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Practical 1: Configure and use vCenter Server Appliance.

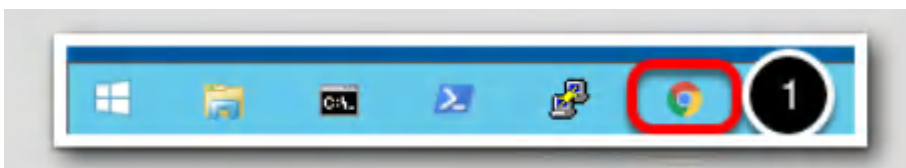
ESXi Host Client: The VMware Host Client is an HTML5-based client that is used to connect to and manage single ESXi hosts. You can use the VMware Host Client to perform administrative and basic troubleshooting tasks, as well as advanced administrative tasks on your target ESXi host. You can also use the VMware Host Client to conduct emergency management when vCenter Server is not available.

It is important to know that the VMware Host Client is different from the vSphere Web Client, regardless of their similar user interfaces. You use the vSphere Web Client to connect to vCenter Server and manage multiple ESXi hosts, whereas you use the VMware Host Client to manage a single ESXi host.

This lesson will walk through some of the most frequently used features in the ESXi Host Client.

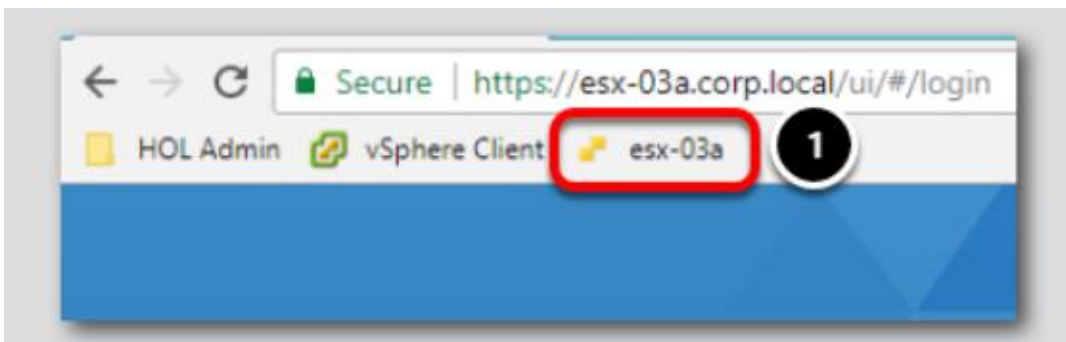
Launch Chrome

1. Click on the Chrome Icon on the Windows Quick Launch Task Bar.



Select esx-03a

1. From the Bookmarks bar, select esx-03a



Login

Login with the following credentials:

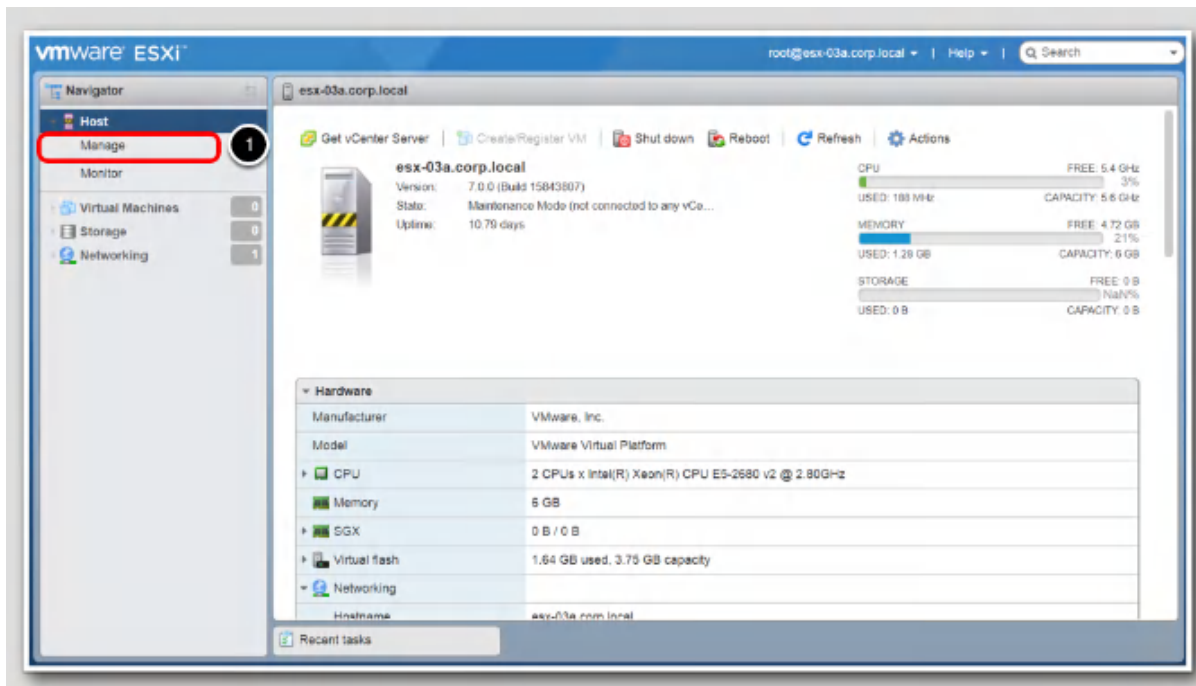
1. User name: root
2. Password: VMware1!



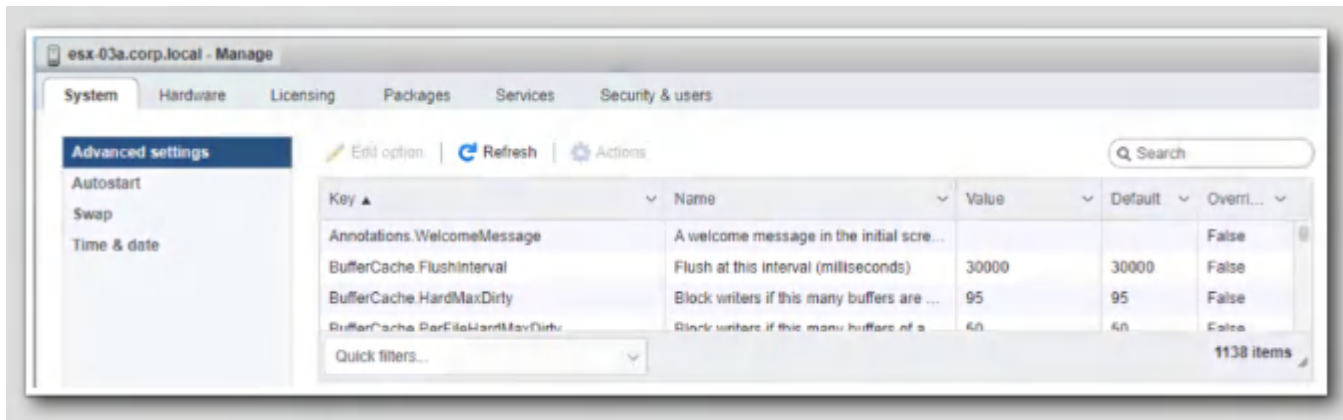
Click the Log in button. The ESXi Host, in this case, esx-03aesx-03a, can now be directly managed. This can be useful in test/dev environments where a vCenter Server is not present or in a production environment where the vCenter Server is not reachable.

ESXi Host Client

1. Click on Manage.

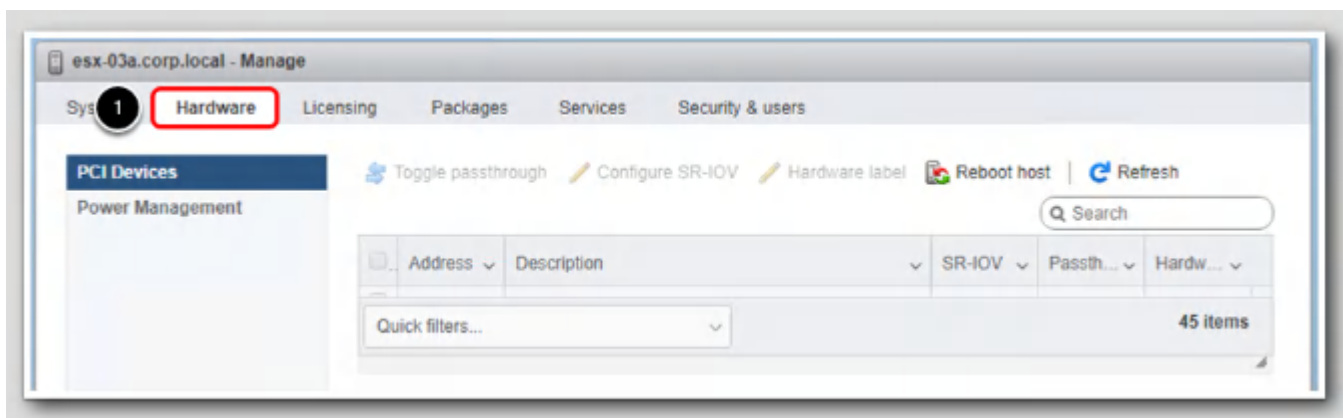


2. On the System tab, the most common options set here are the date and time for the host. It can be set and synchronized with an NTP server or set manually. In addition, Autostart settings for the host can be configured here as well.

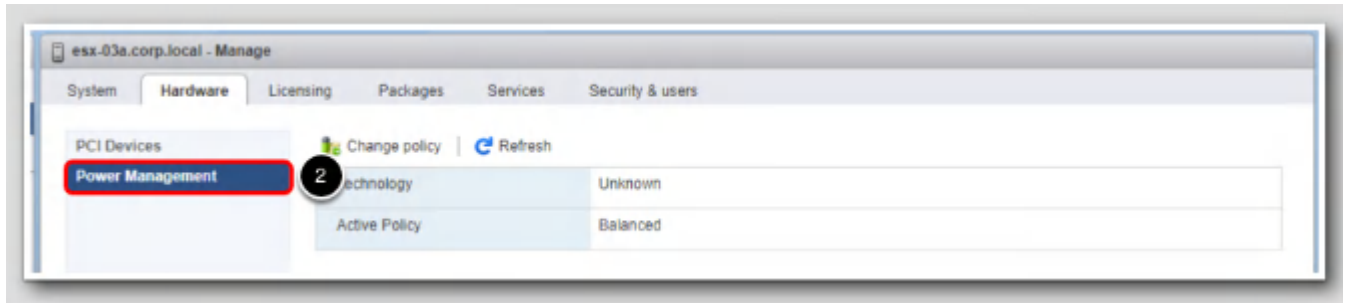


Hardware

1. Click on the Hardware tab.



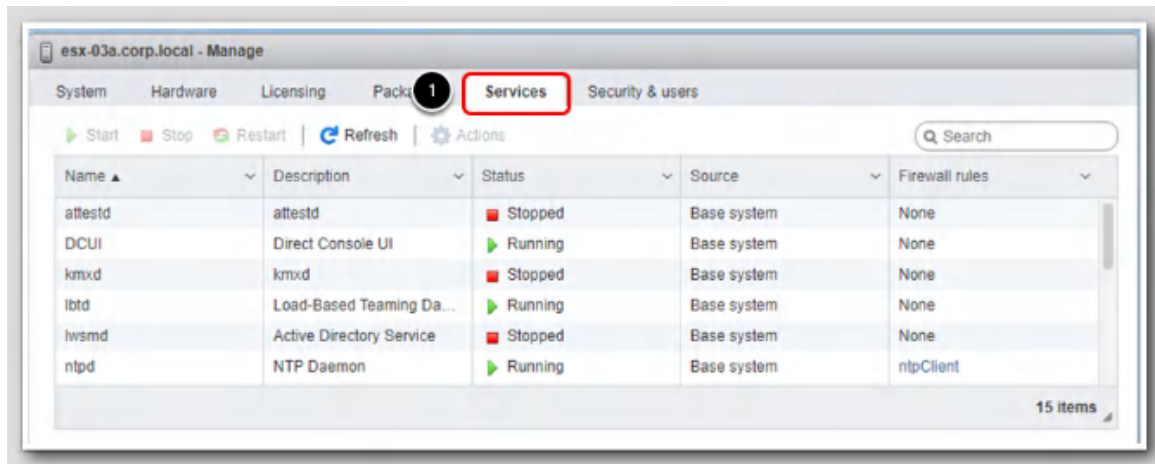
2. Click Power Management. This is where power management policies can be set for the host.



Services

1. Click the Services tab

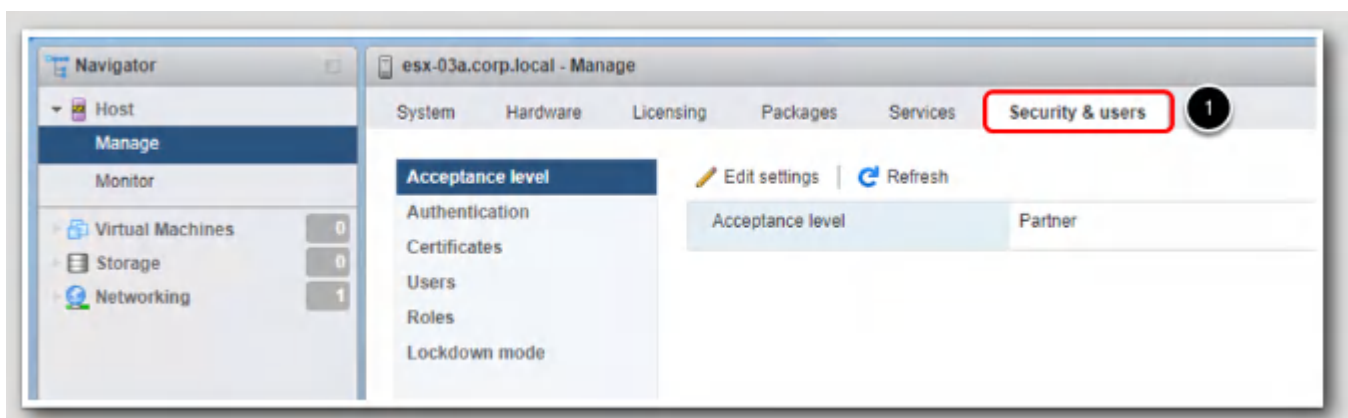
Services like SSH access and the Direct Console UI can be stopped and started from this screen



Security and Users

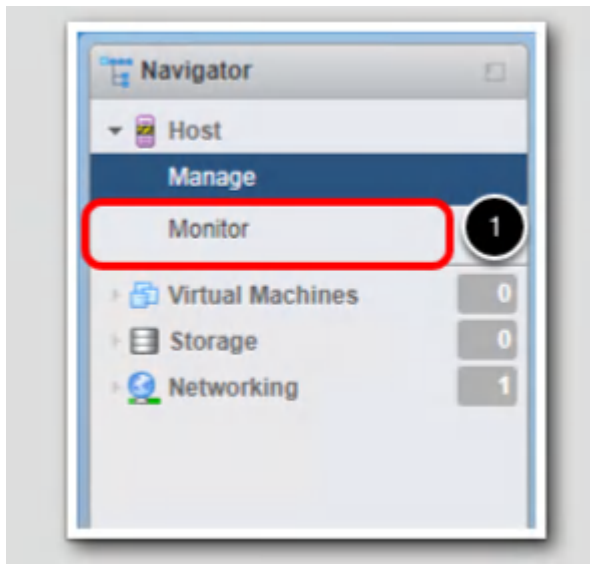
1. Click on Security & user.

On the Security & Users tab, security options such as authentication to Active Directory and Certificates can be set here. There is also the ability to create additional roles and user accounts for the host itself. This option uses accounts that are local only to the host and not shared with any other hosts or vCenter Server. vCenter Server is set up to use single sign-on which makes account management much easier.



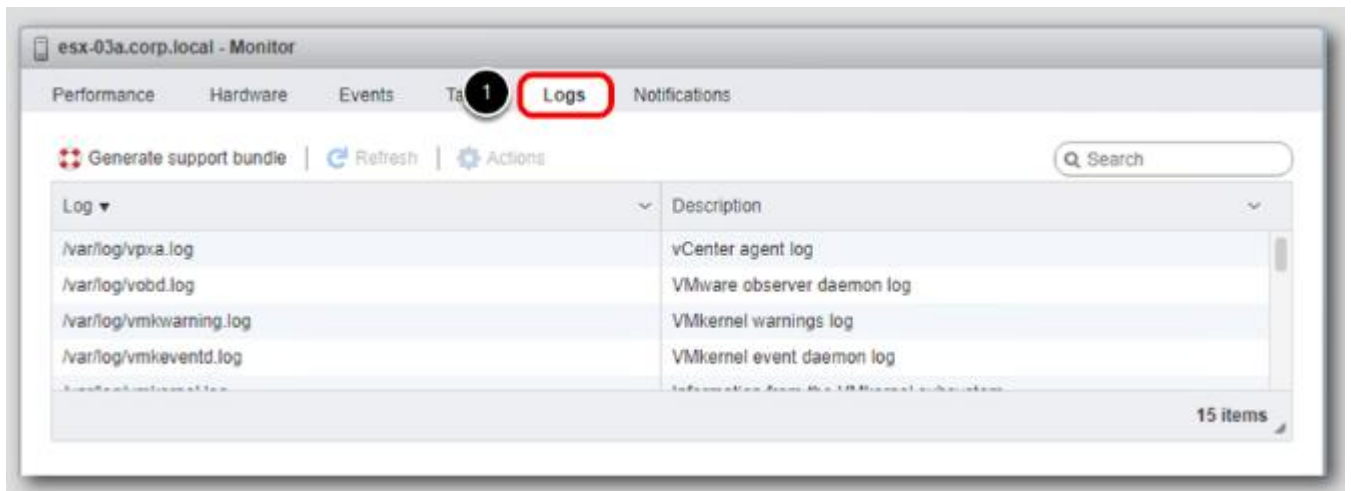
Monitor

1. Click on Monitor. The Monitor section includes Performance Charts, Hardware monitoring, an event log and other useful monitoring information.



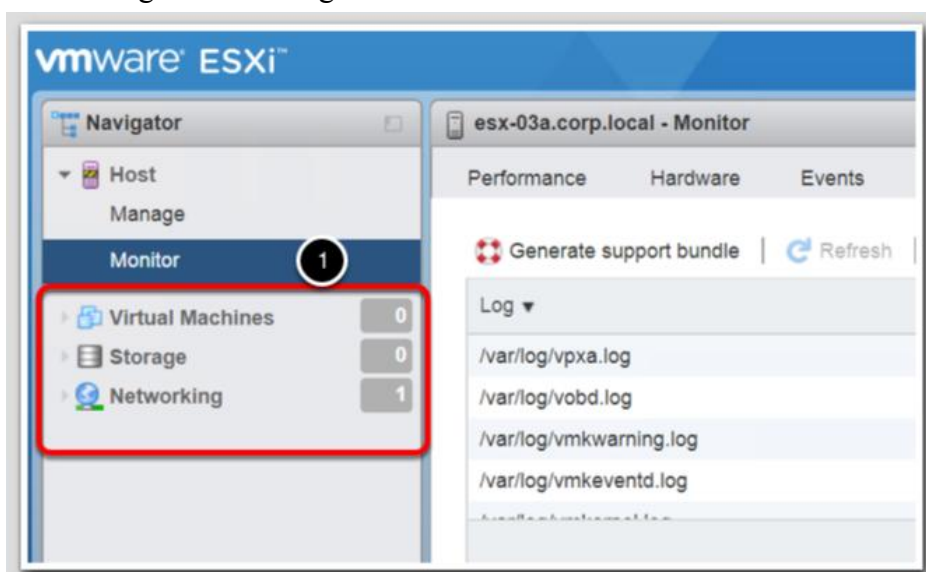
Logs

1. Click the Logs tab. On the Logs tab, a support bundle can be created that includes log files and system information that can be helpful in troubleshooting issues.



VMs, Storage and Networking

1. In addition to managing and monitoring the host, Virtual Machines can be created, Storage and Networking can be configured at the host level.



Practical 2: Adding and Configuring vSphere Standard Switch

The following lesson will walk you through the process of creating and configuring the vSphere Standard Switch.

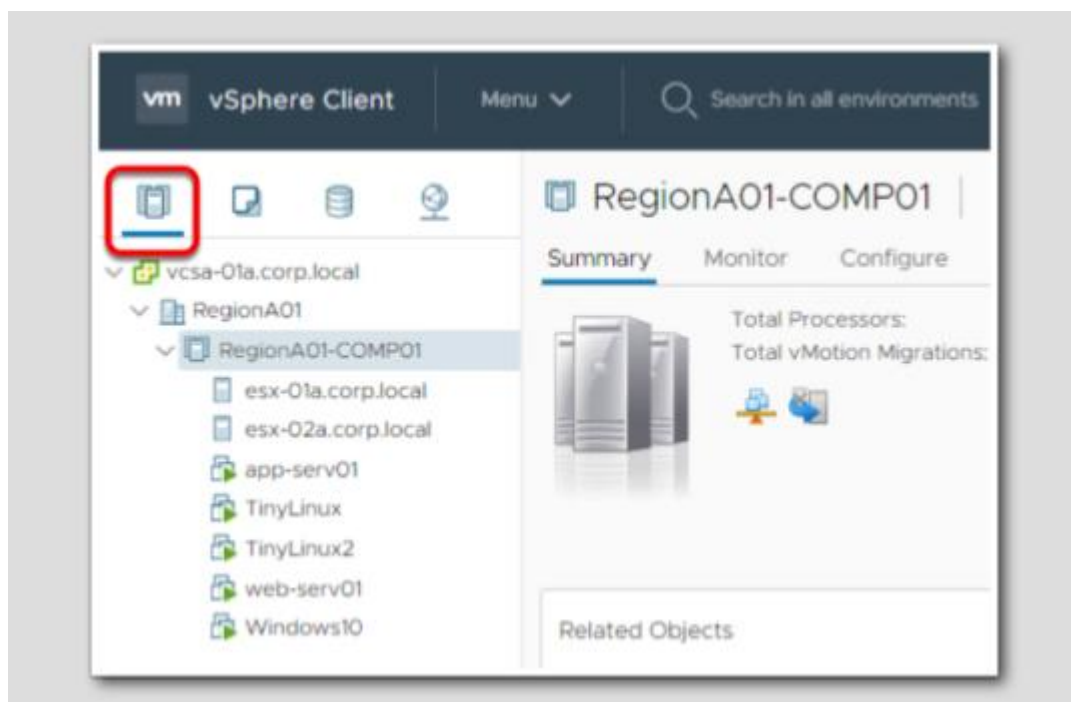
Adding a Virtual Machine Port Group with the vSphere Client

If you are not already logged in, launch the Chrome browser from the desktop and log in to the vSphere Web Client.

1. Click the "Use Windows session authentication" check box
2. Click "Login"



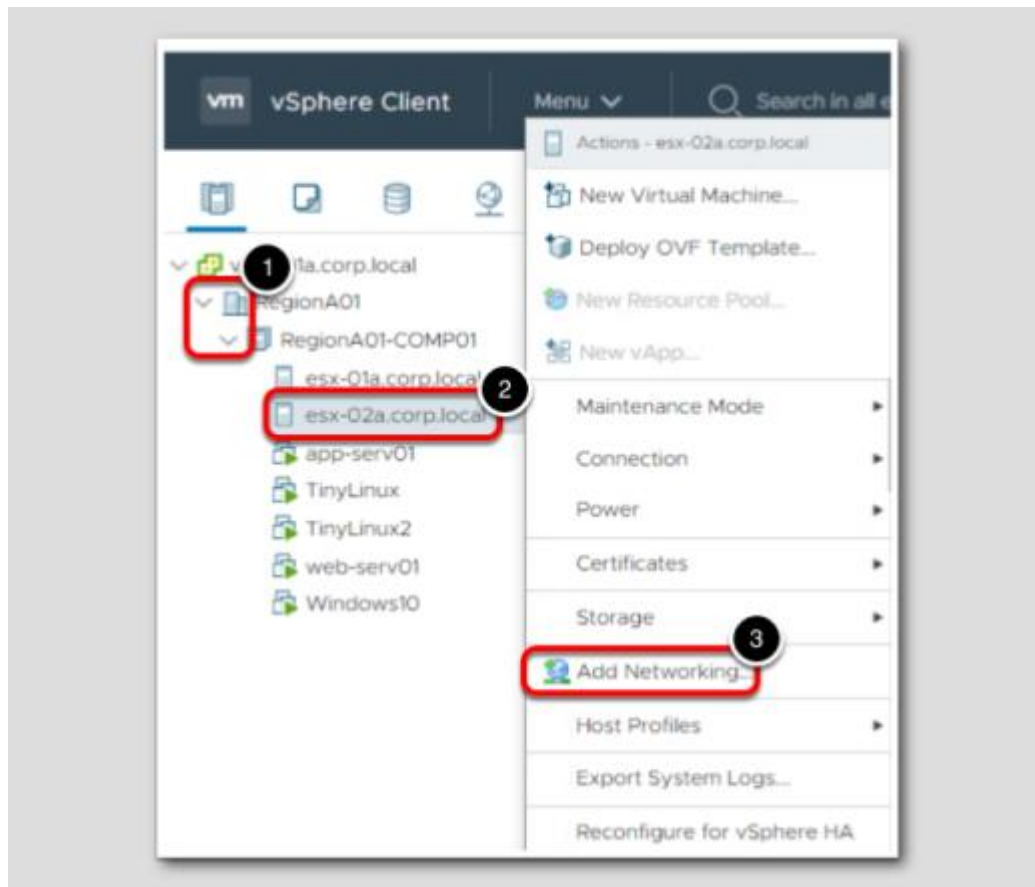
Select Hosts and Clusters



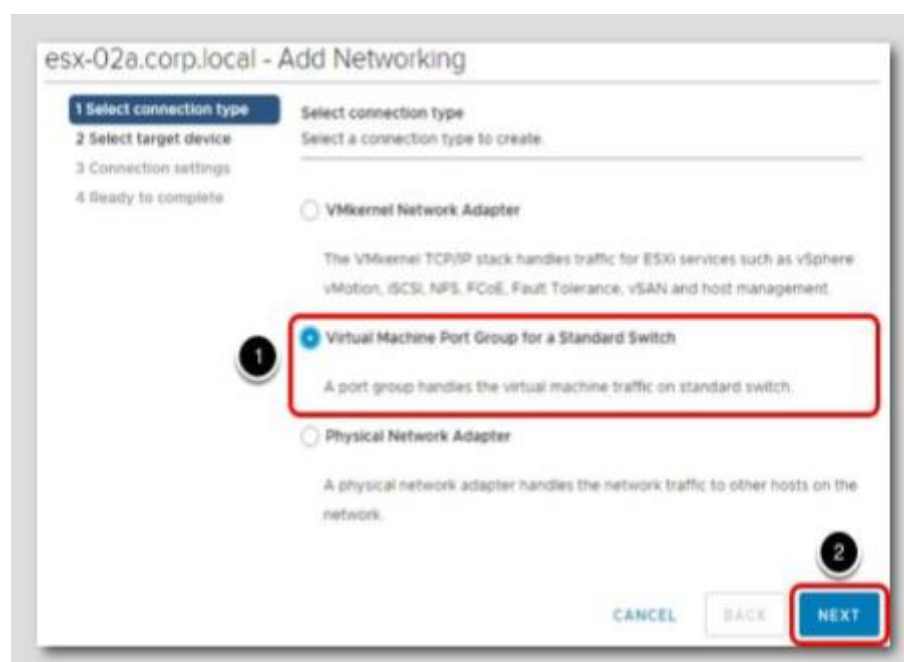
If you are not directed to "Hosts and Clusters", click the icon for it.

Add Networking

1. Under vcsa-01a.corp.local, expand RegionA01 and then RegionA01-COMP01.
2. Next, right-click on esx-02a.corp.local in the Navigator.
3. Select Add Networking....



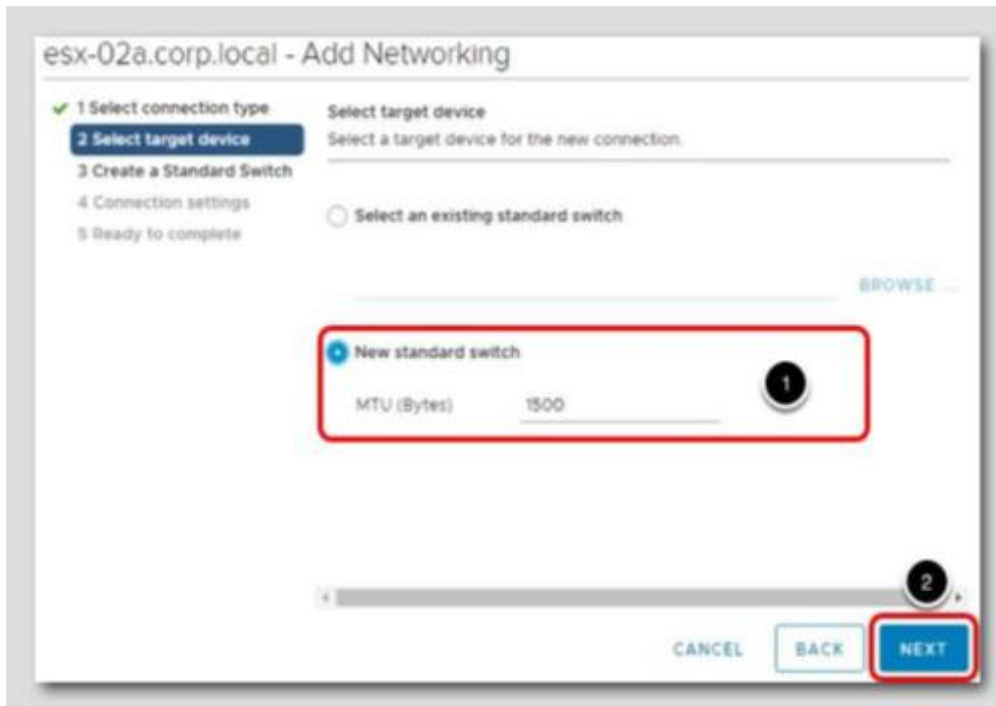
Connection Type



1. When asked to select connection type, choose Virtual Machine Port Group for a Standard Switch.
2. Click Next.

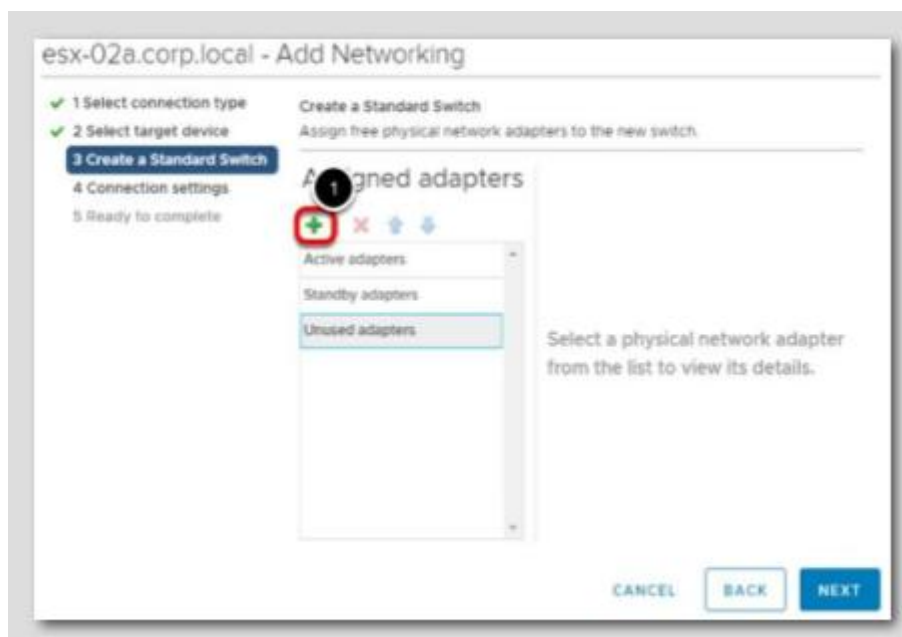
Target Device

1. When asked to select a target device, choose New Standard Switch. Note that a larger MTU size can be specified if needed.
2. Click Next.



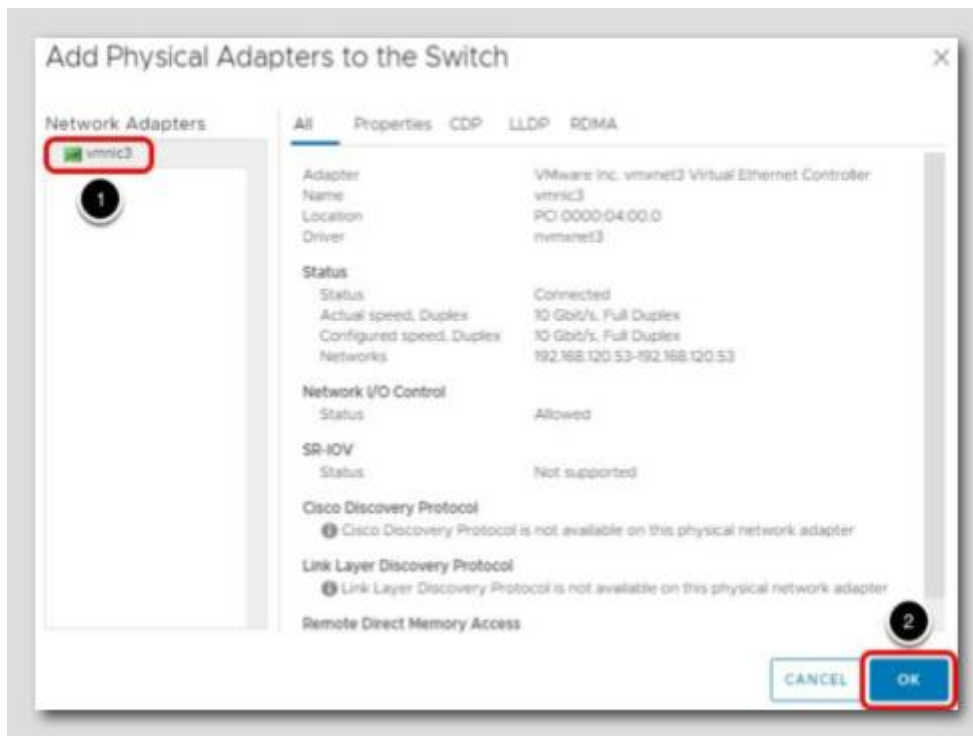
Create a Standard Switch

1. Click the '+' button.



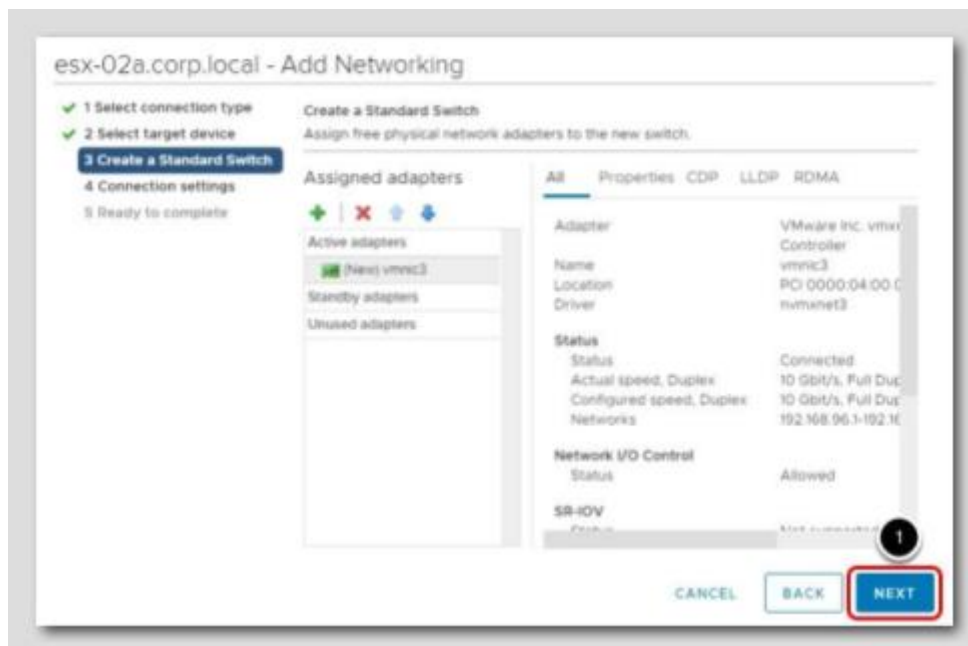
Add Physical Adapter

1. Select vmnic3 under Network Adapters
2. Click OK.



Add Physical Adapter

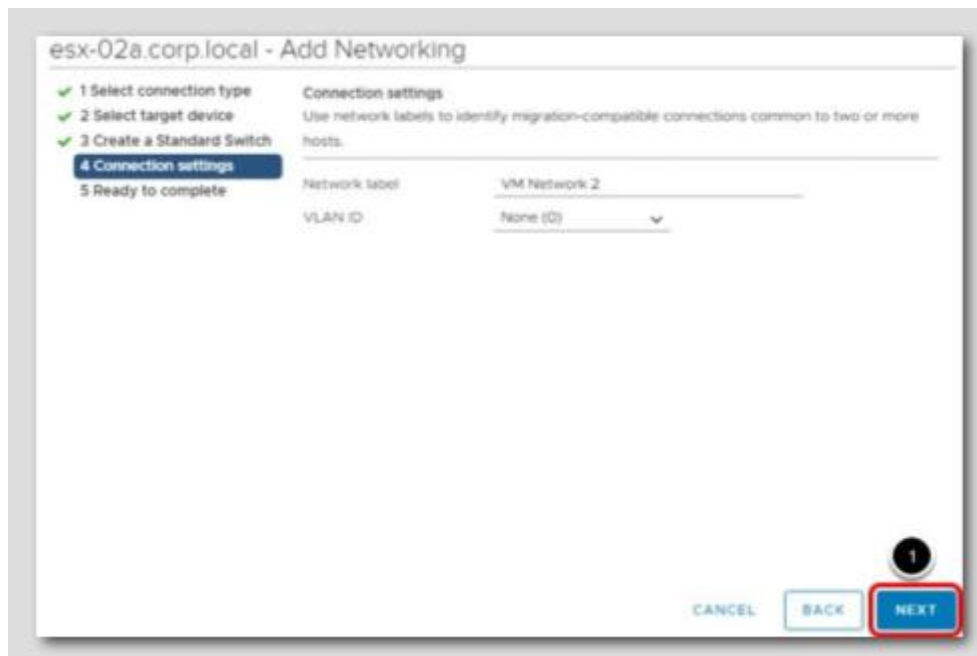
1. Click Next to continue.



