# 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.

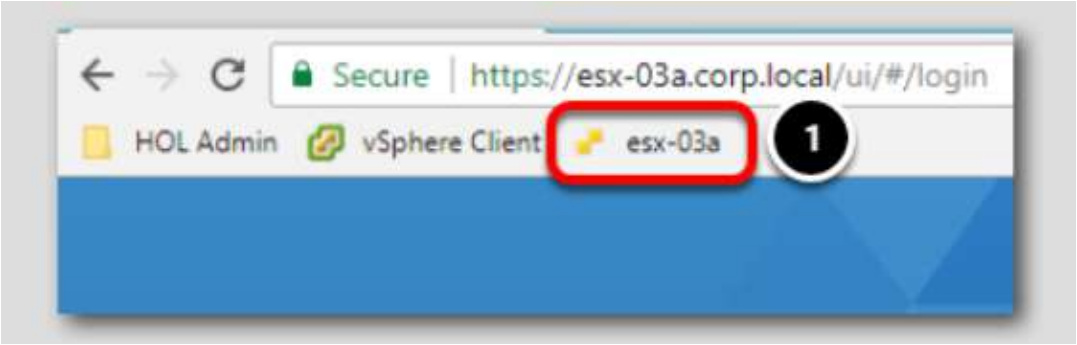
This lesson will walk through some of the most frequently used features in the ESXi Host Client.

**Launch Chrome**

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


**Select esx-03a**

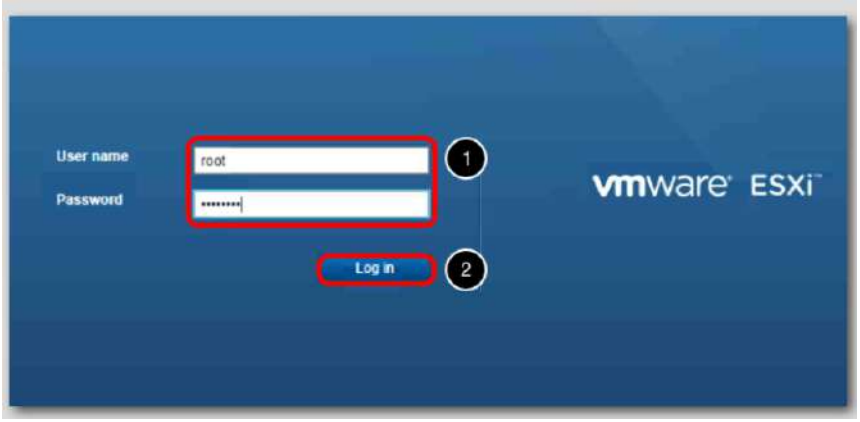
1. From the Bookmarks bar, select esx-03a




**Login**

Login with the following credentials:

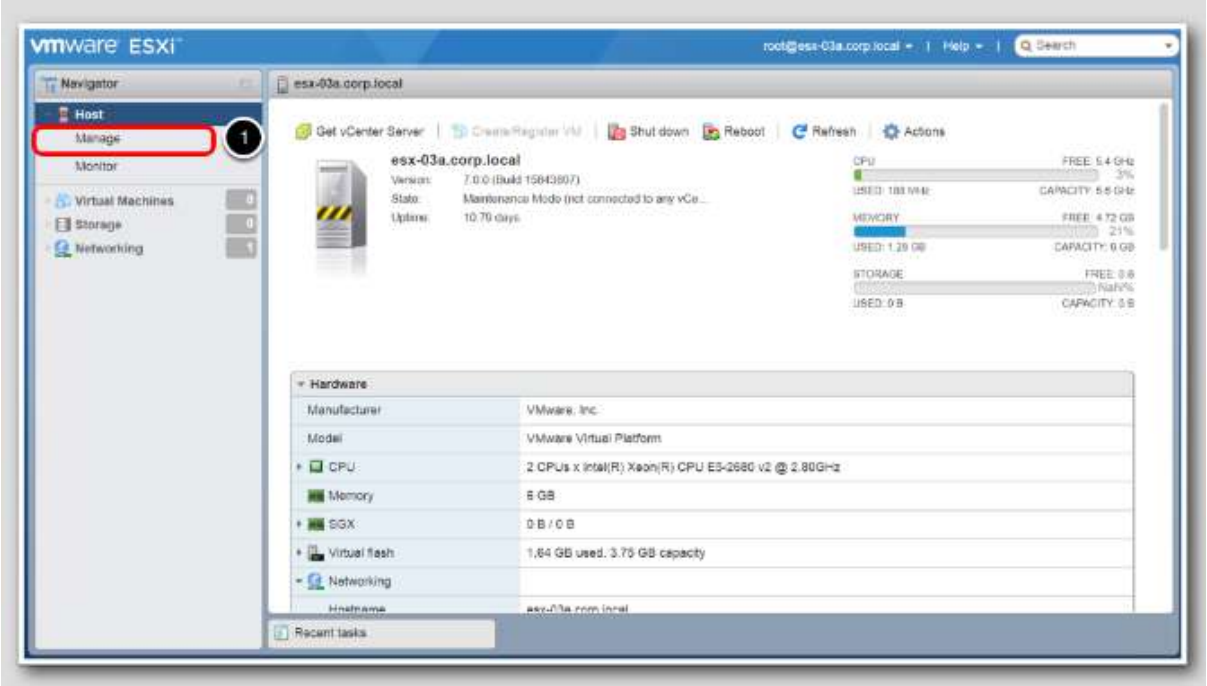
1. User name: root
2. Password: VMware1!



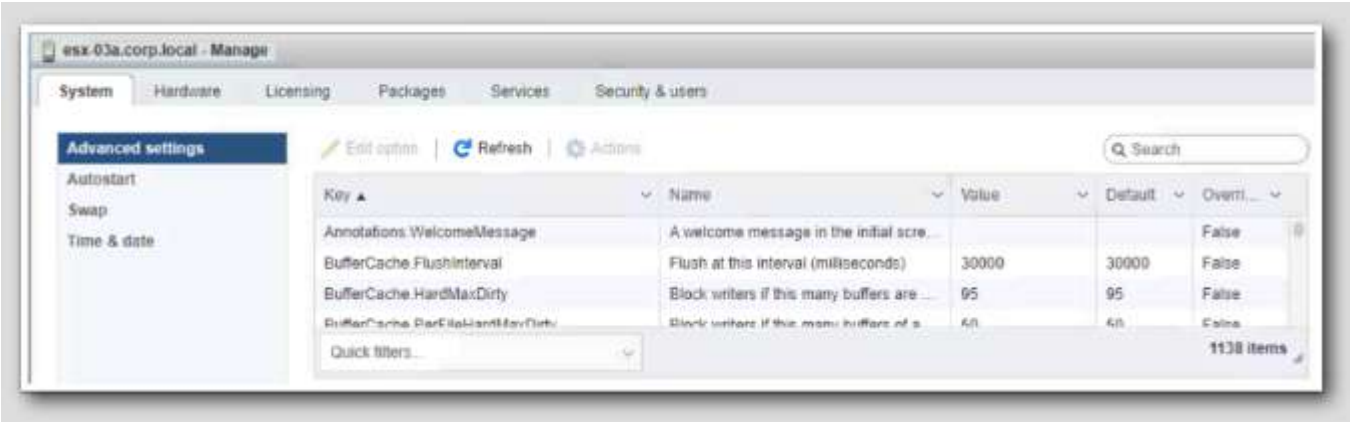
Click the Log in button. The ESXi Host, in this case, esx-03aesx-03a, can now be directly managed. This can be useful in test/dev environments where a vCenter Server is not present or in a production environment where the vCenter Server is not reachable.

**ESXi Host Client**

1. Click on Manage.

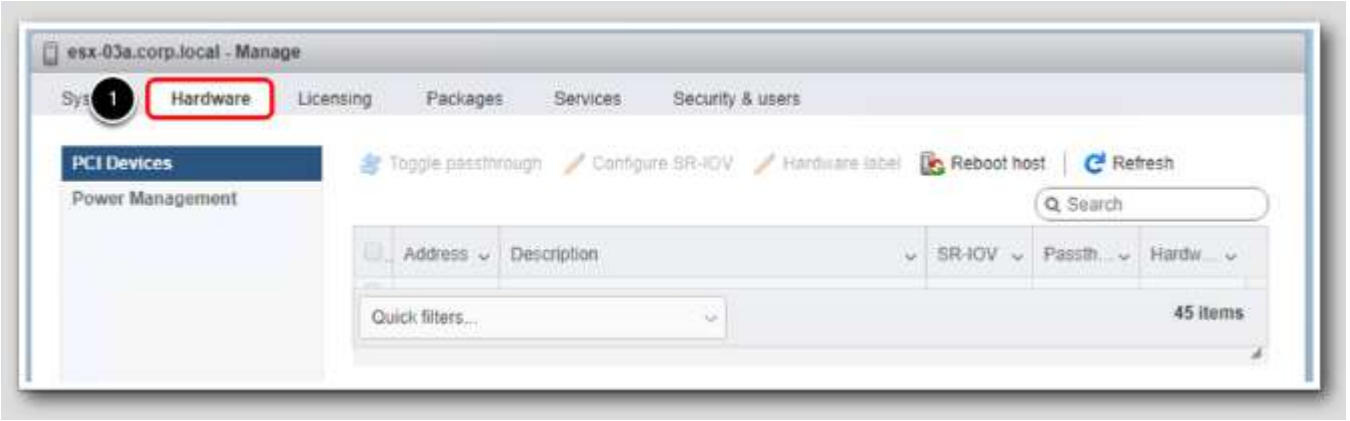



2. On the System tab, the most common options set here are the date and time for the host. It can be set and synchronized with an NTP server or set manually. In addition, Autostart settings for the host can be configured here as well.

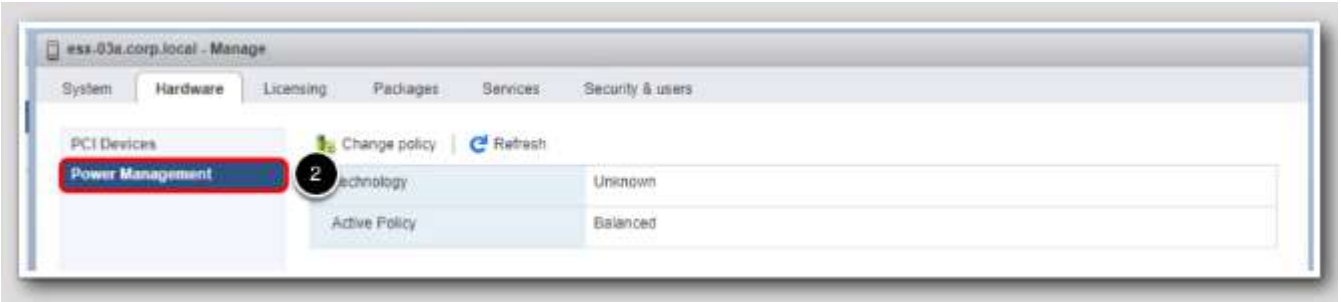



**Hardware**

1. Click on the Hardware tab.



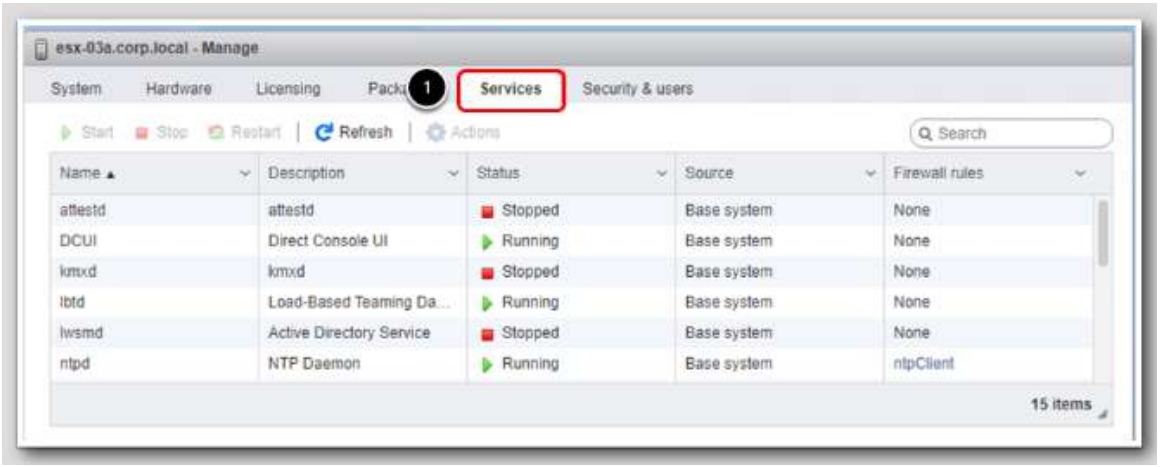
2. Click Power Management. This is where power management policies can be set for the host.




