Valid range is 1-100%. The default is 60%. • IO Type list: Valid values are Random and Sequential. The default is Random. • IO Block Size (KB): Valid range is 0-99. The default is 8. • Threads per VM: Value must be greater than 1. The default is 32. **Data Set** • **Deduplication** (%): Valid range is 0-99%. The default is 50%. • Compression (%): Valid range is 0-99%. The default is 50%. • Dataset per VM (GB): Value must be greater than 1. The default is 100. • Working Set (% of Dataset): Valid range is 0-100%. The default is 100%. Loadpoint and Run Time • Select the Loadpoint: Fixed Load (only 100% loadpoint) or Stepwise Load (Initial calibration, 10%, 50%, 75% 90%, 100% load point) • Run Time (min): Length of time of the test: Value must be greater than 1.
- a) Select the desired **Profile Type** for the named test from the following options:

Г

Profile Type	Description
Upload File	Click the Browse button to navigate to upload Vdbench test parameters from a file.

b) Click Next to continue to the VM Group.

Step 3 On the VM Group page, provide the infrastructure details of the virtual machines you want to test.

a) Select the infrastructure to run the tests.

Infrastructure Type	Description
Use Existing VM Group	To use the existing infrastructure to run the tests, select the VM from the Select VM Group list.
Create New VMs	To create a new infrastructure, select Create New VMs and complete the following fields:
	• VM Name: Name of the VM.
	• Node: Name of the node.
	• Data Store list: List of data stores in the vCenter that are queried at runtime.
	• Total VMs across All Nodes: Total count of VMs across all nodes. Value needs to be greater than 1.
	• MTU Size: (Optional) MTU size for the test VMs and controller.
	• HX Connect IP: HX Connect IP address.
	• HX Connect Username: HX Connect Username.
	• HX Connect Password: HX Connect Password.
Target Server Details	Enable CHAP: Select either Yes or No. If yes is selected, the CHAP Username and Password fields is visible and mutual authentication between target and user is configured. Complete the required fields.
	• IP Address: CHAP IP address
	• CHAP Username: CHAP username
	CHAP Password: CHAP password
Network Configuration	• Static/DHCP: Select Static or DHCP for IPs to assign to the test VMs.
Details	• IP Range Start: Starting IP address for test VMs. Successive unused IPs after this IP are used for test VMs. This option is only available if you select Static .
	• Netmask: NetmaskIP of the network used for test VMs. This option is only available if you select Static.
	• Gateway: GatewayIP of the network used for test VMs. This option is only available if you select Static.

Infrastructure Type	Description
Data Priming	Priming involves performing an initial write to the entire VM. This is required for all new VMs to ensure performance results are valid. Existing VMs should be re-primed when using a storage efficiency ration other than the one used for initial creation.
	Use the radio buttons to include or skip priming and specify when to run the priming test in the field provided.

b) Click Next.

c) Upon successful selection of Define Test and Define Infra, click **Start Test** to start the test. As the test progresses, it will automatically transition through the following work flow progress pages.

Work flow Page	Description
Create Infra	View the Test VMs created with the given specifications. Use the Log Details tab to view the progress.
Validate Infra	VM infrastructure is validated for its availability and reachability.
Create Data Set	Data disk priming is carried out to run the test. The VM infrastructure is ready upon the completion of data disk priming. Now, the Vdbench tool is triggered to run the storage performance test using the provided test inputs on the VM infrastructure.
Run Tests	Performance metrics are captured and updated as the test progresses.
Completed	When the test is successfully Completed , the status turns green. The fields under Aggregate Test Results are updated.

When the test is successfully Completed, the status turns green and the fields under **Loadpoint Averages and VM Average Comparison** are updated.

• You can view the Test VMs created with the given specifications. You can view the progress in the Status column.

View the progress in the **Status column**. View the Test VMs created with the given specifications.

- Data disk priming is carried out to run the test.
- The VM infrastructure is ready upon the completion of data disk priming. The vdbench tool is now triggered to run the storage performance test using the provided test inputs on the VM infrastructure.
- Performance metrics are updated as the test progresses on theRun Tests page.
- When the test is in progress the **Create VM Group** button is disabled. The button is enabled after test completes, fails or terminates.

Testing iSCSI Storage: Non-HyperFlex Clusters

To test storage performance (non-HyperFlex platform) in HxBench, proceed as follows:

Step 1 On the **Bench Tests** tab, click **Create Test**. The **Create** page appears. This is the first of three pages that guide you through creating a bench test.