Connection Settings

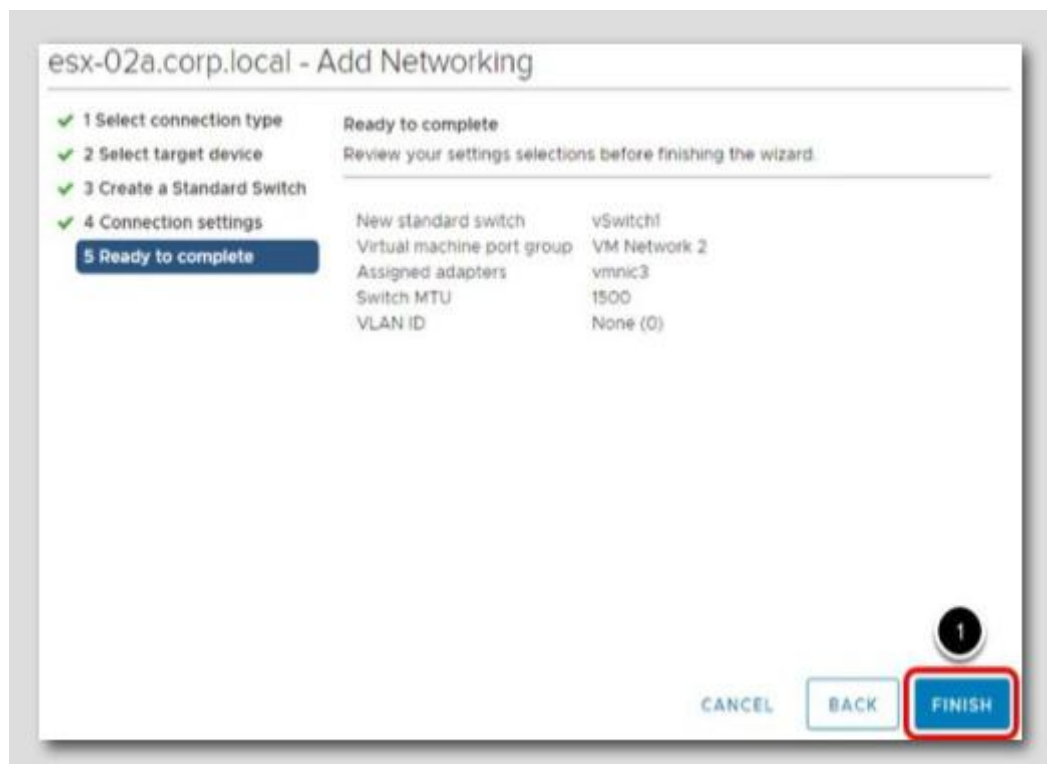
At the Connection settings step of the wizard, for Network label, leave the default name of VM Network 2. Do not change the VLAN ID; leave this set to None (0).

1. Click Next to continue.



Complete the Wizard

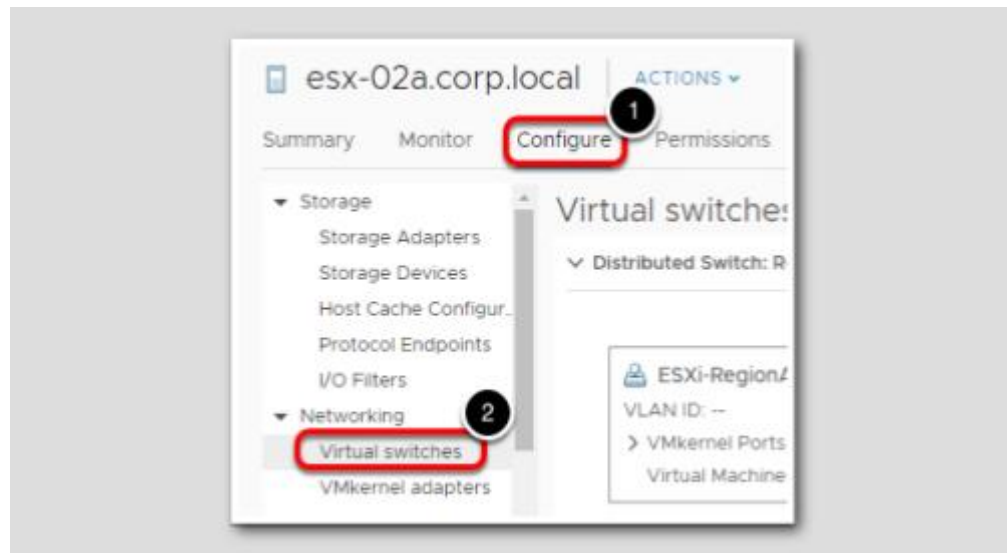
1. Review the port group settings in Ready to complete and click Finish.



Virtual Switches

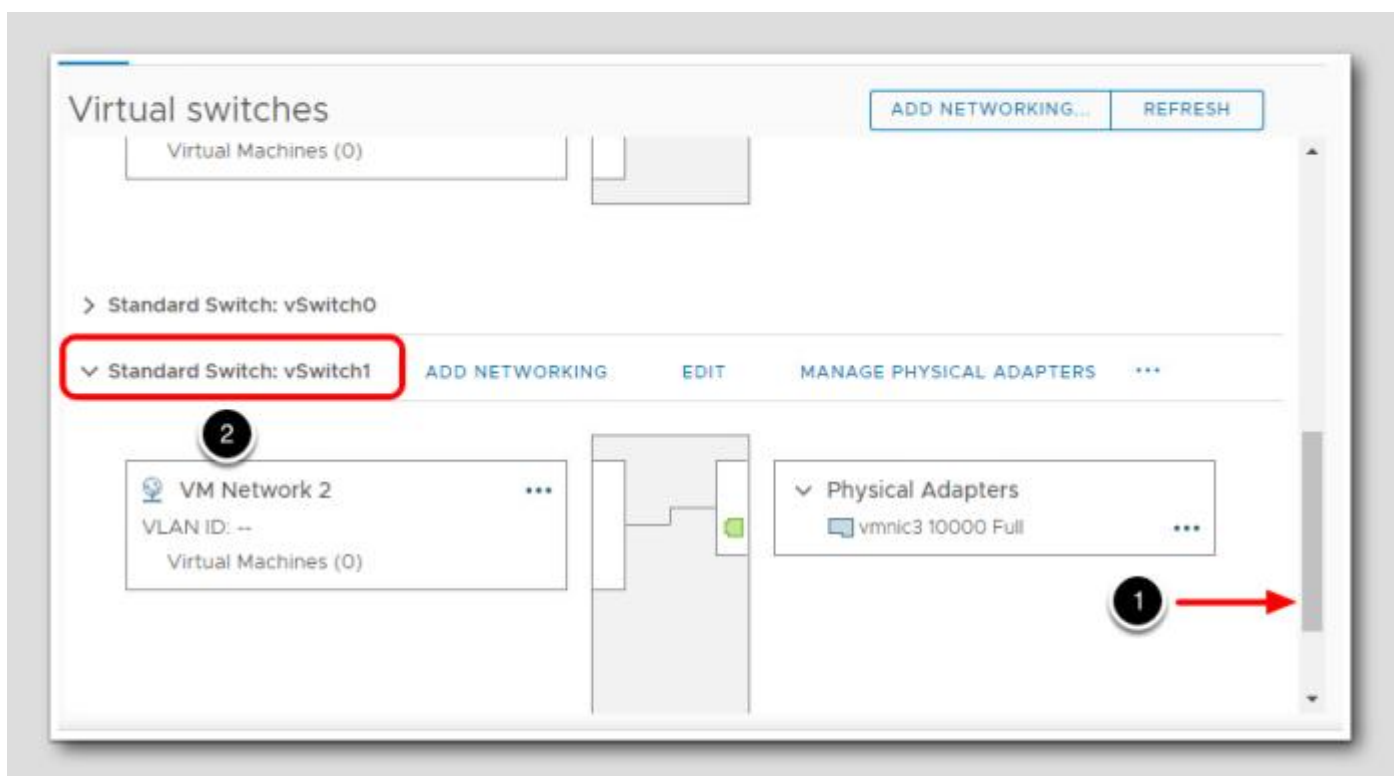
Next, we will verify the switch has been created.

1. Click Configure.
2. Click on Virtual Switches.



Standard Switch: vSwitch1

1. Scroll down until you see Standard Switch: vSwitch1.
2. If needed, expand the section.



Practical 3: Configure Access to an iSCSI datastore.

The vSphere Hypervisor, ESXi, provides host-level storage virtualization, which logically abstracts the physical storage layer from virtual machines.

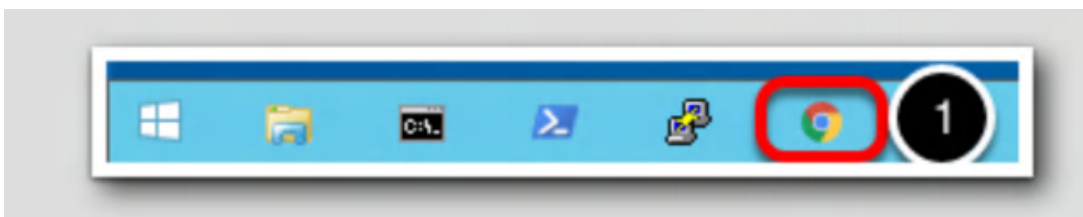
A vSphere virtual machine uses a virtual disk to store its operating system, program files, and other data associated with its activities. A virtual disk is a large physical file, or a set of files, that can be copied, moved, archived, and backed up as easily as any other file. You can configure virtual machines with multiple virtual disks.

To access virtual disks, a virtual machine uses virtual SCSI controllers. These virtual controllers include BusLogic Parallel, LSI Logic Parallel, LSI Logic SAS, and VMware Paravirtual. These controllers are the only types of SCSI controllers that a virtual machine can see and access.

Each virtual disk resides on a vSphere Virtual Machine File System (VMFS) datastore or an NFS-based datastore that are deployed on physical storage.

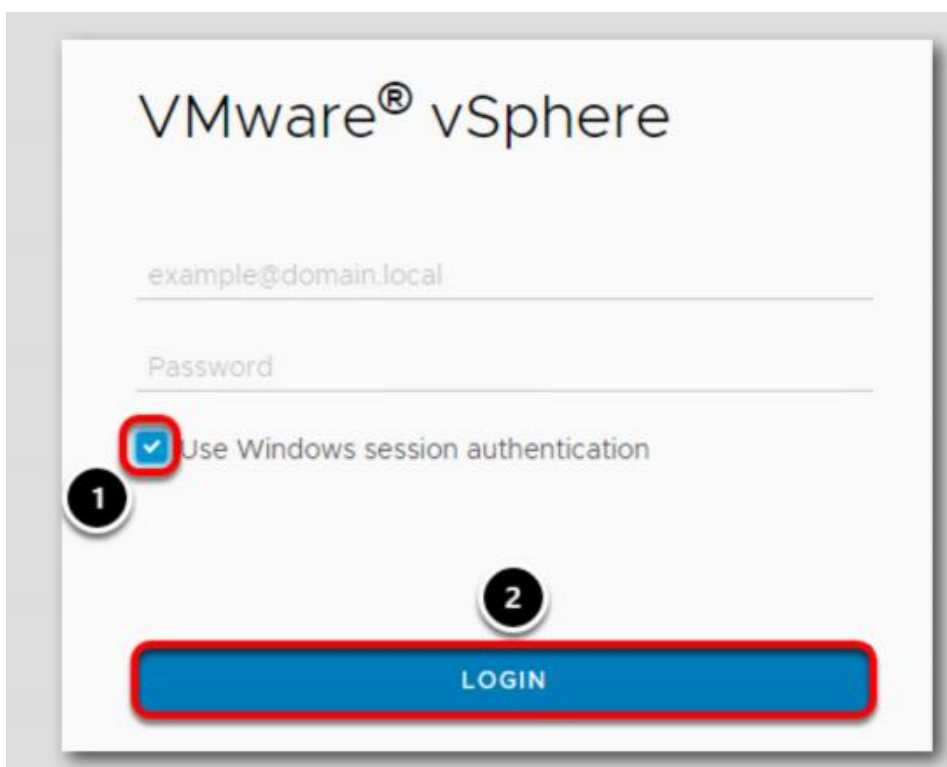
Launch Google Chrome web browser

1. Click on the Chrome Icon on the Windows Quick Launch Task Bar.



Enter credentials and log in

1. Select "Use Windows session authentication" check box.
2. Select Login.

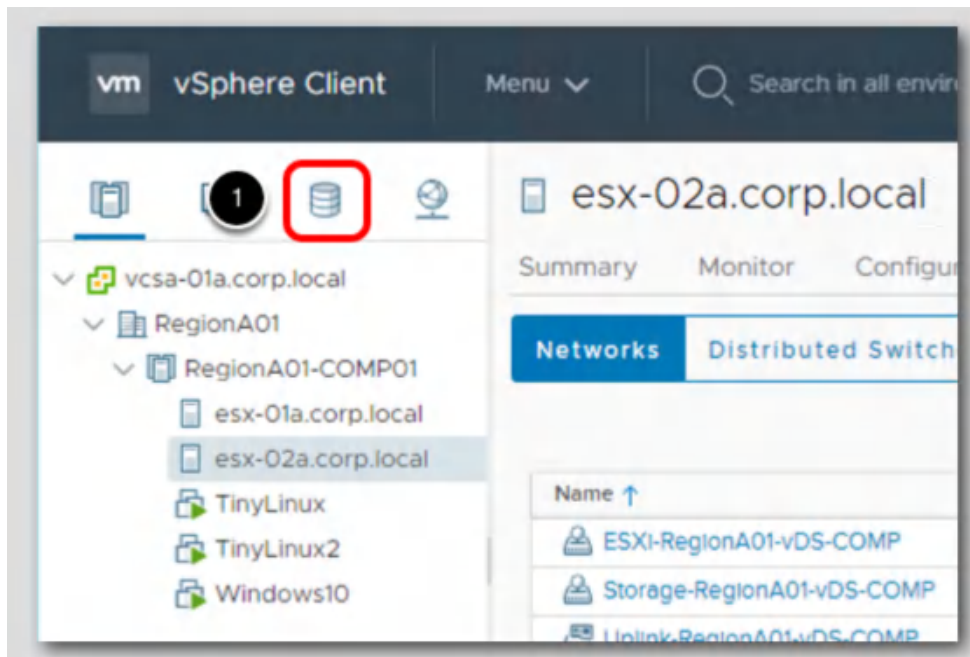


If credentials aren't saved, use the following:

- username: administrator@corp.local
- password: VMware1!

Navigate to Storage Management

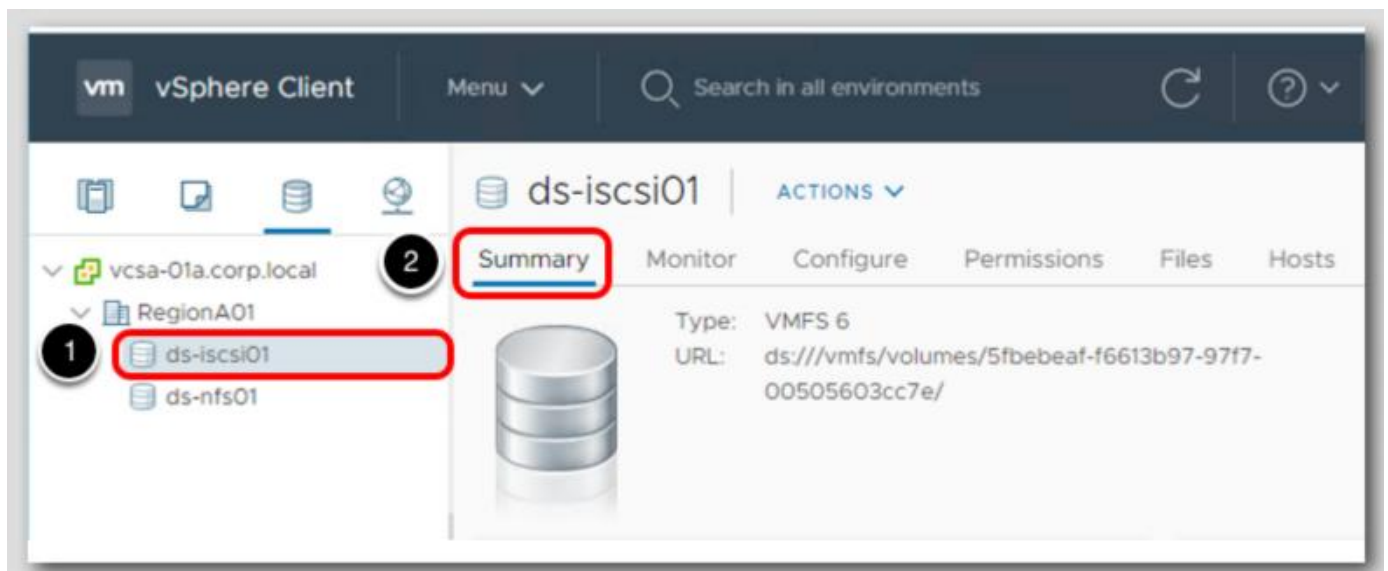
1. Select the Storage tab.



Expand RegionA01 Datacenter

There are 2 storage datastores configured, an iSCSI datastore and an NFS datastore.

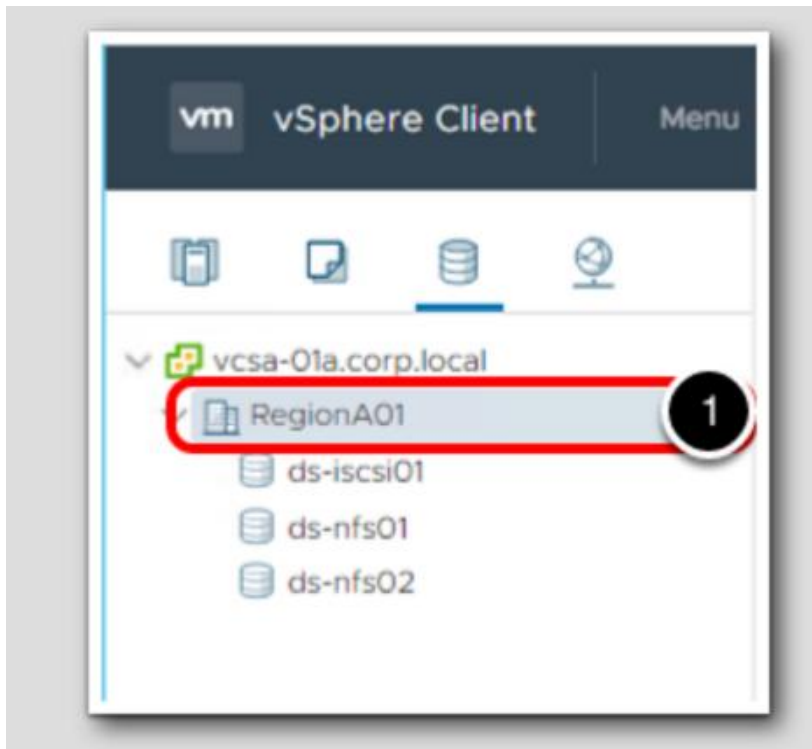
1. Select the ds-iscsi01 datastore.
2. Click on Summary for summary details of the datastore.



Practical 4: Create and manage VMFS datastore.

Create a VMFS Datastore

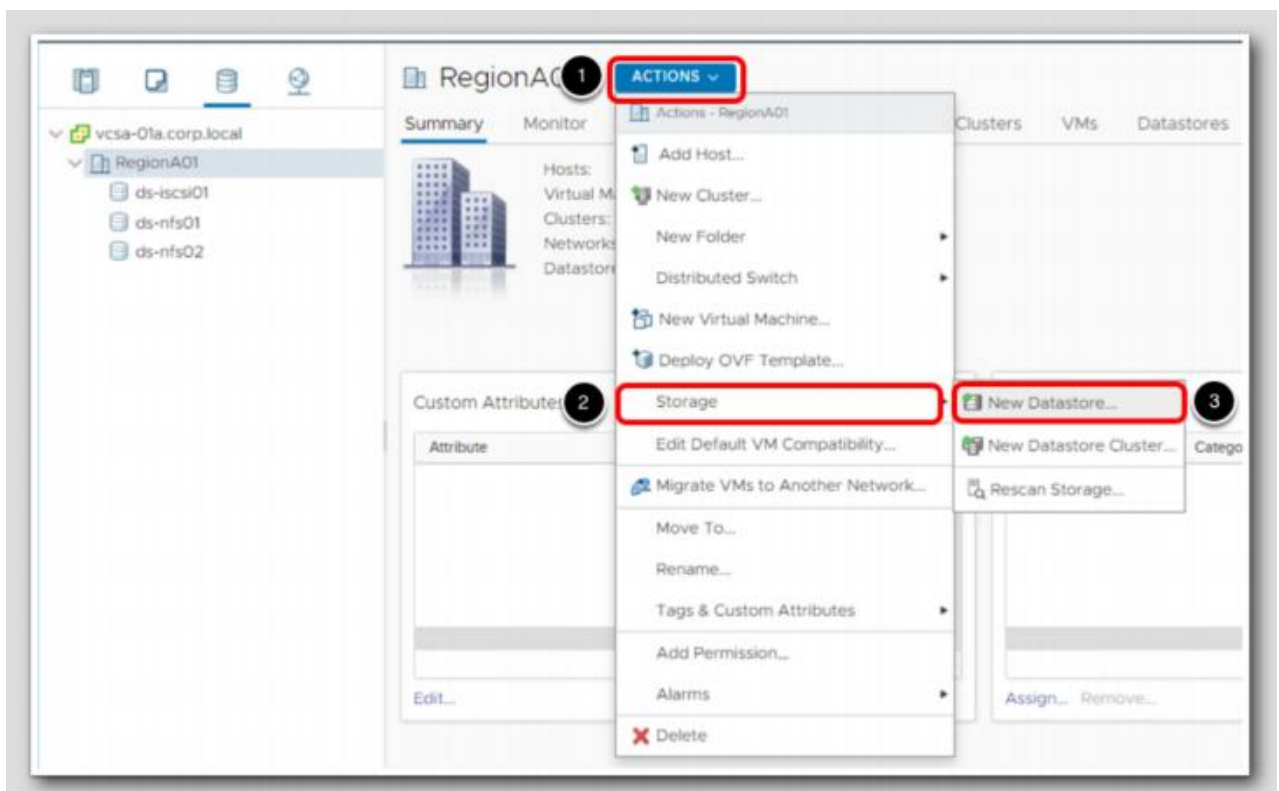
1. Select RegionA01 Datacenter.



New Datastore

In this section, you will create a new vSphere iSCSI Datastore with a pre-provisioned iSCSI LUN.

1. Select Actions.
2. Select Storage.
3. Select New Datastore.



New Datastore - Type

1. Verify VMFS is selected.
2. Click Next.

New Datastore

1 Type

2 Name and device selection

3 VMFS version

4 Partition configuration

5 Ready to complete

Type

Specify datastore type.

☒ VMFS
Create a VMFS datastore on a disk/LUN.

☐ NFS
Create an NFS datastore on an NFS share over the network.

☐ vVol
Create a Virtual Volumes datastore on a storage container connected to a storage provider.

CANCEL BACK NEXT

New Datastore - Name and Device configuration

1. Give the new Datastore the name ds-iscsi02.
2. Select a Host to view the accessible disks/LUNs and select esx-01a.corp.local in the drop-down box.

Note: Do not click Next just yet, proceed to the next step!

New Datastore

1 Type

2 Name and device selection

3 VMFS version

4 Partition configuration

5 Ready to complete

Name and device selection

Select a name and a disk/LUN for provisioning the datastore.

Datastore name: ds-iscsi02

The datastore will be accessible to all the hosts that are configured with access to the selected disk/LUN. If you do not find the disk/LUN that you are interested in, it might not be accessible to that host. Try changing the host or configure accessibility of that disk/LUN.

Select a host to view its accessible disks/LUNs: <select a host>

Name	LUN	Capacity
esx-01a.corp.local		
esx-02a.corp.local		

New Datastore - Name and device configuration (cont.)

From this view, we can see that there are existing datastores that can be presented to our vSphere environment.

1. Select the device with LUN ID 2. In this case, it should be the only device visible with a FreeNAS prefix.
2. Click Next.

New Datastore

✓ 1 Type
2 Name and device selection
3 VMFS version
4 Partition configuration
5 Ready to complete

Name and device selection
Select a name and a disk/LUN for provisioning the datastore.

Datastore name:

ⓘ The datastore will be accessible to all the hosts that are configured with access to the selected disk/LUN. If you do not find the disk/LUN that you are interested in, it might not be accessible to that host. Try changing the host or configure accessibility of that disk/LUN.

Select a host to view its accessible disks/LUNs:

Name	LUN	Capacity	Hardware	Drive T...	S
FreeNAS ISCSI Disk (nea...	2	44.00 GB	Supported	Flash	-
Local VMware Disk (mpk...	0	5.00 GB	Not suppor...	Flash	£

CANCEL BACK NEXT

New Datastore - VMFS Version

1. Leave the default of VMFS 6 selected.
2. Click Next.

New Datastore

✓ 1 Type
✓ 2 Name and device selection
3 VMFS version
4 Partition configuration
5 Ready to complete

VMFS version
Specify the VMFS version for the datastore.

☒ VMFS 6
VMFS 6 enables advanced format (512e) and automatic space reclamation support.

☐ VMFS 5
VMFS 5 enables 2+TB LUN support.

CANCEL BACK NEXT

New Datastore - Partition Configuration

We can use all available capacity for this datastore or change the size if needed. The defaults are fine for this step.

1. Select Next.

The screenshot shows the 'New Datastore' wizard at the 'Partition configuration' step. On the left, a progress bar shows steps 1 through 5, with step 4 'Partition configuration' highlighted. The main area is titled 'Partition configuration' and contains the following settings:

- Partition Configuration:** Use all available partitions (dropdown menu)
- Datastore Size:** 44 GB (slider bar)
- Block size:** 1 MB (dropdown menu)
- Space Reclamation Granularity:** 1 MB (dropdown menu)
- Space Reclamation Priority:** Low: Deleted or unmapped blocks are reclaimed on the LUN at Low priority (slider bar)

Below the settings is a large blue box representing the disk layout, labeled 'Empty, 44.0 GB'. At the bottom right, there are three buttons: 'CANCEL', 'BACK', and 'NEXT'. The 'NEXT' button is highlighted with a red border and a circled '1' above it.

New Datastore - Ready to complete

1. Review New Datastore configuration and click Finish.

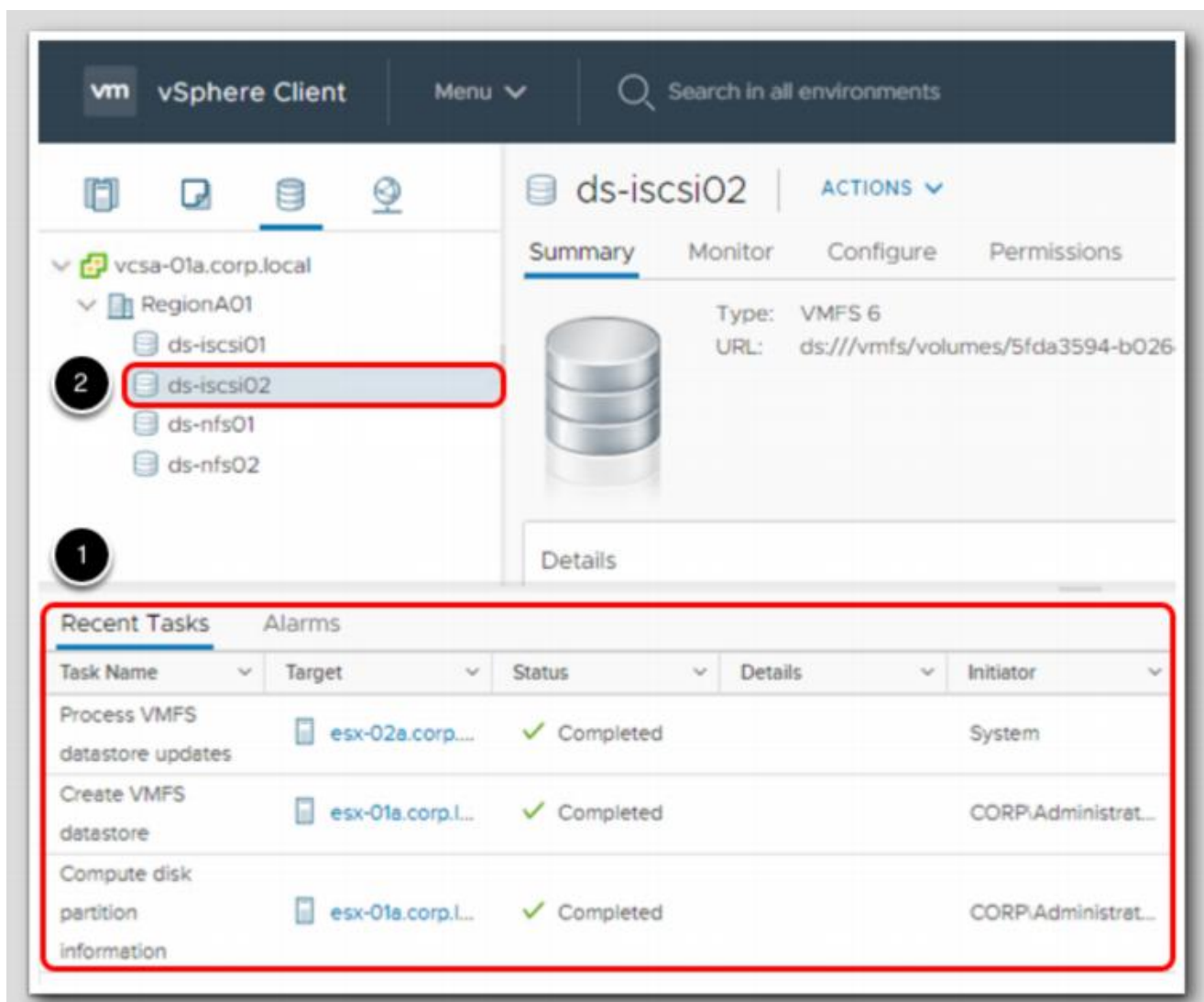
The screenshot shows the 'New Datastore' wizard at the 'Ready to complete' step. On the left, the progress bar shows steps 1 through 5, with step 5 'Ready to complete' highlighted. The main area is titled 'Ready to complete' and contains the following summary information:

- General:**
 - Name: ds-iscsi02
 - Type: VMFS
 - Datastore size: 44.00 GB
- Device and Formatting:**
 - Disk/LUN: FreeNAS iSCSI Disk (naa.6589cfc0000008bed872d58734fe67cb)
 - Partition Format: GPT
 - VMFS Version: VMFS 6
 - Block Size: 1 MB
 - Space Reclamation Granularity: 1 MB
 - Space Reclamation Priority: Low: Deleted or unmapped blocks are reclaimed on the LUN at low priority

At the bottom right, there are three buttons: 'CANCEL', 'BACK', and 'FINISH'. The 'FINISH' button is highlighted with a red border and a circled '1' above it.

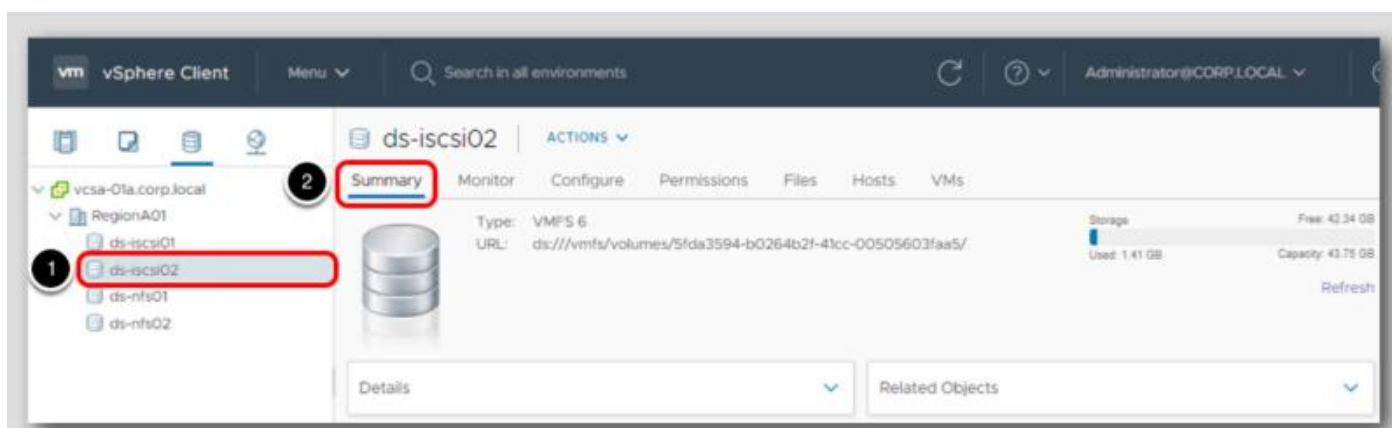
New Datastore - Monitor task progress

1. Note the progress in the Recent Tasks pane.
2. When complete, you should see the ds-iscsi02 Datastore available for use.