**Services**

1. Click the Services tab

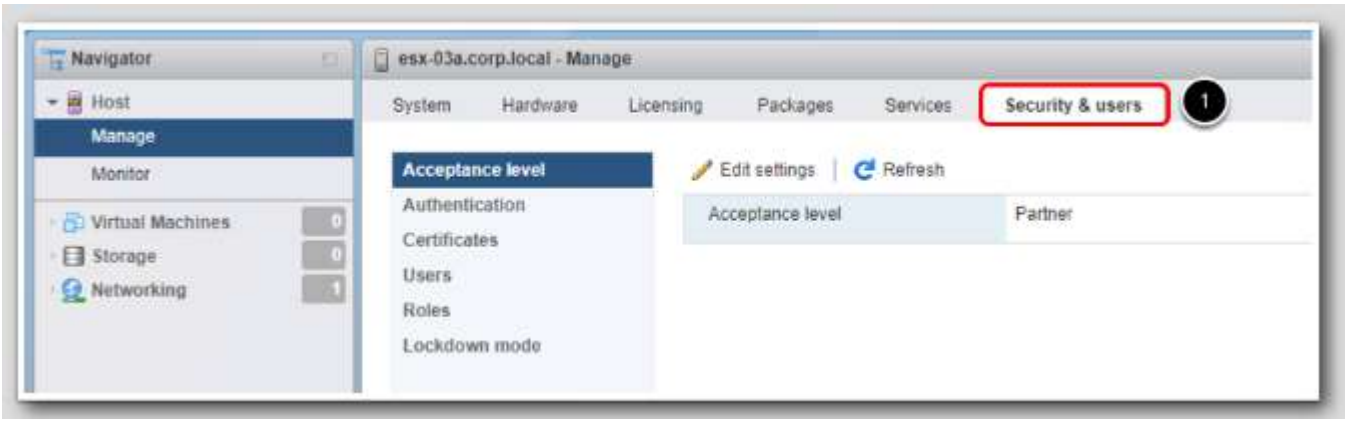
Services like SSH access and the Direct Console UI can be stopped and started from this screen




**Security and Users**

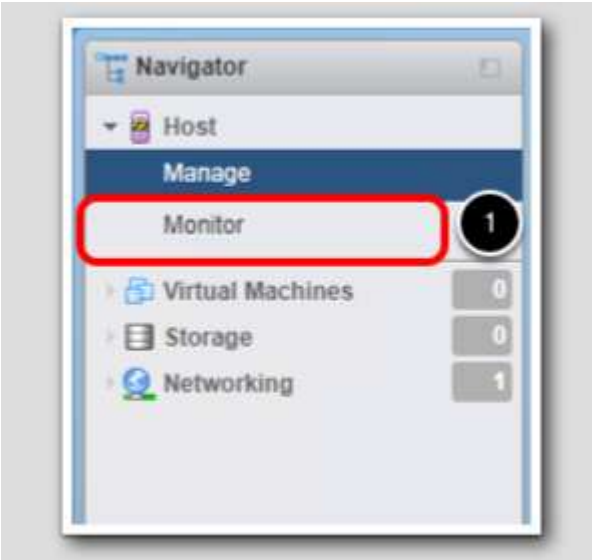
1. Click on Security & user.

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.



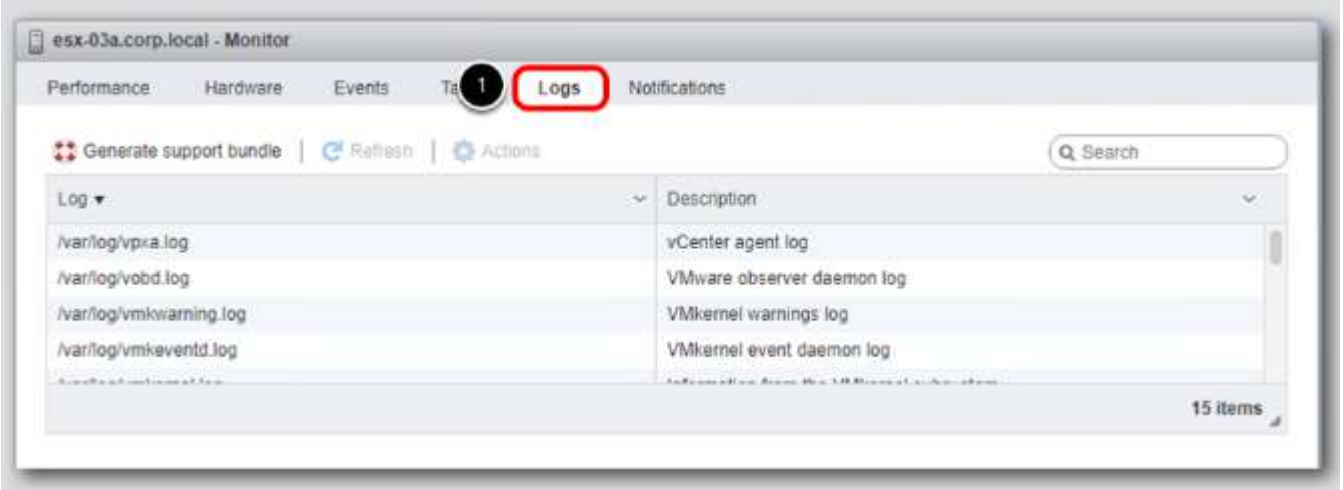

**Monitor**

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



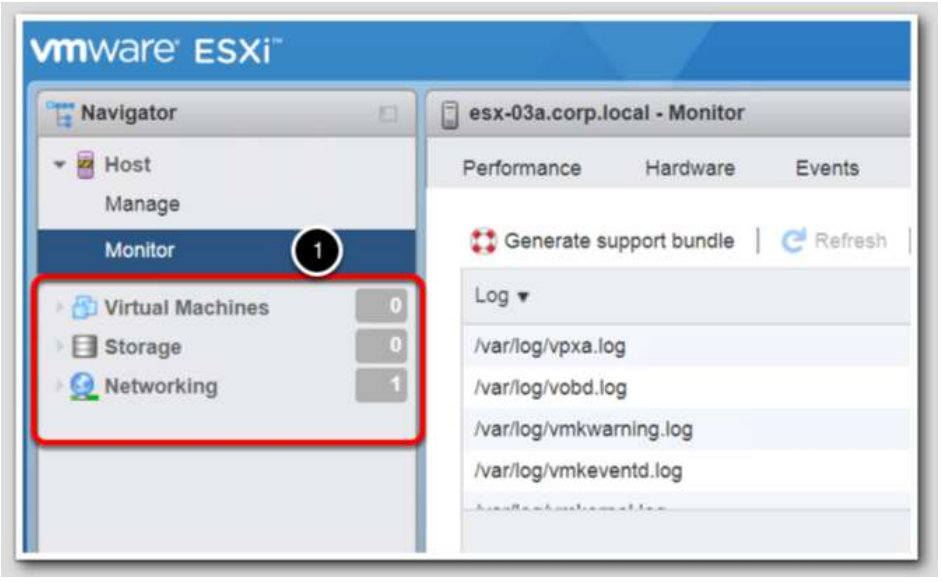

**Logs**

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

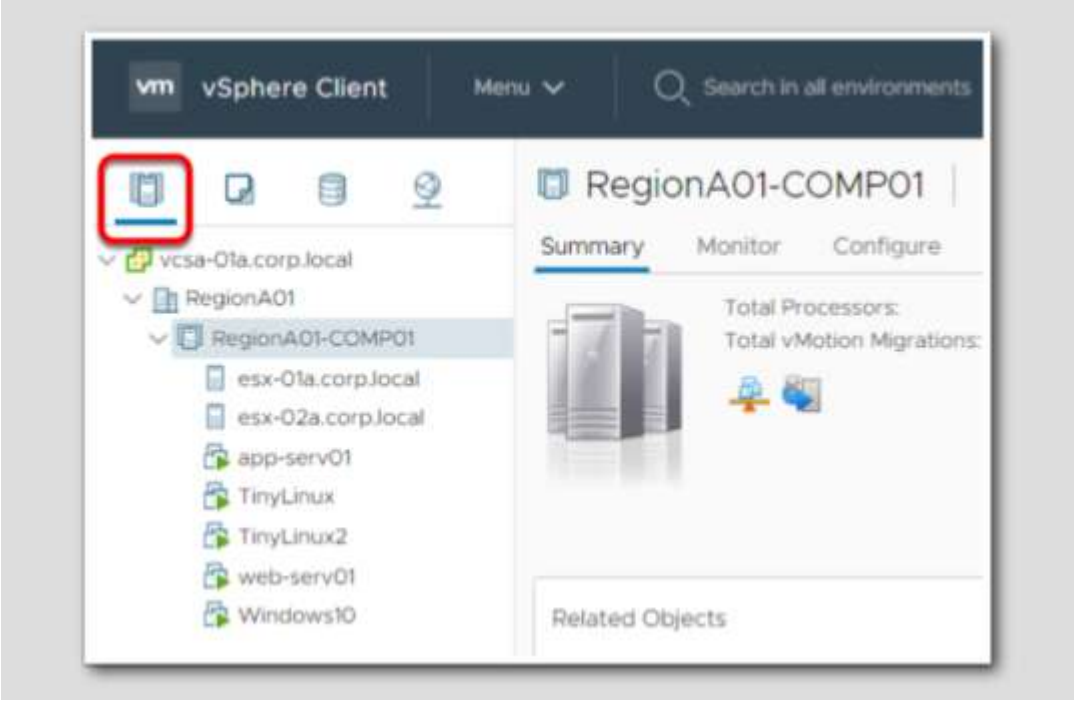
The following lesson will walk you through the process of creating and configuring the vSphere Standard Switch.

**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"

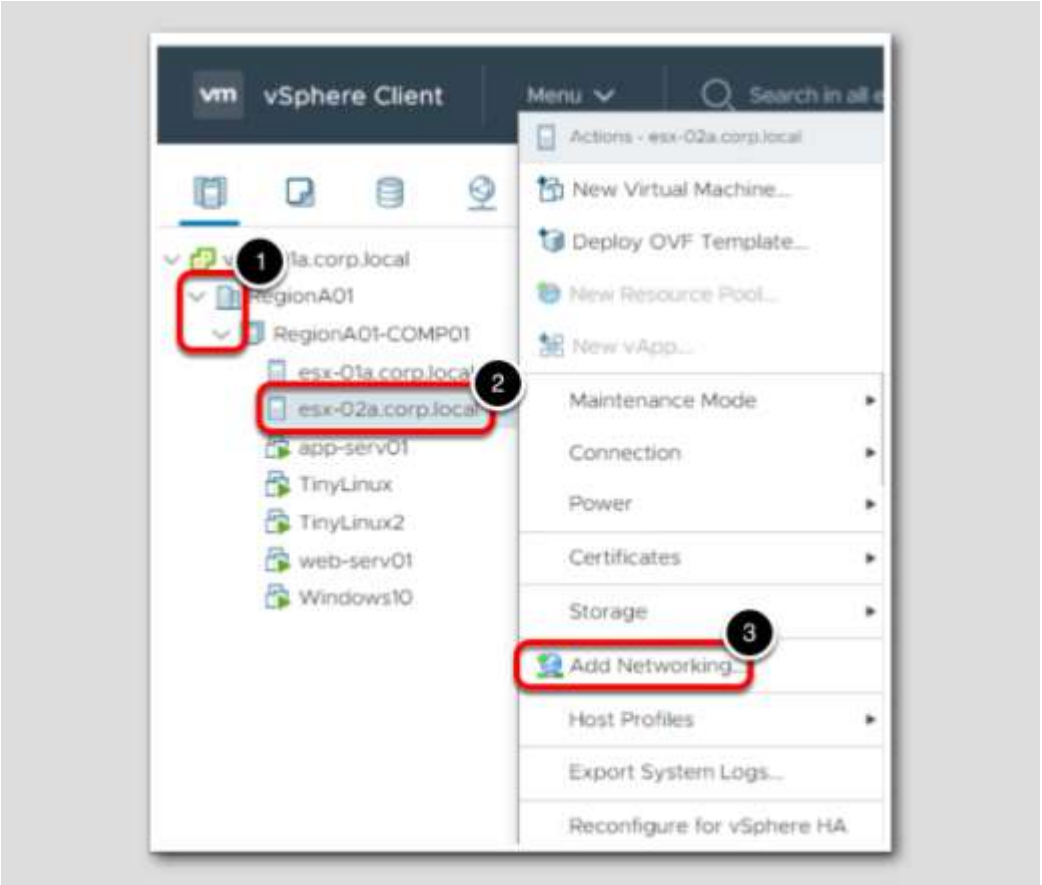

**Select Hosts and Clusters**



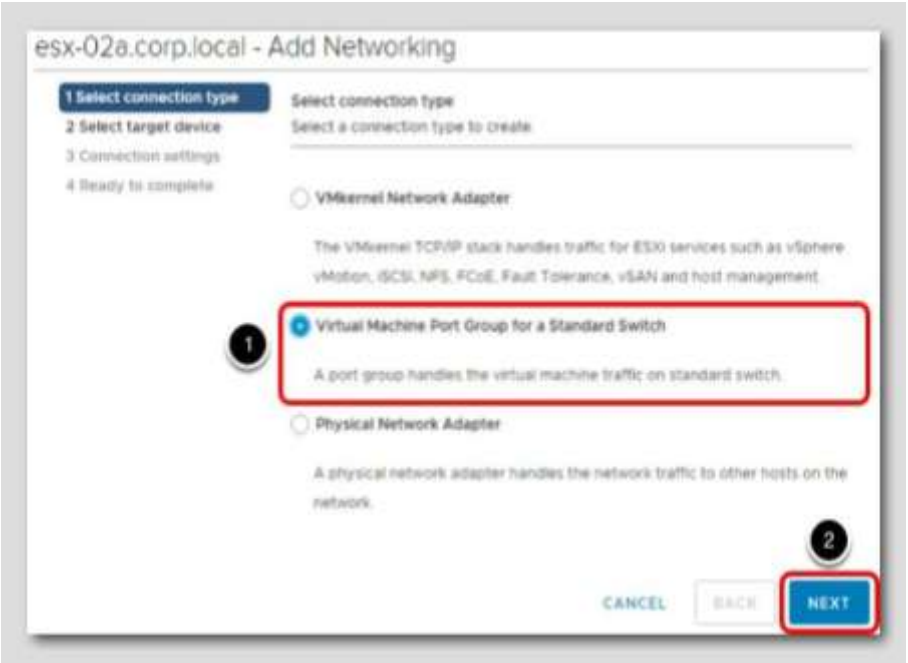

If you are not directed to "Hosts and Clusters", click the icon for it.