Step 2 On the **Test Profile** page, complete the following fields:

Field Name	Description
Test Name field	Type a unique name into the field. The test name is used to associate test parameters and test results into user-defined reports.
Test Type list	Select iSCSI Block Storage Workload – Non-HX from the list.

a) Select the desired **Profile Type** for the named test from the following options:

Profile Type	Description
Select Existing	Use an existing profile from the list of available Test Profiles.
Create New	Create a new test. Complete the Vdbench test parameter values to define a new custom test:
	Test Parameters
	• Read Mix (%): Valid range is 1-100%. The default is 60%.
	• IO Type list: Valid values are Random and Sequential. The default is Random.
	• IO Block Size (KB): Valid range is 0-99. The default is 8.
	• Threads per VM: Value must be greater than 1. The default is 32.
	Data Set
	• Deduplication (%): Valid range is 0-99%. The default is 50%.
	• Compression (%) : Valid range is 0-99%. The default is 50%.
	• Dataset per VM (GB): Value must be greater than 1. The default is 100.
	• Working Set (% of Dataset): Valid range is 0-100%. The default is 100%.
	Loadpoint and Run Time
	• Select the Loadpoint: Fixed Load (only 100% loadpoint) or Stepwise Load (Initial calibration, 10%, 50%, 75% 90%, 100% load point)
	• Run Time (min): Length of time of the test: Value must be greater than 1.
Upload File	Click the Browse button to navigate to upload Vdbench test parameters from a file.

- b) Click Next to continue to the VM Group.
- **Step 3** On the **VM Group** page, configure details of the infrastructure where you want to deploy the test virtual machines to run the test. You must use an existing infrastructure.
 - a) Select Use Existing VM Group to run the tests.
 - b) Click Next.

c) Click Start Test to start the test.

When the test is successfully Completed, the status turns green and the fields under Loadpoint Averages and VM Average Comparison are updated.

• You can view the Test VMs created with the given specifications. You can view the progress in the Status column.

View the progress in the **Status column.** View the Test VMs created with the given specifications.

- Data disk priming is carried out to run the test.
- The VM infrastructure is ready upon the completion of data disk priming. The vdbench tool is now triggered to run the storage performance test using the provided test inputs on the VM infrastructure.
- Performance metrics are updated as the test progresses on theRun Tests page.
- When the test is in progress the **Create VM Group** button is disabled. The button is enabled after test completes, fails or terminates.

Terminate a Test

You can terminate a running test using the **Terminate** option in the Run test wizard. The test will be marked as **Terminated by user**.

Test Details

The various operations you can perform on completed tests, test profiles, and VM infrastructure are listed in this section.

Bench Tests

You can view the list of tests run on the controller under the **BENCH TESTS** tab. You can select any test from this list and visualize the test summary, performance metrics and compare across multiple tests. If there is a test running, the Test History view lists it as *In-Progress Test* and updates the view details periodically. You can delete a test and associated data from HxBench.

Comparisons

You can select and compare test results on the **COMPARISONS** tab. You can select any test from this list, the Run Definition and Loadpoint and compare across multiple tests.

- Use the toggle to auto select similar tests.
- Use the check boxes to select specific metrics.
- Click the + to add additional tests.

Test Profiles

You can view the list of available profiles in the controller under the **TEST PROFILES** tab. You can select a profile and view the details. You can download a profile from here. You can also upload a profile and use

it for testing. However, when a profile file is uploaded, the content must be in the correct format as defined by Vdbench. If there is any wrong format or unrecognized keys, the test will fail. You can delete a profile from HxBench.

VM Groups

You can view the available VM infrastructure and its status from the VM GROUPS page. If an infrastructure is not required for any further testing, you can delete it.

You can create a VM infrastructure to run a test using the Run Test wizard.

Application Logs

Application logs are stored in the following location:

/home/appadmin/hxbench/hxbench/hxbench.log

The following screenshot shows how to download the application logs.

Bench Tests					V 2.0	<u>)</u>	
C Search			4 items found	Sor	vCenter Detail Download Log File	Create Test	
core_perf_custom							
Status Completed Duration 11h 13s	Test Profile VM Group Test Details	core_perf_1gb_disk dev4 Composite Run Definition (11 R_	IOPS ⊙ Latency (ms) ⊙ Throughput (MBps) ⊙	9986 9.6 624.1			
dev_10hrs_curvetest_nonhx							

Test Results

Test Results Logs

Click on Test Details > View Logs > View Run Logs.

You can view the complete test logs.

• Click on Test Details > View Logs > View Vdbench Status.

You can view the parsable information about the current status of Vdbench.