New Datastore - Review Settings

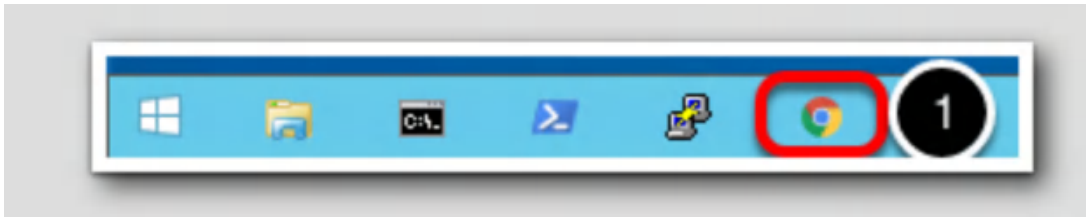
1. Select the datastore ds-iscsi02 from the inventory list
2. Select Summary to review capacity and configuration details



Practical 5: Configure Access to an NFS datastore.

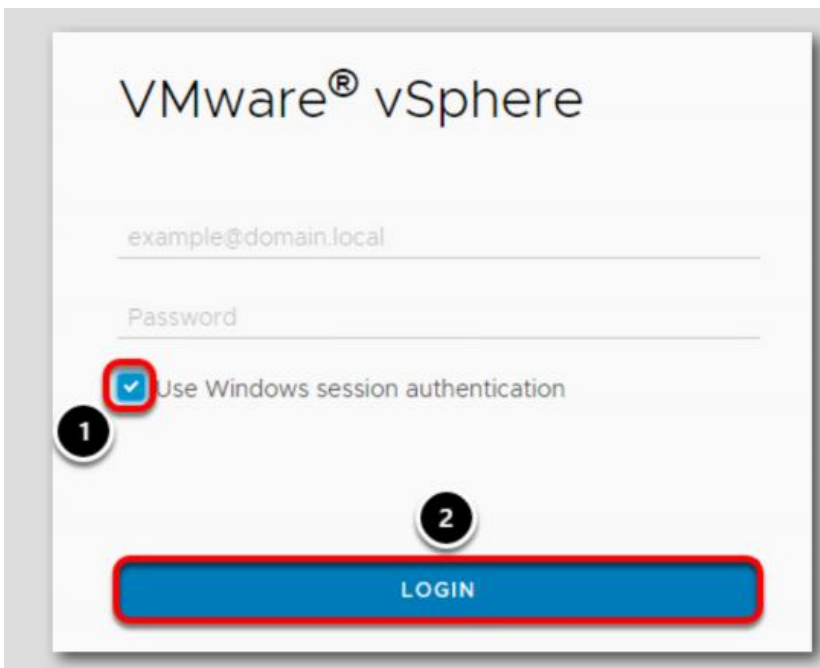
Launch Google Chrome web browser

1. Click on the Chrome Icon on the Windows Quick Launch Task Bar.



Enter credentials and log in

1. Select "Use Windows session authentication" check box.
2. Select Login.

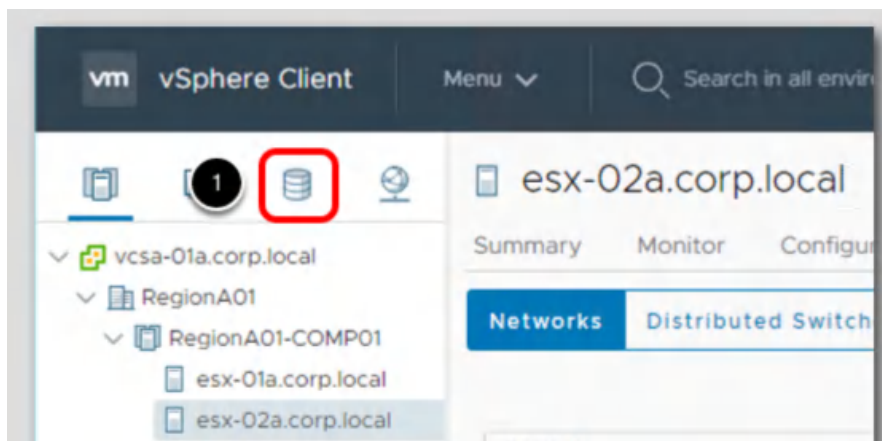


If credentials aren't saved, use the following:

- username: administrator@corp.local
- password: VMware1!

Navigate to Storage Management

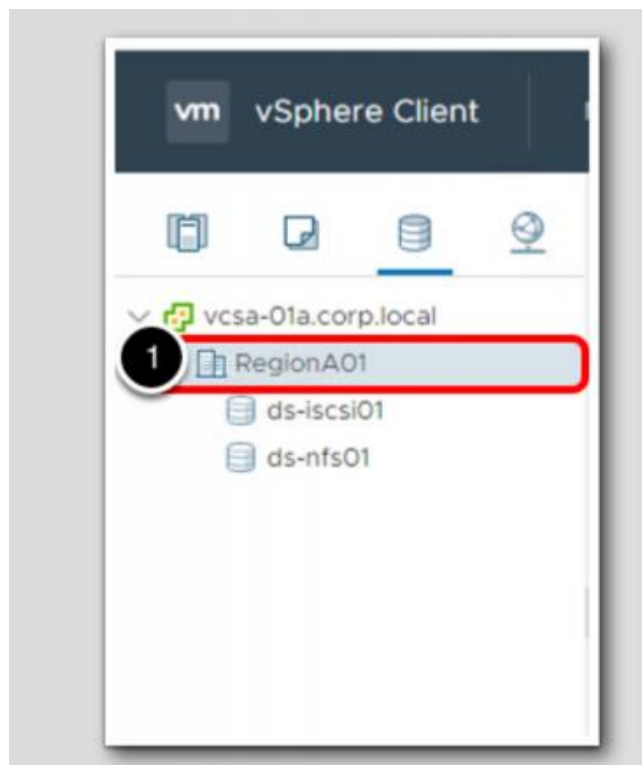
1. Select the Storage tab.



Create a vSphere NFS Datastore

In this section, you will create a new vSphere NFS Datastore using a pre-provisioned NFS mount.

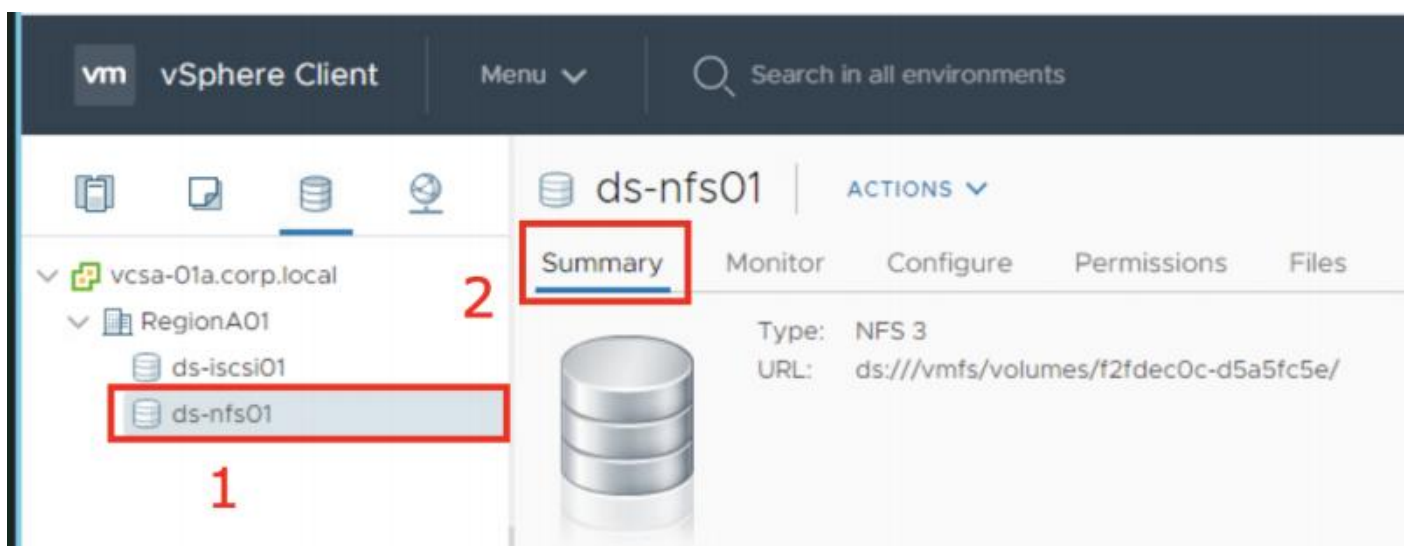
1. Select RegionA01 Datacenter



Expand RegionA01 Datacenter

There are 2 storage datastores configured, an ISCSI datastore and an NFS datastore.

1. Select the ds-nfs01 datastore.
2. Click on Summary for summary details of the datastore.



Practical 6: Deploy a new virtual machine from a template and clone a virtual machine.

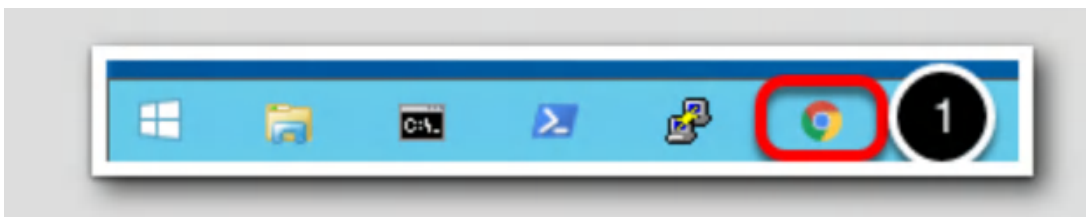
VMware provides several ways to provision vSphere virtual machines.

Cloning a virtual machine can save time if you are deploying many similar virtual machines. You can create, configure, and install software on a single virtual machine. You can clone it multiple times, rather than creating and configuring each virtual machine individually.

Another provisioning method is to clone a virtual machine to a template. A template is a master copy of a virtual machine that you can use to create and provision virtual machines. Creating a template can be useful when you need to deploy multiple virtual machines from a single baseline but want to customize each system independently of the next. A common value point for using templates is to save time. If you have a virtual machine that you will clone frequently, make that virtual machine a template, and deploy your virtual machines from that template.

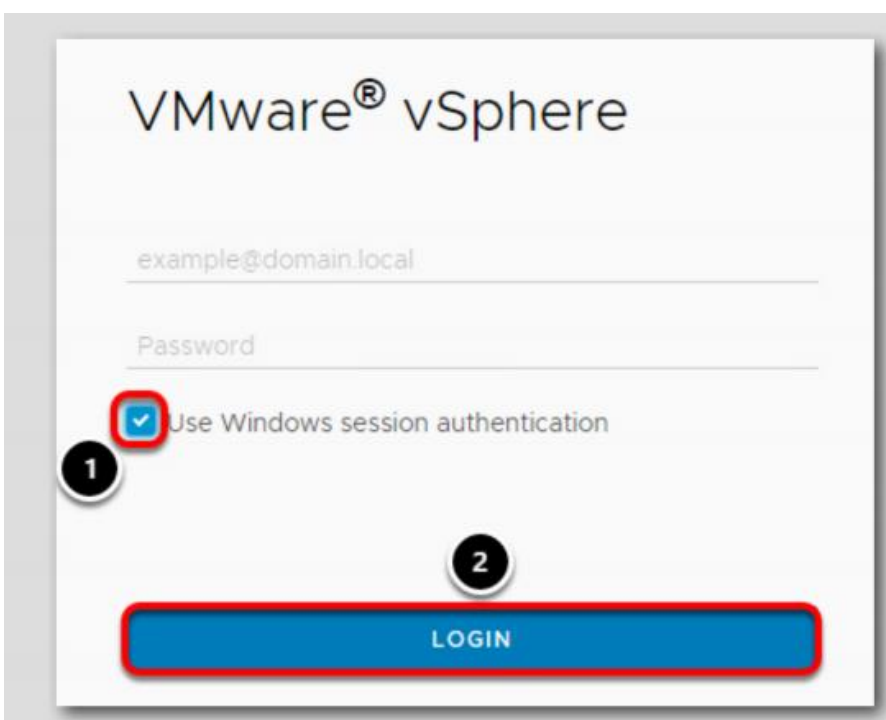
Launch Google Chrome web browser

1. Click on the Chrome Icon on the Windows Quick Launch Task Bar.



Enter credentials and log in

1. Select "Use Windows session authentication" check box.
2. Select Login.

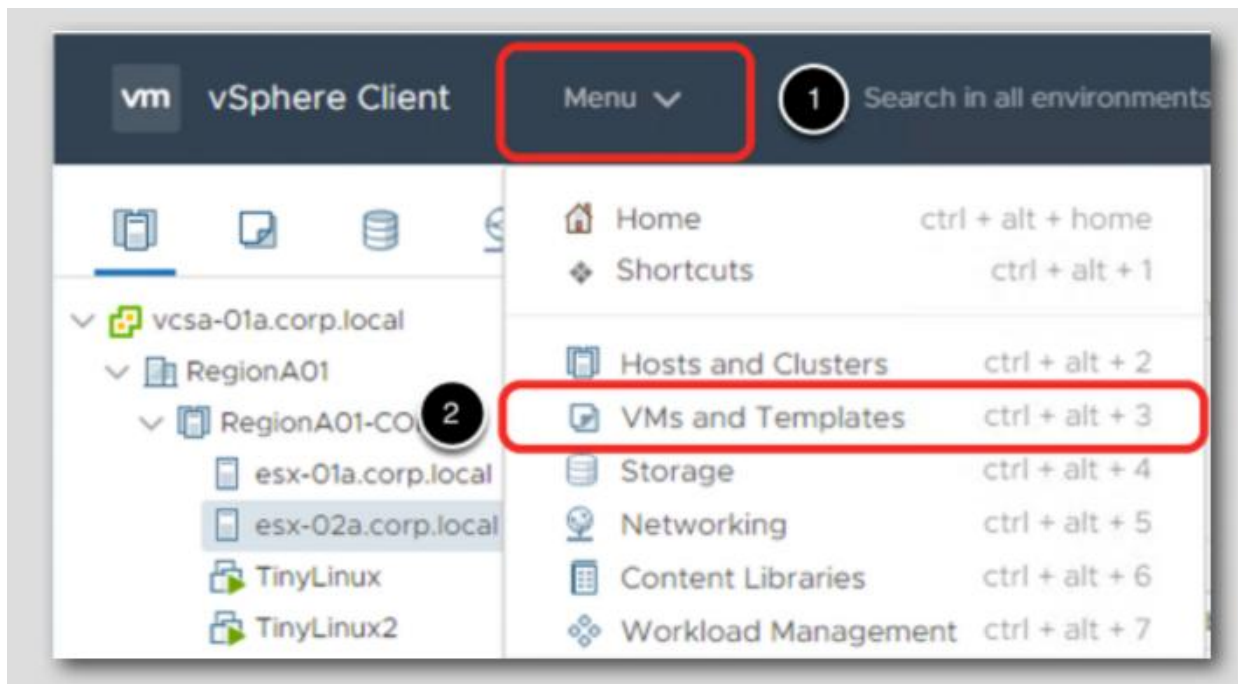


If credentials aren't saved, use the following:

- username: administrator@corp.local
- password: VMware1!

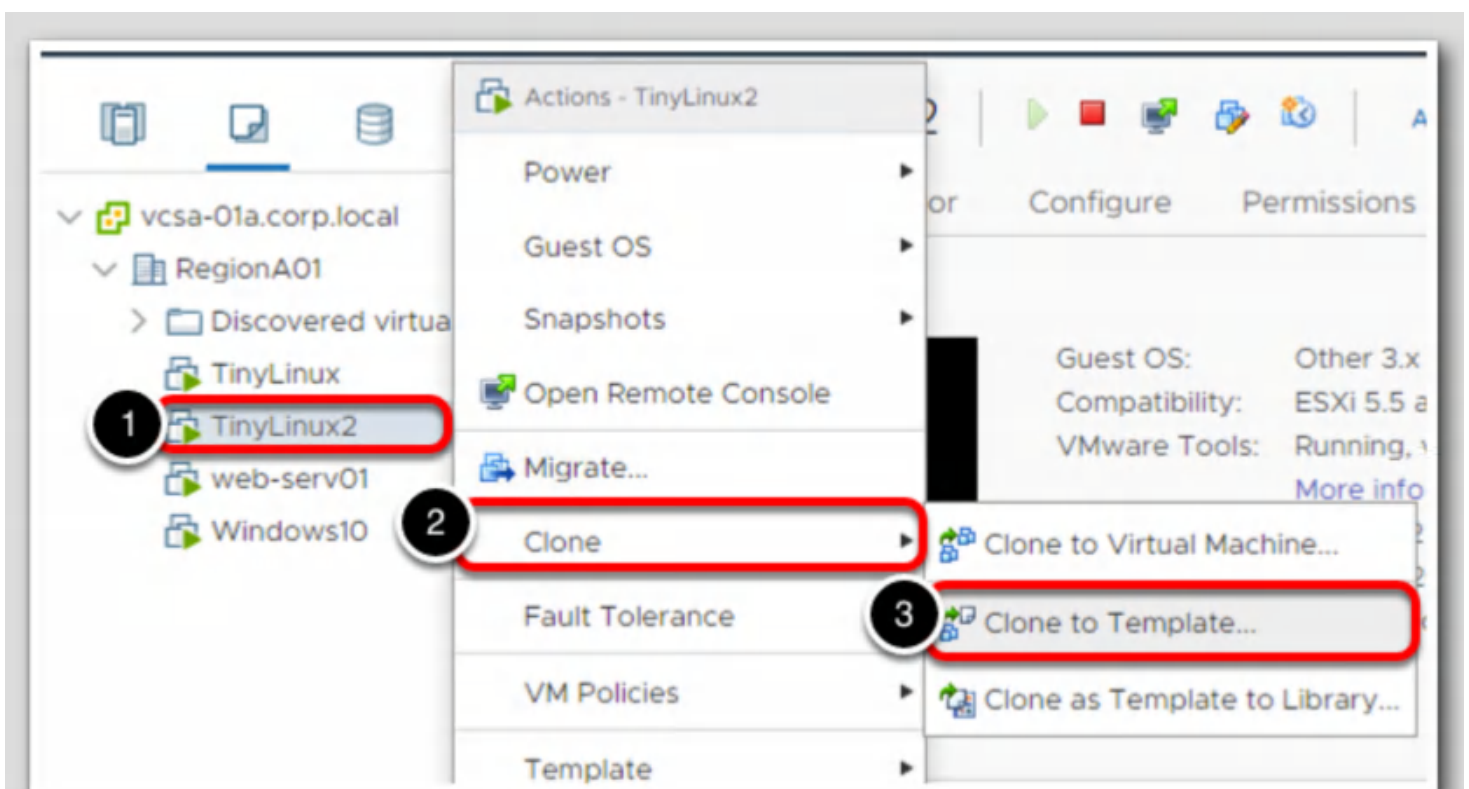
Navigate to the VMs and Templates management pane

1. Click on Menu.
2. Select VMs and Templates.



Launch the Clone Virtual Machine to Template wizard

1. Right-click the Virtual Machine TinyLinux2.
2. Select Clone.
3. Select Clone to Template...



Select a name and folder

In the Clone Virtual Machine to Template wizard, provide a name for the Template - TinyLinux2 Template.

1. Please leave the location as RegionA01 for this lab.
2. Click Next

The screenshot shows the 'TinyLinux2 - Clone Virtual Machine To Template' wizard. On the left, a progress bar indicates four steps: 1. Select a name and folder (active), 2. Select a compute resource, 3. Select storage, and 4. Ready to complete. The main area is titled 'Select a name and folder' with the instruction 'Specify a unique name and target location'. Below this, the 'VM template name:' field contains 'TinyLinux2 Template', which is highlighted with a red box and a circled '1'. Underneath, a tree view for 'Select a location for the template.' shows 'vcsa-01a.corp.local' expanded, with 'RegionA01' selected. At the bottom right, there are 'CANCEL', 'BACK', and 'NEXT' buttons. The 'NEXT' button is highlighted with a red box and a circled '2'.

Select Compute Resource

1. Choose esx-01a.corp.local.
2. Click Next.

The screenshot shows the second step of the wizard, 'Select a compute resource', with the instruction 'Select the destination compute resource for this operation'. The progress bar on the left now shows step 2 as active. The main area contains a tree view where 'RegionA01' is expanded, and 'esx-01a.corp.local' is selected, highlighted with a red box and a circled '1'. Below the tree view, a 'Compatibility' section shows a green checkmark and the text 'Compatibility checks succeeded.' At the bottom right, there are 'CANCEL', 'BACK', and 'NEXT' buttons. The 'NEXT' button is highlighted with a red box and a circled '2'.

Select Storage

1. Select ds-nfs01 as the datastore.
2. Press the Next button

TinyLinux2 - Clone Virtual Machine To Template

✓ 1 Select a name and folder
✓ 2 Select a compute resource
3 Select storage
4 Ready to complete

Select storage
Select the storage for the configuration and disk files.

Select virtual disk format: Thin Provision

VM Storage Policy: Keep existing VM storage policies

Name	Capacity	Provisioned	Free	Type	Cluster
ds-iscsi01	43.75 GB	31.57 GB	18.38 GB	VMFS 6	
ds-nfs01	5.78 GB	96 KB	5.78 GB	NFS v3	

Compatibility
✓ Compatibility checks succeeded.

CANCEL BACK **NEXT**

Review the VM Template Settings

1. Review the VM Template settings and press the Finish button.

TinyLinux2 - Clone Virtual Machine To Template

✓ 1 Select a name and folder
✓ 2 Select a compute resource
✓ 3 Select storage
4 Ready to complete

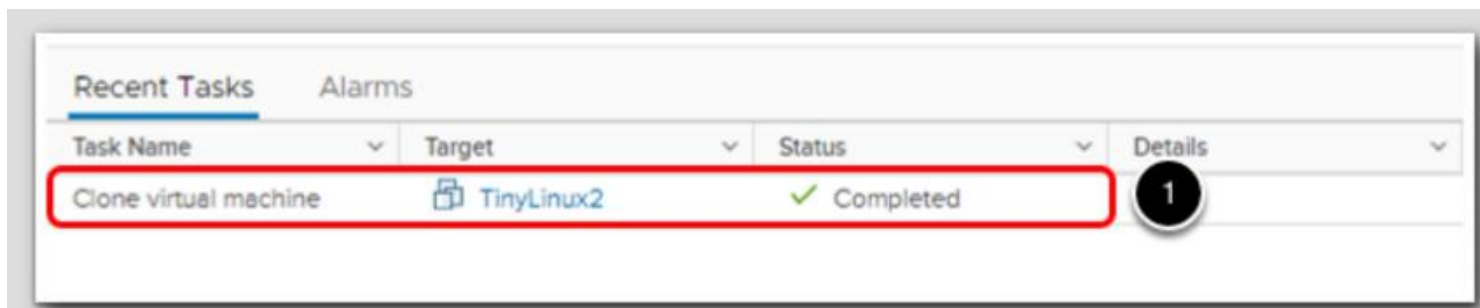
Ready to complete
Click Finish to start creation.

Source virtual machine	TinyLinux2
Template name	TinyLinux2 Template
Folder	RegionA01
Host	esx-01a.corp.local
Datastore	ds-nfs01
Disk storage	Thin Provision

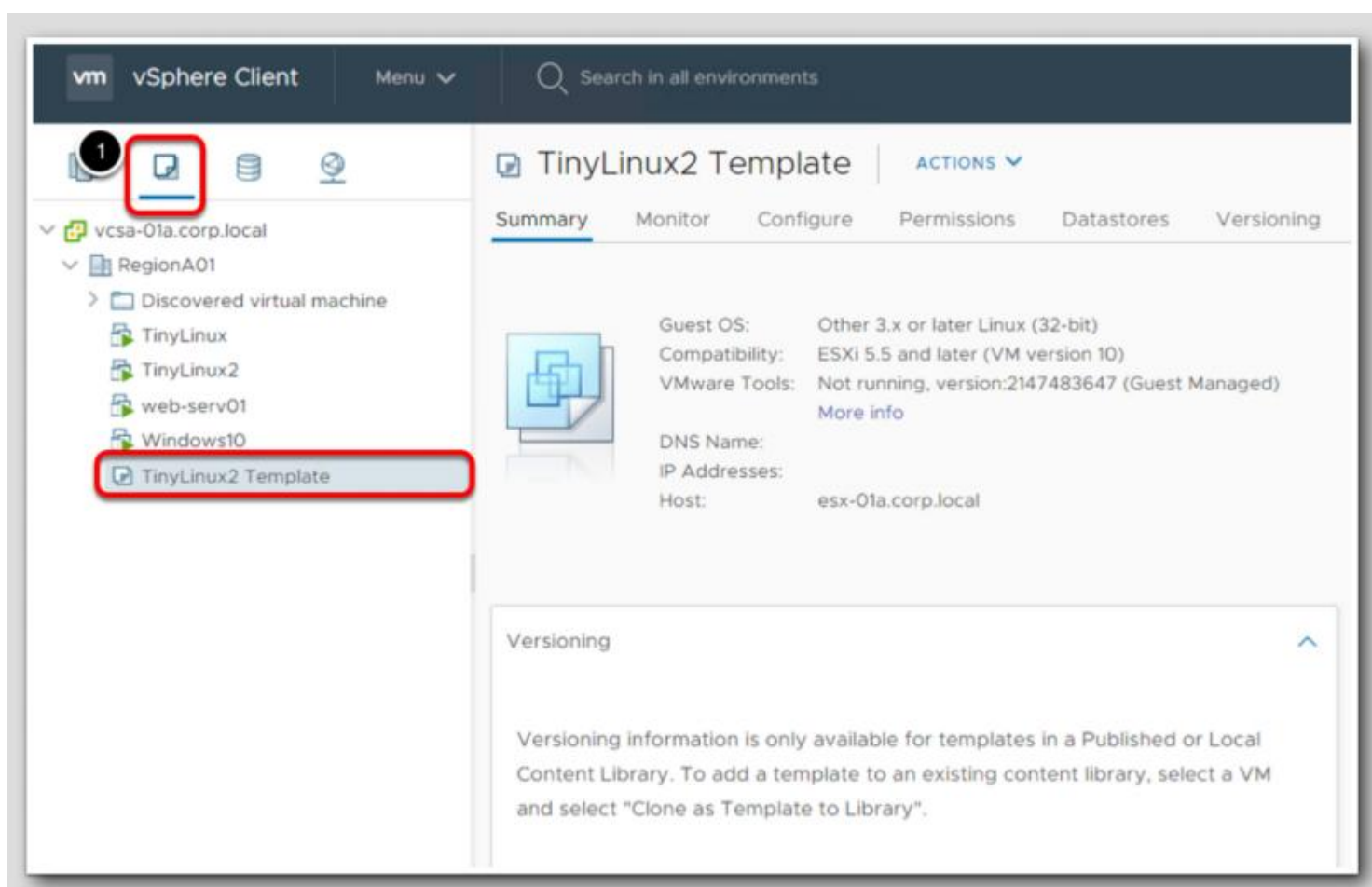
CANCEL BACK **FINISH**

Monitor task progress

1. You can monitor the progress in the recent task window.

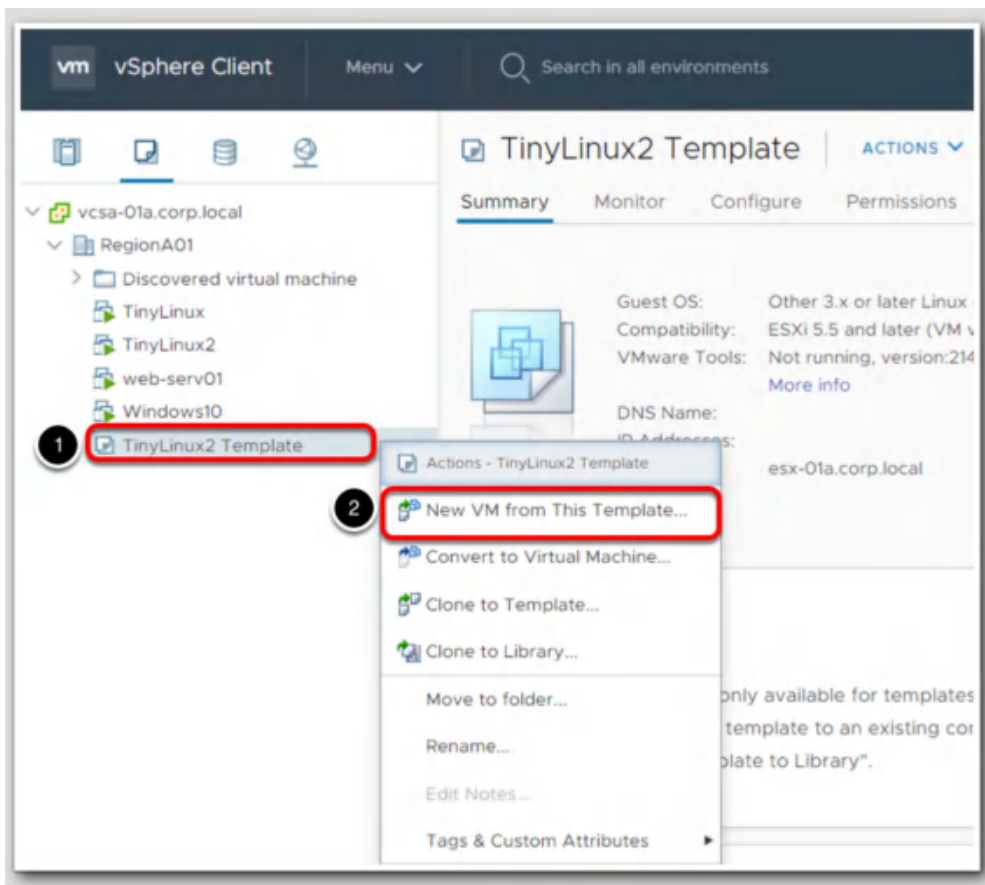


1. Once the task has been completed, click on the VM and Templates icon. TinyLinux 2 Template object should be on the inventory pane.



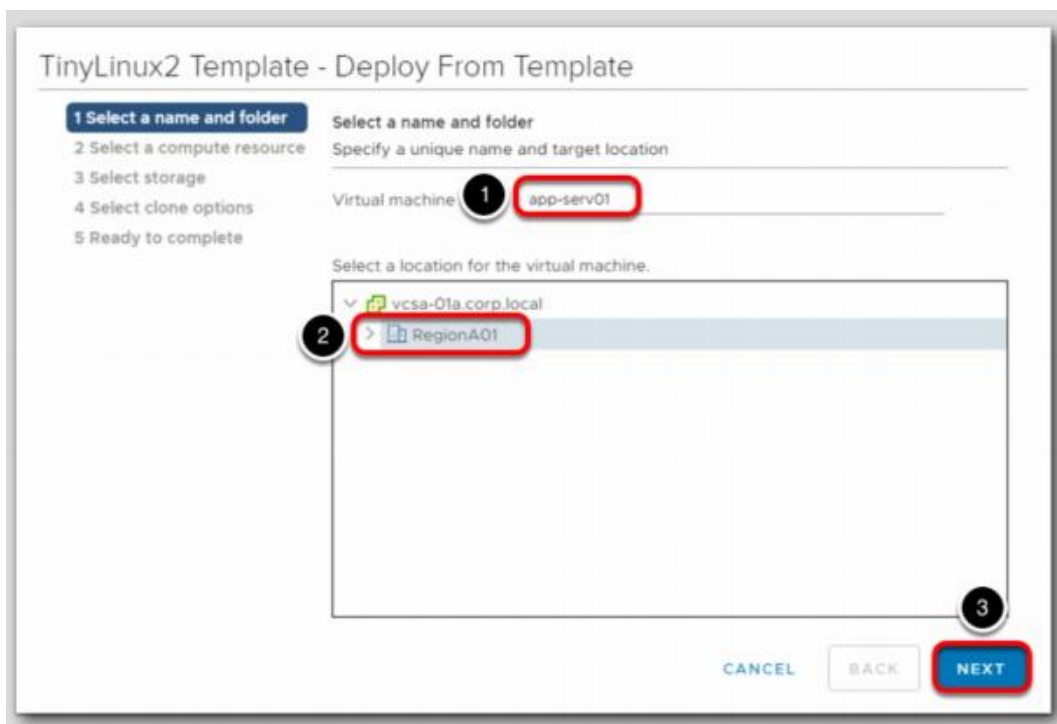
Launch the Deploy From Template wizard

1. Select the Template, TinyLinux2 Template
2. Right click on TinyLinux2 Template and select New VM from This Template.



Select a name and folder

1. Enter app-serv01 for the name of the new virtual machine.
2. Leave the default location of RegionA01 Datacenter.
3. Click the Next button.



Select compute resource

1. Select esx-01a.corp.local.

2. Click Next.

TinyLinux2 Template - Deploy From Template

✓ 1 Select a name and folder

2 Select a compute resource

3 Select storage

4 Select clone options

5 Ready to complete

Select a compute resource

Select the destination compute resource for this operation

▼ RegionA01

▼ RegionA01-COMP01

1

esx-01a.corp.local

esx-02a.corp.local

Compatibility

✓ Compatibility checks succeeded.

2

CANCEL

BACK

NEXT

Select storage

1. Leave the default datastore selected, ds-iscsi01
2. Click Next.

TinyLinux2 Template - Deploy From Template

✓ 1 Select a name and folder

✓ 2 Select a compute resource

3 Select storage

4 Select clone options

5 Ready to complete

Select storage

Select the storage for the configuration and disk files

Configure per disk ☐

Select virtual disk format: Same format as source ▼

VM Storage Policy: Keep existing VM storage poli... ▼

1

Name	Capacity	Provisioned	Free
ds-iscsi01	43.75 GB	49.65 GB	2.27 GB
ds-nfs01	5.78 GB	742.2 MB	5.76 GB

Compatibility

✓ Compatibility checks succeeded.

2

CANCEL

BACK

NEXT

Select clone options

When cloning a virtual machine from a template, the guest operating system and virtual hardware can be modified. For this example, we will not customize the operating system or hardware.

1. Click Next.

The screenshot shows the 'TinyLinux2 Template - Deploy From Template' wizard. On the left, a progress list shows steps 1 through 5, with step 4 'Select clone options' highlighted in a blue box. To the right, under the heading 'Select clone options', there is a sub-heading 'Select further clone options' followed by three unchecked checkboxes: 'Customize the operating system', 'Customize this virtual machine's hardware', and 'Power on virtual machine after creation'. At the bottom right, there are three buttons: 'CANCEL', 'BACK', and 'NEXT'. The 'NEXT' button is highlighted with a red border and a black circle with the number '1' above it.