**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....



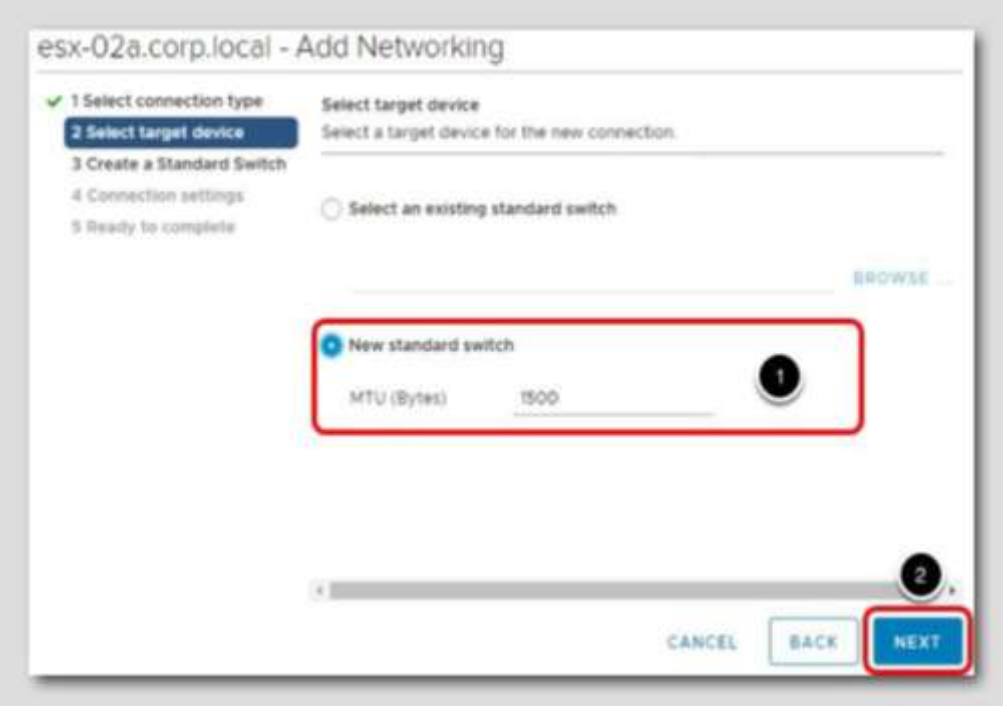

**Connection Type**



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

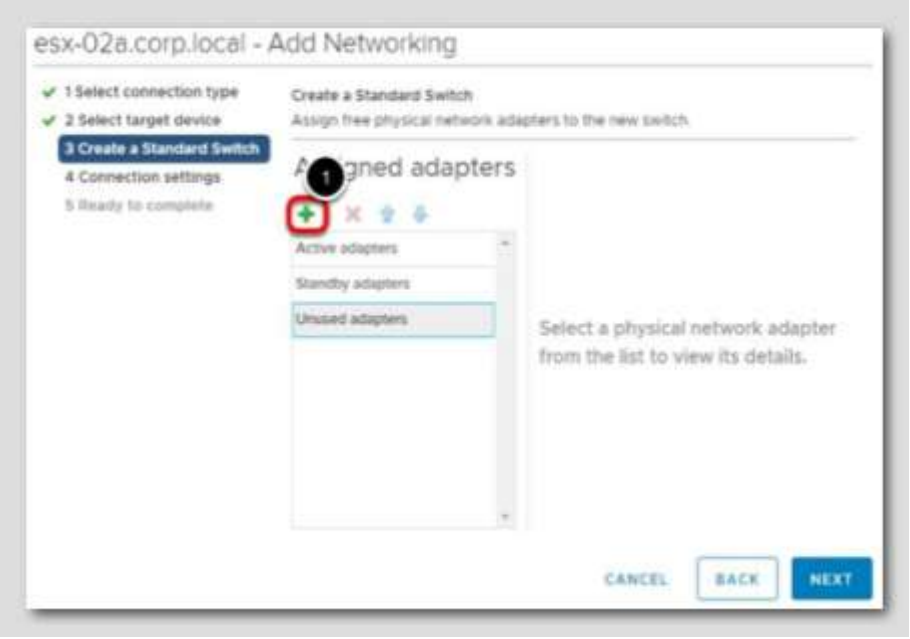
**Target Device**

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.

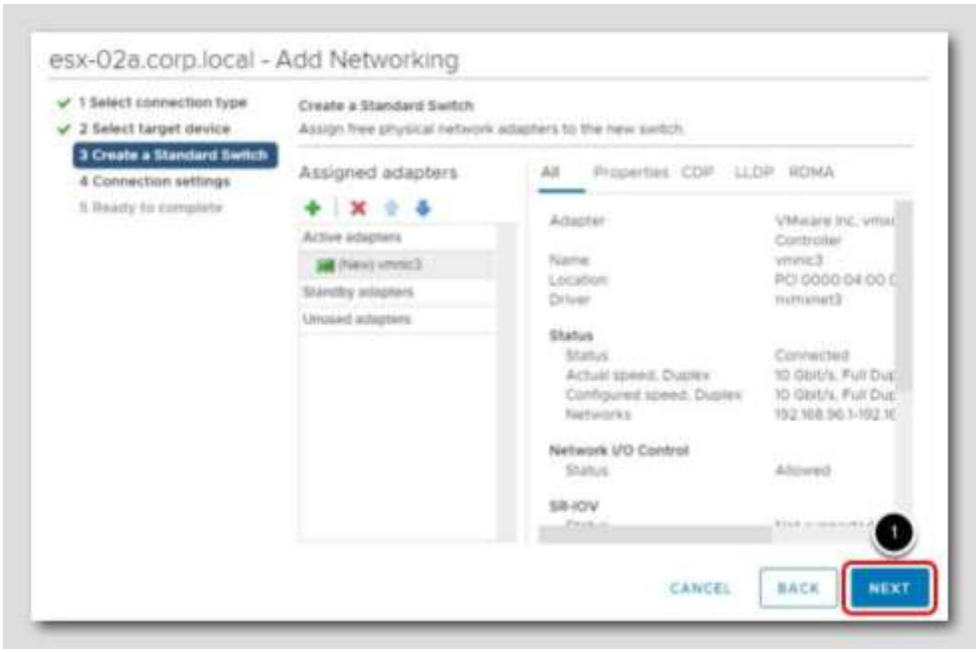



**Add Physical Adapter**

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


**Add Physical Adapter**

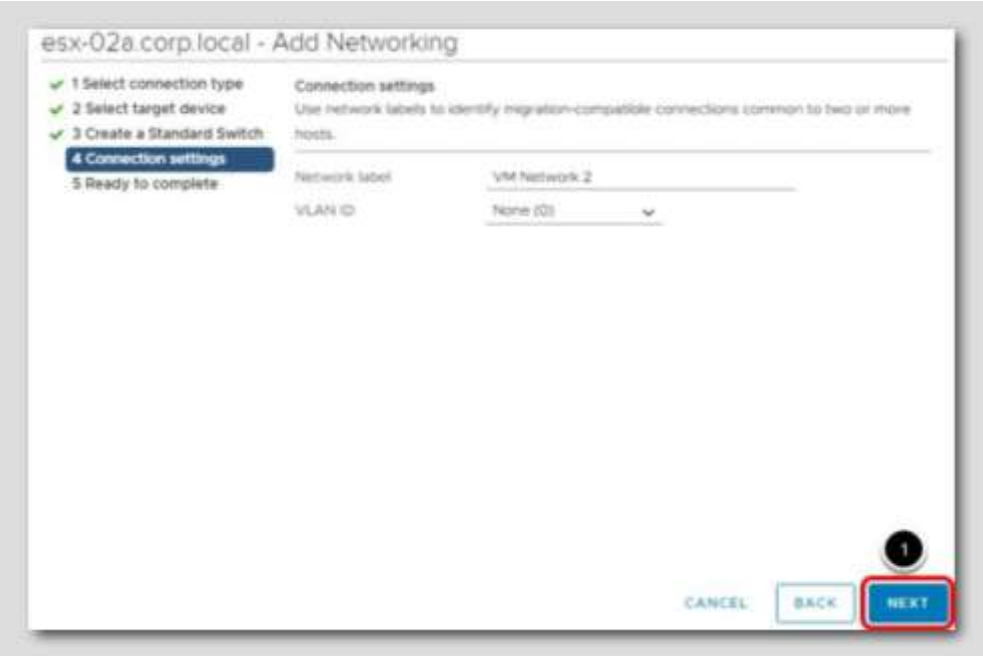
1. Click Next to continue.




**Connection Settings**

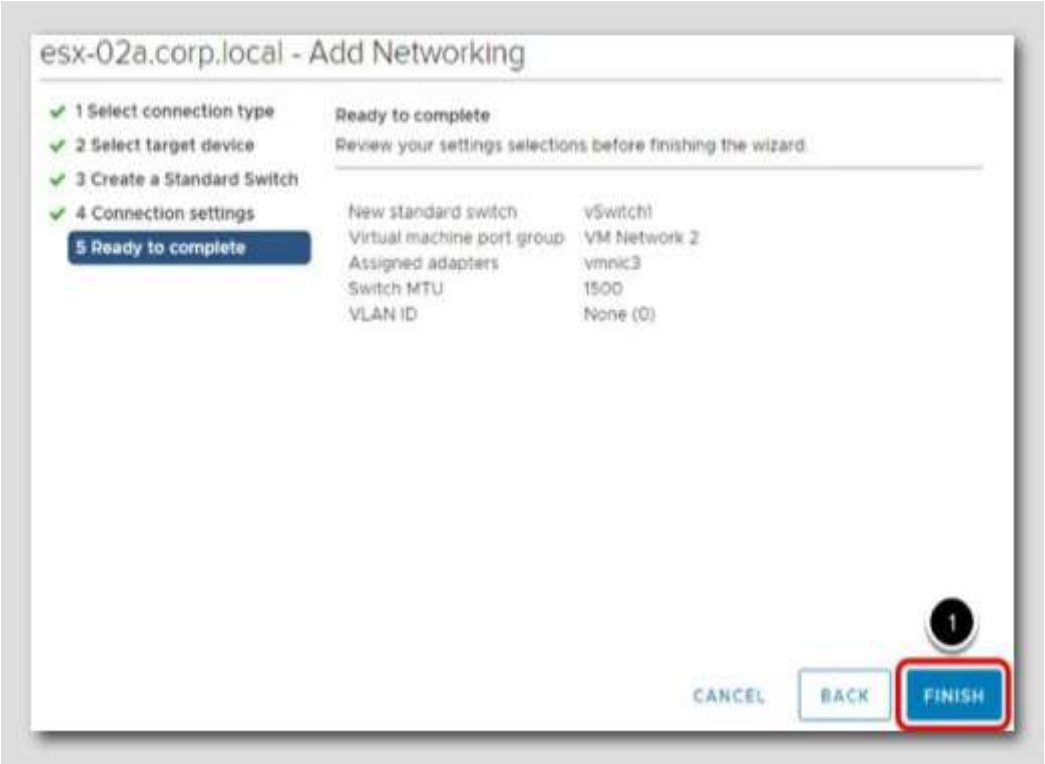
At the Connection settings step of the wizard, for Network label, leave the default name of VM Network 2. Do not change the VLAN ID; leave this set to None (0).

1. Click Next to continue.




**Complete the Wizard**

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



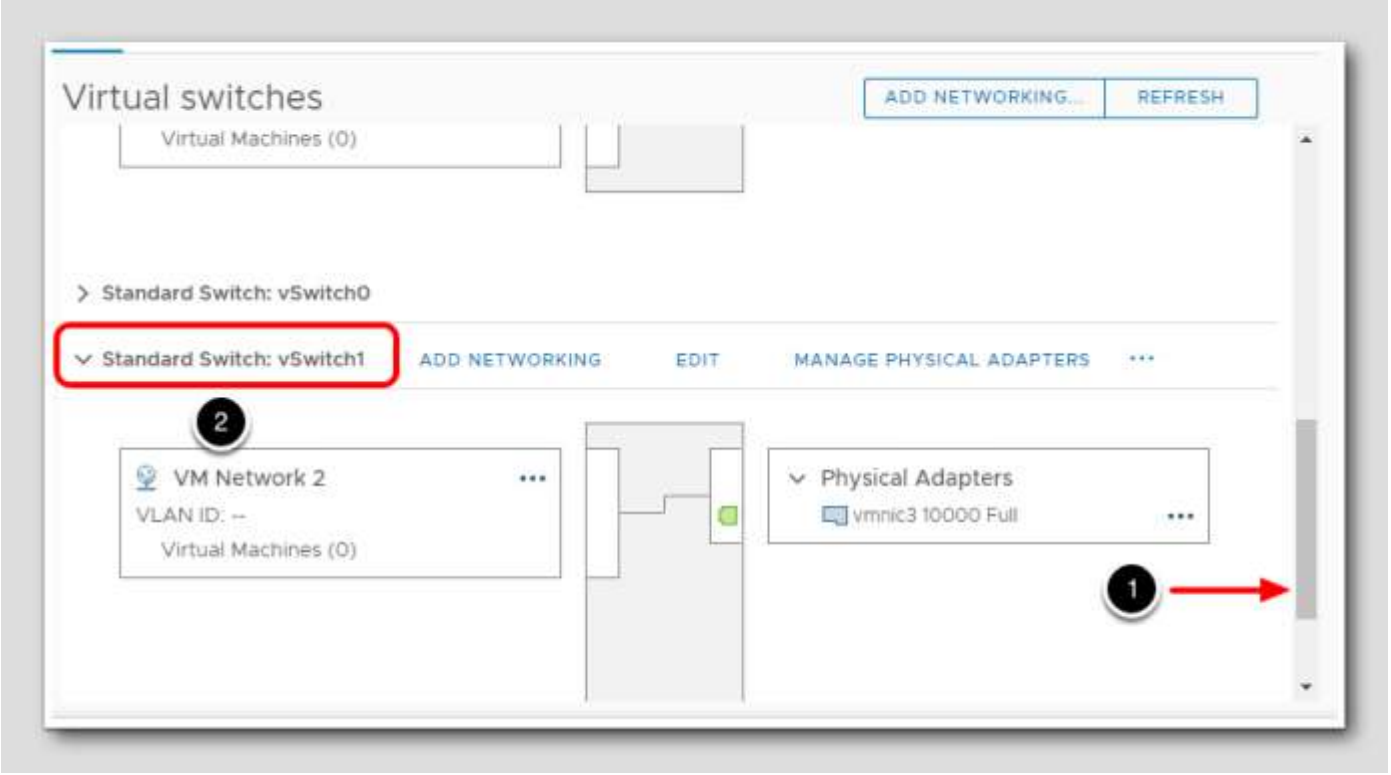

**Virtual Switches**

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.