Bench Tests > core_perf_custom				V2.0 🔅 🛛 🖉 🚨
				Actions v
core_perf_custom				Clone
Completed Duration: 11h 13e Test Profile VM Group #VM	core_perf_1gb Test Type dev4 Test Details 4	ISCSI Block St Sta Composite Ru En Du	art Time Oct 25, 2020 06 d Time Oct 26, 2020 05 ration 11h 13s	View Run Logs View Vdbench Status Download Summary report (PDF) Download Vdbench raw data (CSV)
Loadpoint Averages VM Average Comparision			Test Definition 3	2 Delete
Metrics : Max				
Throughput (MBps)		219.1		
Read %		0		

Download Test Results Report

- To download the detailed results in PDF, click on Download icon under Test Details and select PDF.
- To download the detailed results in CSV, click on Download icon under Test Details and select CSV.

Bench Tests > core_perf_custom	v20 😳 💿 🚨
	Actions ~
core_perf_custom	Clone
Completed Duration: 11h 13e Test Profile core_perf_1gb Test Type iSCSI Block St Start Time Oct 25, 2020 06 VM Group dev4 Test Details Composite Ru End Time Oct 26, 2020 05 VM 4 Outration: 11h 13e Outration: 11h 13e Outration: 11h 13e Outration: 11h 13e	View Run Logs IC W View Vdbench Status D Download Summary report (PDF) Download Vdbench raw data (CSV)
Loadpoint Averages VM Average Comparision Test Definition Metrics Max	32 Delete
Throughput (MBps) 219.1	
Read % 0	

Comparing Test Results

You can perform various comparisons on completed tests by selecting the required test from the list. You can select a minimum of two and a maximum of five tests at a time. To compare completed test proceed as follows:

Step 1 Click on the **Comparisons** tab.

≡	cisco HX Bench	COMPARISONS	V21	0	0 4	2
6	BENCH TESTS	Collapse Test View				
긬	COMPARISONS	Compare similar tests 🐵				
۵	TEST PROFILES	Test Name Test Name test-new v test-01 v				
₽	CONTAINER GROUPS	Run Definition Run Definition				
		Loadpoint Loadpoint				
		Max v 90% v Through and (100 a) Date (100 a) Date (100 a) Date (100 a) Date (100 a)			unload	

Step 2 Select the tests to be compared from the completed **Test Name** list. You can select a minimum of two and a maximum of five tests.

=	diali: HX Bench	COMPARISONS	V21	0	0	۹
ß	BENCH TESTS	Collapse Test View				ľ
<u>00</u> 0	COMPARISONS	Compare similar tests 💿				- 1
۵	TEST PROFILES	Test Name Test Name Test Name test-new v test-01 v test-00 v				- 1
0 1	Container Groups	Run Definition Run Definition Run Definition Industry Industry Industry Losdpoint Losdpoint Losdpoint Max 90% Max Image: Throughput (MBps) Read % Read 10PS 450 Max Max			lownload	

Step 3 Use the check boxes to select the test parameters that you want to compare.

≡	cisco HX Bench	COMPURSONS	V2.1	0	0	۹
ផ	BENCH TESTS	Collapse Test View				
tie	COMPARISONS	◯ Compare similar tests ↔				
۵	TEST PROFILES	Test Name Test Name Test Name test-new v test-01 v test-00 v				
	CONTAINER GROUPS	Run Definition Run Definition Run Definition				
		+ · · · · · · · · · · · · · · · · · · ·				
		Loadpoint Loadpoint Loadpoint				
		<u>Max</u> <u>v</u> <u>90% v</u> <u>Max</u> v				
		🛂 Throughput (M8pa) 📄 Read N 🔤 KOPS 📄 Read IOPS 📄 Write IOPS 🔛 Latency (ma) 📄 Read Latency (ma) 📄 Write Latency (ma)		De	wnload	1
		Throughput (MBps)				
		" paramatic and the paramatic				
			Max	Min	Aug.	
			447.5 3	24.6	433	

Step 4 Turn on the **Compare similar tests** switch to compare tests with the same test profile. The first test selected is considered the base test, all of the other tests to be compared will have the same run definition and loadpoint as the first test.

≡	cisco HX Bench	COMPARISONS V21	00	٩
ß	BENCH TESTS	Collapse Test View		
ele	COMPARISONS	Compare similar tests O		
6	TEST PROFILES	Test Name v Run Definition v Loadpoint	~	
₽	CONTAINER GROUPS	·		
		Test Name +		
		🗹 Throughput (MBps) 📄 Read % 🔽 IOPS 📄 Read IOPS 📄 Write IOPS 🔯 Latency (ms) 📄 Read Latency (ms) 📄 Write Latency (ms)	Download	

The comparison results appear with an illustrative graph.