TinyLinux2 Template - Deploy From Template	
✓ 1 Select a name and folder	Select clone options
✓ 2 Select a compute resource	Select further clone options
✓ 3 Select storage	
4 Select clone options	<input type="checkbox"/> Customize the operating system
5 Ready to complete	<input type="checkbox"/> Customize this virtual machine's hardware
	<input type="checkbox"/> Power on virtual machine after creation

CANCEL BACK **NEXT**

Ready to complete

1. Review the deployment options and then click Finish.

The screenshot shows the 'TinyLinux2 Template - Deploy From Template' wizard at the 'Ready to complete' step. The progress list on the left now highlights step 5 'Ready to complete' in a blue box. The main area shows the text 'Ready to complete' and 'Click Finish to start creation.' Below this is a table summarizing the deployment configuration. At the bottom right, there are three buttons: 'CANCEL', 'BACK', and 'FINISH'. The 'FINISH' button is highlighted with a red border and a black circle with the number '1' above it.

TinyLinux2 Template - Deploy From Template	
✓ 1 Select a name and folder	Ready to complete
✓ 2 Select a compute resource	Click Finish to start creation.
✓ 3 Select storage	
✓ 4 Select clone options	
5 Ready to complete	

Source template	TinyLinux2 Template
Virtual machine name	app-serv01
Folder	RegionA01
Host	esx-01a.corp.local
Datastore	ds-iscsi01
Disk storage	Same format as source

CANCEL BACK **FINISH**

Monitor task progress

1. You can view the Recent Tasks window to monitor the virtual machine being created from the template.
2. When the task is complete, you will see the app-serv01app-serv01 virtual machine in the inventory pane.

The screenshot displays the vSphere Client interface. On the left, the inventory pane shows a tree structure with 'vcsa-01a.corp.local' expanded to 'RegionA01', which contains a 'Discovered virtual machine' folder. Inside this folder, 'app-serv01' is highlighted with a red circle and a black circle containing the number '2'. Other VMs listed include TinyLinux, TinyLinux2, web-serv01, Windows10, and TinyLinux2 Template.

The main pane shows the details for 'app-serv01'. The status is 'Powered Off'. The 'Summary' tab is active, showing fields for Guest OS (Other 3.x or later Linux (32-bit)), Compatibility (ESXi 5.5 and later (VM version 8.0)), VMware Tools (Not running, version:214748), DNS Name, IP Addresses, and Host (esx-01a.corp.local). A 'More info' link is present.

At the bottom, the 'Recent Tasks' window is open, showing a table of tasks. The first task, 'Clone virtual machine', is highlighted with a red circle and a black circle containing the number '1'. The task is completed, with a green checkmark and the status 'Completed'. The target is 'TinyLinux2 Te...' and the initiator is 'CORP\Administrator'.

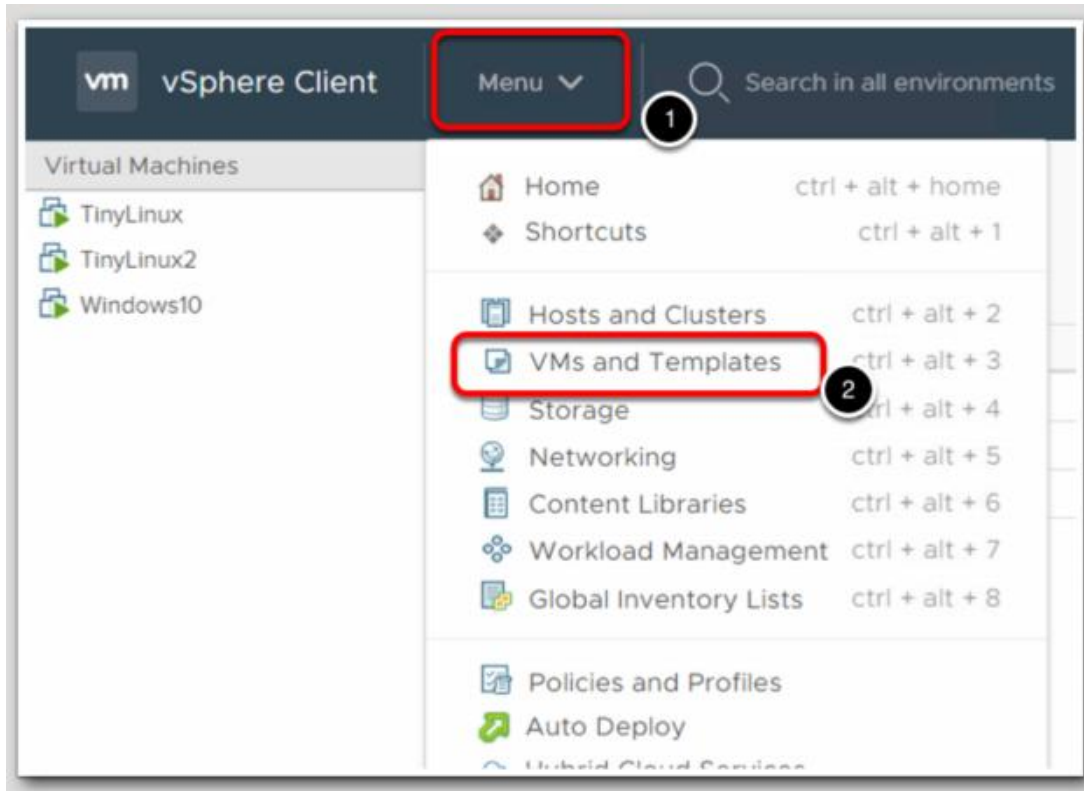
Task Name	Target	Status	Details	Initiator
Clone virtual machine	TinyLinux2 Te...	✓ Completed	Copying Virtual Machine Configuration	CORP\Administrator

Practical 7: Create a content library to clone and deploy virtual machines.

Create a Virtual Machine

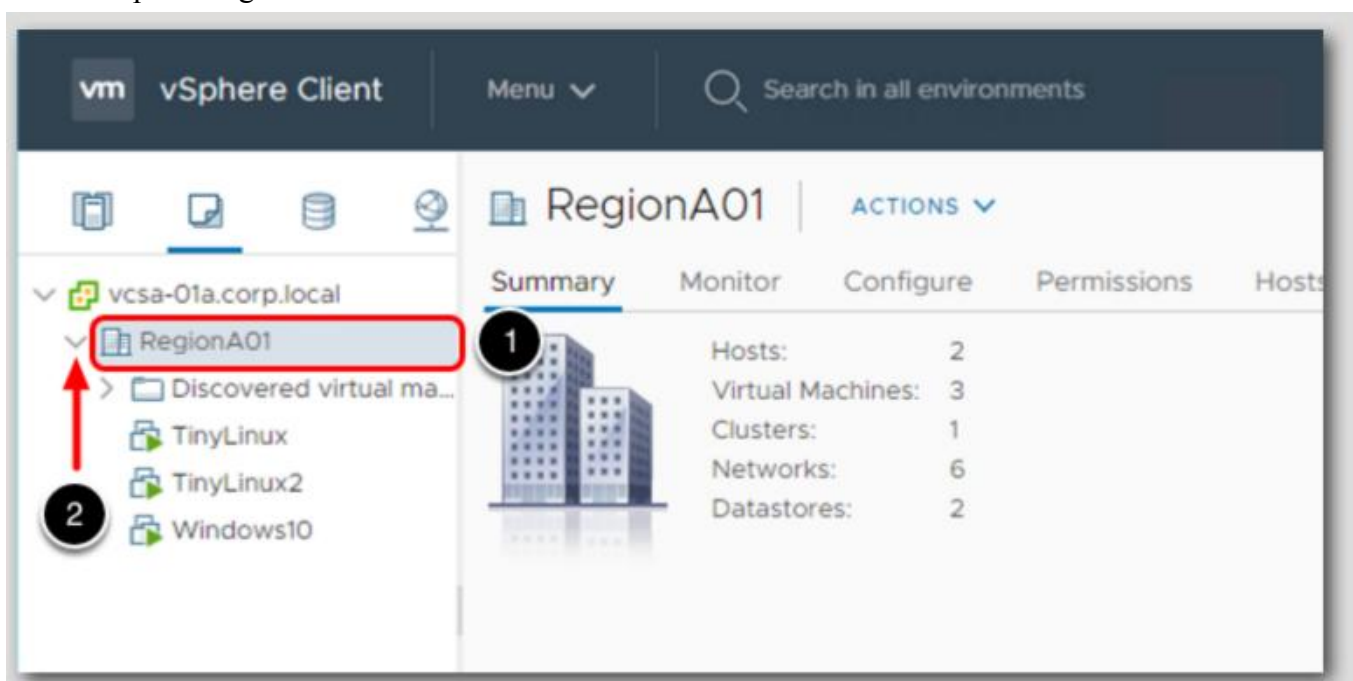
In the next steps, we will create a virtual machine and then, install an operating system.

1. To return to the VMs and Templates view, click on Menu.
2. Select VMs and Templates.



Select and Expand Datacenter

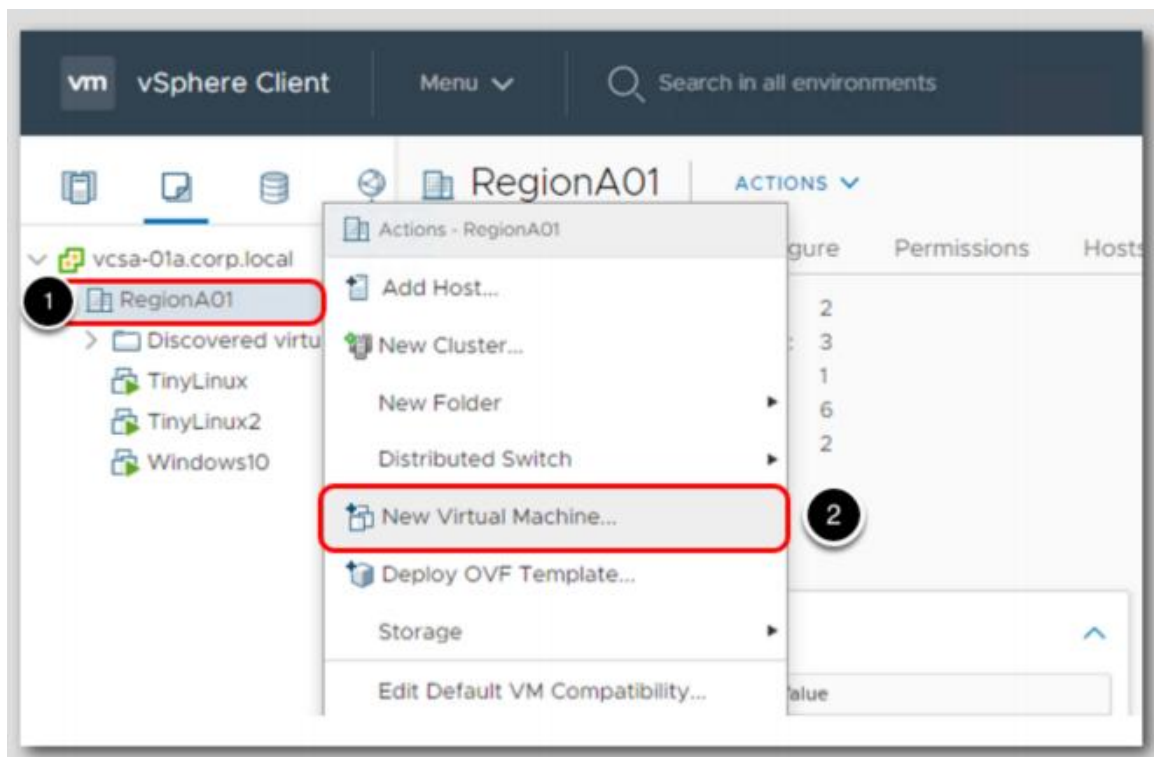
1. Click on RegionA01 Datacenter.
2. Expand RegionA01 Datacenter so the virtual machines under it can be seen.



Start the New Virtual Machine Wizard

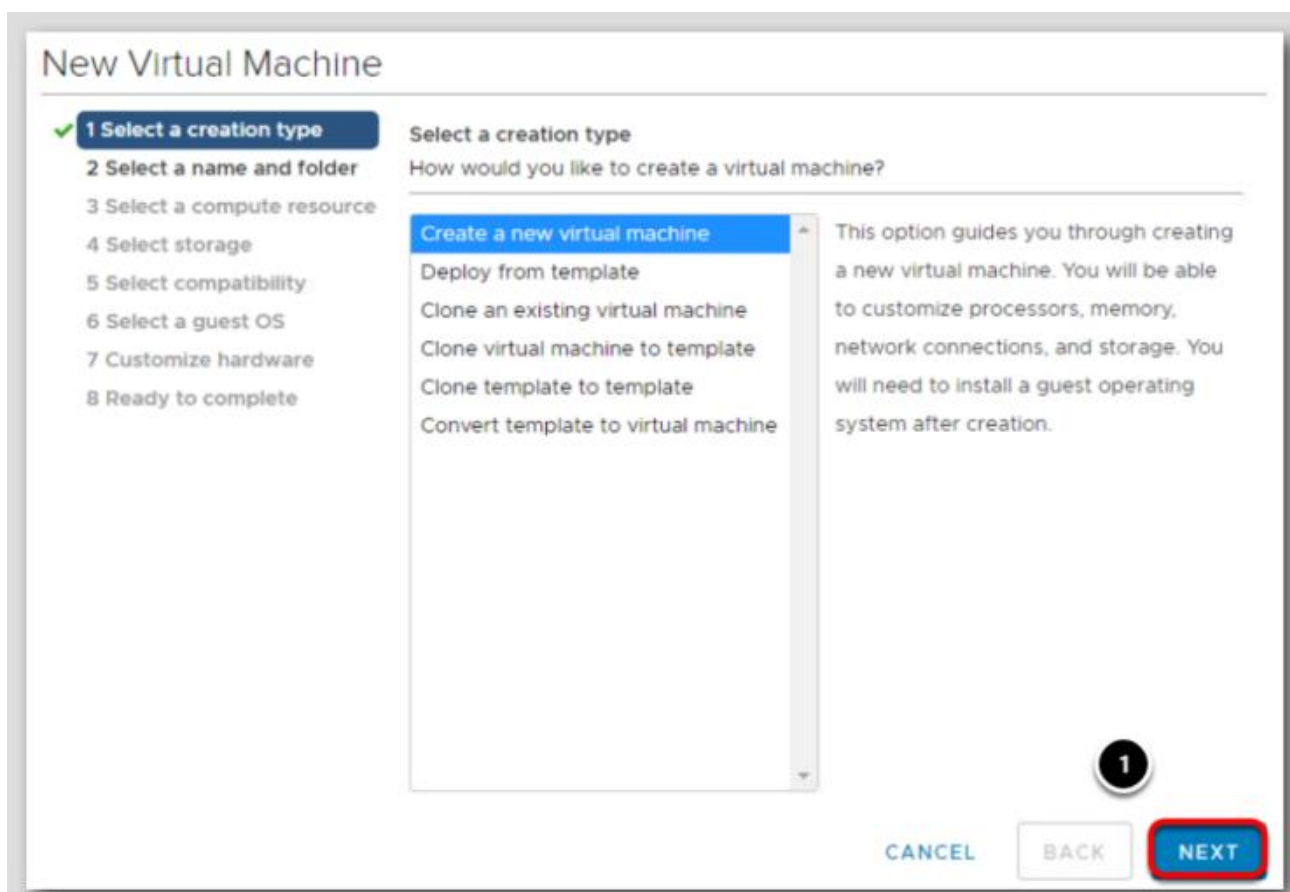
1. Right-click on RegionA01 Datacenter.
2. Click New Virtual Machine to start the new virtual machine wizard.

This wizard is used to create a new Virtual Machine and place it in the vSphere inventory.



Virtual Machine wizard

Since the Create a new virtual machine wizard is highlighted, just click Next.



Name the Virtual Machine

1. Enter web-serv01 for the name of the new virtual machine.
2. Click Next.

The screenshot shows the 'New Virtual Machine' wizard at step 2, 'Select a name and folder'. The left sidebar lists steps 1 through 8, with step 2 highlighted. The main area has two sections: 'Select a name and folder' and 'Select a location for the virtual machine'. In the first section, the 'Virtual machine name' field contains 'web-serv01', which is highlighted with a red box and a circled '1'. In the second section, a tree view shows 'vcsa-01a.corp.local' expanded to 'RegionA01'. At the bottom right, there are 'CANCEL', 'BACK', and 'NEXT' buttons, with the 'NEXT' button highlighted with a red box and a circled '2'.

Virtual Machine Placement

Because Distributed Resource Scheduler (DRS) is not enabled, you just have to select a host to use for the VM. More details on DRS will be covered later in this module.

1. Click esx-01a.corp.local.
2. Click Next.

The screenshot shows the 'New Virtual Machine' wizard at step 3, 'Select a compute resource'. The left sidebar lists steps 1 through 8, with step 3 highlighted. The main area has a section 'Select a compute resource' with the instruction 'Select the destination compute resource for this operation'. Below this is a tree view showing 'RegionA01' expanded to 'RegionA01-COMP01', which is further expanded to show three hosts: 'esx-01a.corp.local', 'esx-02a.corp.local', and 'esx-03a.corp.local'. The 'esx-01a.corp.local' host is highlighted with a red box and a circled '1'. Below the tree view is a 'Compatibility' section with a green checkmark and the text 'Compatibility checks succeeded.'. At the bottom right, there are 'CANCEL', 'BACK', and 'NEXT' buttons, with the 'NEXT' button highlighted with a red box and a circled '2'.

Select Storage

1. Ensure the ds-iscsi01 datastore is selected.
2. Click Next.

The screenshot shows the 'New Virtual Machine' wizard at the 'Select storage' step. On the left, a progress list shows steps 1 through 8, with '4 Select storage' highlighted. The main area is titled 'Select storage' and includes a checkbox for 'Encrypt this virtual machine (Requires Key Management Server)'. Below this is a 'VM Storage Policy' dropdown set to 'Datastore Default'. A table lists available datastores:

Name	Capacity	Provisioned	Free	Type	Cluster
ds-iscsi01	43.75 GB	31.57 GB	18.35 GB	VMFS 6	
ds-nfs01	5.78 GB	96 KB	5.78 GB	NFS v3	

The 'ds-iscsi01' row is highlighted with a red box and a circled '1'. Below the table is a 'Compatibility' section with an empty dropdown. At the bottom right, there are 'CANCEL', 'BACK', and 'NEXT' buttons. The 'NEXT' button is highlighted with a red box and a circled '2'.

Compatibility

1. Select ESXi 7.0 and later.
2. Click Next to accept.

The screenshot shows the 'New Virtual Machine' wizard at the 'Select compatibility' step. On the left, the progress list shows steps 1 through 8, with '5 Select compatibility' highlighted. The main area is titled 'Select compatibility' and includes instructions: 'Select compatibility for this virtual machine depending on the hosts in your environment.' and 'The host or cluster supports more than one VMware virtual machine version. Select a compatibility for the virtual machine.' Below this, a 'Compatible with' dropdown is set to 'ESXi 7.0 and later', highlighted with a red box and a circled '1'. Further down, it states: 'This virtual machine uses hardware version 17, which provides the best performance and latest features available in ESXi 7.0'. At the bottom right, there are 'CANCEL', 'BACK', and 'NEXT' buttons. The 'NEXT' button is highlighted with a red box and a circled '2'.

Guest OS

In this step, we will be selecting what operating system we will be installing. When we select the operating system, the supported virtual hardware and recommended configuration is used to create the virtual machine. Keep in mind this does not create a virtual machine with the operating system installed, but rather creates a virtual machine that is tuned appropriately for the operating system you have selected.

1. For the Guest OS Family, select LinuxLinux from the drop-down menu.
2. For the Guest OS Version, select VMware Photon OS (64-bit).
3. Click Next to continue.

New Virtual Machine

1 Select a creation type
2 Select a name and folder
3 Select a compute resource
4 Select storage
5 Select compatibility
6 Select a guest OS
7 Customize hardware
8 Ready to complete

Select a guest OS
Choose the guest OS that will be installed on the virtual machine

Identifying the guest operating system here allows the wizard to provide the appropriate defaults for the operating system installation.

Guest OS Family: Linux
Guest OS Version: VMware Photon OS (64-bit)

Compatibility: ESXi 7.0 and later (VM version 14)

CANCEL BACK NEXT

Change Virtual Disk Size

1. Leave the default settings and click Next

New Virtual Machine

1 Select a creation type
2 Select a name and folder
3 Select a compute resource
4 Select storage
5 Select compatibility
6 Select a guest OS
7 Customize hardware
8 Ready to complete

Customize hardware
Configure the virtual machine hardware

Virtual Hardware VM Options

ADD NEW DEVICE

> CPU	1		
> Memory	2	GB	
> New Hard disk *	16	GB	
> New SCSI controller *	VMware Paravirtual		
> New Network *	VM Network		<input checked="" type="checkbox"/> Connect...
> New CD/DVD Drive *	Client Device		<input type="checkbox"/> Connect...

Compatibility: ESXi 6.7 and later (VM version 14)

CANCEL BACK NEXT

Ready to complete

The settings for the virtual machine can be verified prior to it being created.

1. Click Finish to create the virtual machine.

New Virtual Machine

Ready to complete
Click Finish to start creation.

Virtual machine name	web-serv01
Folder	RegionA01
Host	esx-01a.corp.local
Datastore	ds-iscsi01
Guest OS name	VMware Photon OS (64-bit)
Virtualization Based Security	Disabled
CPU(s)	1
Memory	2 GB
NICs	1
NIC 1 network	VM Network
NIC 1 type	VMXNET 3
SCSI controller 1	VMware Paravirtual
Create hard disk 1	New virtual disk
Capacity	16 GB
Datastore	ds-iscsi01

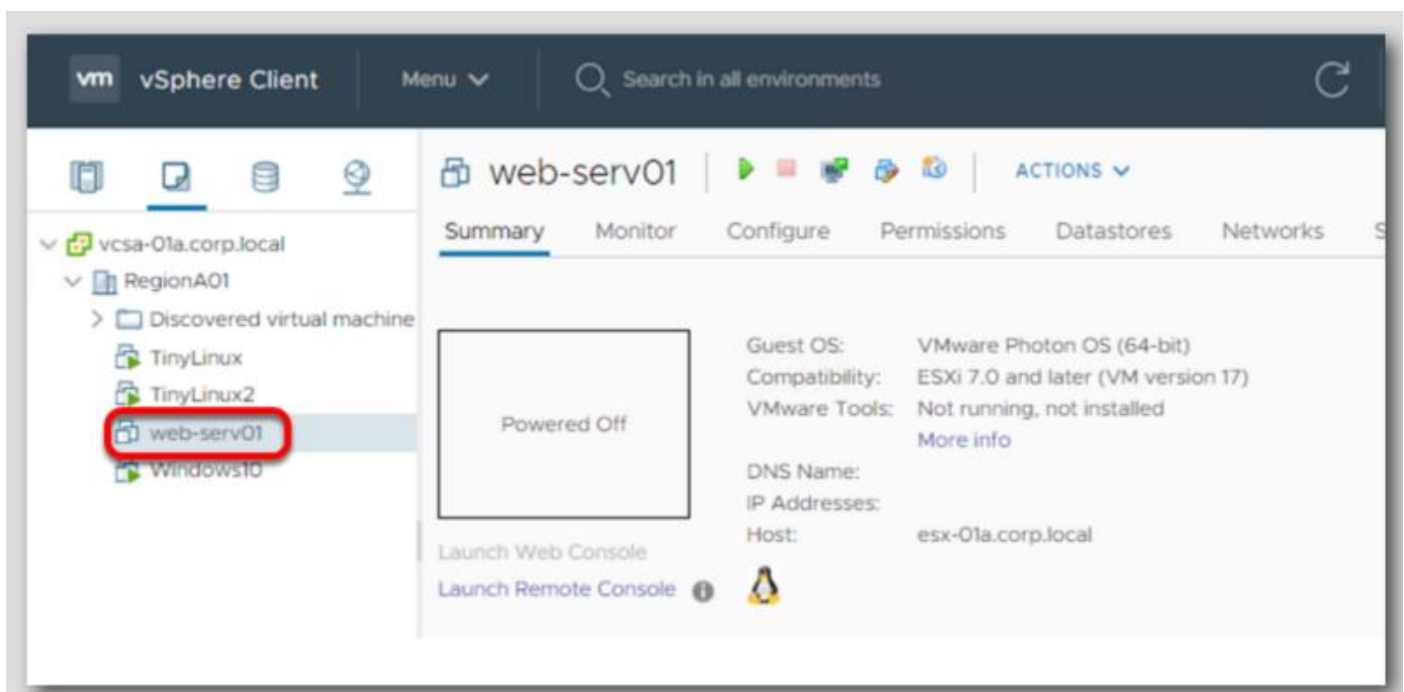
Virtual device node

CANCEL BACK **FINISH**

1

Newly created virtual machine

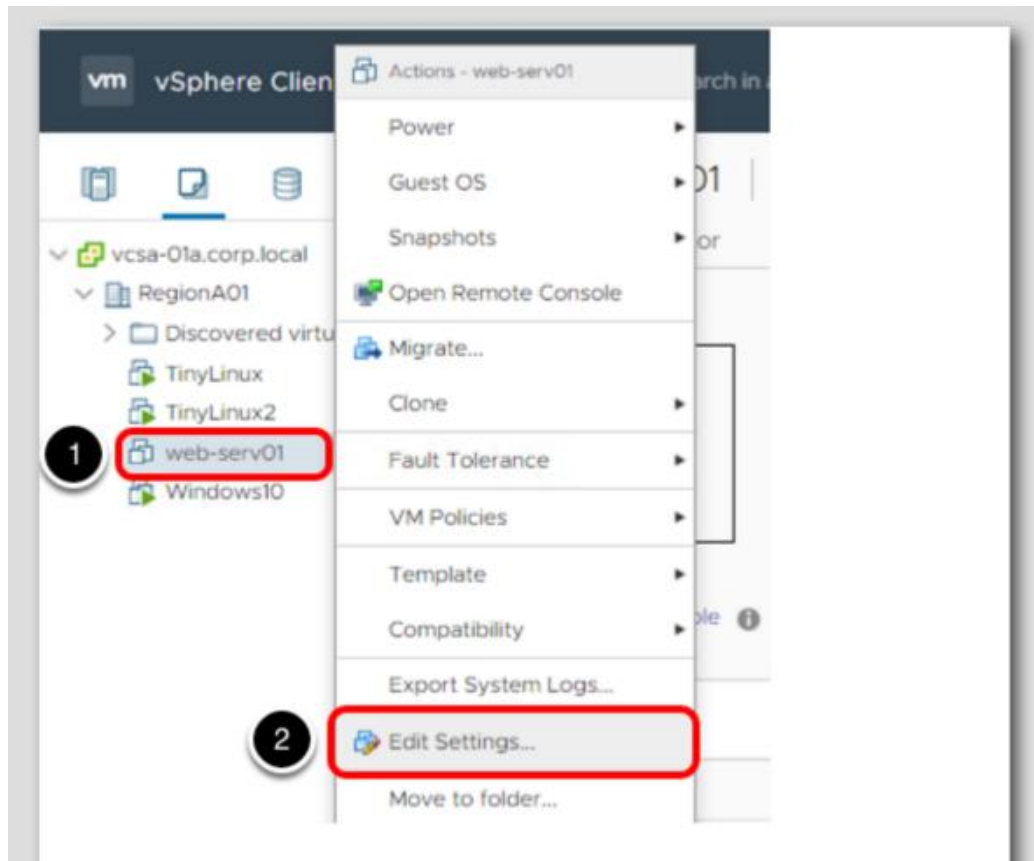
Congratulations on creating your first virtual machine web-serv01.



Attaching an ISO to a Virtual Machine

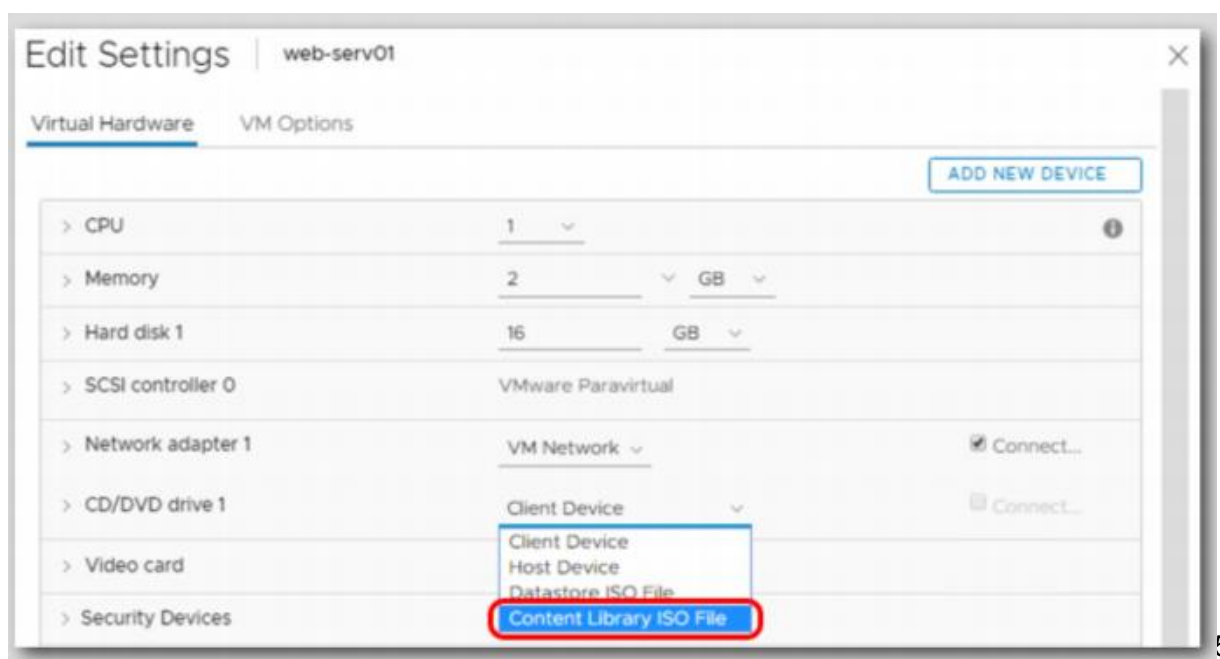
To make it easier to install operating systems on virtual machines, ISO images can be used. These can be kept in the same storage used for virtual machines. In addition, vCenter offers a Content Library as a repository. Content Libraries can then be synchronized to ensure every location is using the same versions.

1. To attach an ISO image to the virtual machine we just created, make sure web-serv01 is selected.
2. Right-click on web-serv01 and select Edit Settings...



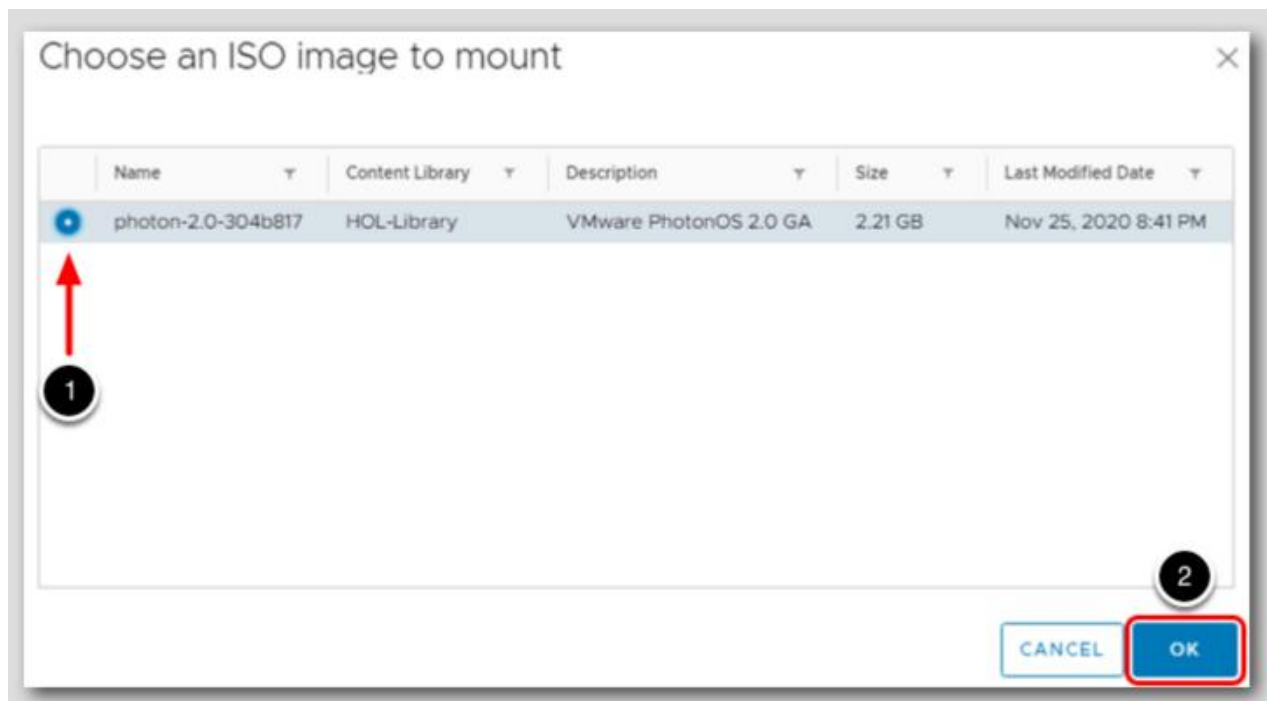
Content Library ISO File

1. From the CD/DVD drive 1 drop-down menu, select Content Library ISO file.



Select Photon

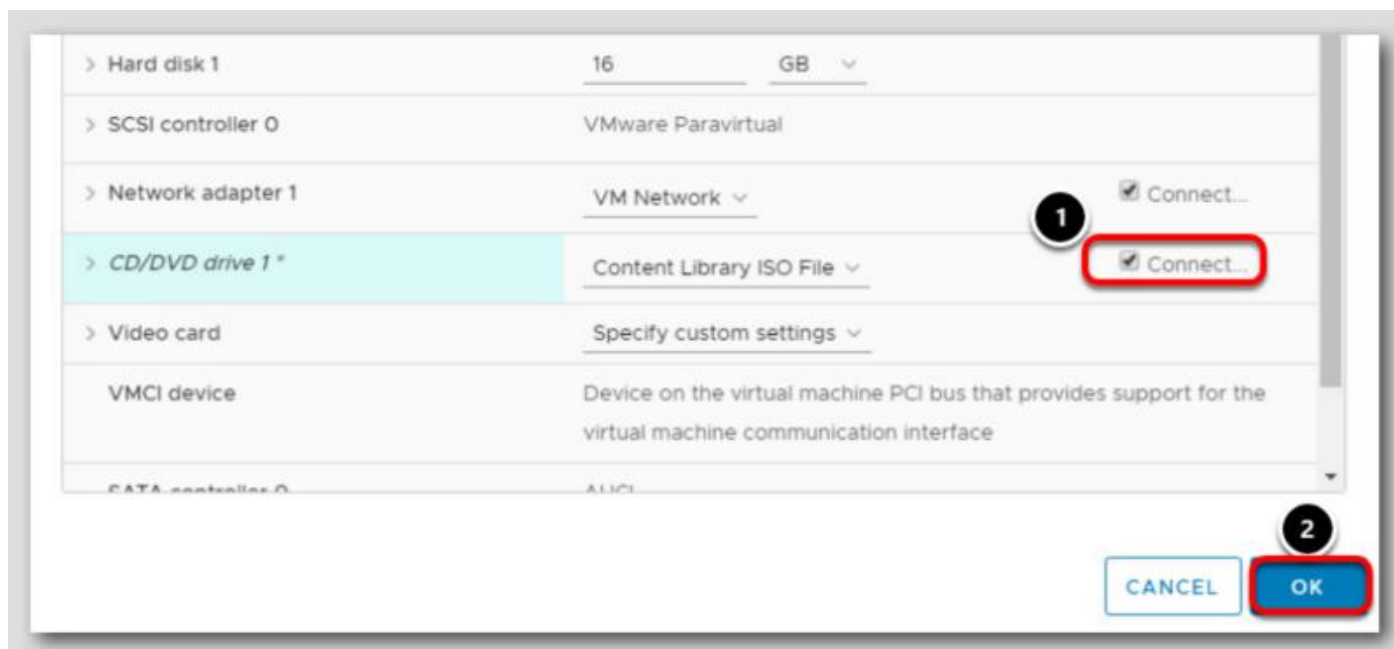
1. Click the radio button next to photon-2.0-304b817.
2. Click OK.