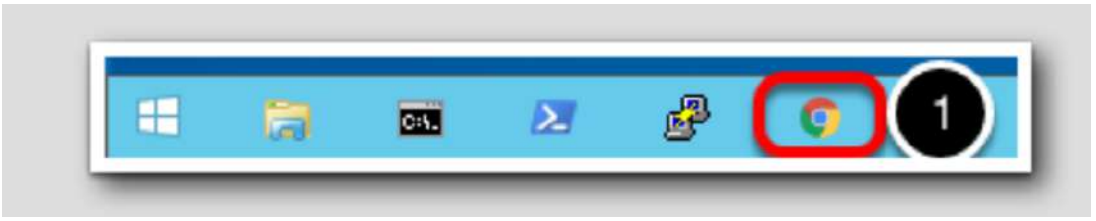
A vSphere virtual machine uses a virtual disk to store its operating system, program files, and other data associated with its activities. A virtual disk is a large physical file, or a set of files, that can be copied, moved, archived, and backed up as easily as any other file. You can configure virtual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

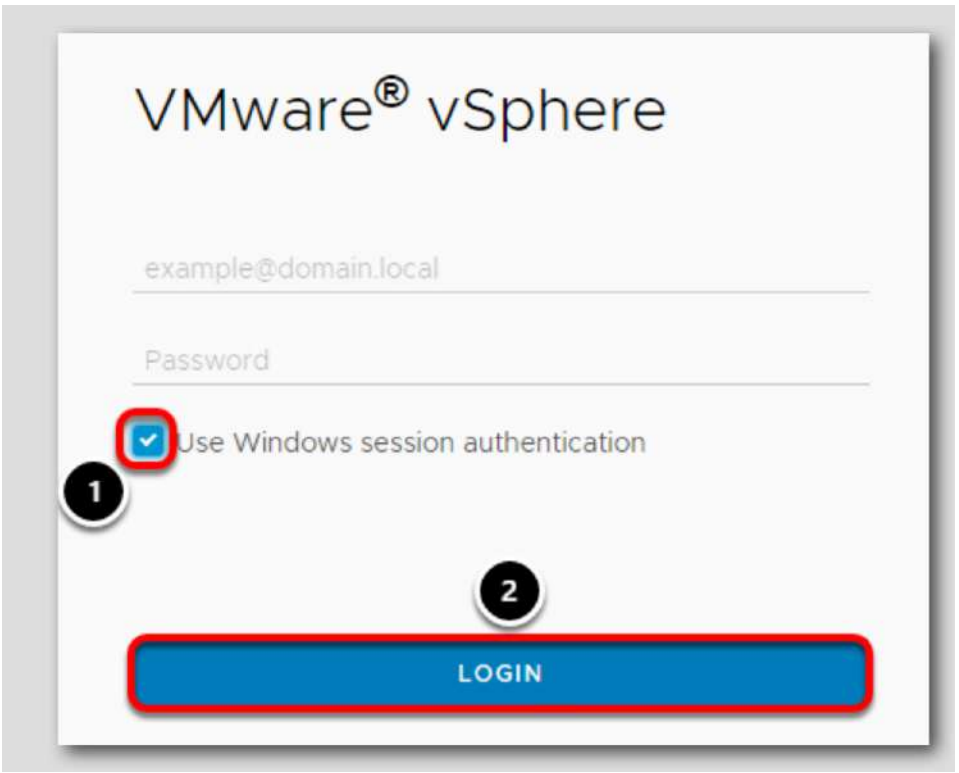
**Launch Google Chrome web browser**

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.

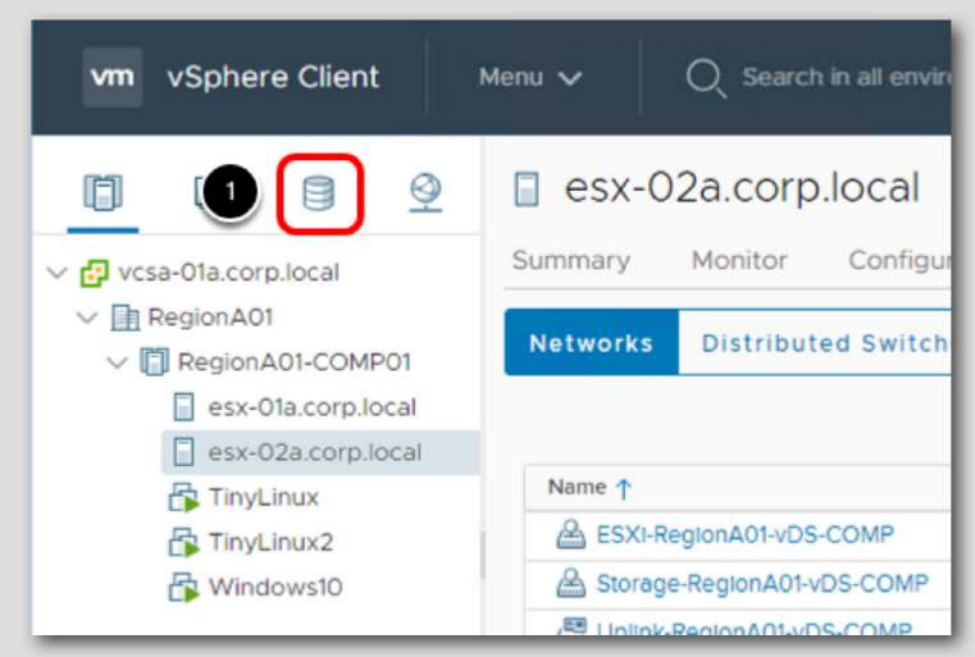


If credentials aren't saved, use the following:

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

**Navigate to Storage Management**

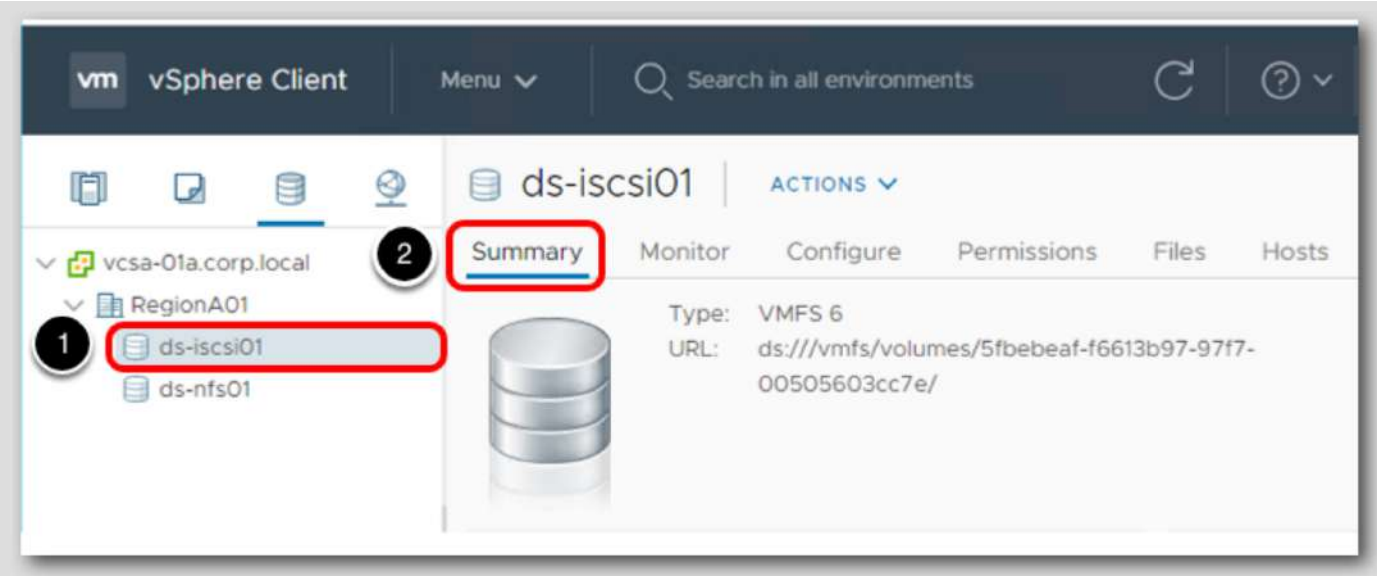
1. Select the Storage tab.




**Expand RegionA01 Datacenter**

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

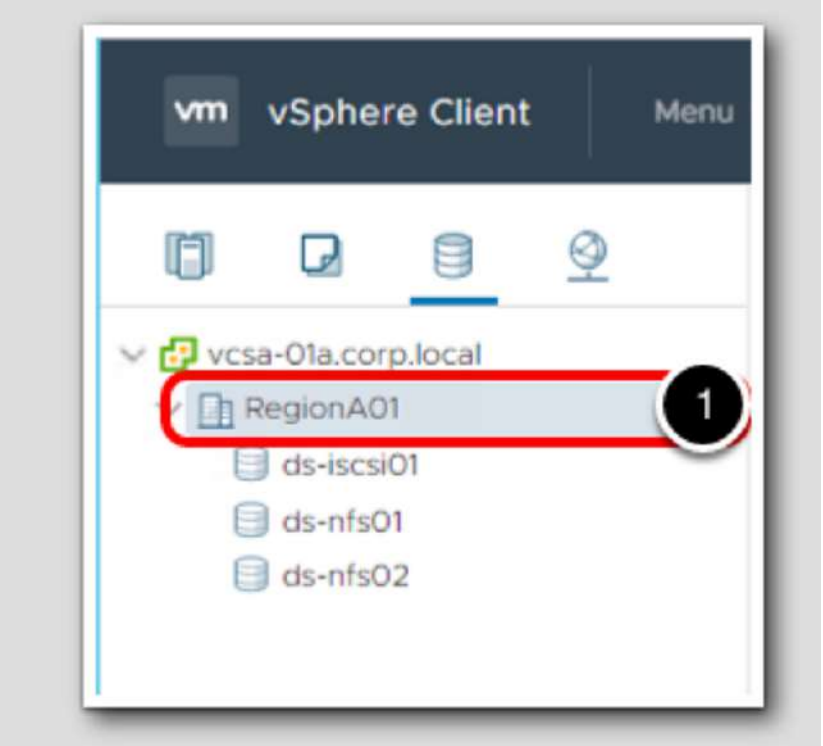
1. Select the ds-iscsi01 datastore.
2. Click on Summary for summary details of the datastore.



# Practical 4: Create and manage VMFS datastore.

**Create a VMFS Datastore**

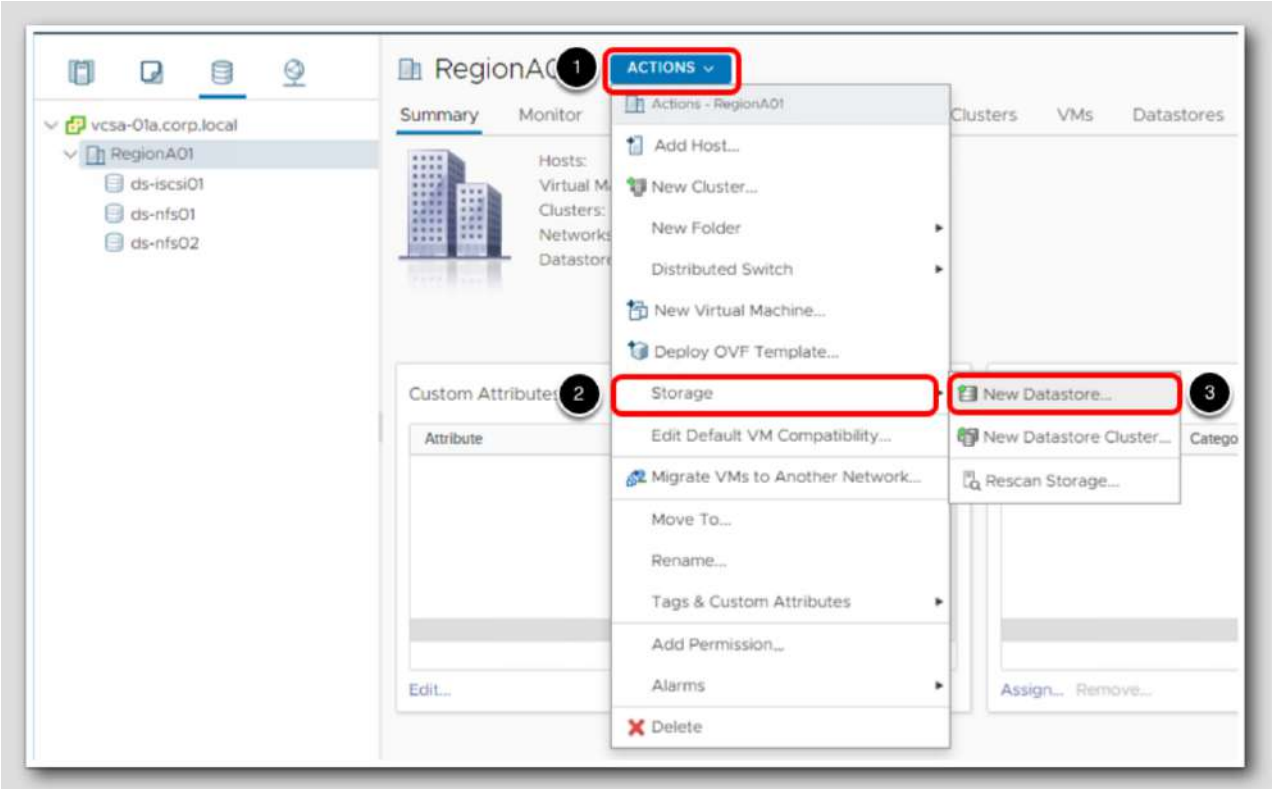
1. Select RegionA01 Datacenter.