What to do next

To download the detailed test comparisons result in PDF, click on the **Download** button under the **Comparisons** tab.

≡	cisco HX Bench	COMPARISONS	V21	0	Θ	۹
ß	BENCH TESTS	Collapse Test View				
20	COMPARISONS	Compare similar tests 💿				
۵	TEST PROFILES	Test Name Test Name test-00 v test-01 v				- 1
	CONTIANER GROUPS	Run Definition Run Definition -rd.vdl.remp -rd.vdl.remp Losdpoint Max Max	60.8	58.4	Synthesis	



Creating Test VMs

- Creating Test VMs for Raw Disk, on page 39
- Creating Test VMs for iSCSI, on page 40

Creating Test VMs for Raw Disk

Step 1 Click on the VM Groups tab.

Step 2 Under the Create VM Groups tab, click on Create VM Group and complete the following fields:

Table 3: Create VM Group for Raw Disk fields

Field	Description
VM Group for Test Type	Select Raw Disk from the drop-down.
VM Name Prefix	Name of the VM.
vCenter	vCenter field is pre-populated. You cannot edit the value.
Number of VMs	Number of VMs to deploy. The default value is set to 4.
Network	List of network switches available in vCenter.
Stretched Cluster	If you are benchmarking a Stretched Cluster complete the additional fields:
	• HX Connect IP: HX Connect IP address
	• HX Connect Username: HX Connect Username
	• HX Connect Password: HX Connect Password.
	• Fetch Data Store: After entering HX Connect details click on this button to fetch Datastore details.

Step 3 Click Save.

Creating Test VMs for iSCSI

Creating Test VMs for iSCSI: HyperFlex Clusters

Step 1 Select the VM Groups tab.

Step 2 On the Create VM Groups tab, click Create VM Group and complete the following fields:

Table 4: Create VM Group for iSCSI Block Storage Fields

Field	Description
VM Group Details	
VM Group for Test Type	Select iSCSI Block Storage Workload from the list.
VM Group Name	Type the unique VM Group Name in the field.
vCenter	vCenter field is pre-populated. You cannot edit the value.
Data Center	Select the Data Center from the list.
Cluster	Select the Cluster from the list.
Data Store	List of data stores in the vCenter that are queried at runtime.
Network	List of network switches available in vCenter.
Total VMs across All Nodes	Total count of VMs across all nodes. Value needs to be greater than 1. The default value is set to 4.
Disk Size / VM (GB)	
MTU Size	(Optional) MTU size for the test VMs and controller. This field is optional.
Target Server Details	
Cluster Type	Specify HX or non HX.
HX Connect IP	HX Connect IP
HX Connect Username	HX Connect Username
HX Connect Password	HX Connect Password
Target Server IP	IP address of the target server. This IP is used to discover targets in the target server.
СНАР	Select either Yes or No . If yes is selected, mutual authentication between target and user is configured.

Field	Description
VM Group Details	
CHAP Username	CHAP username. This field is visible only if the CHAP radio button is selected with Yes .
CHAP Password	CHAP Password. This field is visible only if the CHAP radio button is selected with Yes .
Network Configuration Details	
Static/DHCP	Select Static or DHCP for IPs to assign to the test VMs.
IP Range Start	Starting IP address for test VMs. Successive unused IPs after this IP are used for test VMs. This option is not available if you select DHCP.
Gateway	GatewayIP of the network used for test VMs. This option is not available if you select DHCP.
Netmask	NetmaskIP of the network used for test VMs. This option is not available if you select DHCP.
Target Server Details	
Enable CHAP	Select either Yes or No. If yes is selected, the CHAP Username and Password fields is visible and mutual authentication between target and user is configured. Complete the required fields.
	• IP Address: CHAP IP address
	• CHAP Username: CHAP username
	CHAP Password: CHAP password
Network Configuration Details	
Static/DHCP	Select Static or DHCP for IPs to assign to the test VMs.
IP Range Start	Starting IP address for test VMs. Successive unused IPs after this IP are used for test VMs. This option is only available if you select Static .
Netmask	NetmaskIP of the network used for test VMs. This option is only available if you select Static .
Gateway	(Optional) Gateway IP of the network used for test VMs. This option is only available if you select Static .

Step 3 Click Save.