Connect the drive

Finally, we want to attach or connect the ISO image to the virtual machine.

1. Click the Connected check box next to CD/DVD drive 1CD/DVD drive 1.
2. Click OK



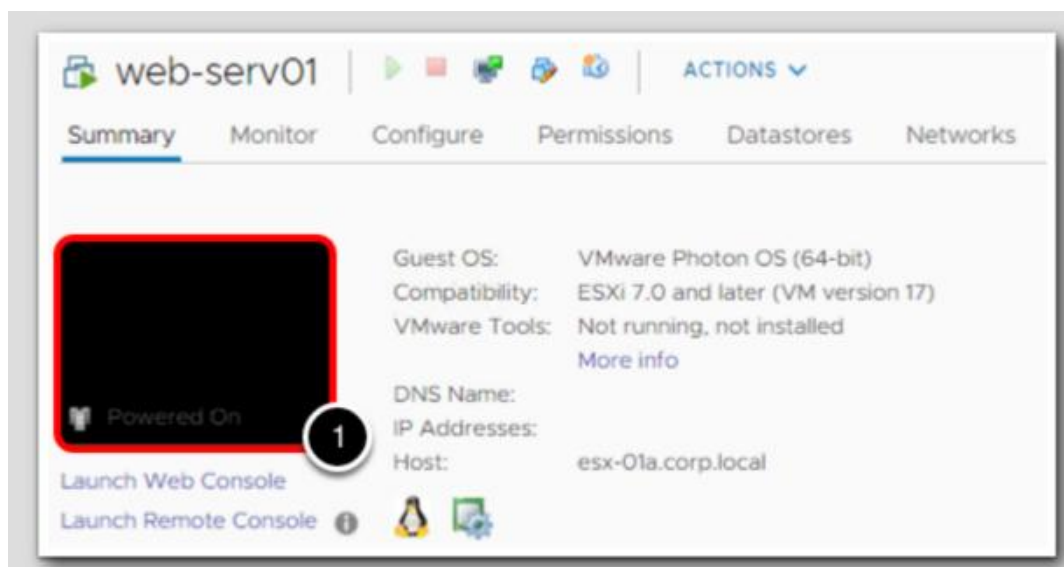
Power on web-serv01

1. Click the green play button to power on the virtual machine and start the installation.



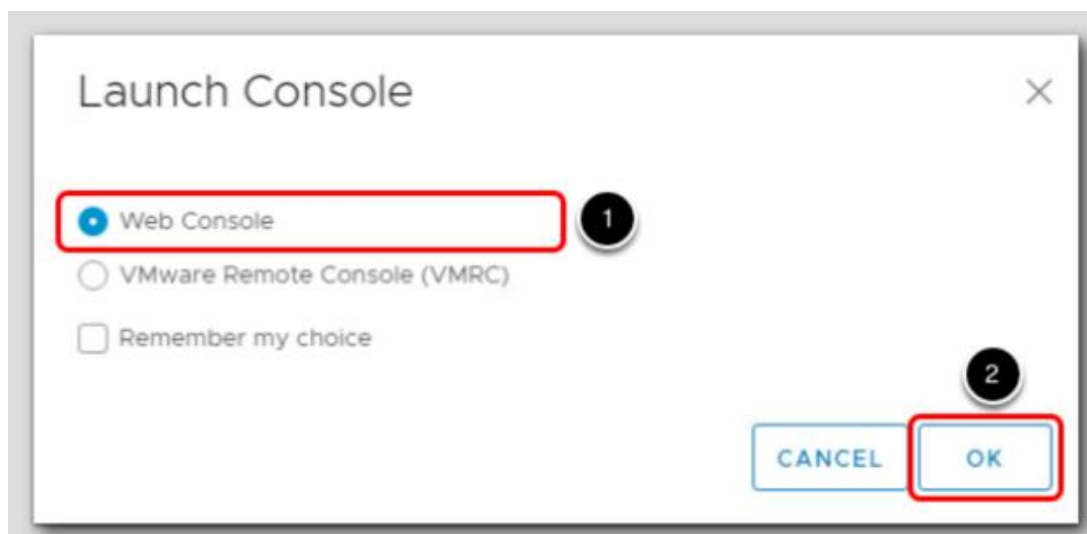
Launch Console

1. To launch the console window, click anywhere in the console window screen.



Web Console

1. Select the Web Console.
2. Click OK.

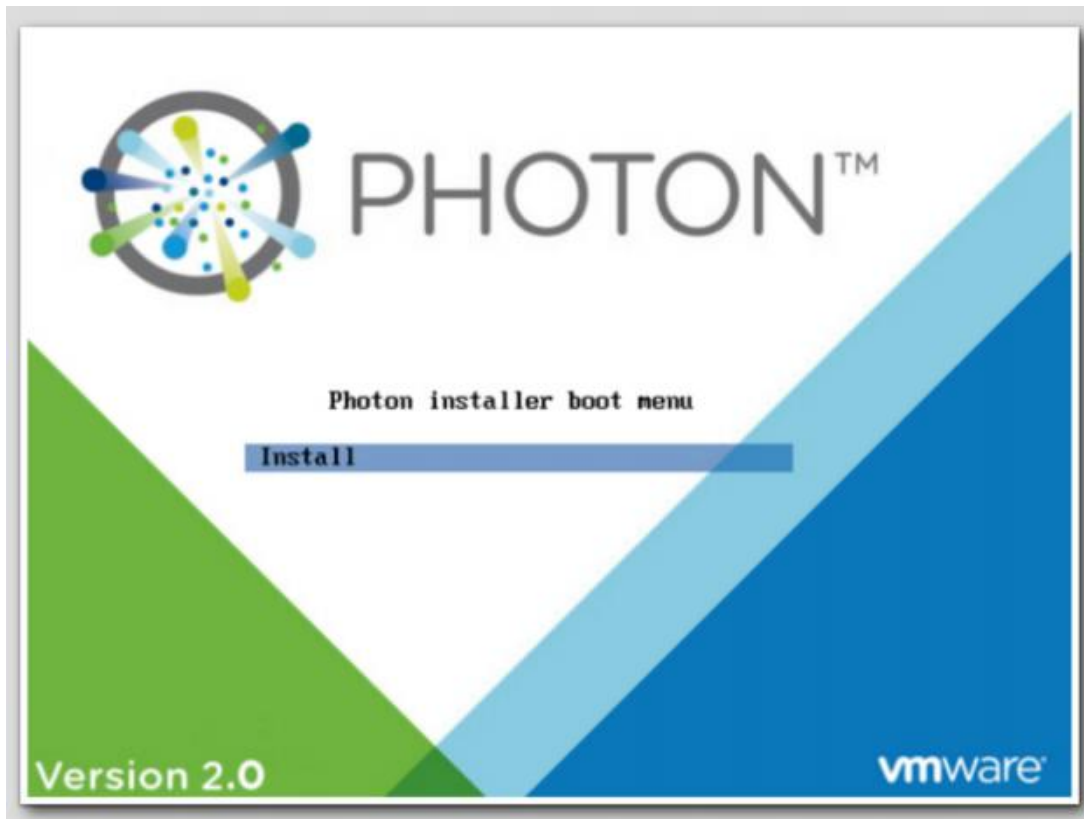


Note you also have the option of using the VMware Remote Console (VMRC). This is console is a separate application that needs to be installed on your local device as opposed to the Web Console which will launch in a new browser tab. The VMRC can be useful in certain situations when you need more capabilities, like attaching devices or power cycling options.

Photon Boot Screen

A new tab will open and you will be presented with the Photon OS boot screen.

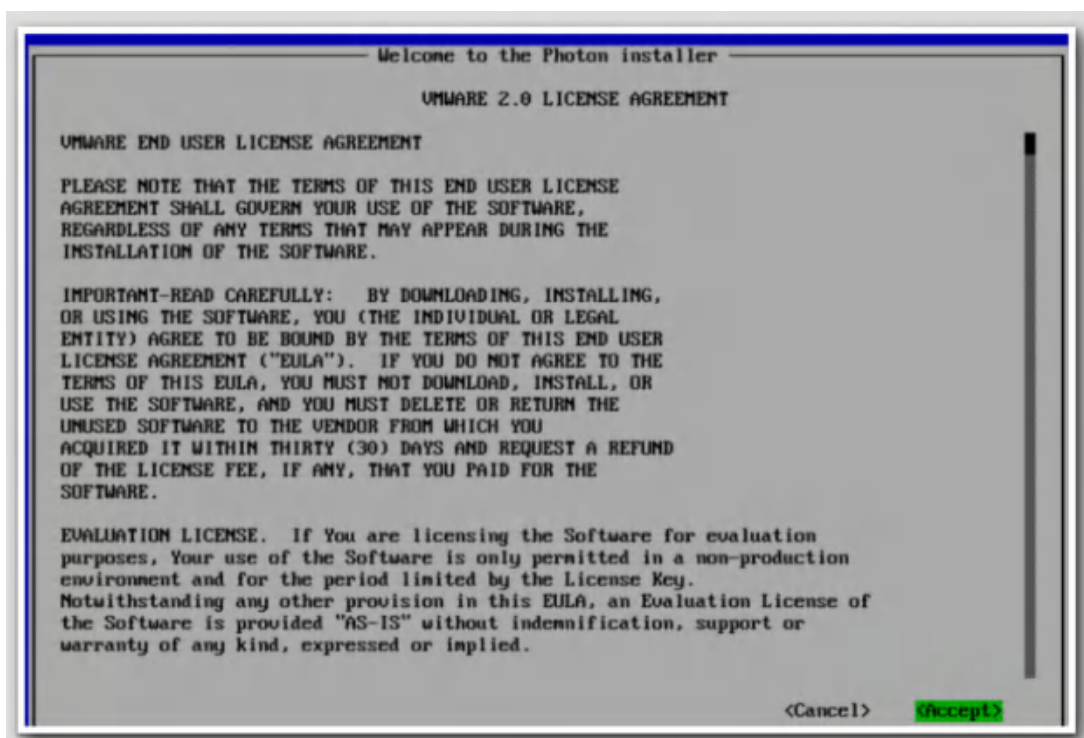
1. Press the Enter key to start the installation process.



License Agreement

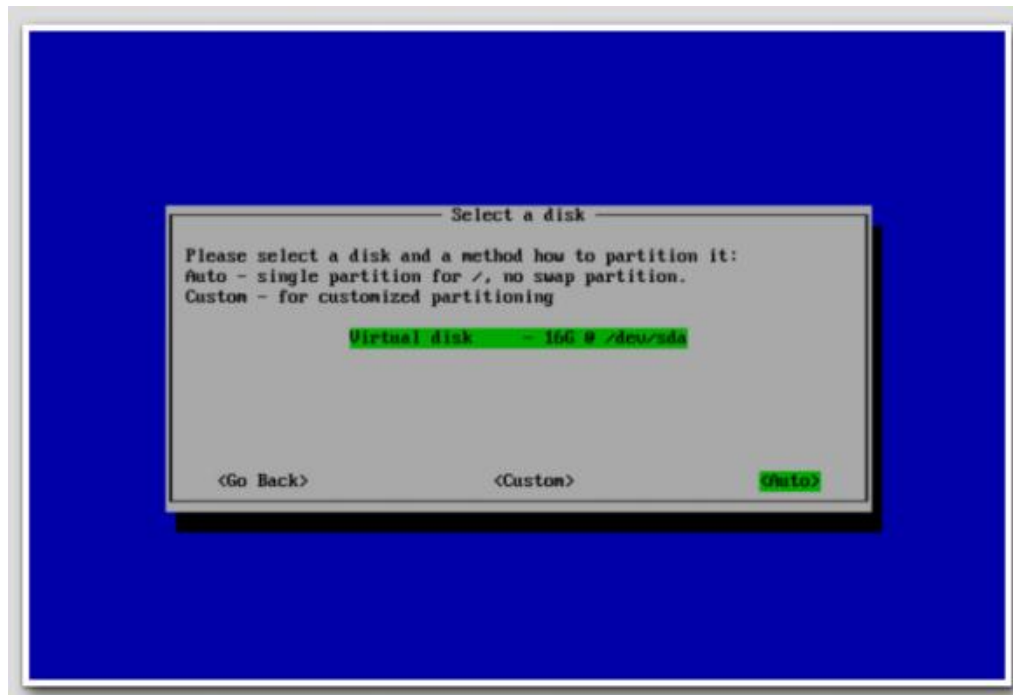
After the boot process is complete, you will be presented with a license agreement.

1. Press Enter to accept.



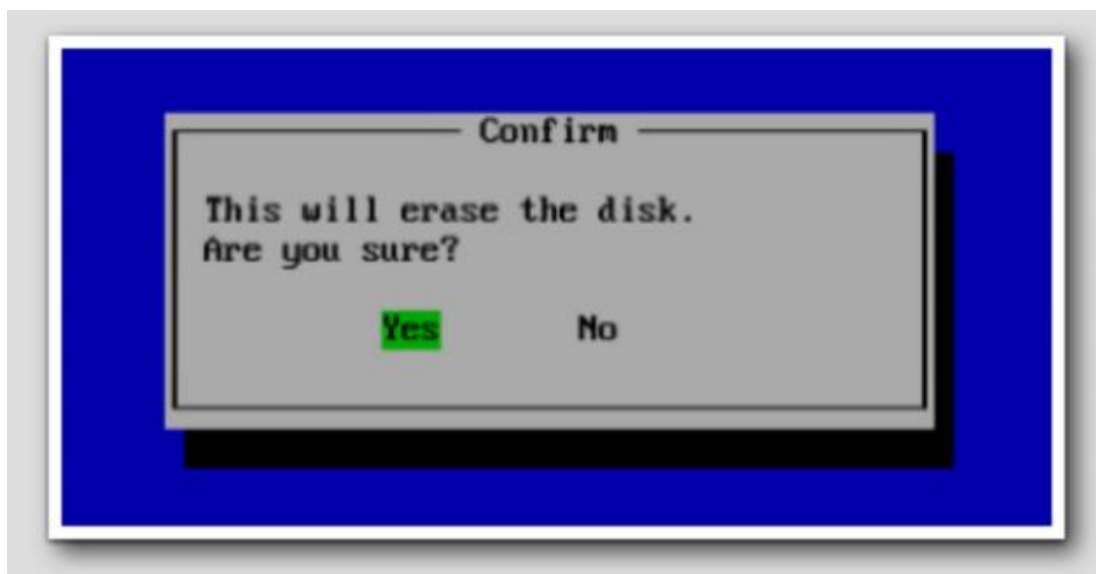
Select Disk

1. Press Enter to accept the selected disk and use the auto partitioning option



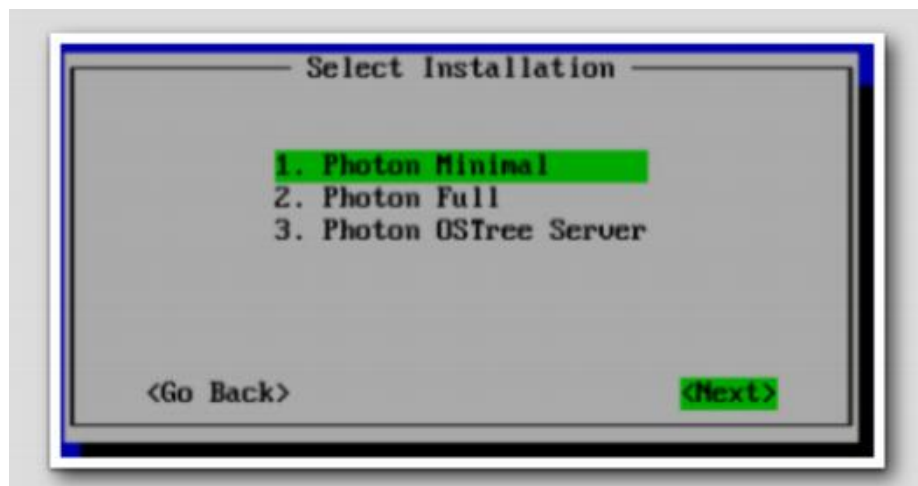
Confirm

1. Press Enter confirm the disk should be erased.



Select Installation

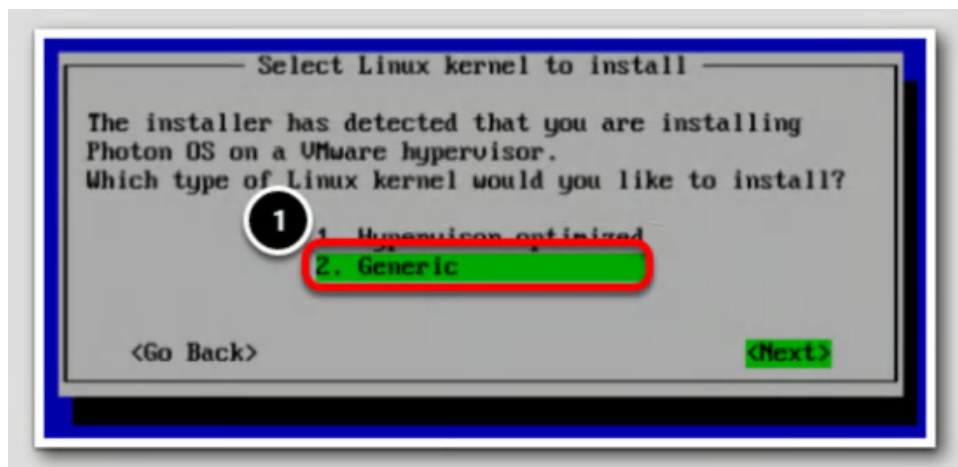
1. At the Select Installation screen, make sure the default option of 1. Photon Minimal is selected.
2. Press the Enter key.



Linux Kernel

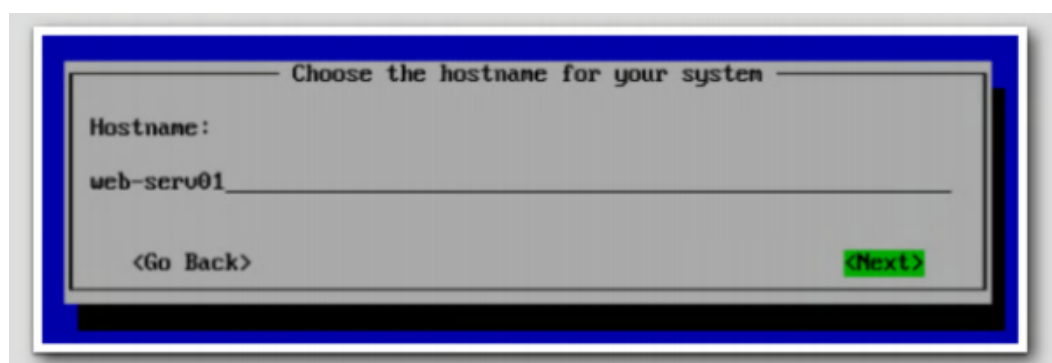
1. Use the arrow key to select 2. Generic.
2. Press the Enter key.

NOTE: If 1. Hypervisor optimized is selected, the virtual machine will not boot. This is due to the unique environment the Hands-on Labs are running in.



Rename Host

1. Use the Backspace key to remove the default hostname.
2. Type web-serv01.
3. Press the Enter key.



Password

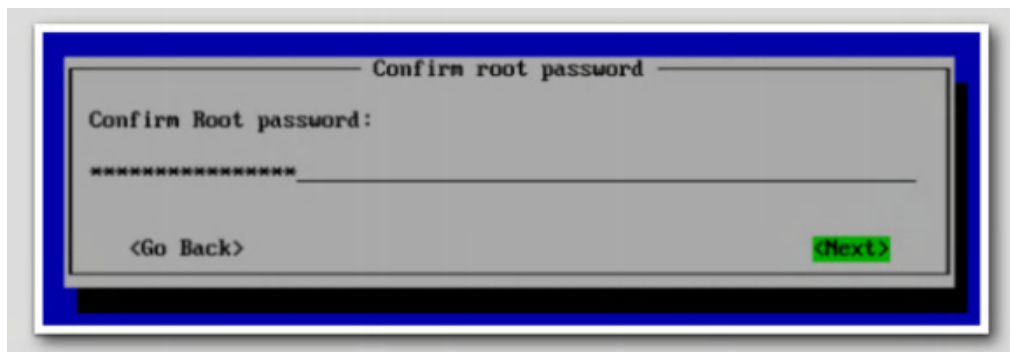
1. For the password, use VMware1!VMware1!

Note that Photon requires a complex, non-dictionary password, which is why the typical password is being repeated.



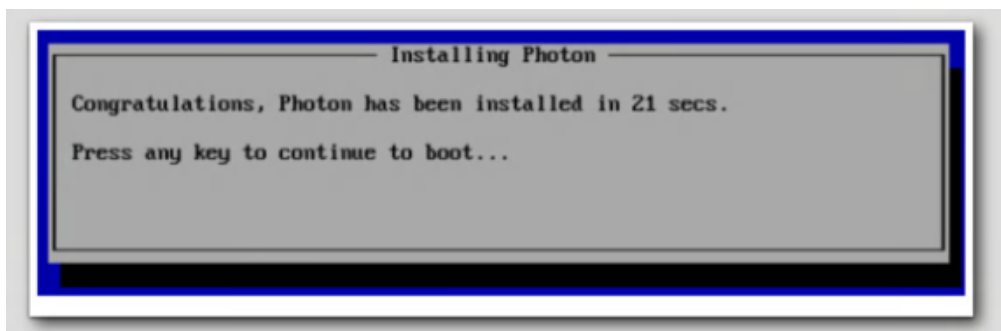
Confirm Password

1. Type VMware1!VMware1! again to confirm the password.
2. Press the Enter key.



Installation Complete

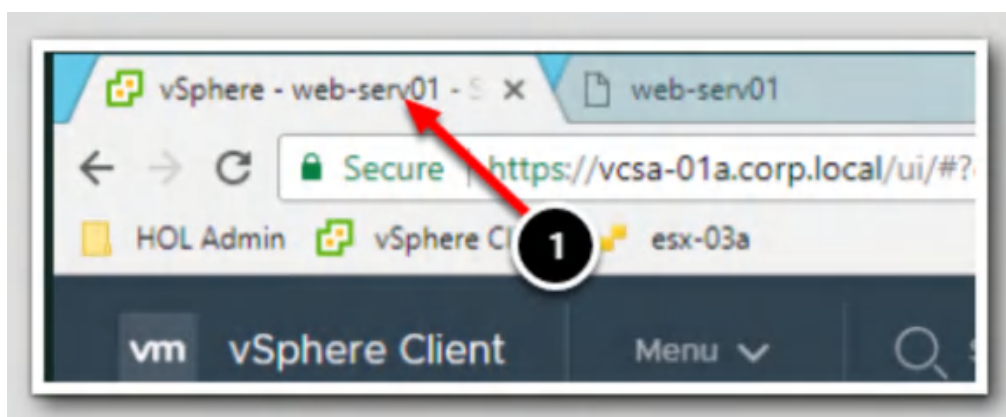
After a minute or two, the installation will be complete.
Press a key to reboot the virtual machine. After a minute or two, the system should boot the login prompt.



vSphere Tab

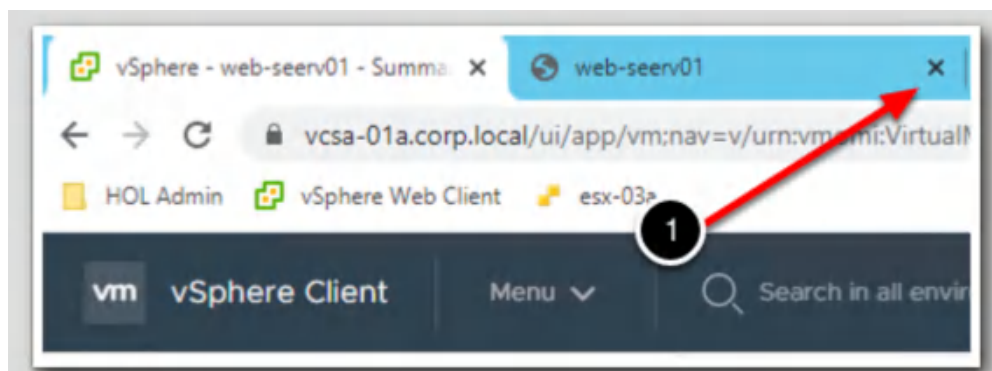
Now that the operating system has been installed and is up and running, the ISO image needs to be disconnected from the virtual machine.

1. Select the vSphere- web-serv01 tab.



web-serv01 Console

1. Click the 'X' to close the console window for web-serv01



Practical 8: Use vSphere vMotion and vSphere Storage vMotion to migrate virtual machines.

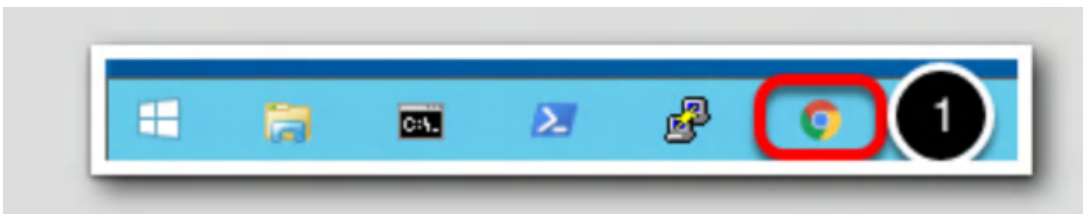
Planned downtime typically accounts for over 80% of datacenter downtime. Hardware maintenance, server migration, and firmware updates all require downtime for physical servers. To minimize the impact of this downtime, organizations are forced to delay maintenance until inconvenient and difficult-to-schedule downtime windows.

The vMotion functionality in vSphere makes it possible for organizations to reduce planned downtime because workloads in a VMware environment can be dynamically moved to different physical servers without service interruption. Administrators can perform faster and completely transparent maintenance operations, without being forced to schedule inconvenient maintenance windows. With vSphere vMotion, organizations can:

- Eliminate downtime for common maintenance operations.
- Eliminate planned maintenance windows.
- Perform maintenance at any time without disrupting users and services.

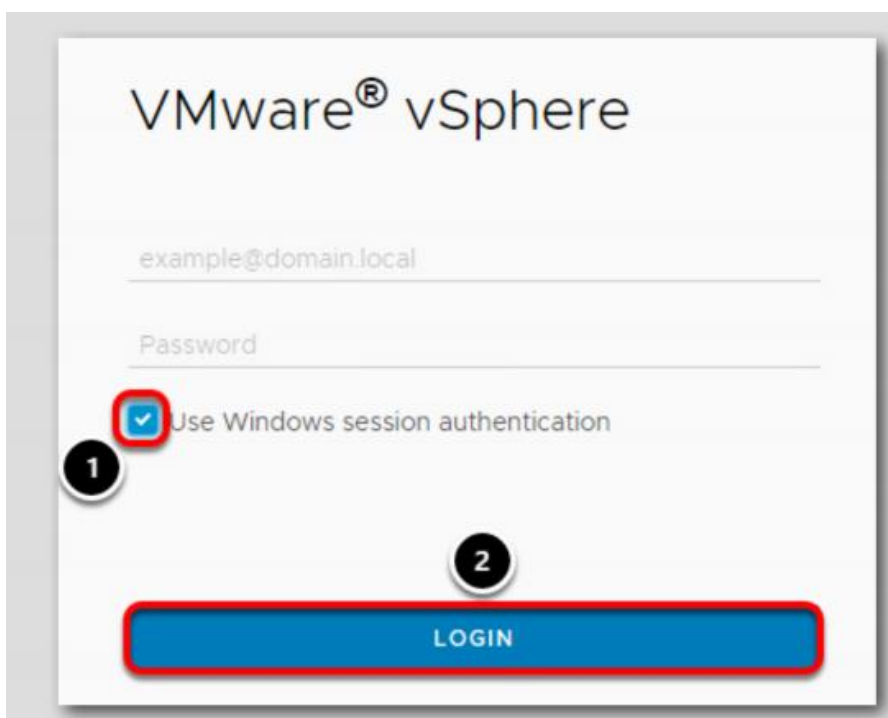
Launch Google Chrome web browser

1. Click on the Chrome Icon on the Windows Quick Launch Task Bar.



Enter credentials and log in

1. Select "Use Windows session authentication" check box.
2. Select Login.



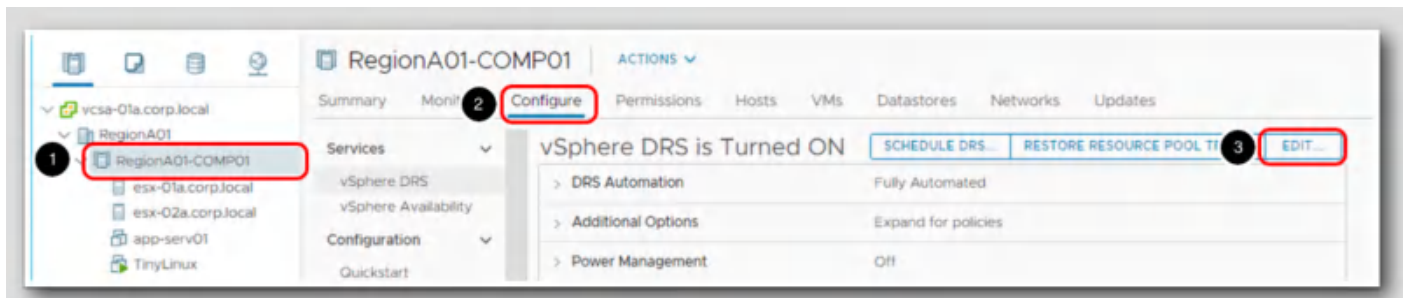
If credentials aren't saved, use the following:

- username: administrator@corp.local
- password: VMware1!

Edit Cluster Settings

We will disable DRS and then migrate all of the virtual machines esx-02a.corp.local hosts over to esx-01a.corp.local. This will also help prepare us for the next lesson on Performance.

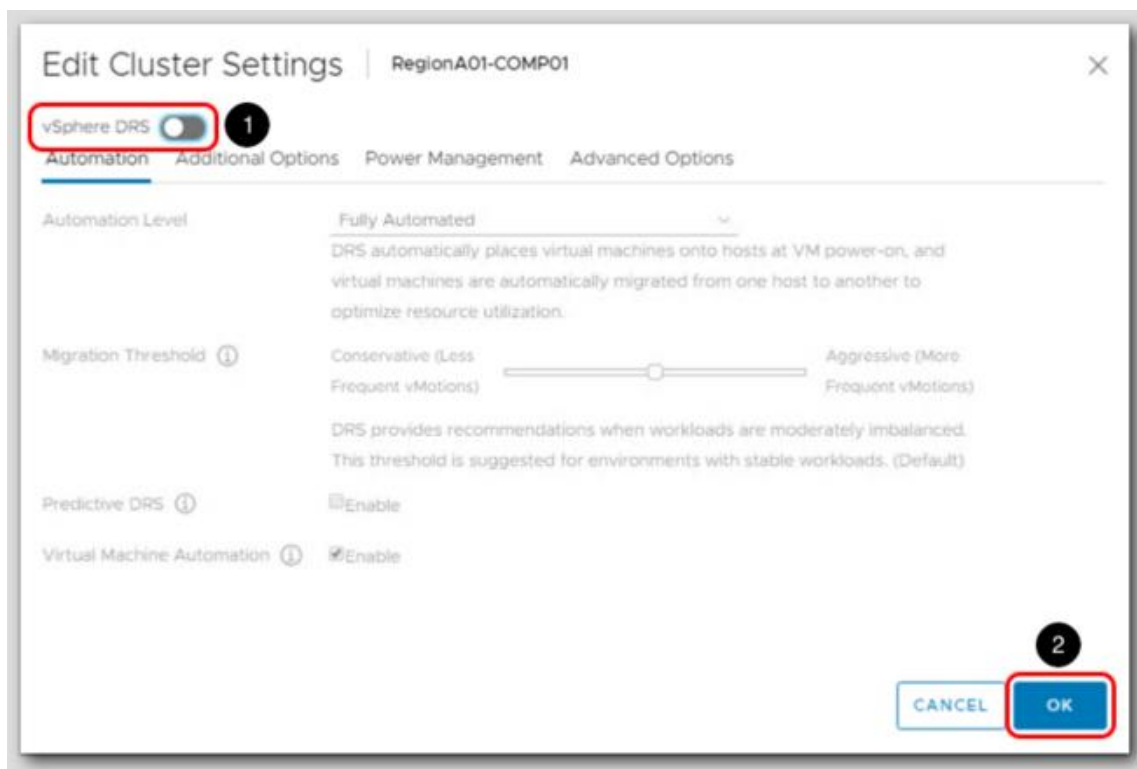
1. Select RegionA01-COMP01
2. Click the Configure tab
3. Click the Edit button



Disable DRS

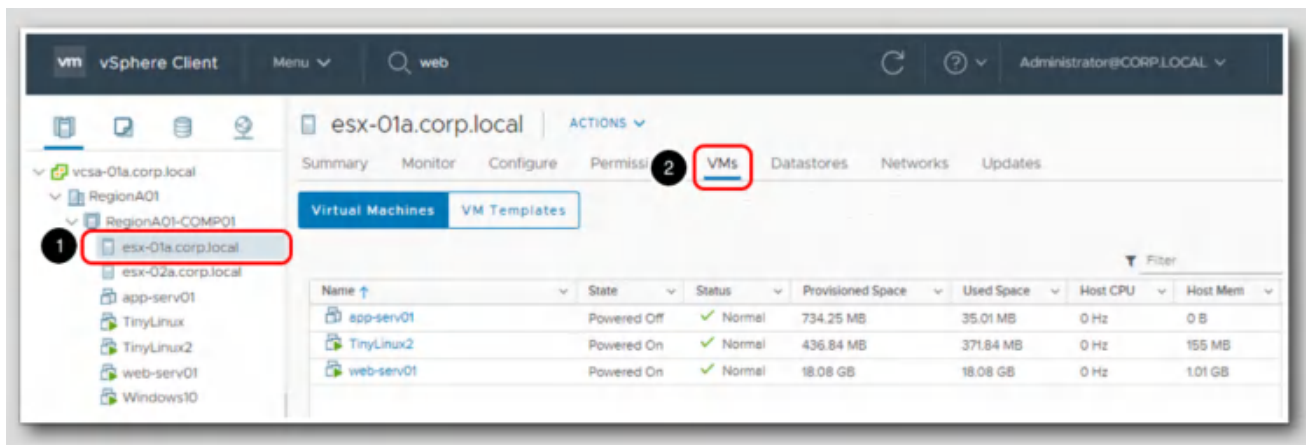
1. Flip the switch to disable vSphere DRS.
2. Click OK

By disabling DRS, this will prevent the virtual machines from being migrated back to esx-01a.corp.local.