**New Datastore**

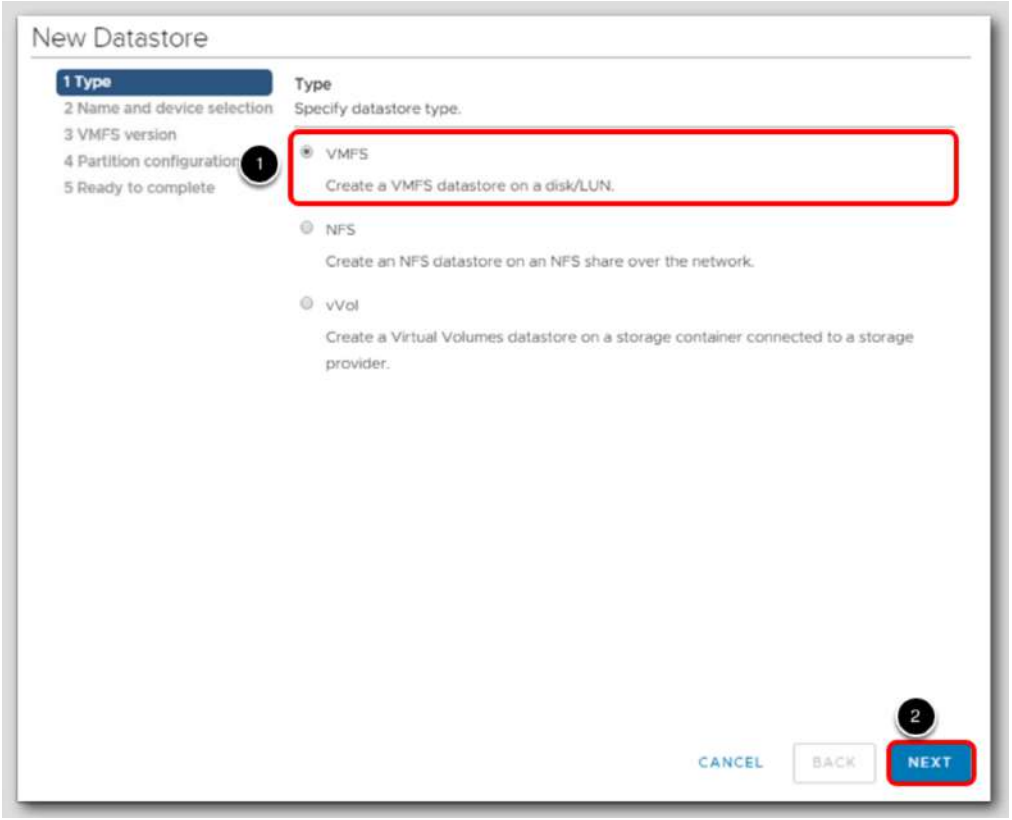
In this section, you will create a new vSphere iSCSI Datastore with a pre-provisioned iSCSI LUN.

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



**New Datastore - Type**

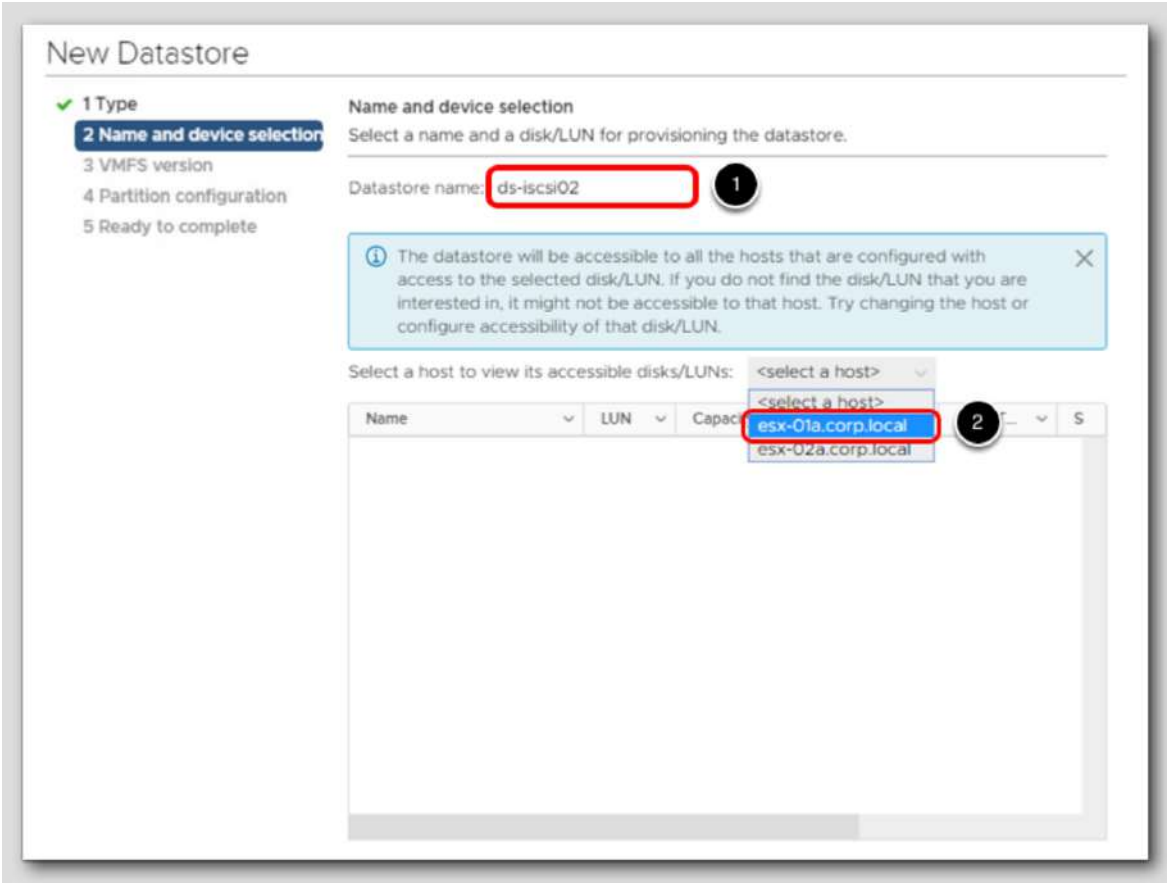
1. Verify VMFS is selected.
2. Click Next.




**New Datastore - 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.

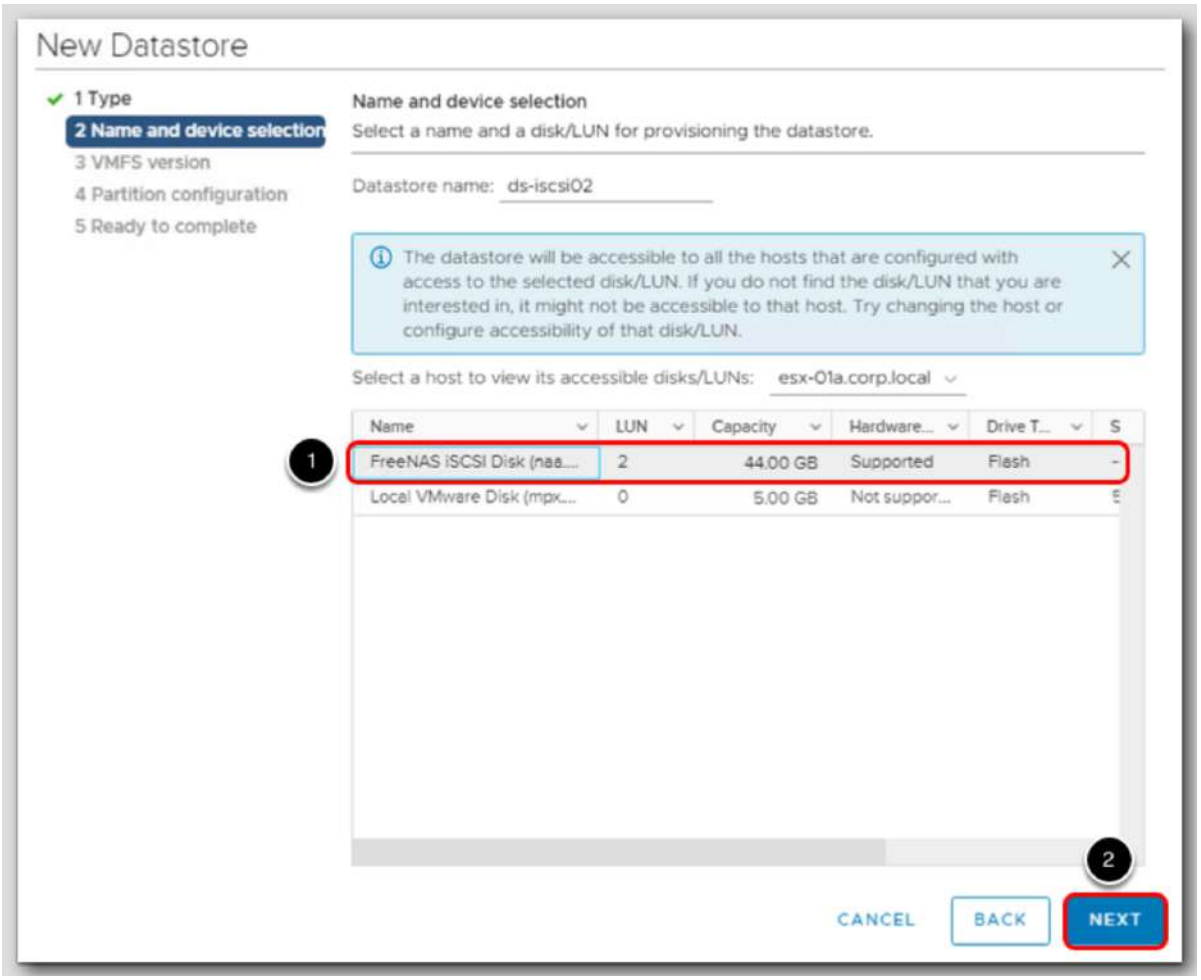
**Note: Do not click Next just yet, proceed to the next step!**



**New Datastore - Name and device configuration (cont.)**

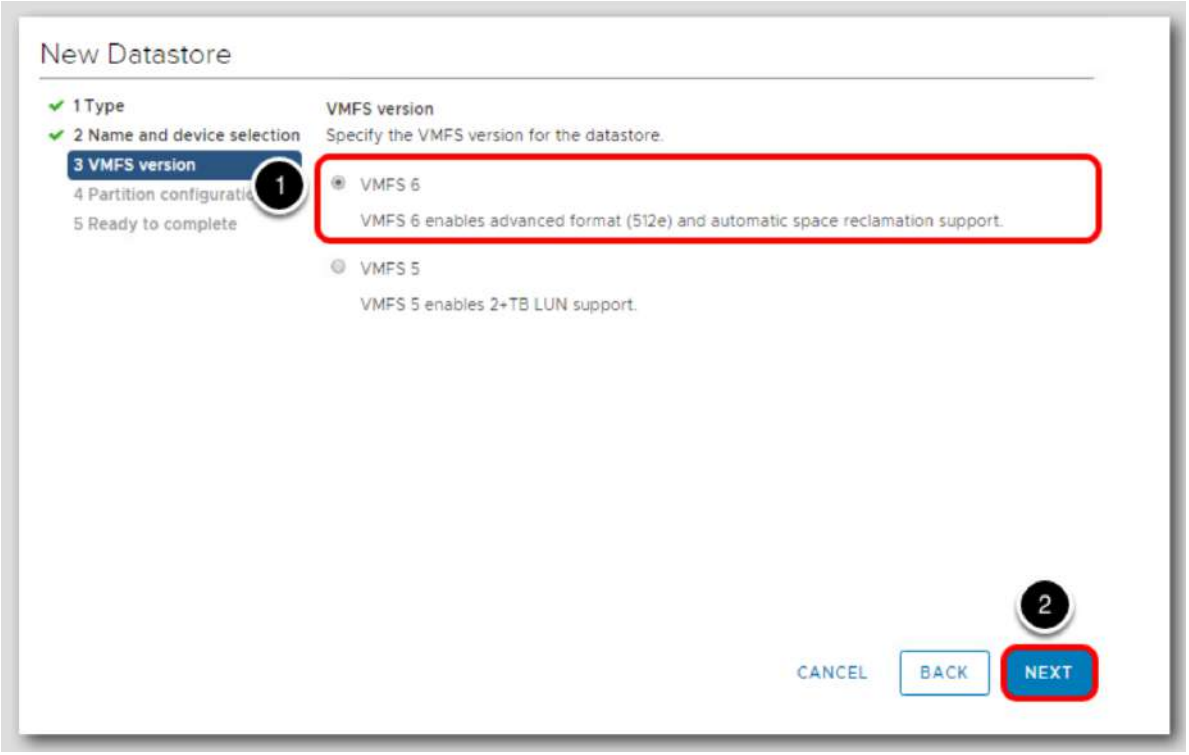
From this view, we can see that there are existing datastores that can be presented to our vSphere environment.

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 - VMFS Version**

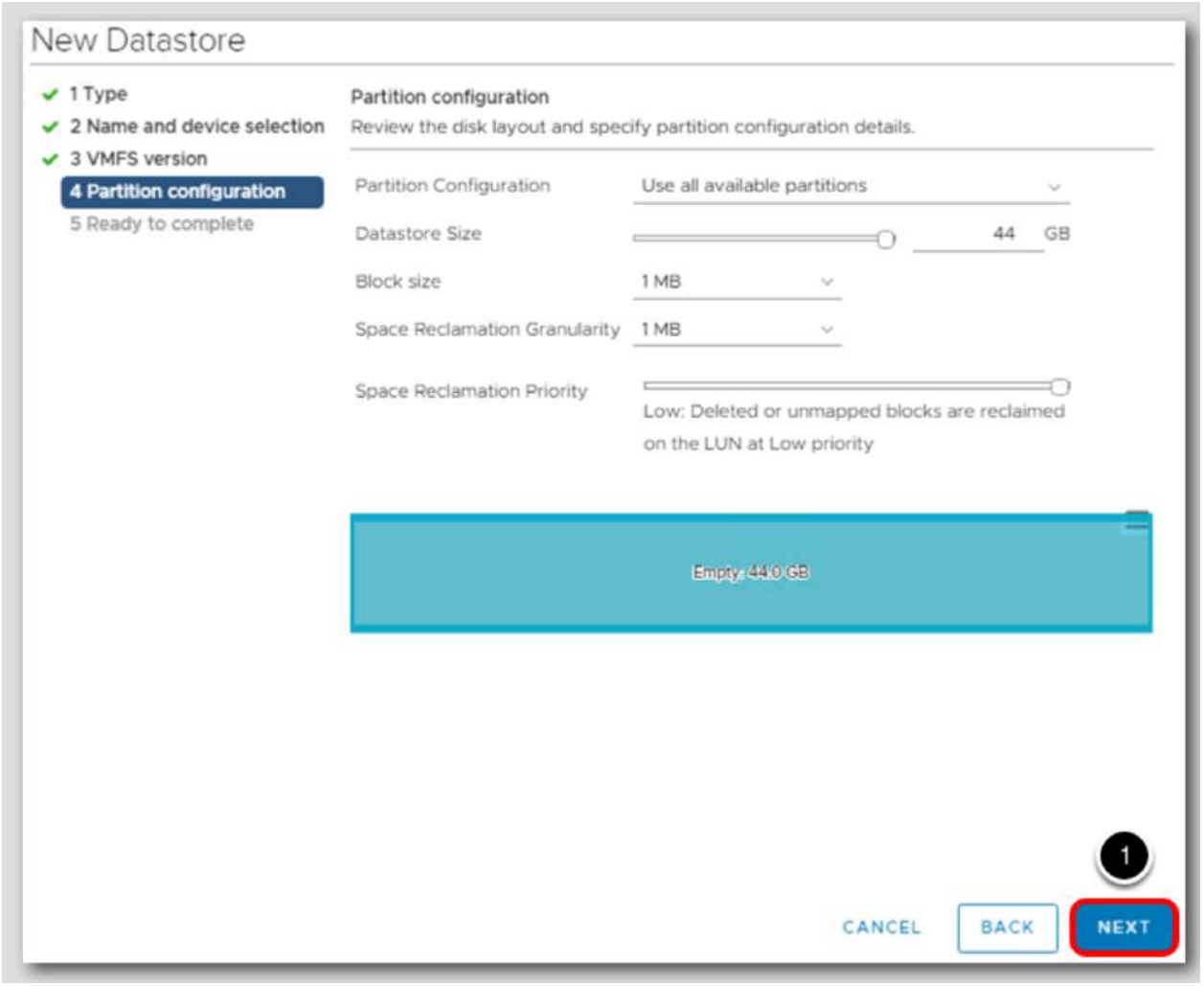
1. Leave the default of VMFS 6 selected.
2. Click Next.