Creating Test VMs for iSCSI: Non-HyperFlex Clusters

- **Step 1** Click on the VM Groups tab.
- **Step 2** Under the **Create VM Groups** tab, click on **Create VM Group** and complete the following fields:

Table 5: Create VM Group for iSCSI Block Storage Fields

Field	Description
VM Group for Test Type	Select iSCSI Block Storage Workload from the drop-down list.
VM Name Prefix	Name of the VM.
vCenter	vCenter field is pre-populated. You cannot edit the value.
Datastore	List of datastores in the vCenter that are queried at runtime.
Number of VMs	Number of VMs to deploy. The default value is set to 4.
Cluster Type	Set the Cluster Type to HX/Non-HX for iSCSI Block Storage Workload . Default value is HX .
Target Server IP	IP address of the target server. This IP is used to discover targets in the target server.
СНАР	Select either Yes or No . If yes is selected, mutual authentication between target and user is configured.
CHAP Username	CHAP username. This field is visible only if the CHAP radio button is selected with Yes .
CHAP Password	CHAP Password. This field is visible only if the CHAP radio button is selected with Yes .
Network Configuration Details	
Static/DHCP	Select Static or DHCP for IPs to assign to the test VMs.
IP Range Start	Starting IP address for test VMs. Successive unused IPs after this IP are used for test VMs. This option is not available if you select DHCP.
Gateway	GatewayIP of the network used for test VMs. This option is not available if you select DHCP.
Netmask	NetmaskIP of the network used for test VMs. This option is not available if you select DHCP.
Network	List of network switches available in vCenter.
MTU Size	MTU size for the test VMs and controller. This field is optional.

Step 3 Click Save.



Appendix

• Appendix, on page 45

Appendix

Deploy Cluster on a Single Host

This appendix provides step-by-step tasks for manual network creation for a Datacenter or cluster with one host.

Datacenter or Cluster with One Host

Follow these steps to create the required vSwitch and Port Group for HxBench.

- 1. Create a vSwitch with or without any uplinks using vSphere Web Client. Alternatively, you can select an existing vSwitch to create the HxBench Private **Port Group**.
- 2. Create a Port Group labeled *HxBench Private* (as shown in the following diagram).



3. During OVA deployment, map NIC-2 of the HxBench Controller to the newly created **HxBench Private Port Group**. Or. the DVS port switch can be used with the proper uplink configured on all the hosts.

Troubleshooting Section

Network Issues

• Uplink Error, on page 46

- Missing Host Error, on page 46
- Network Type Configuration Error, on page 48
- Password Configuration Error, on page 48

VM Deployment Failure

• VM Deployment Failure, on page 49

Uplink Error

The following error message is displayed:

Failure Info	\otimes
Some of the hosts in the n have a proper uplink configurat with other hosts in the cluster. reachability issue from HXbench test VMs.	etwork don't ion to interface This may cause n controller to
Ok	

Steps to resolve this error:

• Please check if all the Host in the Cluster are connected to HXBench Private network and necessary VLAN ID is assigned.

(For VLAN ID details, please contact the Networking team.)

Missing Host Error

This issue occurs when some of the hosts in the cluster are not connected to HXBench Private network.

Network Settings
valinata and i obligure the
\mathbf{X}
The network that will be used for testing, is not available in few hosts in the cluster
You may choose to run the tests with current network settings, or a new network can be created on all hosts to run the test.
Click Confirm to create a network or cancel to continue with the current network setup.
Cancel Confirm

Steps to resolve this issue:

• To continue to run the tests on all the hosts in the cluster, click on **Confirm** button which creates the network on all the hosts.

 Please note : A new network will be created on all hosts to run the test. 		
Create Network		
VLAN ID *		
3998	0	
Host : ucs-508.eng.storvisor.com		
Switches		
vswitch-hx-inband-mgmt - management network	~	
Host : ucs-509.eng.storvisor.com		
Switches		
vswitch-hx-vm-network	~	
Host : ucs-507.eng.storvisor.com		
Switches		
vswitch-hx-storage-data	~	
		Proceed
		Proceed



For VLAN ID details, contact the Networking team.

Network Type Configuration Error

The following error message is displayed:



The issue may occur if either the Public Network Type property or DHCP/static option is not selected in the **Network Type** selection during the deployment.

Steps to resolve this error:

Redeploy the HxBench controller. During deployment, select Public Network Type property from the drop-down menu.

Password Configuration Error

The following error message is displayed:

Property 'Enter New Password' must be configured for the VM to power on.

The issue may occur if the password is not changed in the System password section during the deployment.

Steps to resolve this error:

Redeploy the HxBench controller. During deployment, under **System password**, enter the password that you would like to use to access the HxBench controller

VM Deployment Failure

The following error message is displayed:

Unable to copy files to x.x.x.x

Steps to resolve this issue:

- Click on the **Retry** button to reboot the VM.
- Copy the files again.

If the files are copied successfully, then you can continue to use the same VM group to run the future tests.

I