Migrating to esx-02a.corp.local

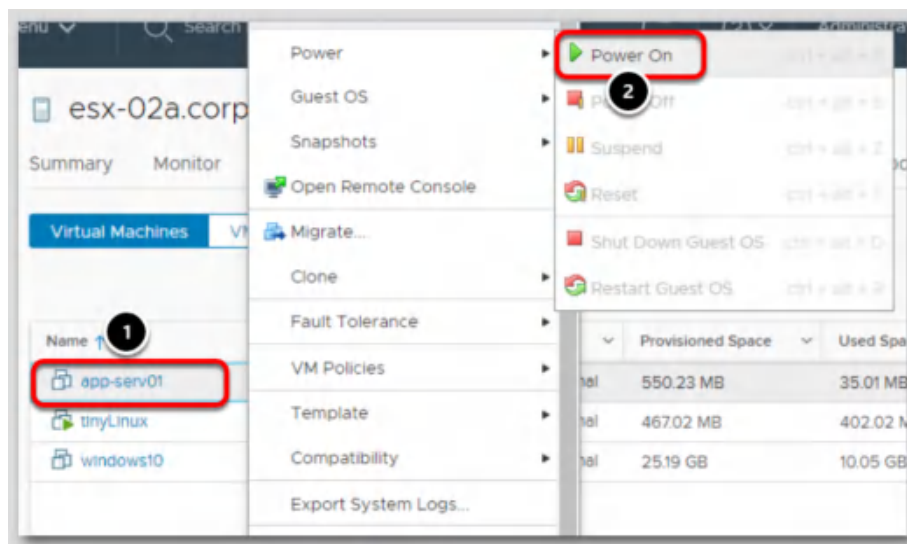
1. Select esx-01a.corp.local
2. Click the VMs tab



Power on VMs

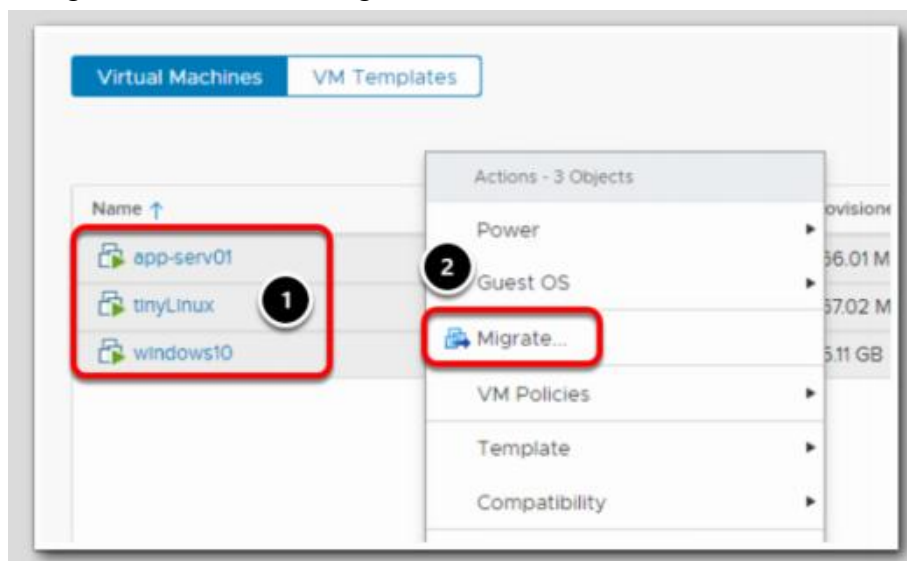
1. Look for any virtual machines that are Powered Off and select them. Multiple virtual machines can be selected by holding the Ctrl key and clicking on them.
2. Right click and select Power/Power On

Do this for every powered off virtual machine, otherwise the next step will fail.



Migrate VMs

1. Select all the virtual machines (click the first one on the list, hold the shift key, click the last one on the list).
2. Right click and select Migrate...



Migrate

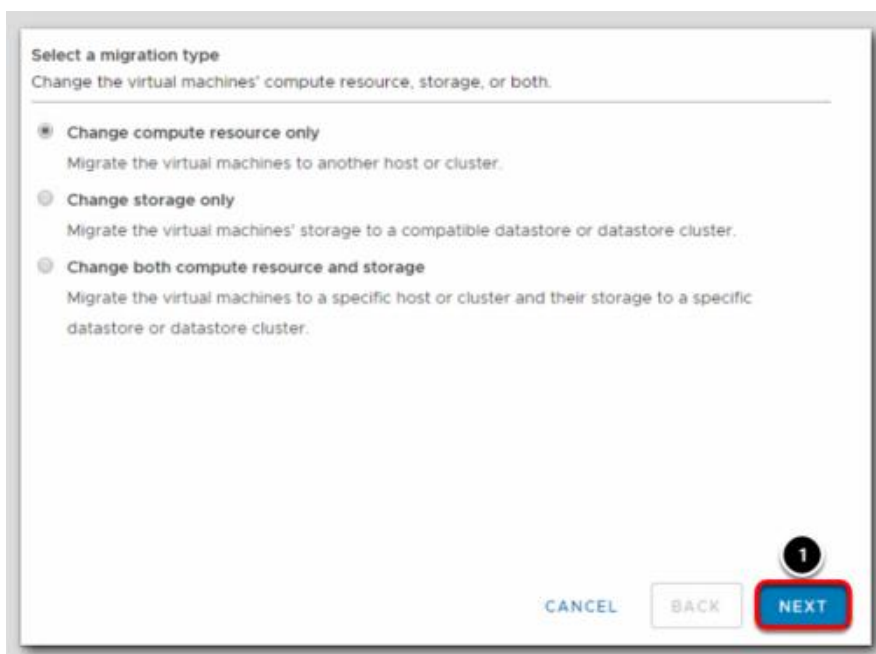
Click Yes to start the migration process.



Migration Type

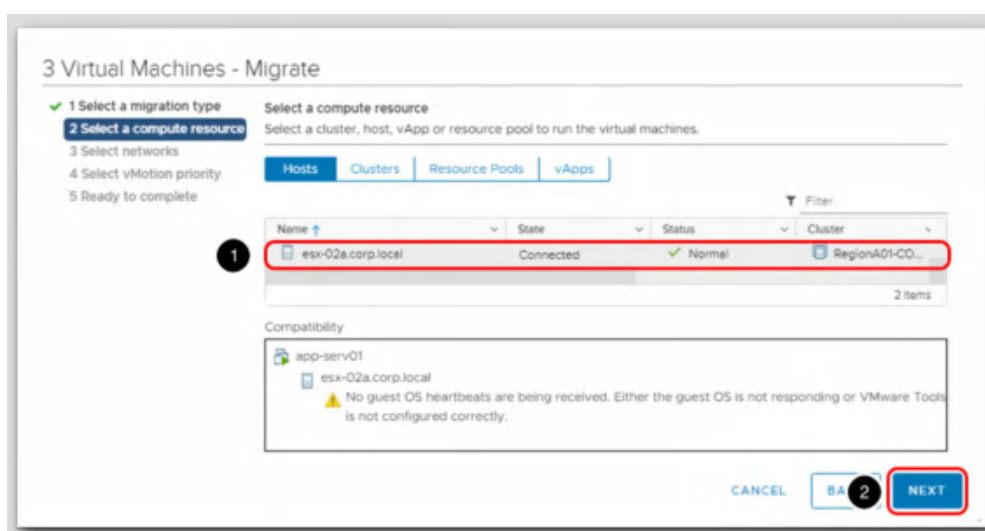
1. Leave the default setting and click Next.

In addition to changing what ESXi host the virtual machine will run on (using compute resources), the virtual machine can be moved to different datastores (storage) if needed. A virtual machine can also be moved to a different host and storage at the same time. More on migrating to different storage is covered in Module 3, in the Storage vMotion lesson



Compute Resource

1. Select esx-02a.corp.local
2. Click Next



Since we want to move all the virtual machines to esx-02a.corp.local, we are selecting a specific host. We could also place it in a Cluster and let DRS decide the best host to move it to.

Networks

In most cases, the network adapter will not need to be changed.

1. Click Next

Select networks
Select destination networks for the virtual machine migration.

Migrate VM networking by selecting a new destination network for all VM network adapters attached to the same source network.

Source Network	Used By	Destination Network
VM-RegionA01-vDS-COMP	2 VMs / 2 Network adapters	VM-RegionA01-vDS-COMP
VM Network	2 VMs / 2 Network adapters	VM Network

ADVANCED >>

Compatibility
✓ Compatibility checks succeeded.

CANCEL BACK **NEXT**

vMotion Priority

A priority can be set for the vMotion task. In most cases, the default option is OK.

1. Leave the default setting and click Next

Select vMotion priority
Protect the performance of your running virtual machines by prioritizing the allocation of CPU resources.

☒ Schedule vMotion with high priority (recommended)
vMotion receives higher CPU scheduling preference relative to normal priority migrations.
vMotion might complete more quickly.

☐ Schedule normal vMotion
vMotion receives lower CPU scheduling preference relative to high priority migrations. You can extend vMotion duration.

CANCEL BACK **NEXT**

Ready to Complete

Review the settings and click Finish to migrate the virtual machines to esx-02a.corp.local.

3 Virtual Machines - Migrate

✓ 1 Select a migration type

✓ 2 Select a compute resource

✓ 3 Select networks

✓ 4 Select vMotion priority

5 Ready to complete

Ready to complete

Verify that the information is correct and click Finish to start the migration.

Migration Type	Change compute resource. Leave VM on the original storage
Virtual Machine	Migrating 3 VMs
Cluster	RegionA01-COMP01
Host	esx-02a.corp.local
vMotion Priority	High
Networks	No network reassignments







CANCEL

BA 1

FINISH

Monitor Progress

You can monitor progress using Recent Tasks.

Recent Tasks		Alarms	
Task Name	Target	Status	
Relocate virtual machine	 app-serv01	<div><div></div></div> 72%	
Relocate virtual machine	 tinyLinux	<div><div></div></div> 52%	
Relocate virtual machine	 windows10	<div><div></div></div> 40%	

Migration Complete

When the task has been completed successfully, you should see all of the virtual machines moved over to `esx-02a.corp.local`.

esx-02a.corp.local

ACTIONS ▾

Summary

Monitor

Configure

Permissions

VMs











Datstores

Networks

Updates

Virtual Machines

VM Templates

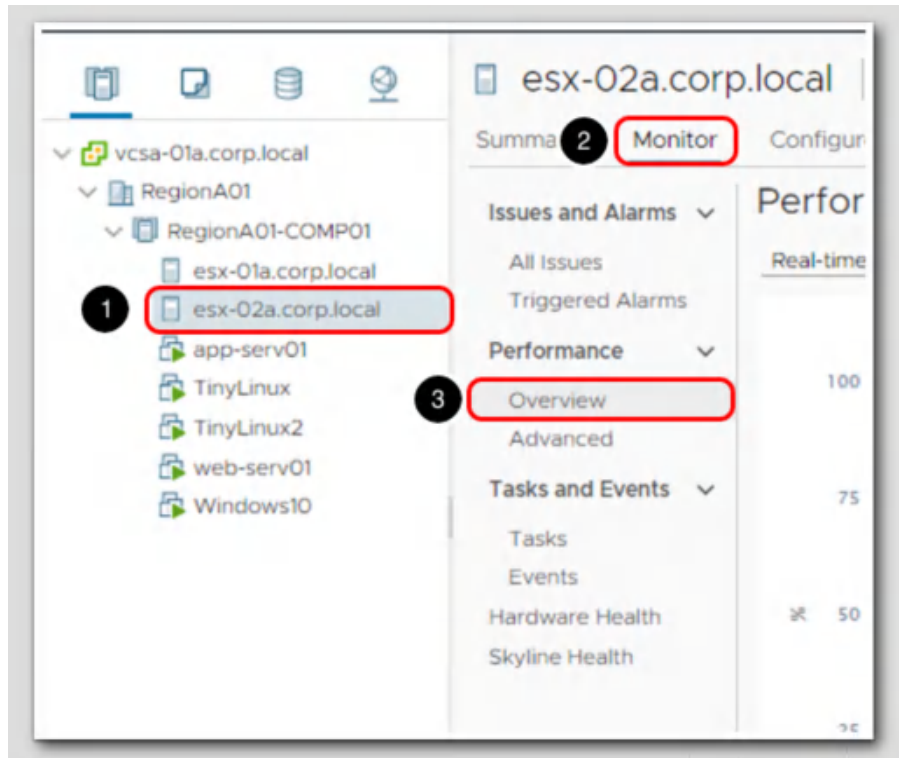
Name ↑ ▾	State ▾	Status ▾	Provisioned Space ▾	Used Space ▾
 app-serv01	Powered On	 Normal	436.19 MB	371.19 MB
 TinyLinux	Powered On	 Normal	436.83 MB	371.83 MB
 TinyLinux2	Powered On	 Normal	436.81 MB	371.81 MB
 web-serv01	Powered On	 Normal	18.08 GB	18.08 GB
 Windows10	Powered On	 Normal	27.08 GB	20.56 GB

Practical 9: Use the system monitoring tools to reflect the CPU workload.

VMware provides several tools to help you monitor your virtual environment and to locate the source of potential issues and current problems. This lesson will walk through using the performance charts and graphs in the vSphere Client.

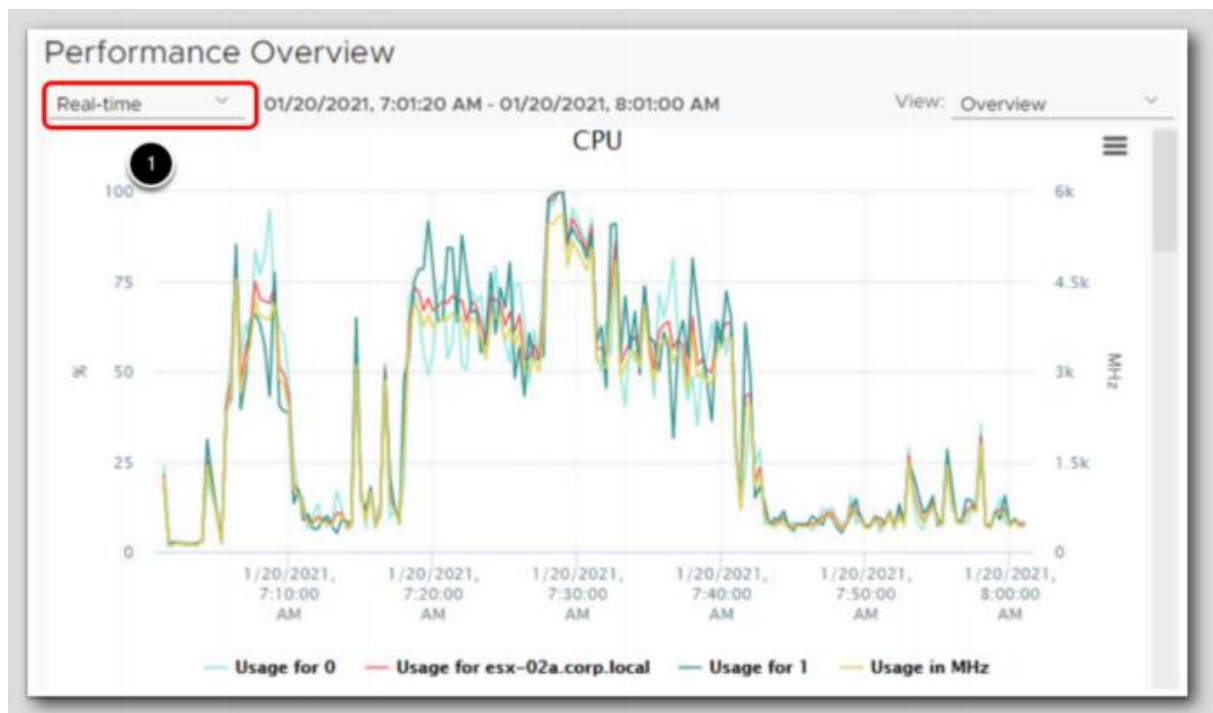
Select esx-02a

1. Select esx-02a.corp.local
2. Click the Monitor tab
3. Click Overview under the Performance section.



Host CPU Usage

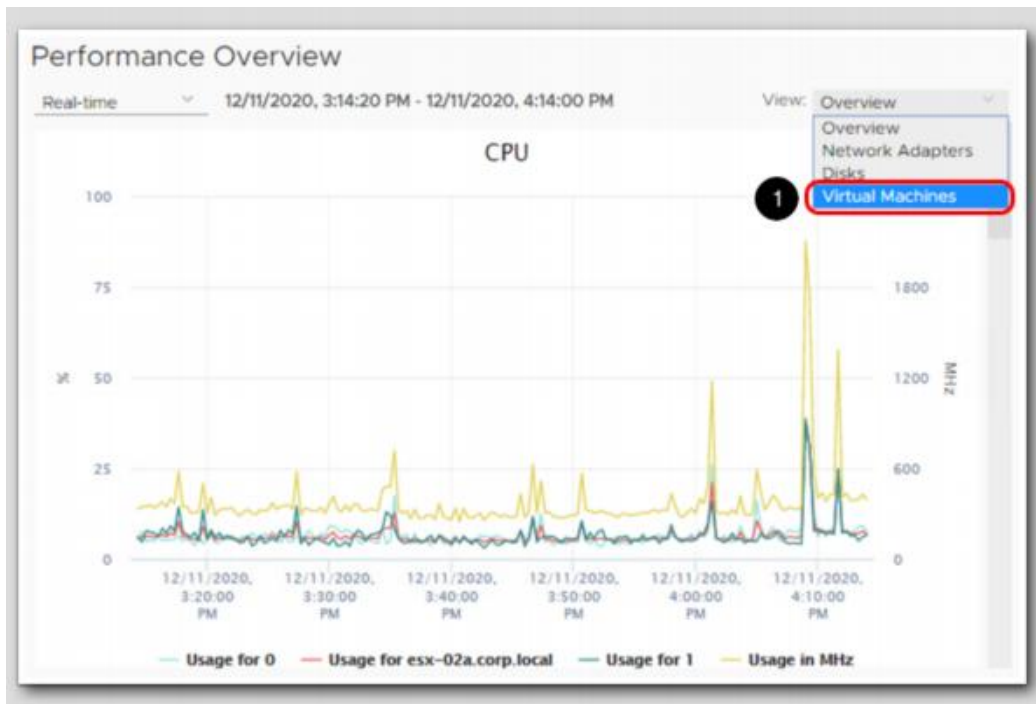
1. Ensure Real-timeReal-time has been selected from the Time Range drop-down menu



Here we can see in real time the CPU usage in percent for esx-02a.corp.local. By default, the chart will refresh every 20 seconds. The amount of data you see will depend on how long you have been taking the lab.

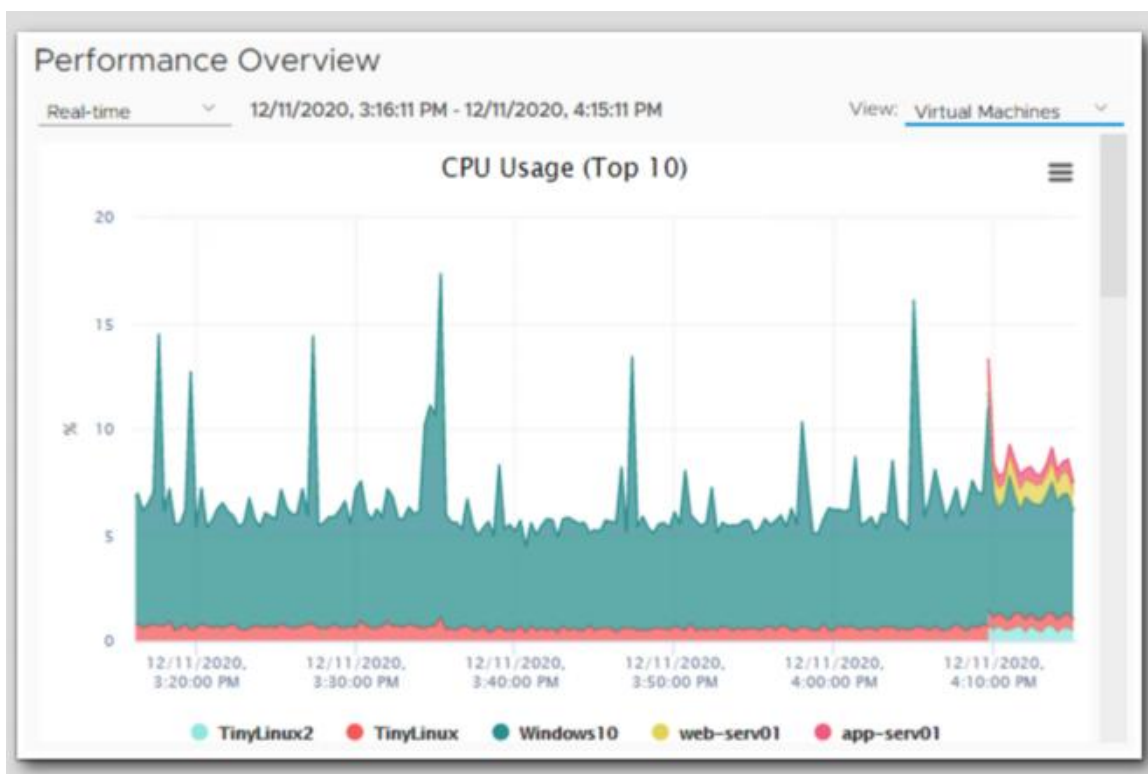
Virtual Machine CPU Usage

1. Now click the View drop-down box and select Virtual Machines.



Combined CPU Usage

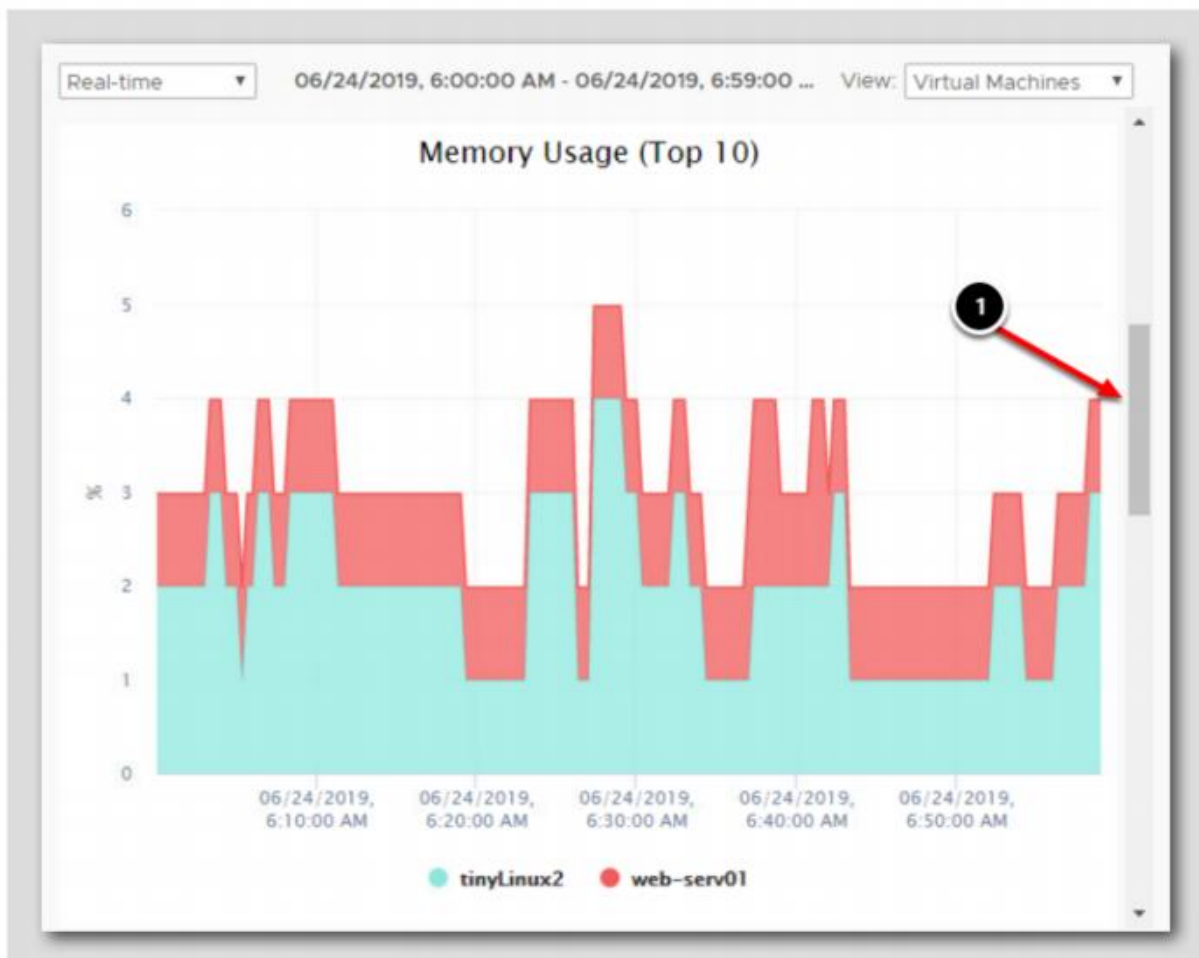
This chart shows the real-time CPU usage of each virtual machine. Each VM is represented by a different color in the graph and you can see at the bottom, which VM is represented by what color. Combined, they give you an idea of overall CPU usage on the host.



Other Available Graphs

There are other graphs available to show host and virtual machine memory usage, network (Mbps) and disk (KBps).

1. Use the scroll bars to access the additional charts.



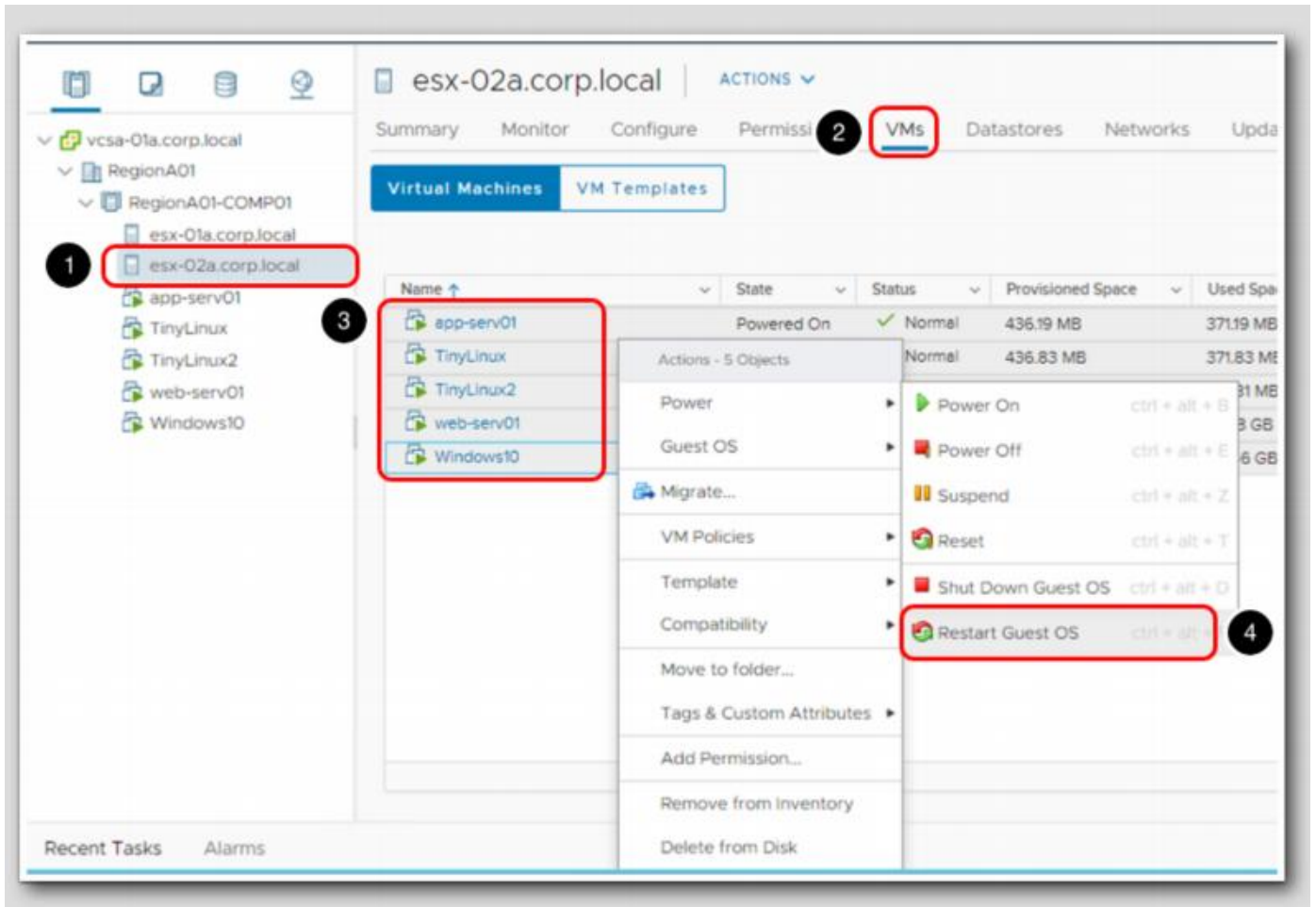
The graphs we have looked at so far will give you an overview of the four main components, CPU, memory, disk and storage. The advanced graphs will give you more detailed information on each of these.

Before we look at these charts, let's generate some CPU activity on esx-01a.corp.local by restarting all of the virtual machines it hosts

Select the VMs to be Restarted

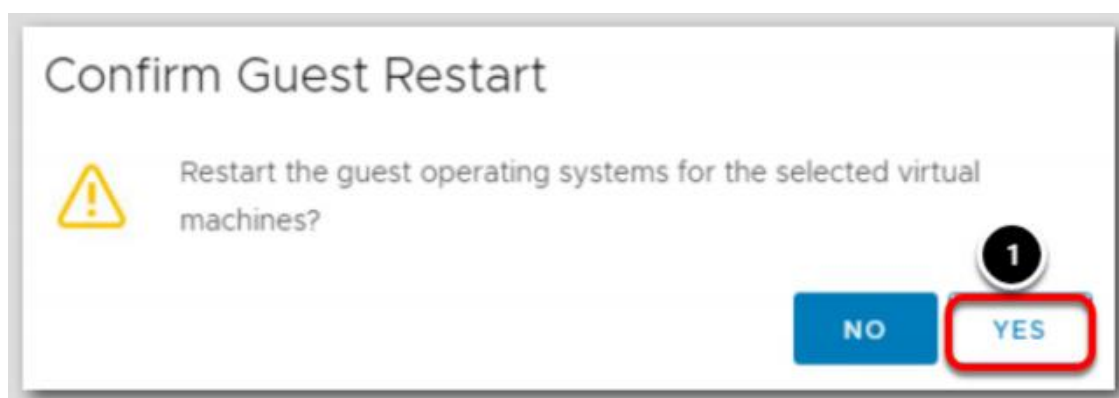
To generate some activity on esx-02a.corp.local, the virtual machines will be rebooted.

1. Select esx-02a.corp.local
2. Click on the VMs tab
3. Click on the first VM that is listed, hold down the Shift key and select the last VM on the list.
4. Select Power and click the Restart Guest OS button.



Confirm Restart

1. Click Yes to continue.

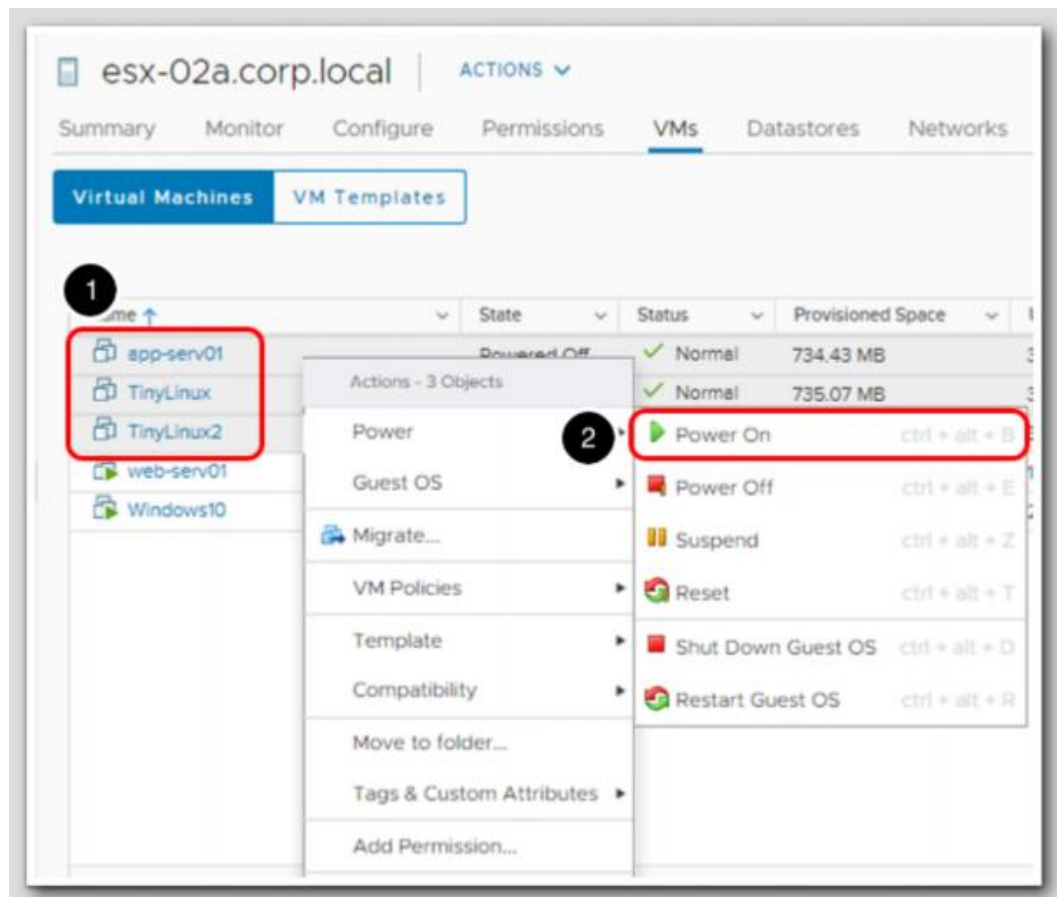


Note: You may also receive a warning that only X of X virtual machines will be restarted. This depends on what other modules and/or lessons have been completed in the lab previously.