**New Datastore - Partition Configuration**

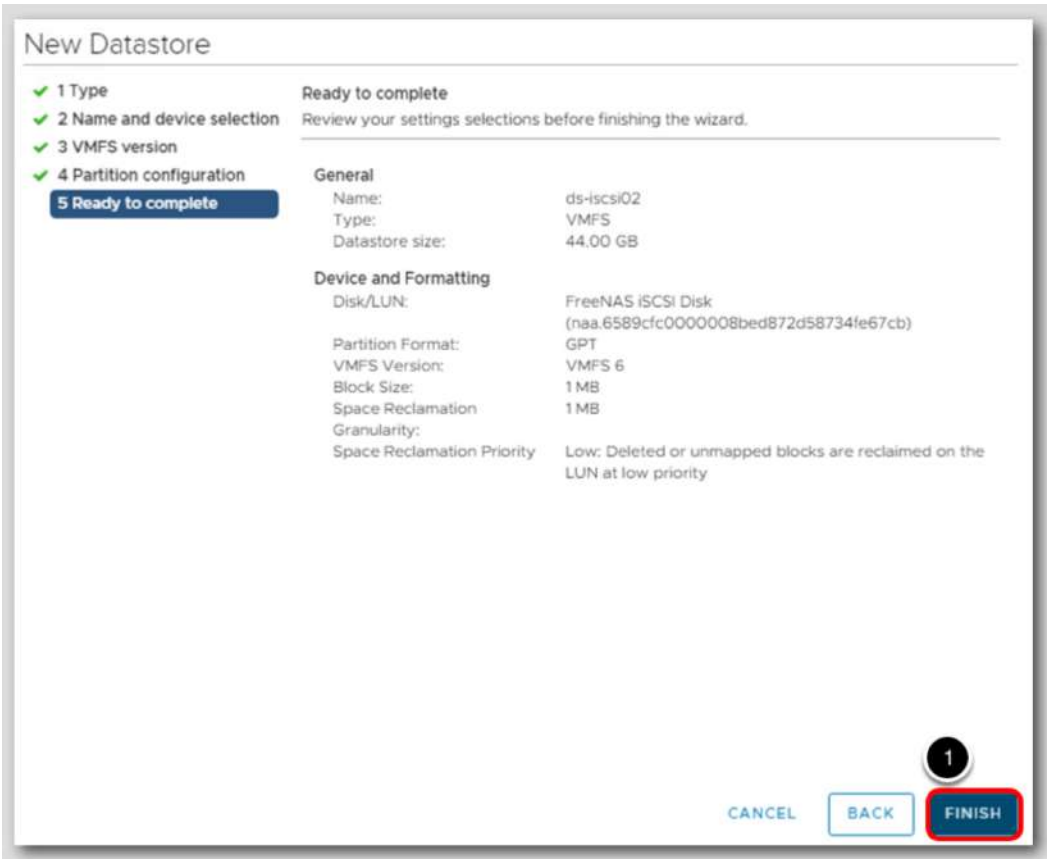
We can use all available capacity for this datastore or change the size if needed. The defaults are fine for this step.

1. Select Next.



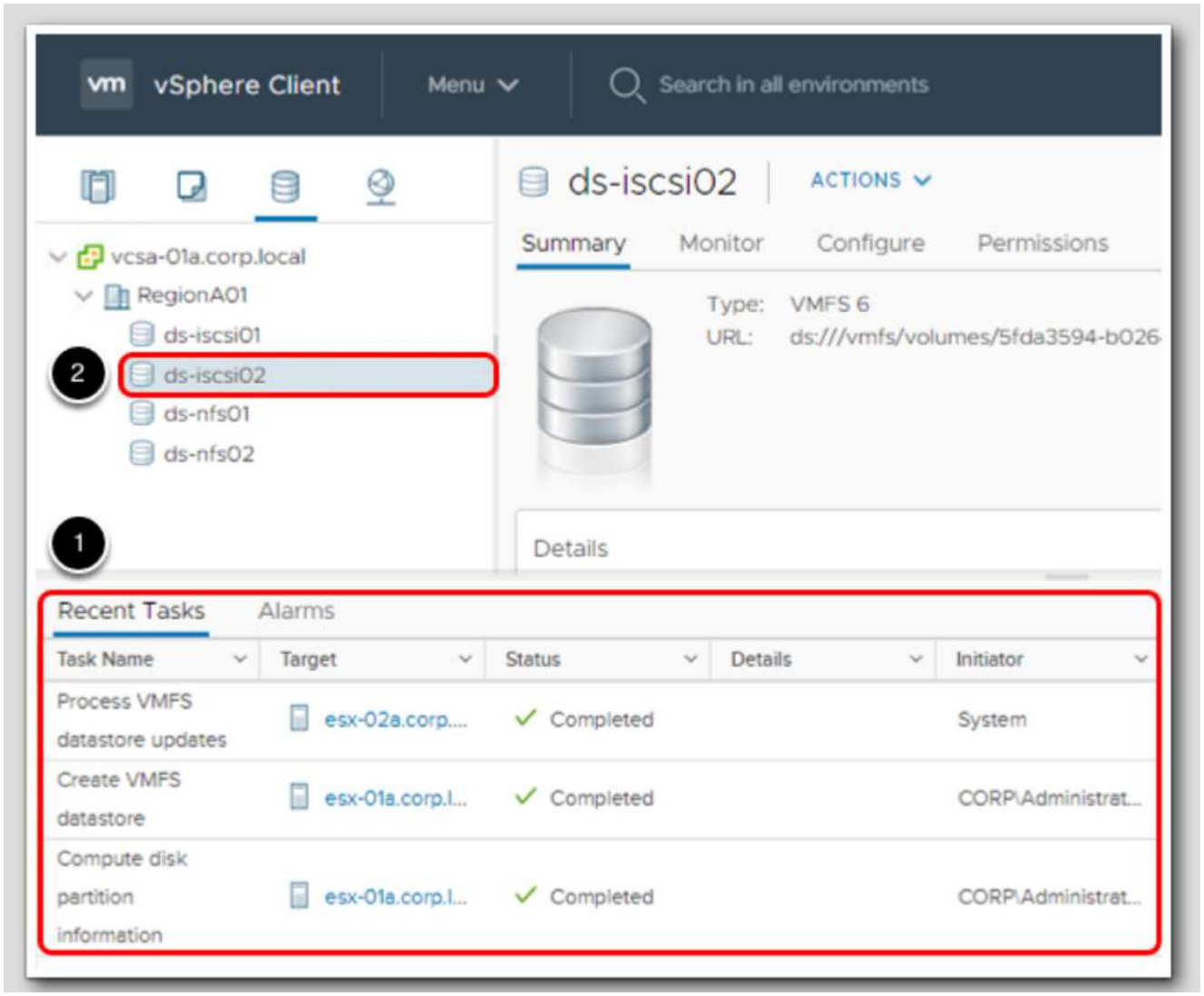

**New Datastore - Ready to complete**

1. Review New Datastore configuration and click Finish.



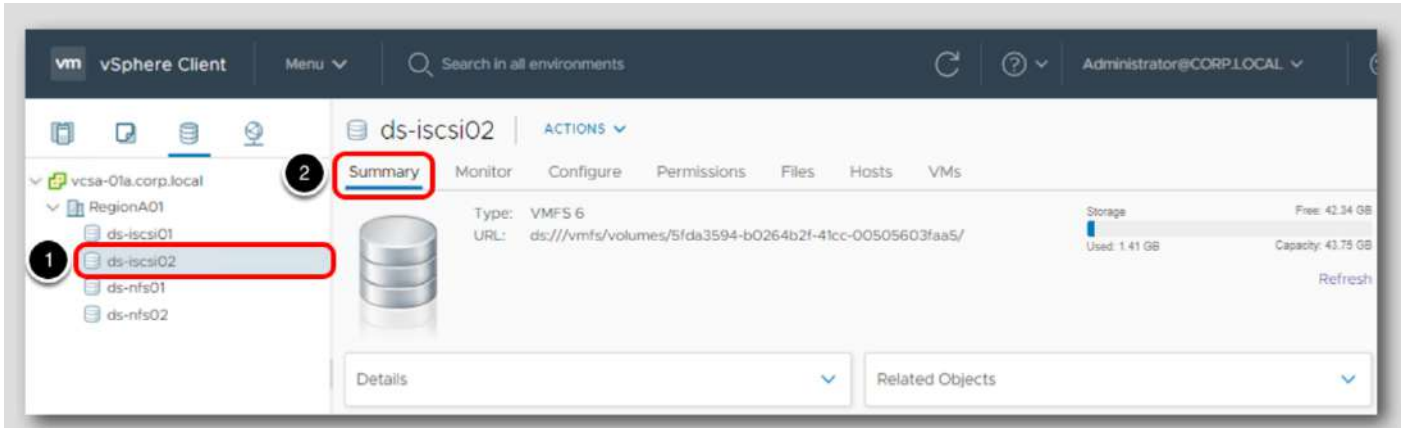
**New Datastore - Monitor task progress**

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**

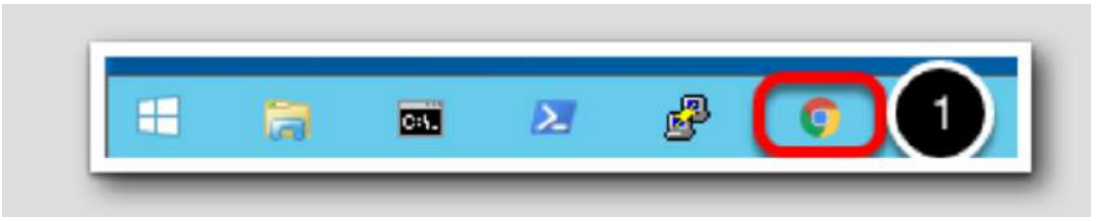
1. Select the datastore ds-iscsi02 from the inventory list
2. Select Summary to review capacity and configuration details



# Practical 5: Configure Access to an NFS datastore.

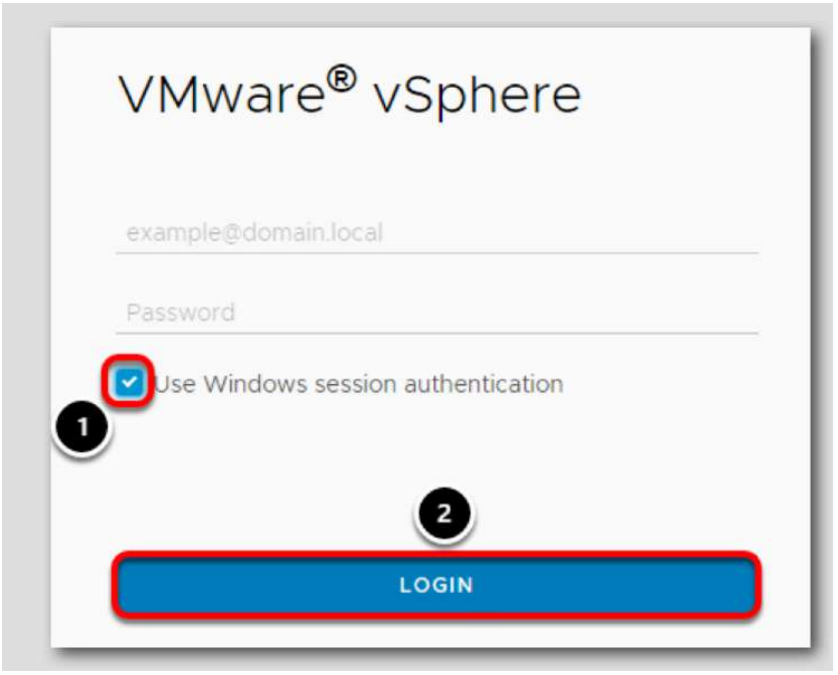
### Launch Google Chrome web browser

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.