Manually Start VMs

1. If TinyLinux, TinyLinux2, or app-serv01 did not restart, but instead shut down.

2. Select all and power them on manually.



Monitor Performance

1. Click on the Monitor tab.
2. Click Advanced in the Performance section.

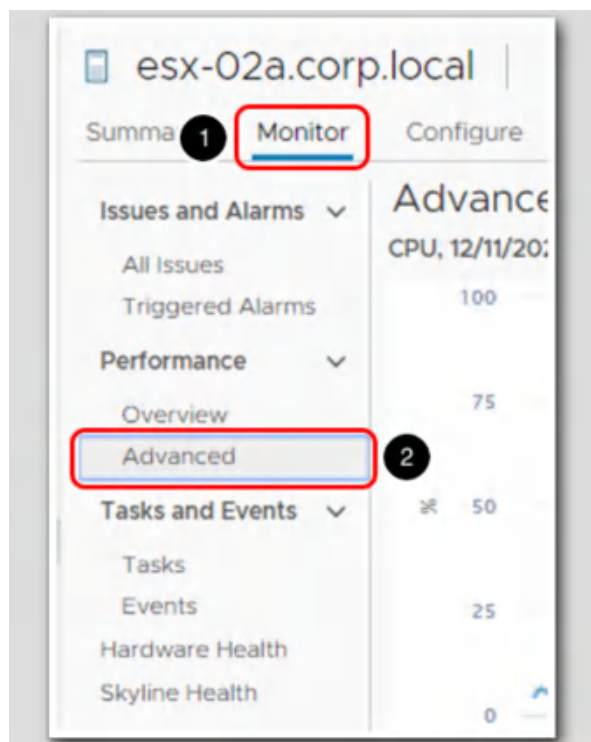
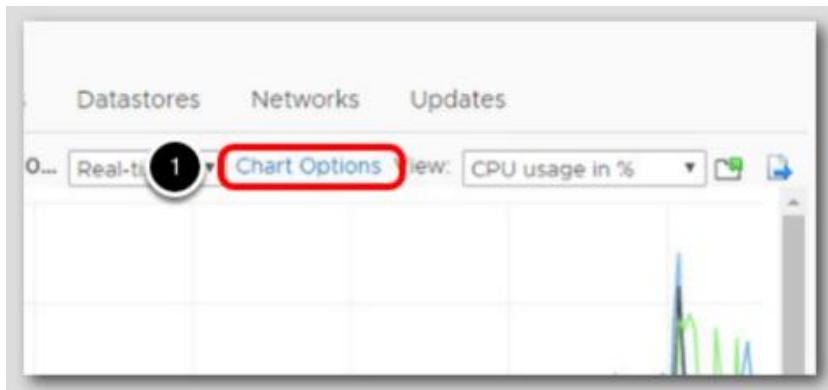


Chart Options

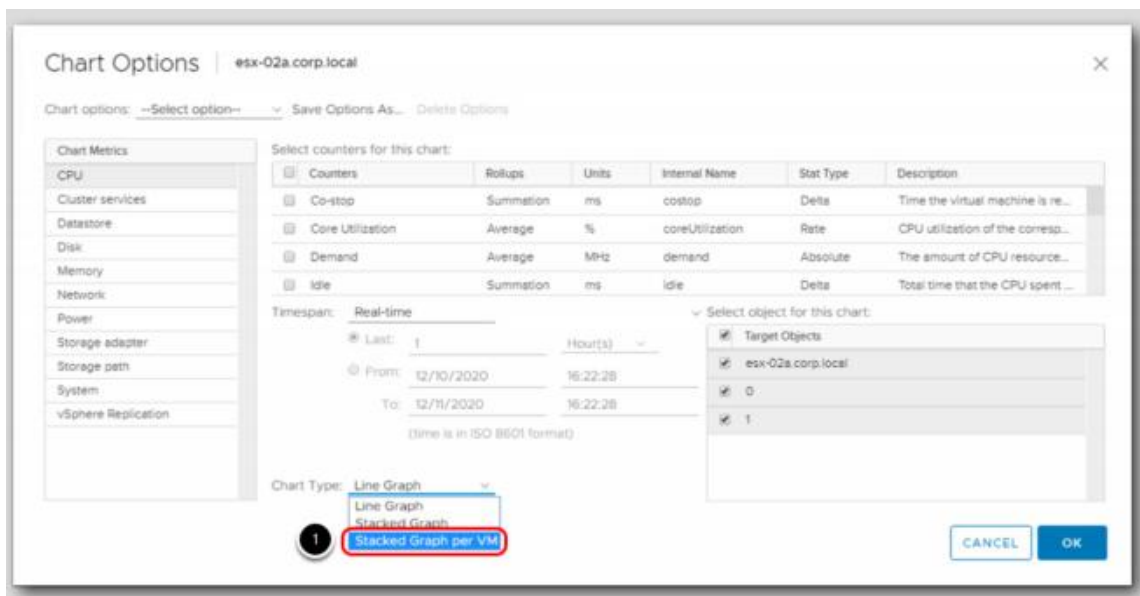
1. Click the Chart Options link.



This will bring up options to customize the chart.

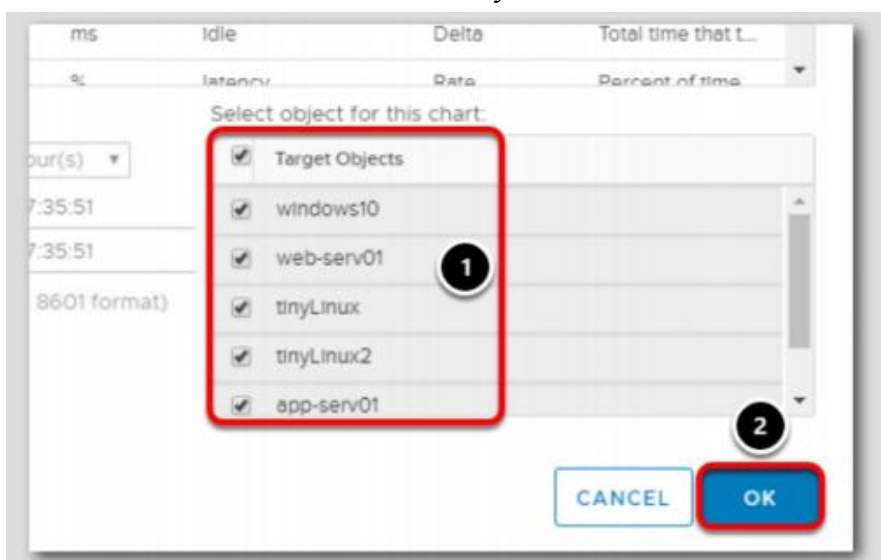
Stacked Graph per VM

1. From the Chart Type drop-down menu, select Stacked Graph per VM.



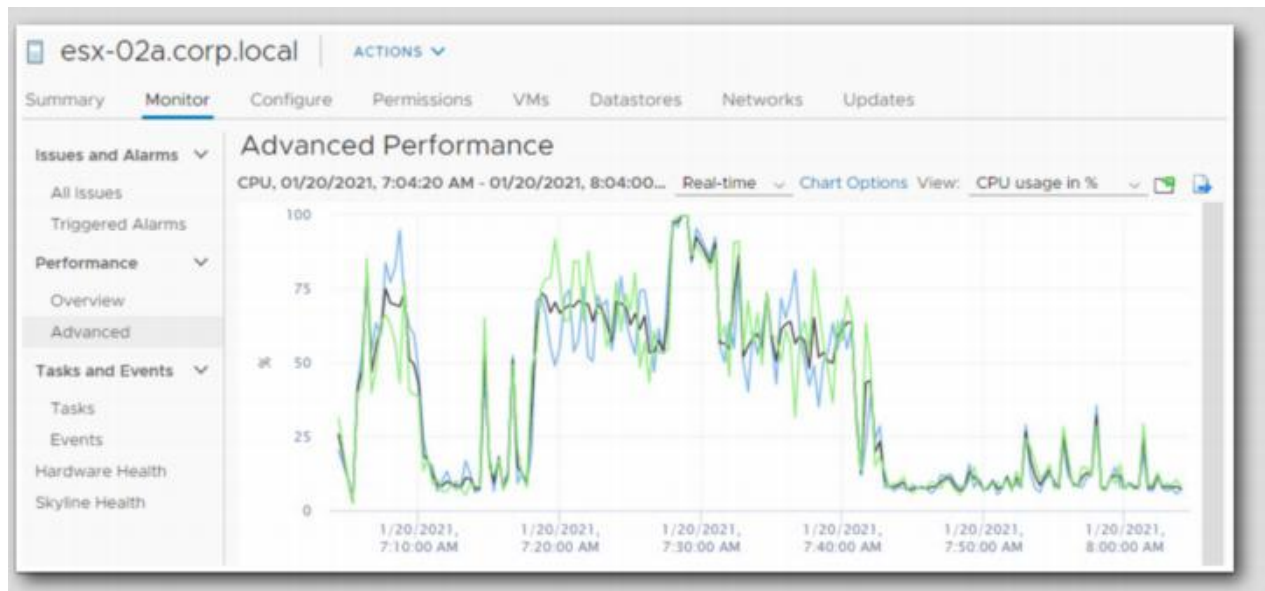
Select Objects

1. Under the Select objects for this chart box, verify all the virtual machines are selected.
2. Click the OK button to see the newly customized chart.



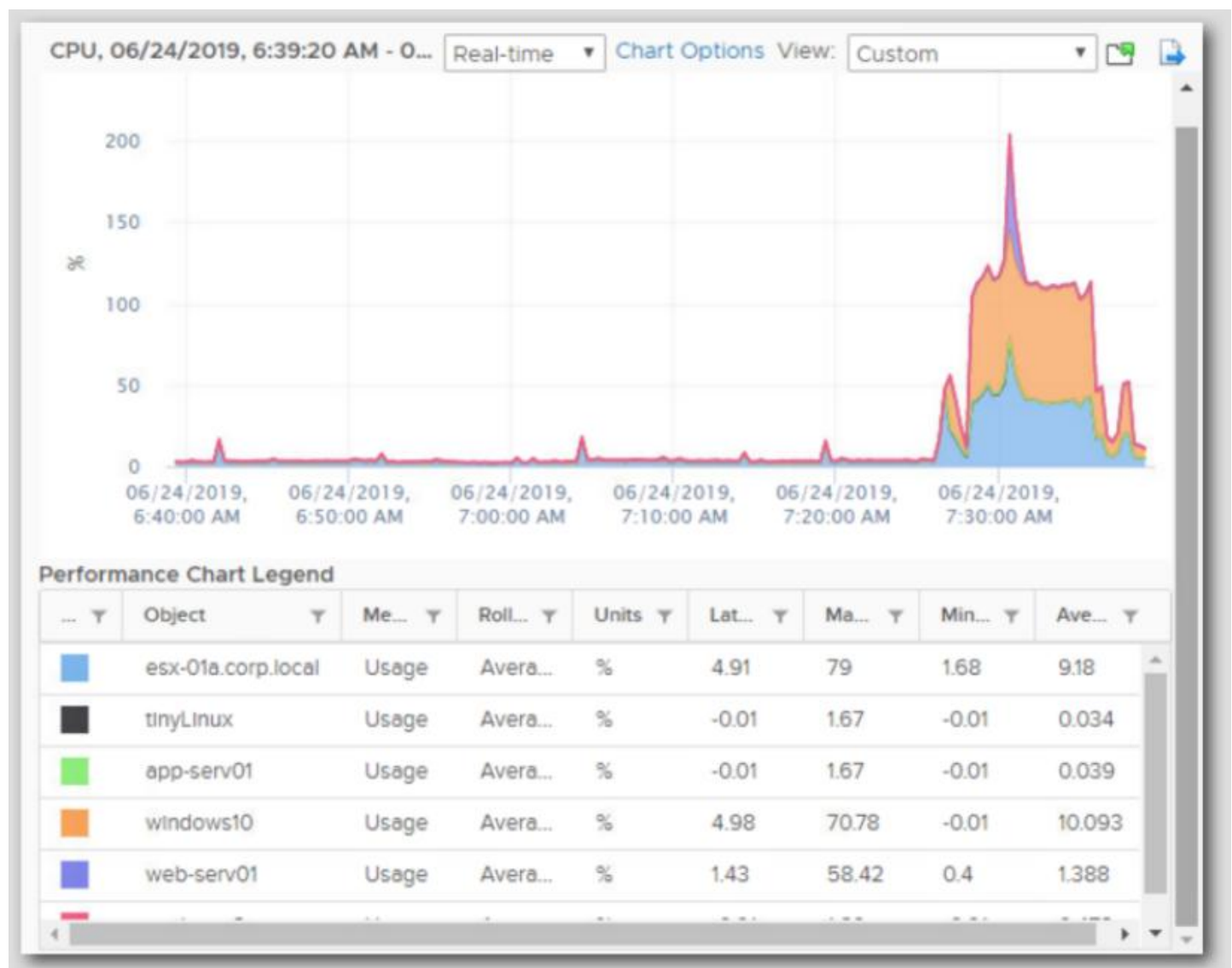
CPU Usage in Real-time

Here we can see the CPU usage of each virtual machine and esx-02a.corp.local.



Performance Chart Legend

Scroll down and you will see the Performance Chart Legend. You can click on any of the virtual machines or esx-01a.corp.local to highlight it on the chart.



Practical 10: Use the vCenter Server Appliance alarm feature.

vSphere includes a user-configurable events and alarms subsystem. This subsystem tracks events happening throughout vSphere and stores the data in log files and the vCenter Server database. This subsystem also enables you to specify the conditions under which alarms are triggered.

Alarms can change state from mild warnings to more serious alerts as system conditions change and can trigger automated alarm actions. This functionality is useful when you want to be informed, or take immediate action, when certain events or conditions occur for a specific inventory object, or group of objects.

Events are records of user actions or system actions that occur on objects in vCenter Server or on a host. Actions that might be reordered as events include, but are not limited to, the following examples:

- A license key expires
- A virtual machine is powered on
- A user logs in to a virtual machine
- A host connection is lost

Event data includes details about the event such as who generated it, when it occurred, and what type of event.

Alarms are notifications that are activated in response to an event, a set of conditions, or the state of an inventory object. An alarm definition consists of the following elements

- Name and description - Provides an identifying label and description.
- Alarm type - Defines the type of object that will be monitored.
- Triggers - Defines the event, condition, or state that will trigger the alarm and defines the notification severity.
- Tolerance thresholds (Reporting) - Provides additional restrictions on condition and state triggers thresholds that must be exceeded before the alarm is triggered.
- Actions - Defines operations that occur in response to triggered alarms. VMware provides sets of predefined actions that are specific to inventory object types.

Alarms have the following severity levels:

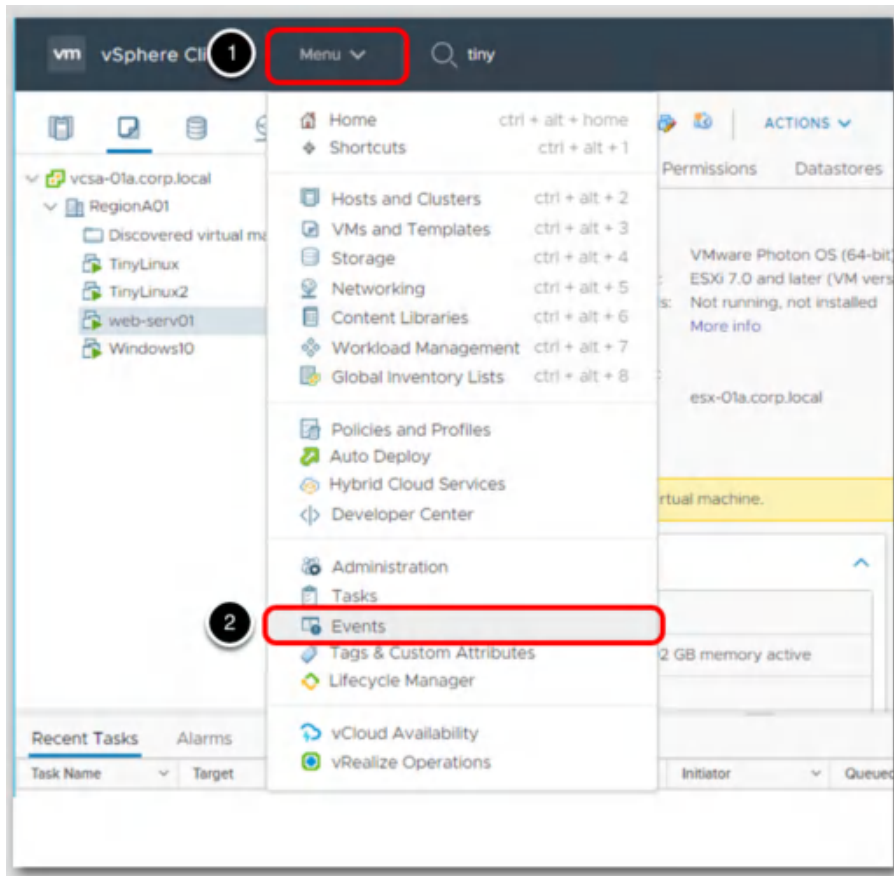
- Normal – green
- Warning – yellow
- Alert – red

Alarm definitions are associated with the object selected in the inventory. An alarm monitors the type of inventory objects specified in its definition

For example, you might want to monitor the CPU usage of all virtual machines in a specific host cluster. You can select the cluster in the inventory and add a virtual machine alarm to it. When enabled, that alarm will monitor all virtual machines running in the cluster and will trigger when any one of them meets the criteria defined in the alarm. If you want to monitor a specific virtual machine in the cluster, but not others, you would select that virtual machine in the inventory and add an alarm to it. One easy way to apply the same alarms to a group of objects is to place those objects in a folder and define the alarm on the folder. In this lab, you will learn how to create an alarm and review the events that have occurred.

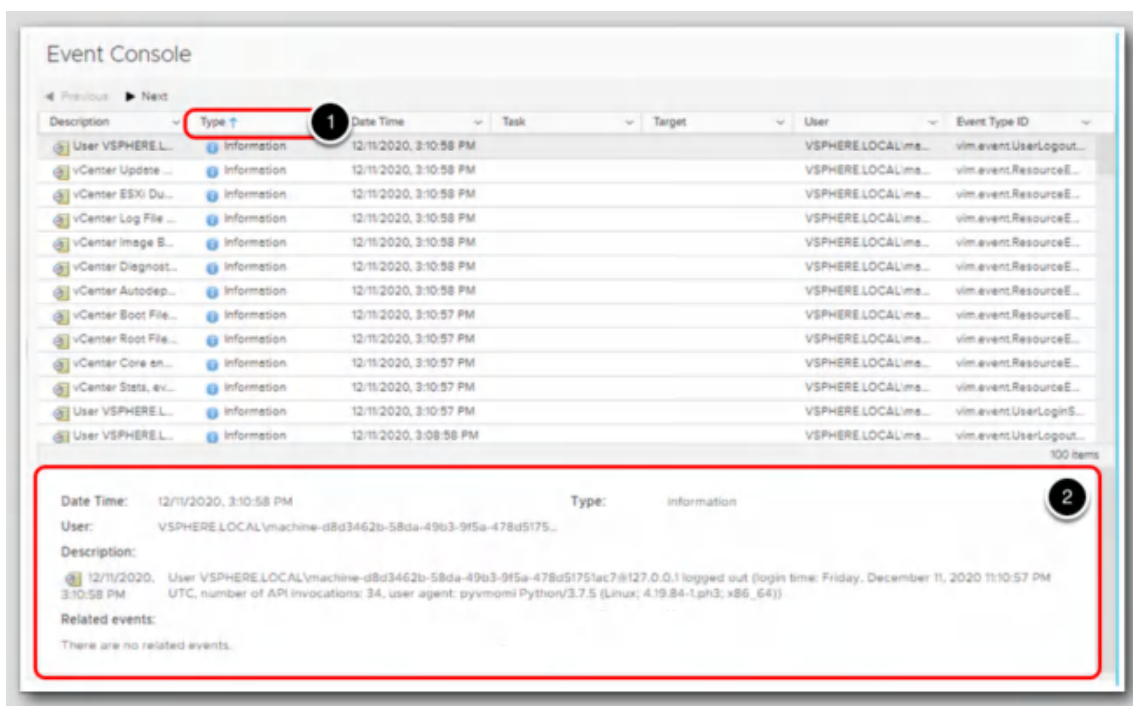
Review default alerts

1. Click Menu
2. Click on Events menu item



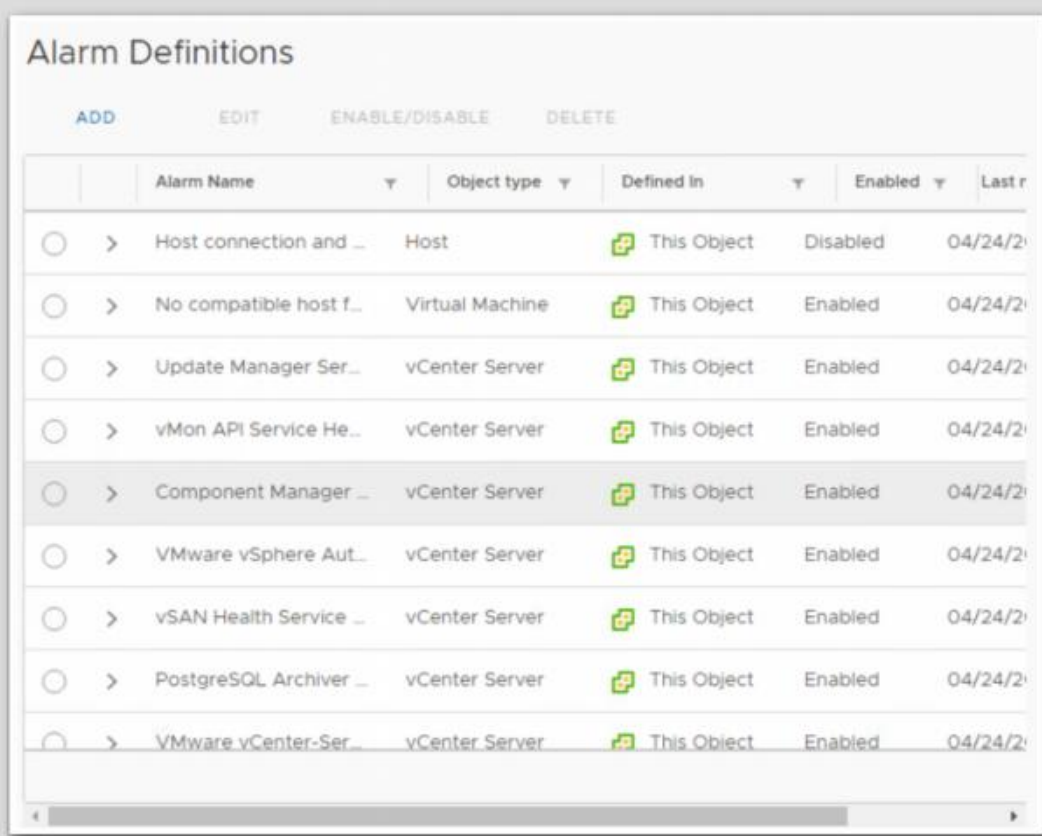
Event Console

1. Click on the Type column to sort by level of severity.
2. Select an event to review the details of the event.



Alarm Definitions

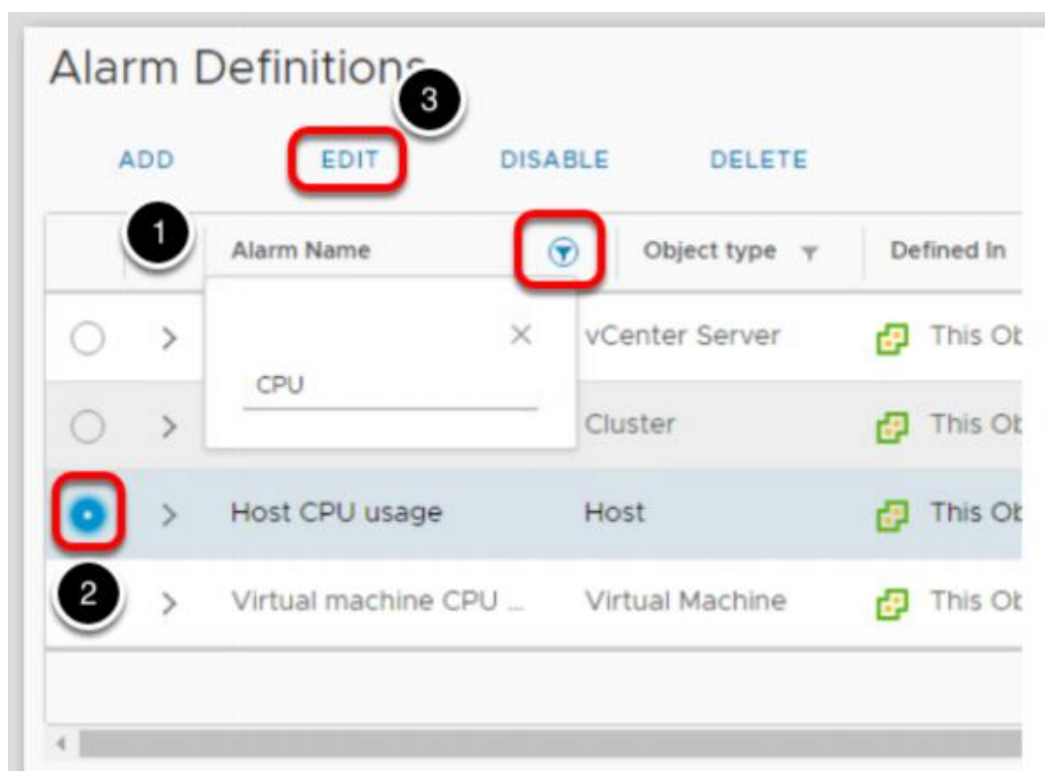
Alarms can be defined at different levels. In the case of the highlighted alarm, you can see it is defined at the top level (vCenter Server). Alarms that are defined at the top level are then inherited by the objects below.



		Alarm Name	Object type	Defined in	Enabled	Last r
<input type="radio"/>	>	Host connection and ...	Host	This Object	Disabled	04/24/20
<input type="radio"/>	>	No compatible host f...	Virtual Machine	This Object	Enabled	04/24/20
<input type="radio"/>	>	Update Manager Ser...	vCenter Server	This Object	Enabled	04/24/20
<input type="radio"/>	>	vMon API Service He...	vCenter Server	This Object	Enabled	04/24/20
<input type="radio"/>	>	Component Manager ...	vCenter Server	This Object	Enabled	04/24/20
<input type="radio"/>	>	VMware vSphere Aut...	vCenter Server	This Object	Enabled	04/24/20
<input type="radio"/>	>	vSAN Health Service ...	vCenter Server	This Object	Enabled	04/24/20
<input type="radio"/>	>	PostgreSQL Archiver ...	vCenter Server	This Object	Enabled	04/24/20
<input type="radio"/>	>	VMware vCenter-Ser...	vCenter Server	This Object	Enabled	04/24/20

Defining an Alarm

1. Click on the Alarm Name filter field and type cpucpu in the search field.
2. Select the Host CPU usage alarm
3. Click the Edit button.



Name and Targets

The Name and Targets screen defines the name of the alarm (Host CPU usage), what object it applies to (Hosts) and where the objects are located.

1. Click Next.

The screenshot shows the 'Edit Alarm Definition' dialog with the 'Name and Targets' tab selected. The left sidebar lists five steps: 1 Name and Targets, 2 Alarm Rule 1, 3 Alarm Rule 2, 4 Reset Rule 1, and 5 Review. The main area contains the following fields:

- Alarm Name ***: Host CPU usage
- Description**: Default alarm to monitor host CPU usage
- Target type ***: Hosts
- Targets**: All Hosts on vcasa-01a.corp.local

At the bottom right, there are 'CANCEL' and 'NEXT' buttons. A red box highlights the 'NEXT' button, and a black circle with the number '1' is placed above it.

Alarm Rule 1

1. Change the percentage of 75% to 80%
2. Use the scroll bar to scroll to the bottom.

Notice this will trigger a Warning alarm.

The screenshot shows the 'Alarm Rule 1' configuration screen. The 'IF' section is configured as follows:

- Host CPU Usage** (selected from a dropdown)
- is above** (selected from a dropdown)
- 80** (highlighted with a red box, indicating a change from 75%)
- % for 5 min** (selected from a dropdown)
- ADD ADDITIONAL TRIGGER** (blue link)

The 'THEN' section is configured as follows:

- Trigger the alarm and *** (selected from a dropdown)
- Show as Warning** (selected from a dropdown)
- Send email notifications** (toggle switch is off)

At the bottom right, there is a scroll bar. A red box highlights the bottom of the scroll bar, and a black circle with the number '2' is placed above it.

Add Advanced Action

1. Click on Add Advanced Action.
2. From the drop-down menu (Select an advanced action), select Enter maintenance mode.
3. Click Next

Alarm Rule 1

Trigger the alarm and * Show as Warning

Send email notifications

Send SNMP traps

Run script

Enter maintenance mode REMOVE

ADD ADVANCED ACTIONS

ADD ANOTHER RULE DUPLICATE RULE REMOVE RULE

CANCEL BACK NEXT

When a Host's CPU runs at or above 80% for more than 5 minutes, a Warning alarm will be triggered, and the Host will be put in Maintenance mode.

Alarm Rule 2

1. Click Next.

Alarm Rule 2

IF

Host CPU Usage

is above 90 % for 5 min ADD ADDITIONAL TRIGGER

THEN

Trigger the alarm and * Show as Critical

Send email notifications

ADD ANOTHER RULE DUPLICATE RULE REMOVE RULE

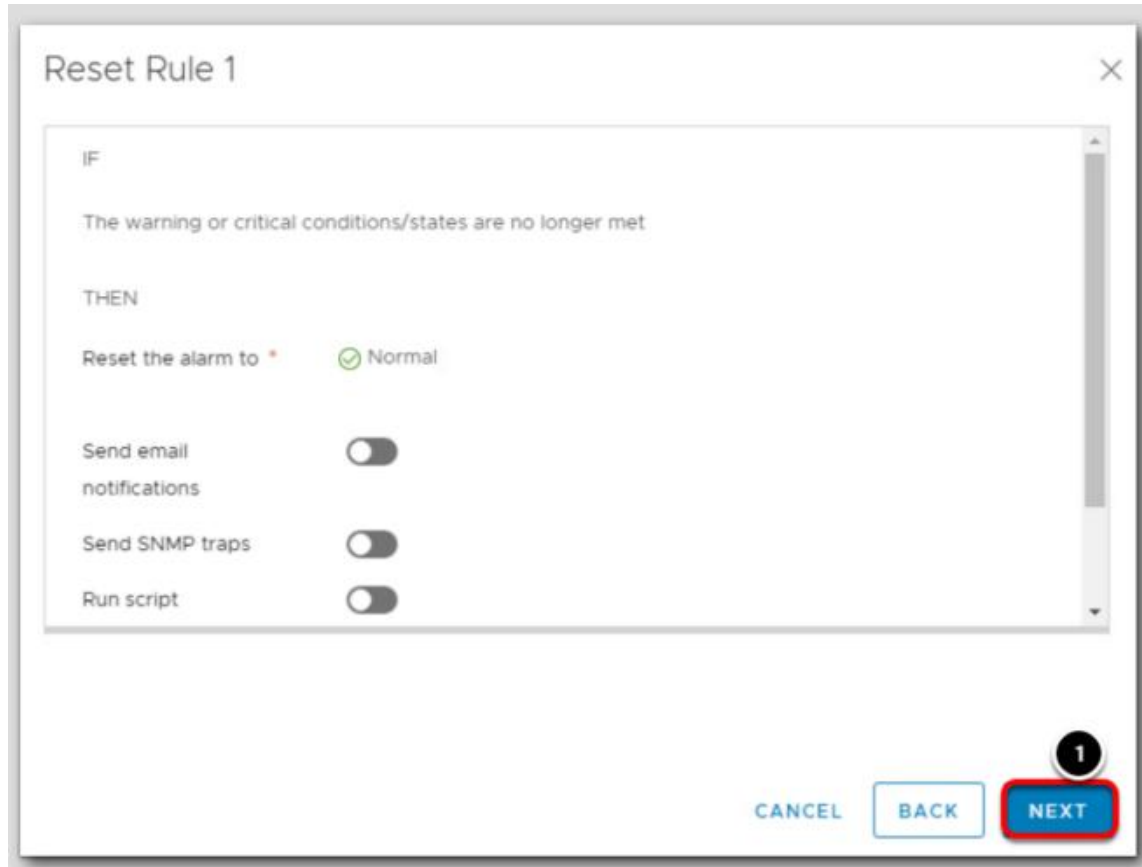
CANCEL BACK NEXT

On this screen we can set additional actions based on when a Host's CPU is about 90% for 5 minutes. In this case, it would trigger a Critical alarm. Additional actions could be taken when a Host is in this state.

Reset Rule 1

If the conditions that originally triggered the alarm are no longer present, additional actions can take place. As an example, once a Host's CPU is no longer at 80% for more than 5 minutes, an email notification could be sent.

1. Click Next.



The screenshot shows a window titled "Reset Rule 1" with a close button (X) in the top right corner. The window is divided into two sections: "IF" and "THEN".

IF

The warning or critical conditions/states are no longer met

THEN

Reset the alarm to * ☒ Normal

Send email notifications ☐

Send SNMP traps ☐

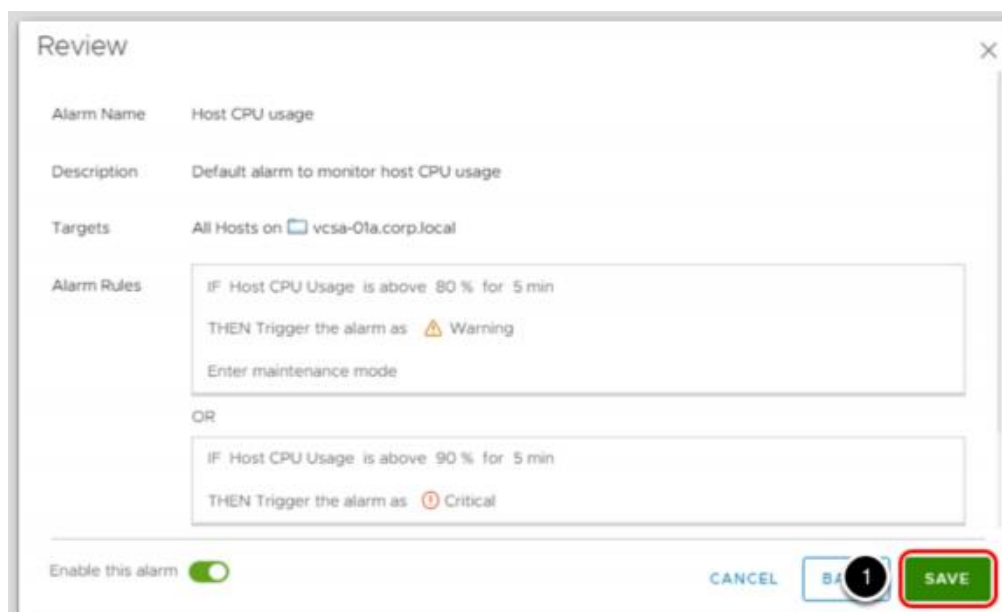
Run script ☐

At the bottom right, there are three buttons: "CANCEL", "BACK", and "NEXT". The "NEXT" button is highlighted with a red border and a black circle with the number "1" above it.

Review

The Review screen shows what was configured.

1. Click Save to keep the changes made to the Alarm



The screenshot shows a window titled "Review" with a close button (X) in the top right corner. The window displays the configured alarm details:

Alarm Name: Host CPU usage

Description: Default alarm to monitor host CPU usage

Targets: All Hosts on ☐ vcsa-01a.corp.local

Alarm Rules:

IF Host CPU Usage is above 80 % for 5 min

THEN Trigger the alarm as ☐ Warning

Enter maintenance mode

OR

IF Host CPU Usage is above 90 % for 5 min

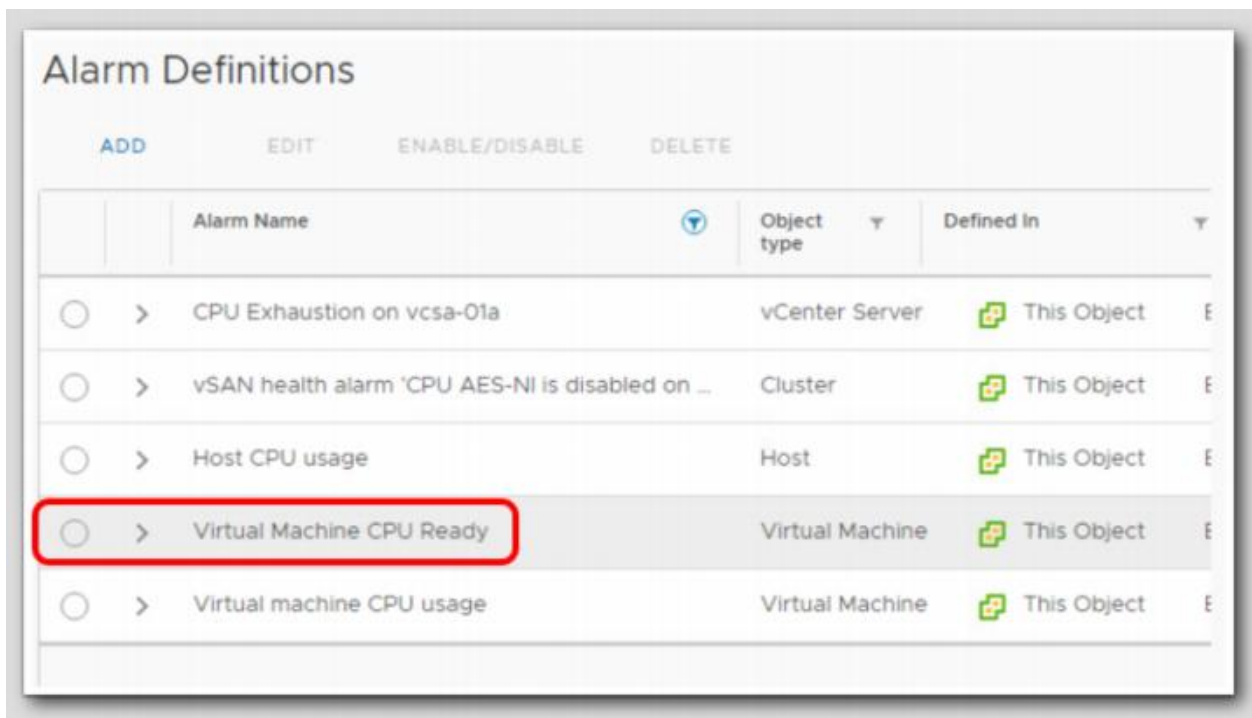
THEN Trigger the alarm as ☒ Critical

At the bottom left, there is a toggle switch for "Enable this alarm" which is currently turned on.

At the bottom right, there are three buttons: "CANCEL", "BACK", and "SAVE". The "SAVE" button is highlighted with a red border and a black circle with the number "1" above it.

New Alarm Created

If the Alarm Name field is still filtering by "cpu", the newly created alarm is displayed. If not, simply click on the Alarm Name field and type cpu ready to see it



The screenshot shows the 'Alarm Definitions' interface in vSphere. At the top, there are buttons for 'ADD', 'EDIT', 'ENABLE/DISABLE', and 'DELETE'. Below these is a table with columns for 'Alarm Name', 'Object type', and 'Defined In'. The table lists several alarms, and the 'Virtual Machine CPU Ready' alarm is highlighted with a red rectangular box.

	Alarm Name	Object type	Defined In
<input type="radio"/> >	CPU Exhaustion on vcsa-01a	vCenter Server	This Object
<input type="radio"/> >	vSAN health alarm 'CPU AES-NI is disabled on ...	Cluster	This Object
<input type="radio"/> >	Host CPU usage	Host	This Object
<input type="radio"/> >	Virtual Machine CPU Ready	Virtual Machine	This Object
<input type="radio"/> >	Virtual machine CPU usage	Virtual Machine	This Object

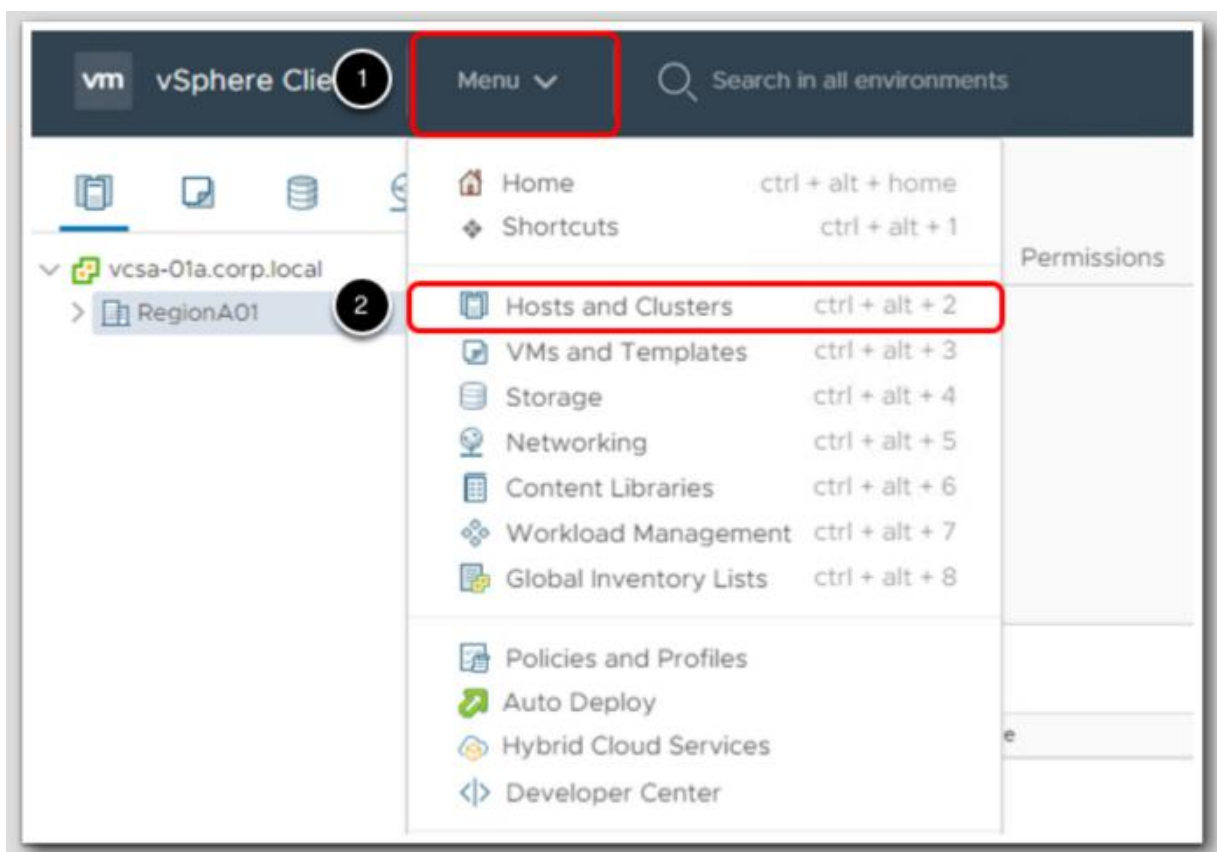
Practical 11: Use vSphere HA functionality.

vSphere Availability provides high availability for virtual machines by pooling the virtual machines and the hosts they reside on into a cluster. Hosts in the cluster are monitored and in the event of a failure, the virtual machines on a failed host are restarted on alternate hosts.

When you create a vSphere Availability cluster, a single host is automatically elected as the master host. The master host communicates with vCenter Server and monitors the state of all protected virtual machines and of the slave hosts. Different types of host failures are possible, and the master host must detect and appropriately deal with the failure. The master host must distinguish between a failed host and one that is in a network partition or that has become network isolated. The master host uses network and datastore heartbeating to determine the type of failure. Also note that vSphere Availability is a host function which means there is not a dependency on vCenter in order to effectively fail over VMs to other hosts in the cluster.

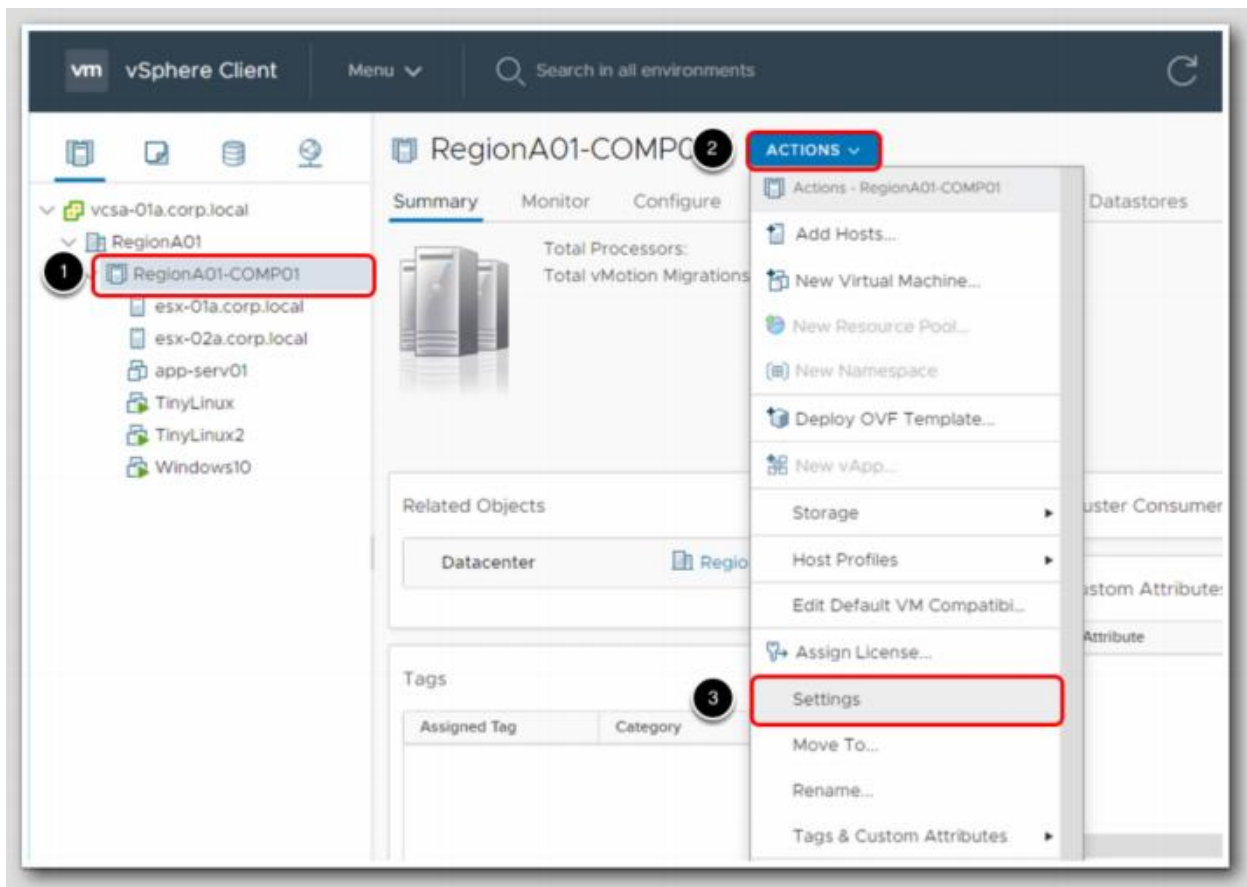
Enable and Configure vSphere Availability

1. First, click on Menu.
2. Select Hosts and Clusters.



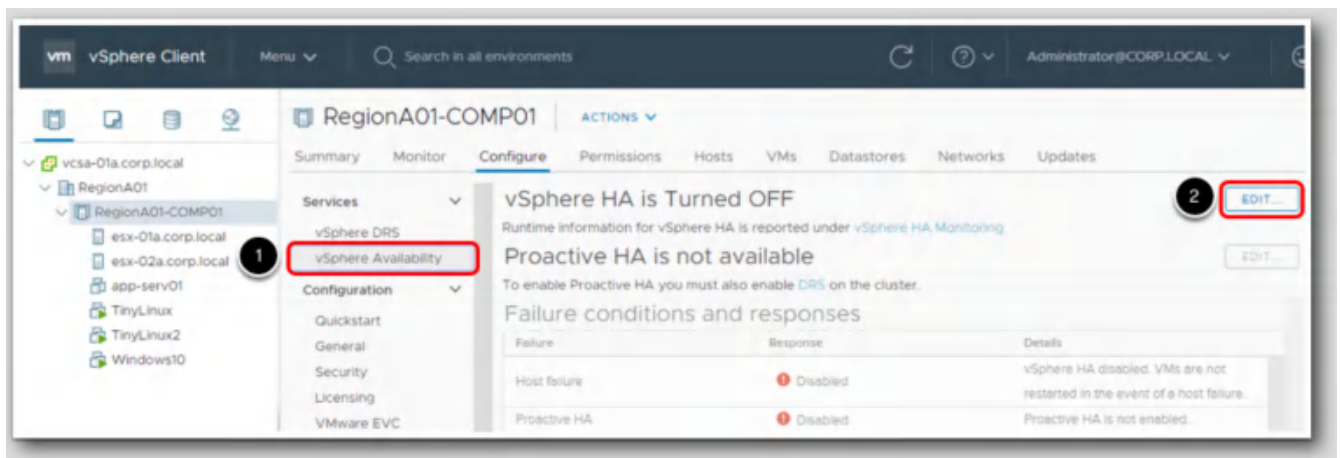
Settings for vSphere Availability

1. Click RegionA01 Cluster.
2. Click Actions to bring up the drop down-menu.
3. Click Settings.



Cluster Settings

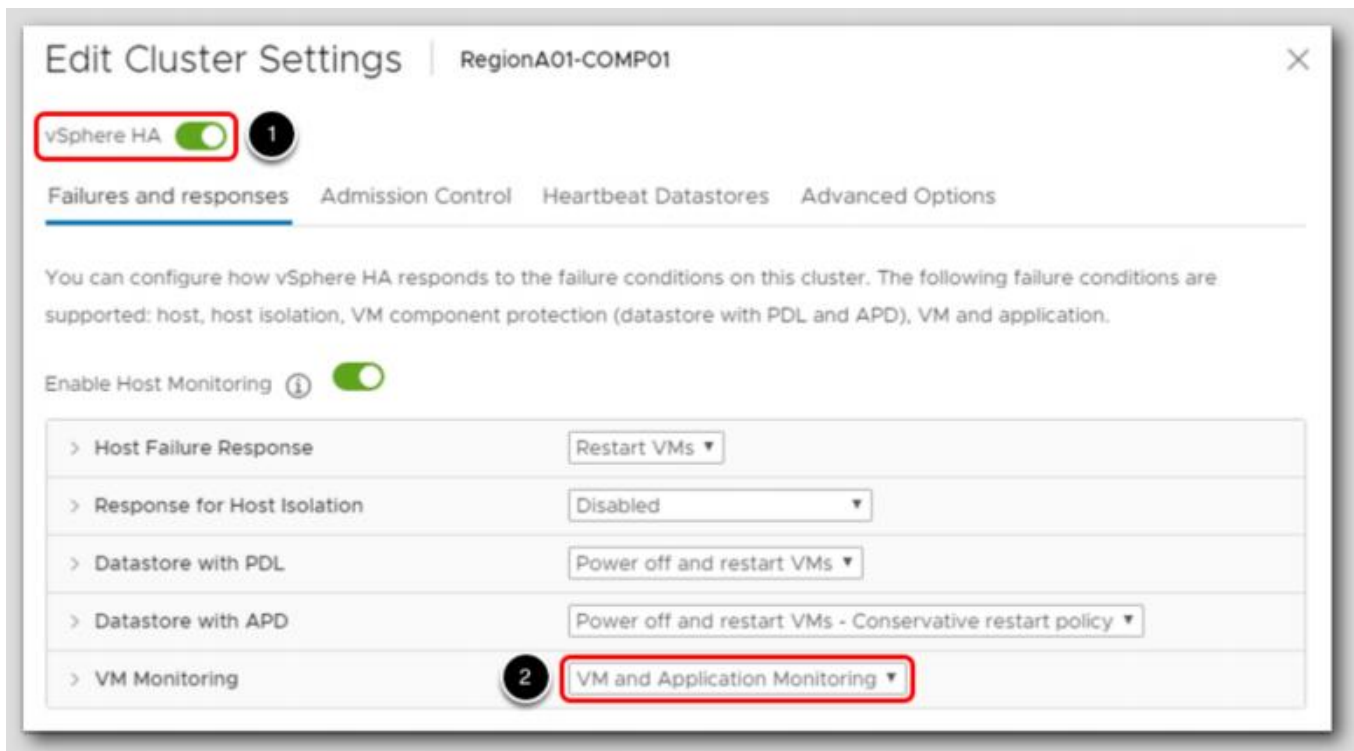
1. Click vSphere Availability under Services to bring up the settings for high availability. Note that you may need to scroll to the top of the list.
2. Click the Edit button next to vSphere HA is Turned OFF.



Enable vSphere HA

1. Click the toggle next to vSphere HA to enable it.
2. From the VM Monitoring drop-down list, select VM and Application Monitoring.

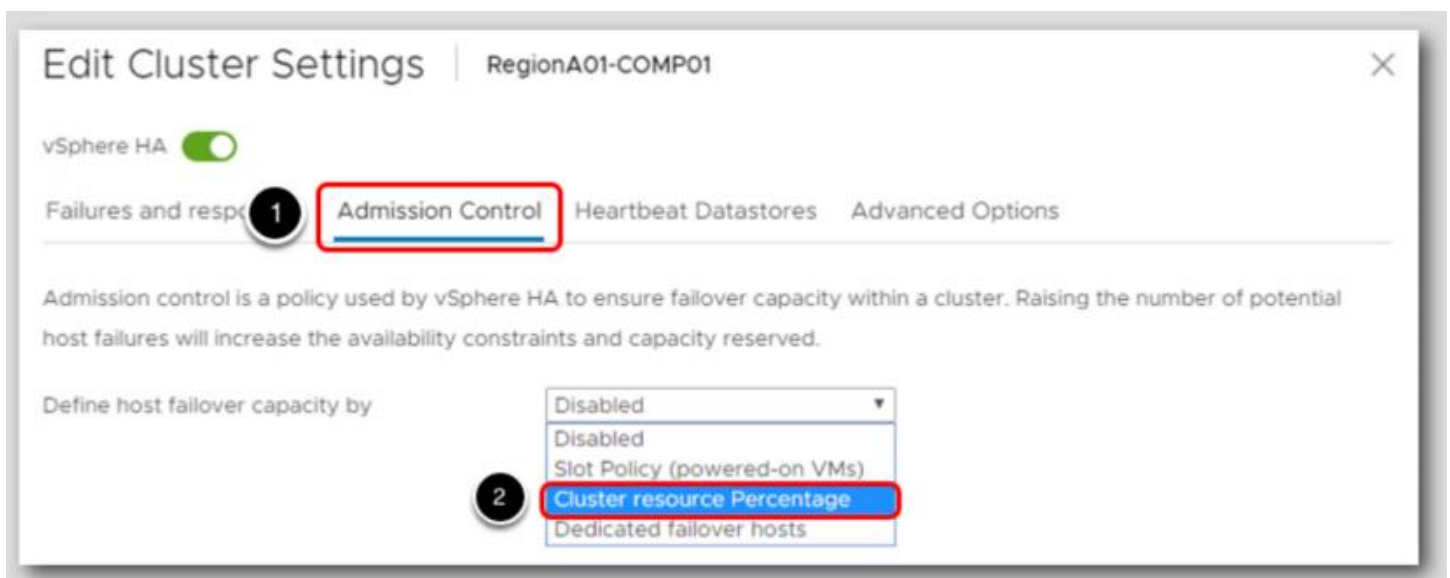
By selecting VM and Application Monitoring, a VM will be restarted if heartbeats are not received within a set time, the default is 30 seconds.



Admission Control

1. Click the Admission Control tab.
2. In the Define host failover capacity by drop-down menu, select Cluster resource Percentage.

We are setting aside a certain percentage of CPU and Memory resources to be used for failover, in the above case 25% for each.

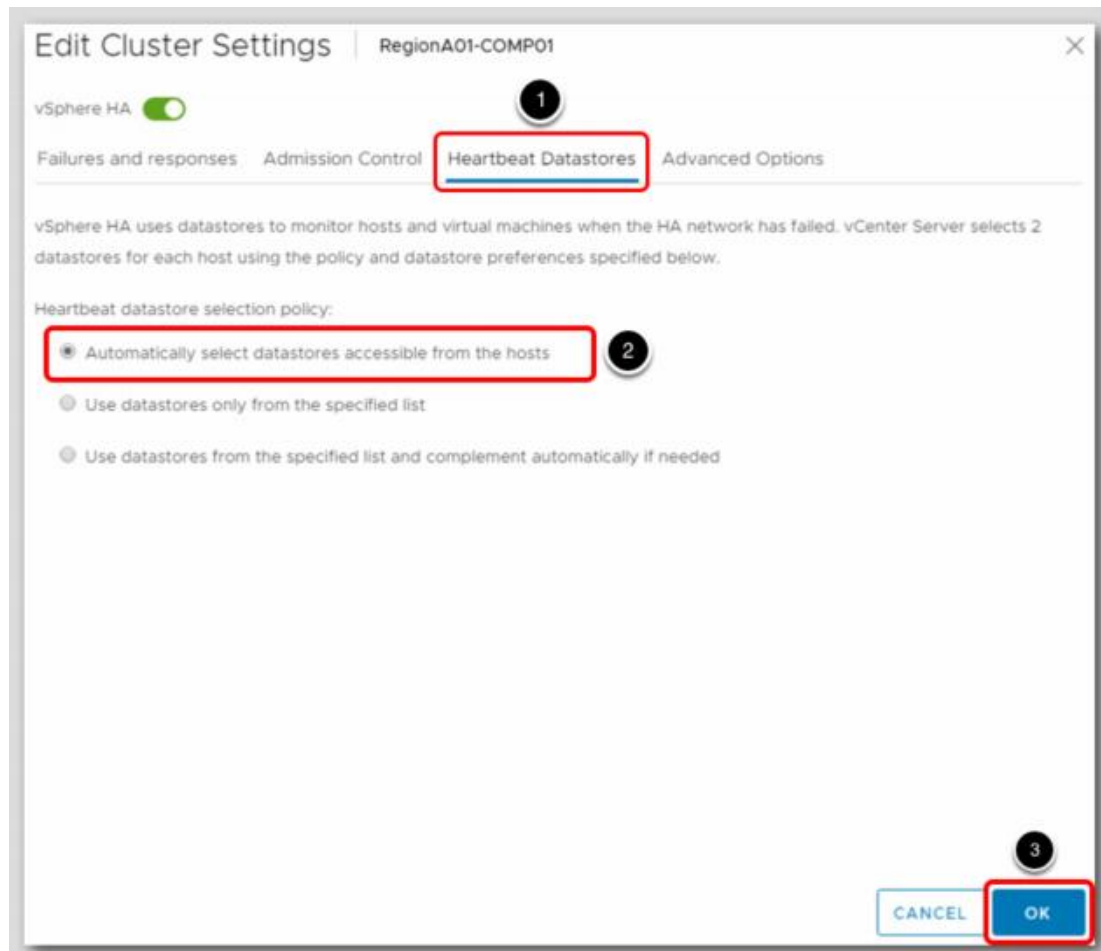


Heartbeat Datastores

1. Click Heartbeat Datastores
2. Select Automatically select datastores accessible from the hosts.

This is another layer of protection. Heartbeat Datastores allows vSphere HA to monitor hosts when a management network partition occurs and to continue to respond to failures that occur.

3. Click OK to enable vSphere HA



Monitor the task

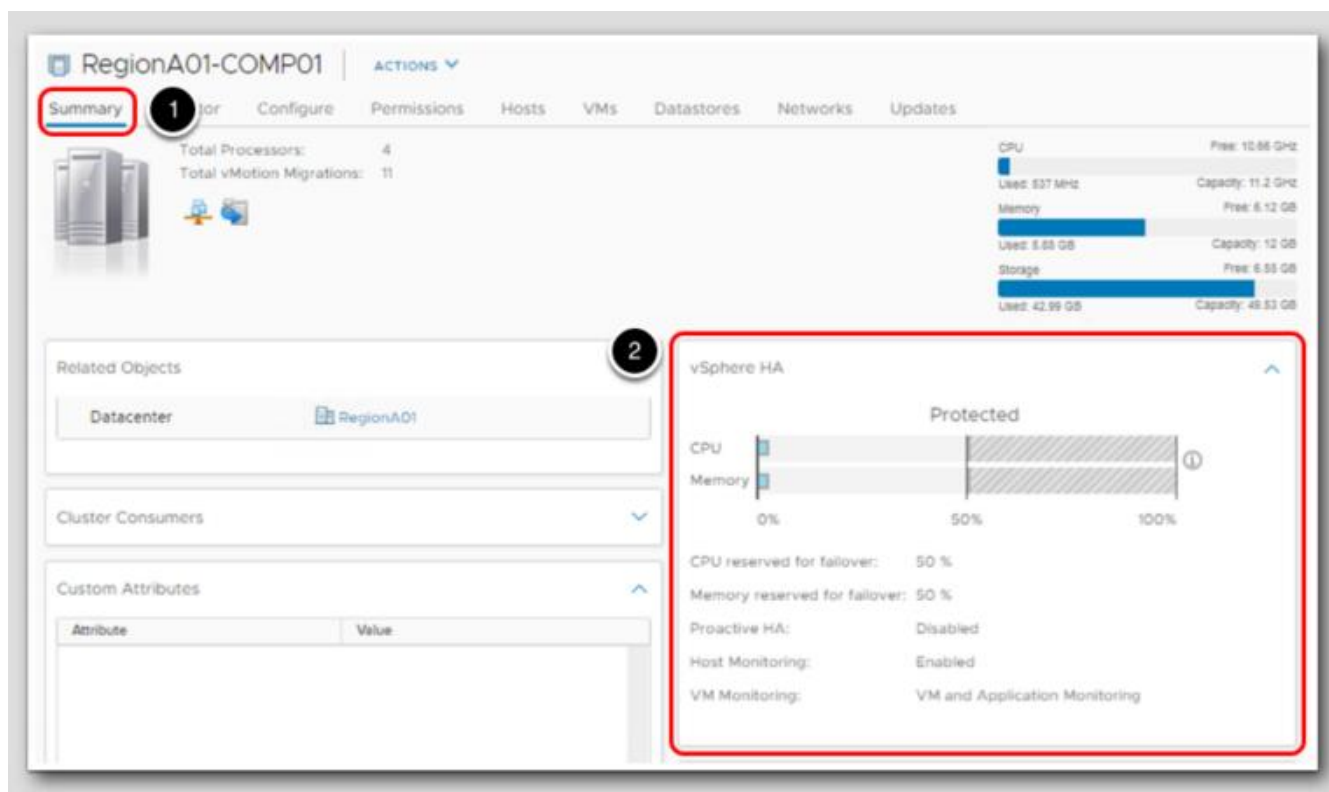
It will take a minute or two to configure vSphere HA. You can monitor the progress in the Recent Tasks window.

Recent Tasks		Alarms						
Task Name	Target	Status	Details	Initiator	Queued For	Start Time	Completion Time	Server
Configuring vSphere HA	esx-01a.corp.l...	6%	Installing vSphere HA agent on esx-01a.corp.local	System	6 ms	01/07/2021, 6:21:16 AM		vcasa-01a.corp.local
Configuring vSphere HA	esx-02a.corp.l...	6%	Installing vSphere HA agent on esx-02a.corp.local	System	15 ms	01/07/2021, 6:21:16 AM		vcasa-01a.corp.local

Recent Tasks		Alarms						
Task Name	Target	Status	Details	Initiator				
Configuring vSphere HA	esx-01a.corp.l...	✓ Completed	Waiting for cluster election to complete	System				
Configuring vSphere HA	esx-02a.corp.l...	✓ Completed	Waiting for cluster election to complete	System				

Use the Summary Tab to Verify that HA Is Enabled

1. Click the Summary tab
2. Locate and expand the vSphere HA panel in the data area: click on the ">" to the right of the panel's name to expand it.



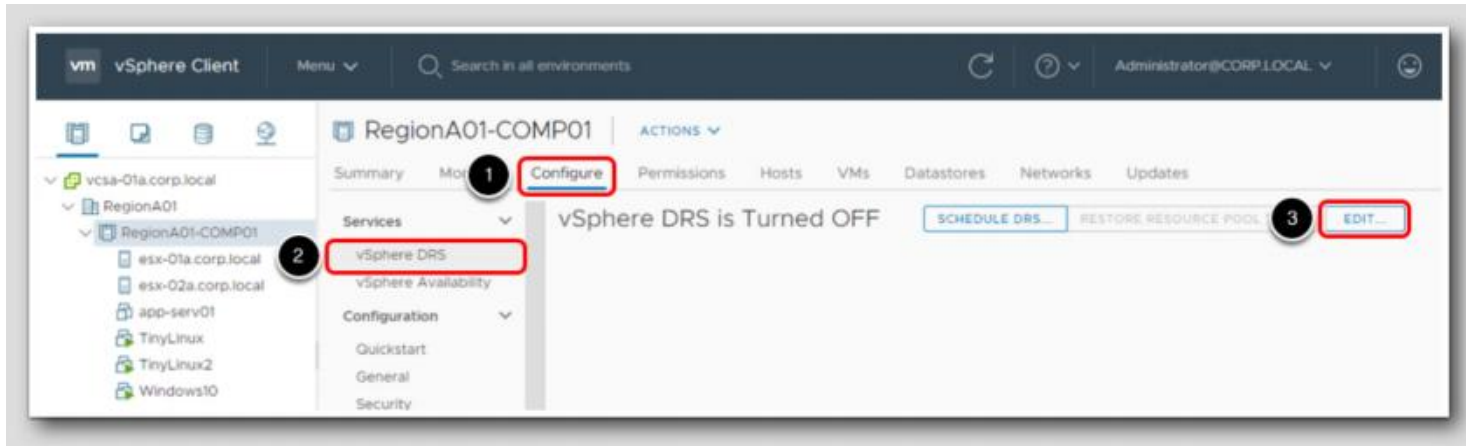
If vSphere HA does not show Protected and the tasks completed successfully, you may need to click the refresh button.

Notice the bars that display resource usage in blue, protected capacity in light gray, and reserve capacity using stripes.

Practical 12: Implement a vSphere DRS cluster.

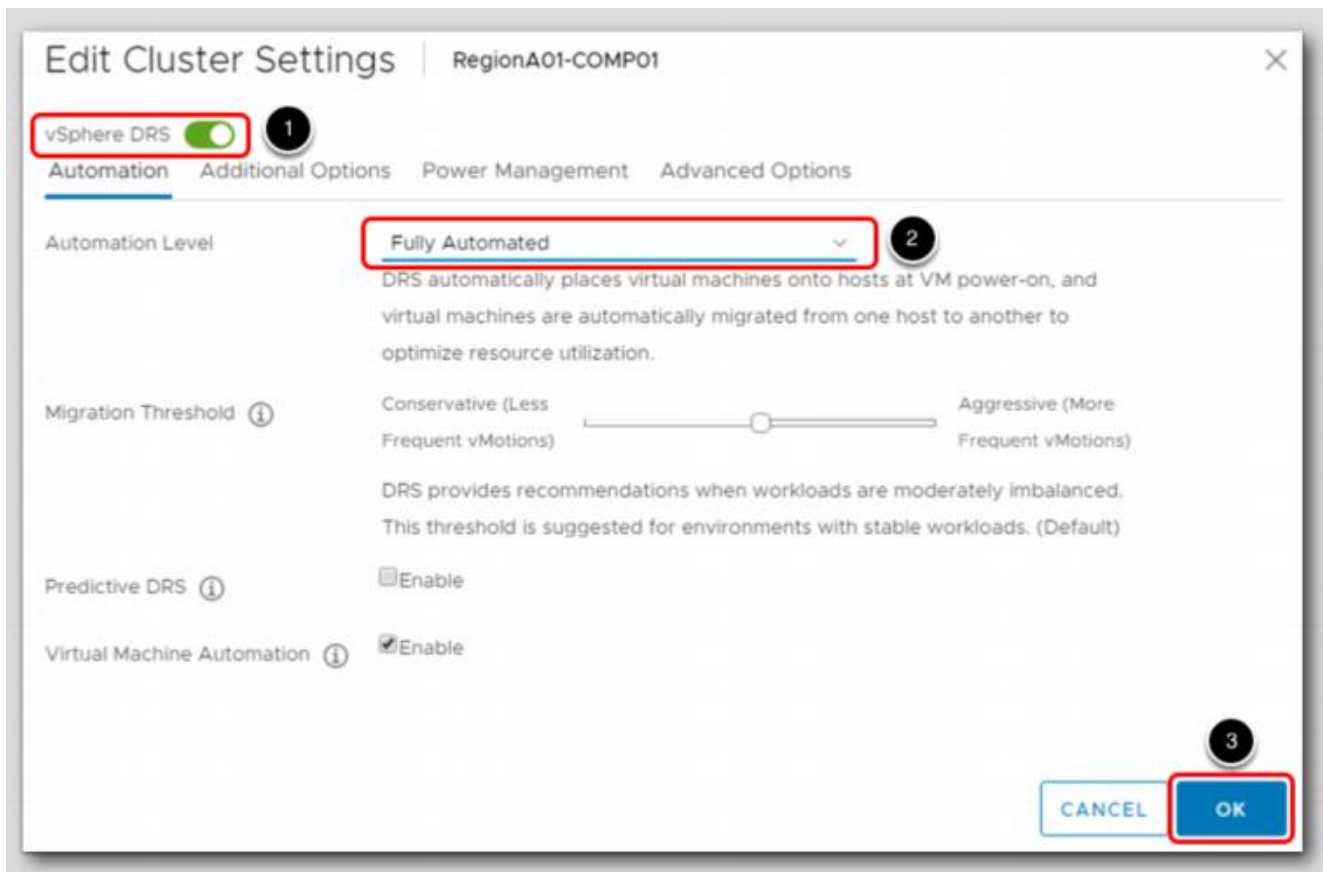
Enable Distributed Resource Scheduler (DRS)

1. Click on the Configure tab to start the process of enabling Distributed Resource Scheduler.
2. Click vSphere DRS.
3. Click on the Edit button to modify the DRS settings.



Enable Distributed Resource Scheduler (DRS)

1. Verify that vSphere DRS is enabled. If not, click the vSphere DRS to enable.
2. Click the drop-down box and select Fully Automated.
3. Click OK.



Automation Levels

Automation Level	Action
Manual	<ul style="list-style-type: none">Initial placement: Recommended host(s) is displayed.Migration: Recommendation is displayed.
Partially Automated	<ul style="list-style-type: none">Initial placement: Automatic.Migration: Recommendation is displayed.
Fully Automated	<ul style="list-style-type: none">Initial placement: Automatic.Migration: Recommendation is executed automatically.

The chart shown above is showing how DRS affects placement and migration according to the setting Manual, Partially Automated or Fully Automated.

Use the Cluster's Summary Tab to Check Cluster Balance

1. Click the Summary tab to display the current status of the cluster.
2. The Summary tab of the Cluster RegionA01-COMP01 shows the current balance of the cluster. Also shown in the DRS section is how many recommendations or faults that have occurred with the cluster. (You may have to scroll down to see the vSphere DRS widget)

The screenshot shows the vSphere Cluster Summary page for RegionA01-COMP01. The 'Summary' tab is selected and highlighted with a red box and a '1' in a circle. The 'vSphere DRS' widget is highlighted with a red box and a '2' in a circle. The widget displays the Cluster DRS Score as 59% and the VM DRS Score breakdown as follows:

Score Range	Count
0-20%	0 VMs
20-40%	1 VM
40-60%	0 VMs
60-80%	1 VM
80-100%	1 VM

Below the score breakdown, it shows 'DRS recommendations: 0' and 'DRS faults: 0'. At the bottom of the widget, there are two buttons: 'VIEW DRS SETTINGS' and 'VIEW ALL VMs'.