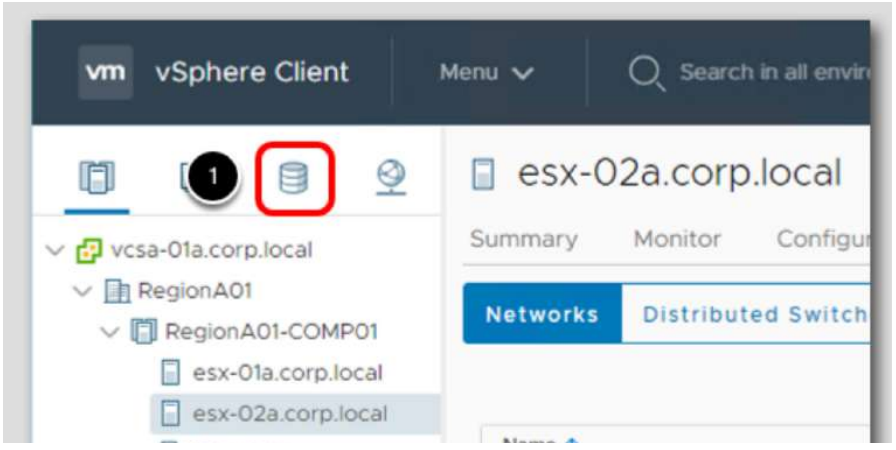



If credentials aren't saved, use the following:

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

**Navigate to Storage Management**

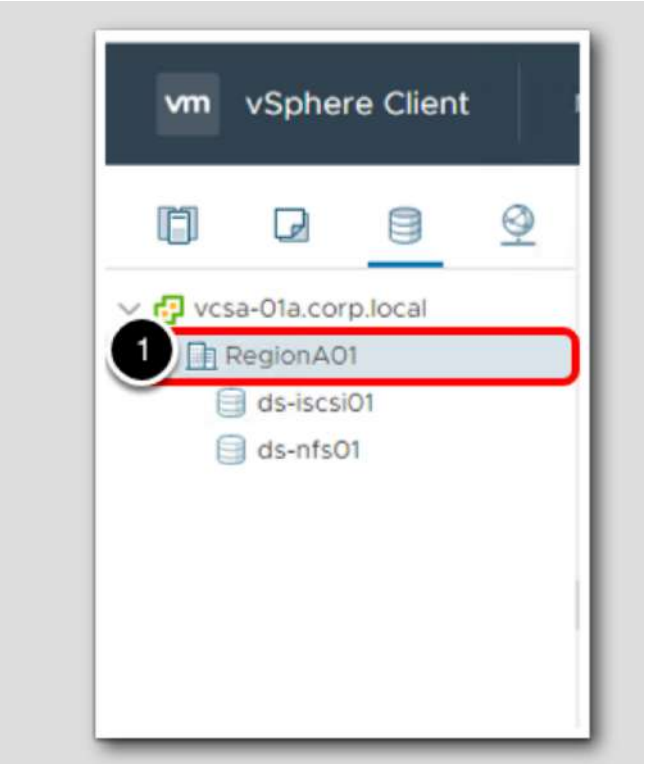
1. Select the Storage tab.



**Create a vSphere NFS Datastore**

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

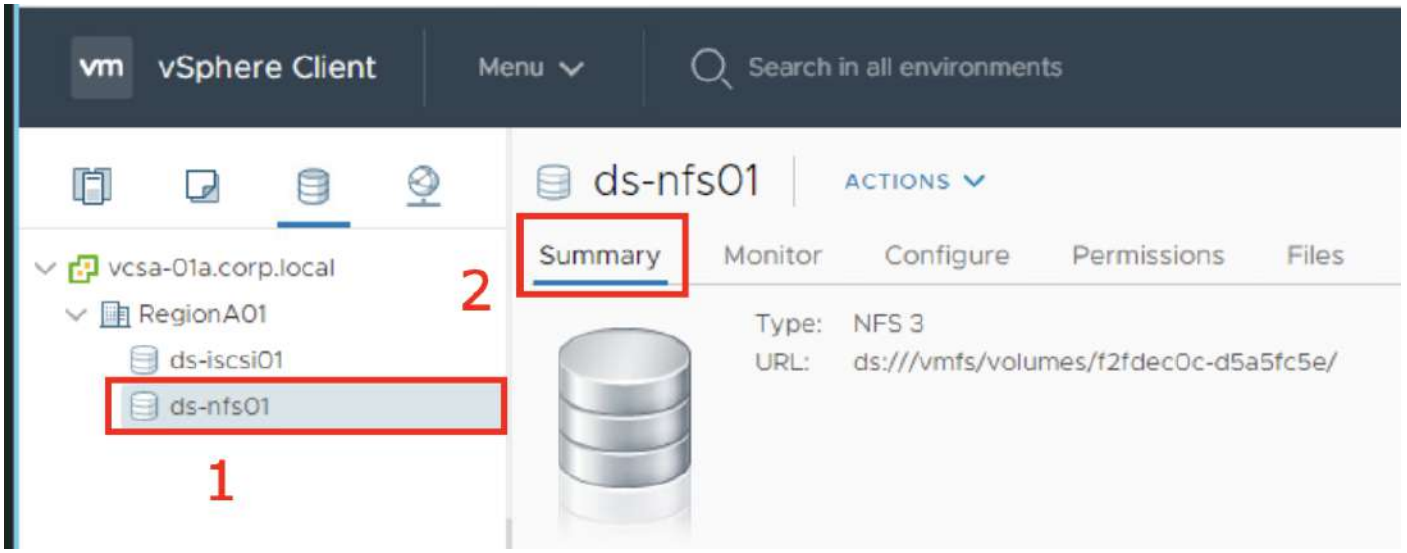
1. Select RegionA01 Datacenter




**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.

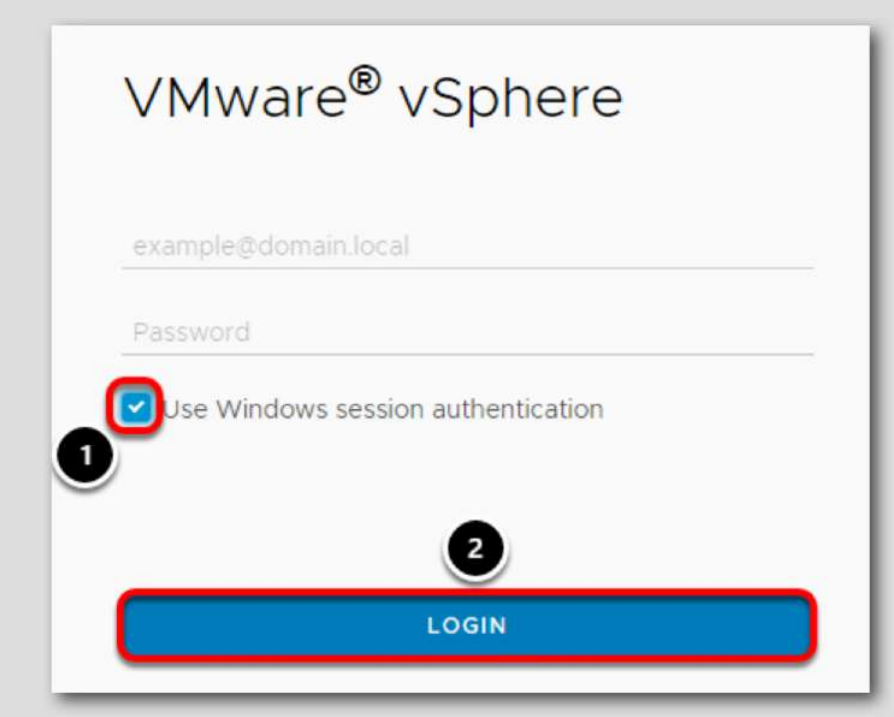
Another provisioning method is to clone a virtual machine to a template. A template is a master copy of a virtual machine that you can use to create and provision virtual machines. Creating a template can be useful when you need to deploy multiple virtual machines from a single baseline but want to customize 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.

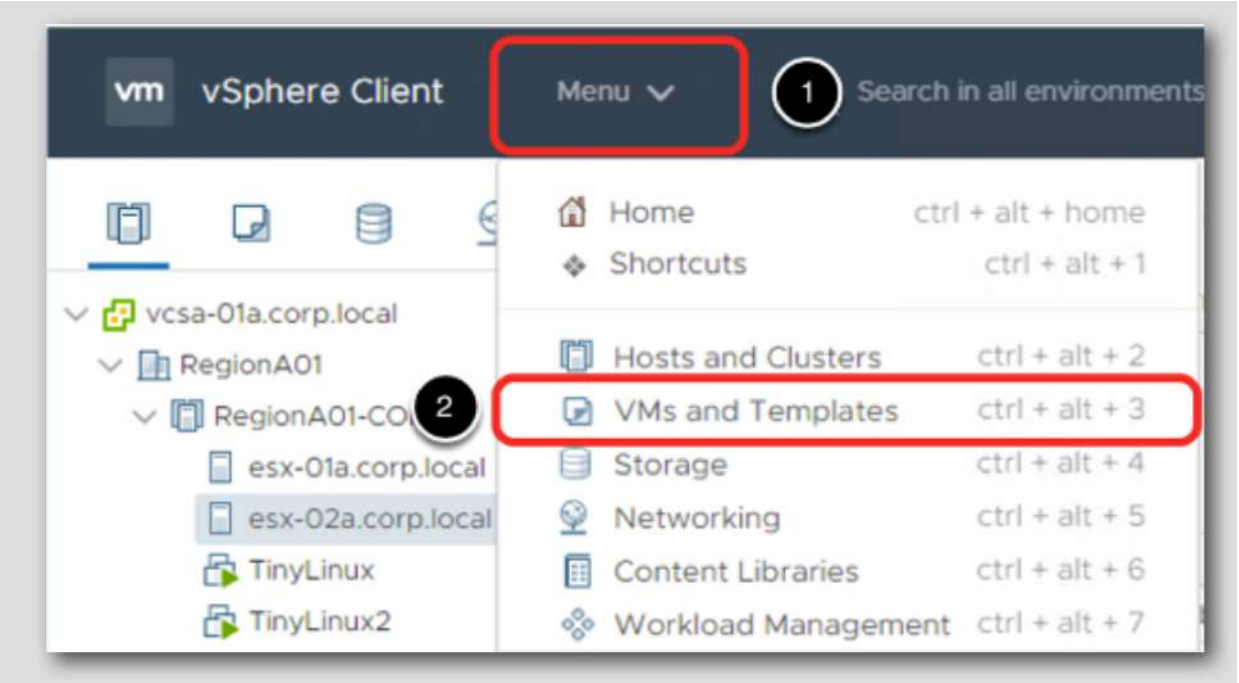


If credentials aren't saved, use the following:

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

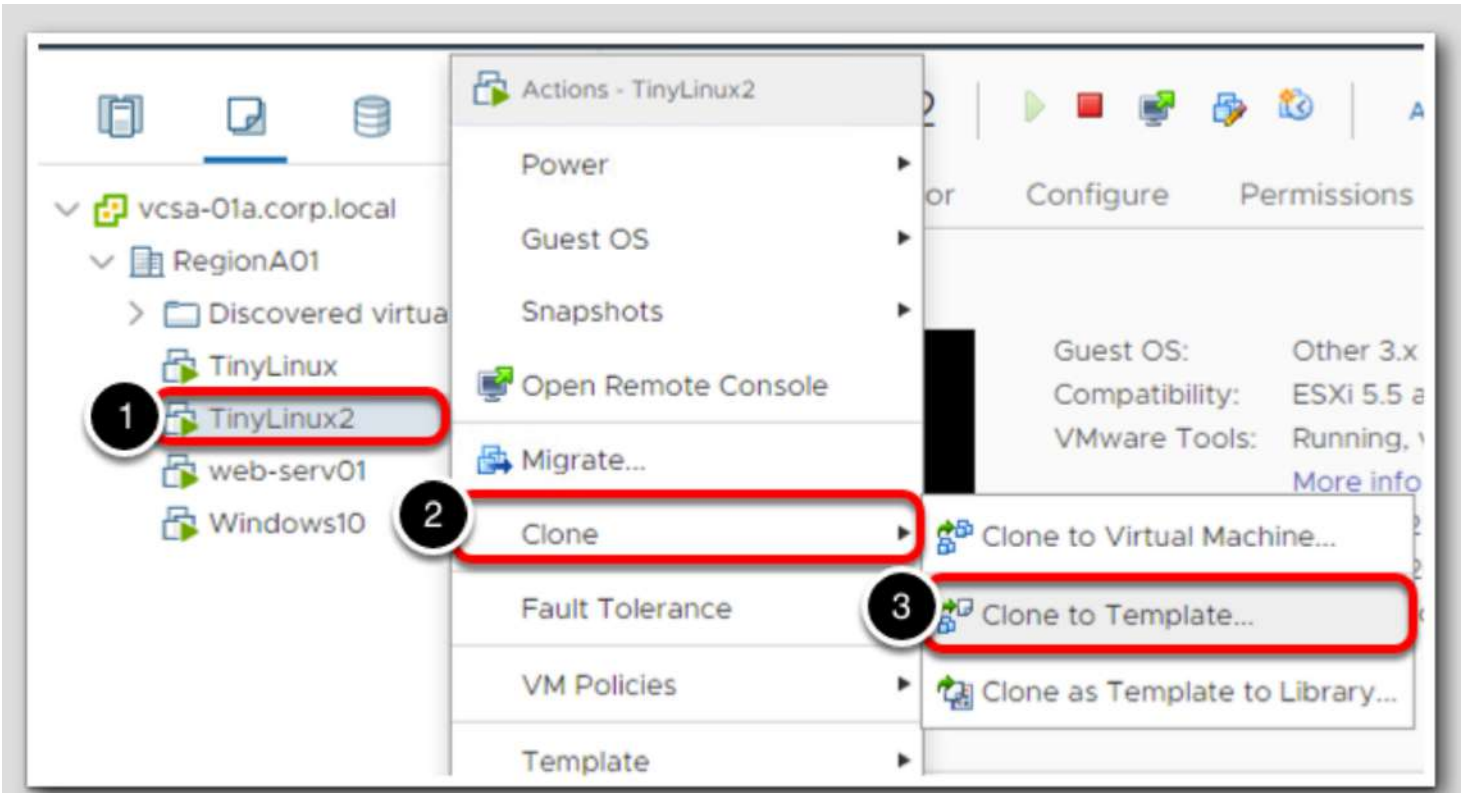
**Navigate to the VMs and Templates management pane**

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




**Launch the Clone Virtual Machine to Template wizard**

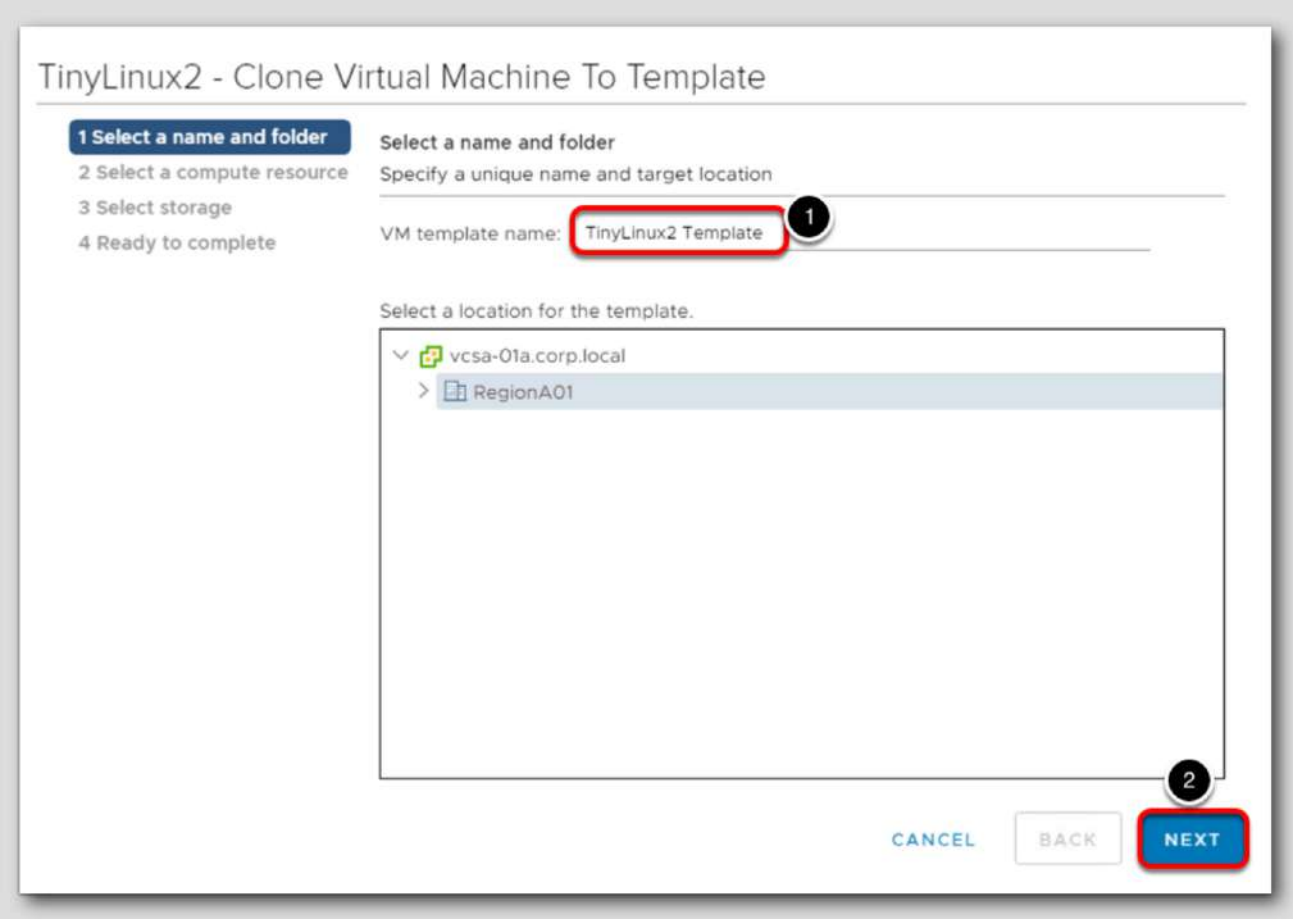
1. Right-click the Virtual Machine TinyLinux2.
2. Select Clone.
3. Select Clone to Template…



**Select a name and folder**

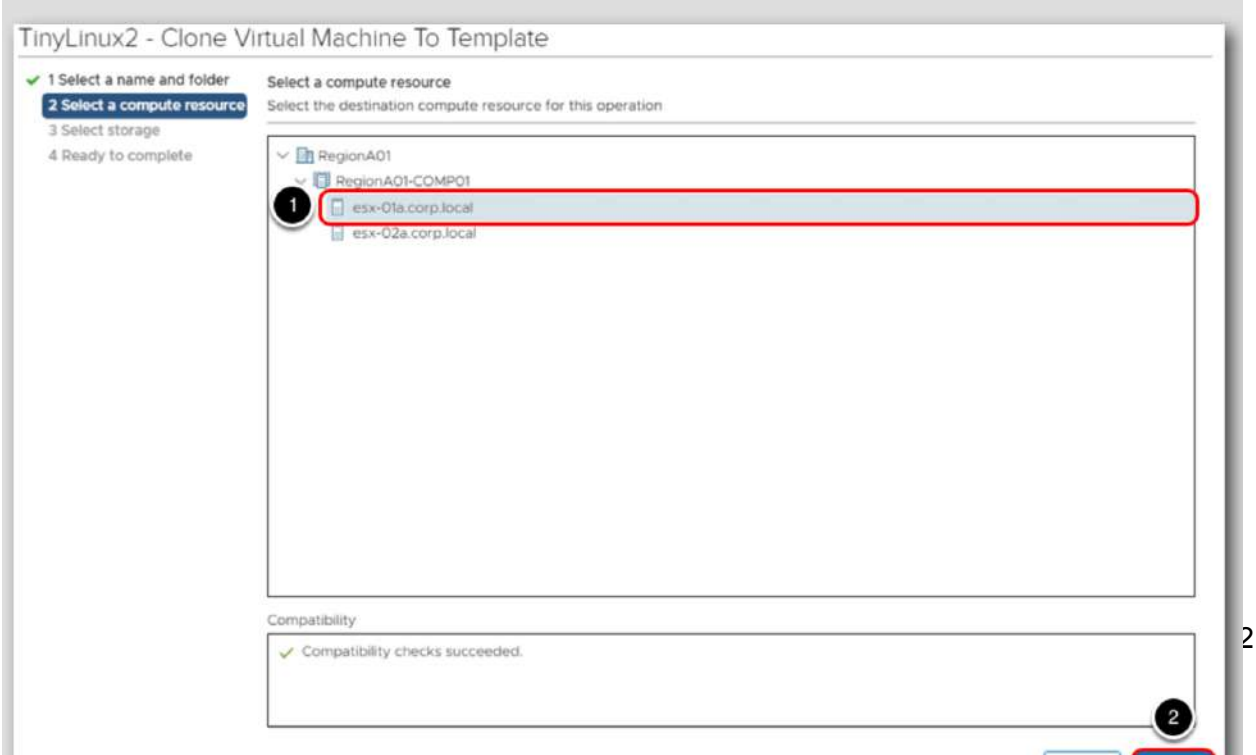
In the Clone Virtual Machine to Template wizard, provide a name for the Template - TinyLinux2 Template.

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



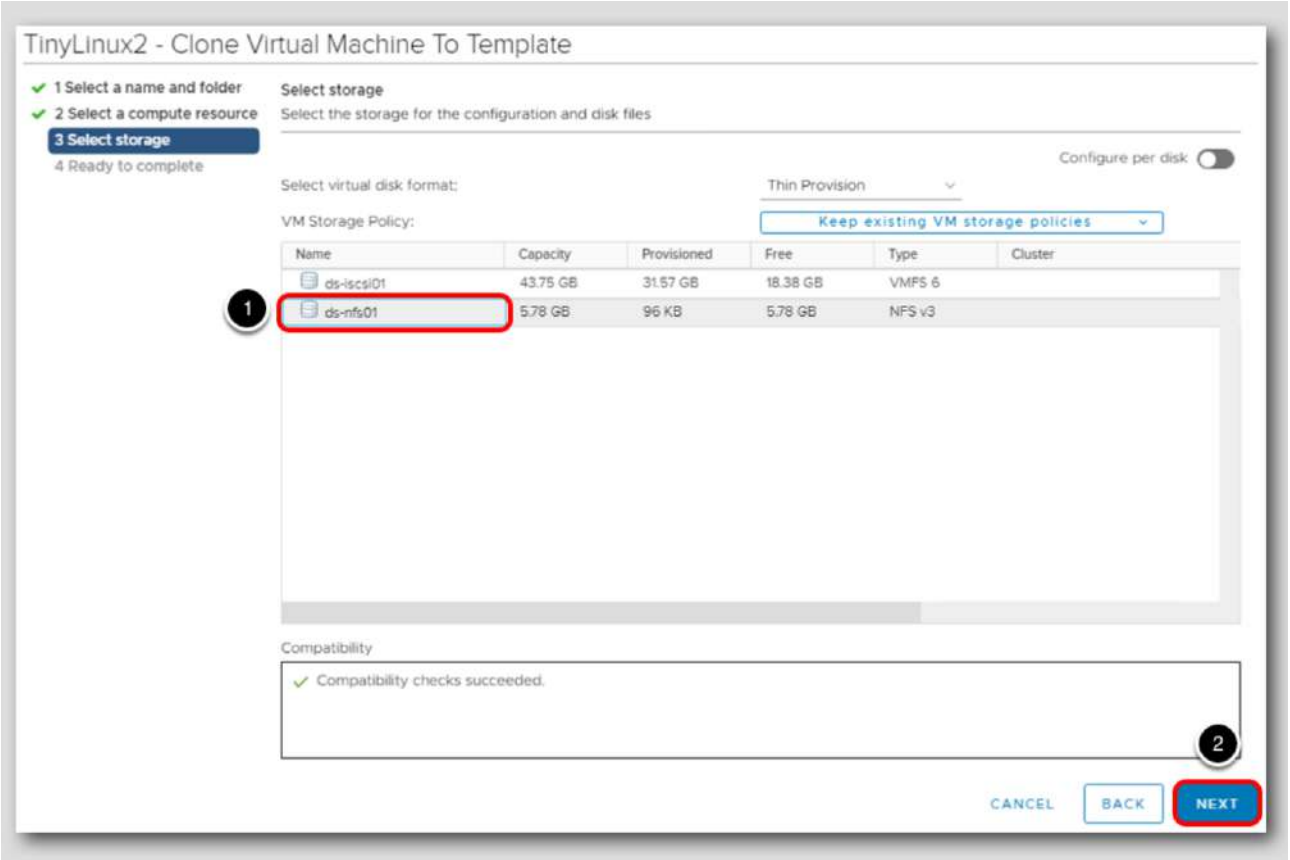

**Select Compute Resource**

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



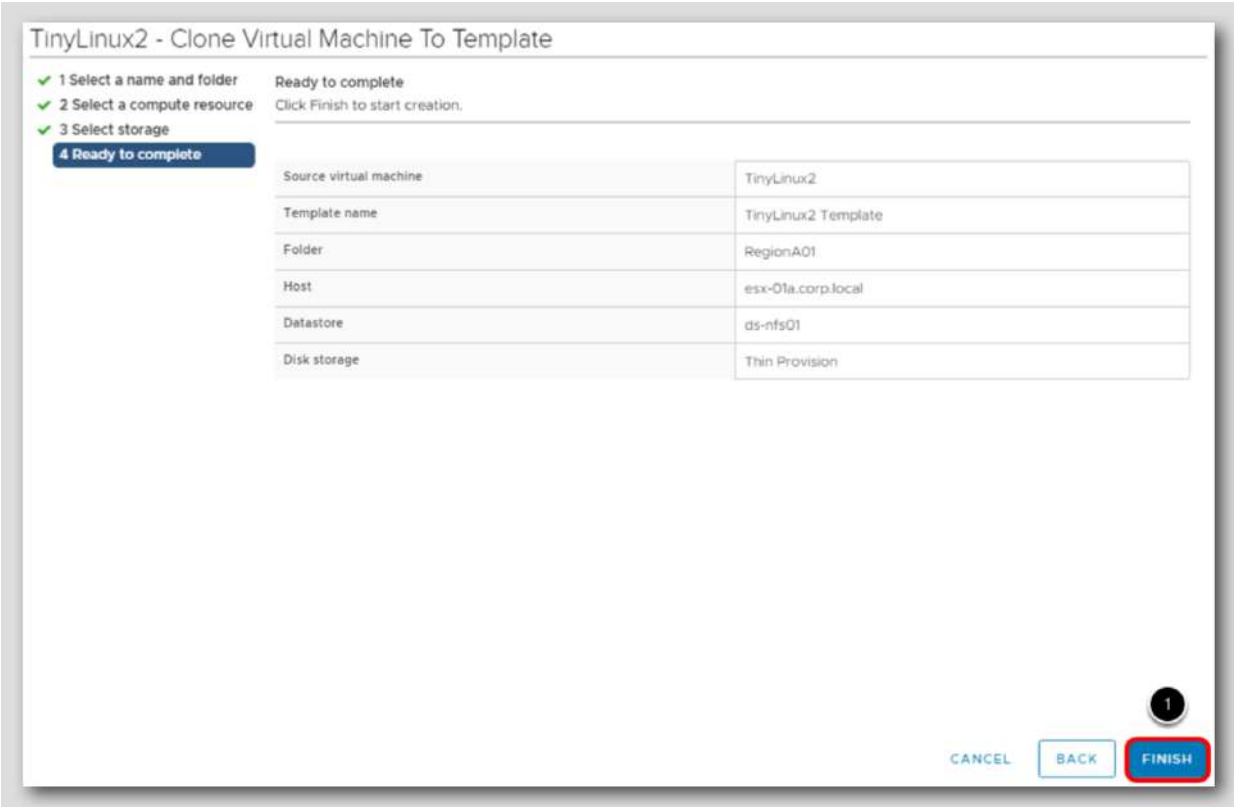
**Select Storage**

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



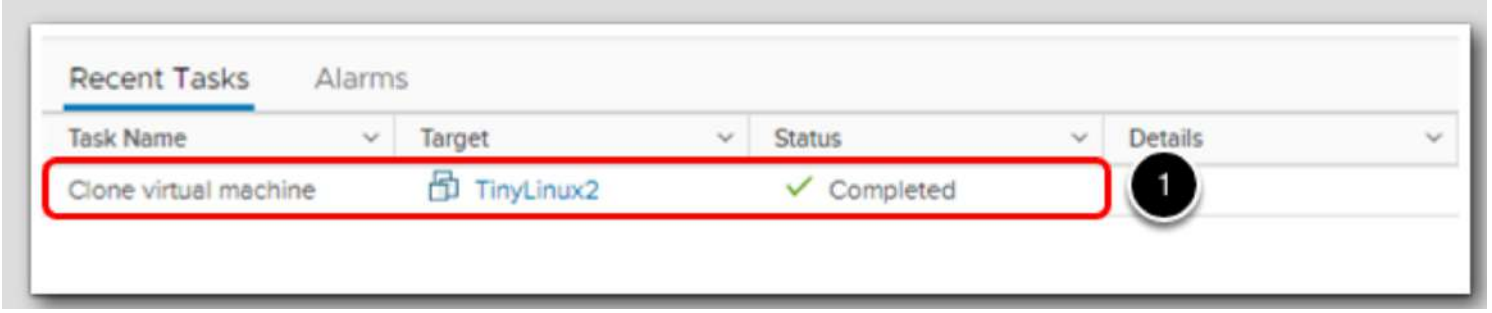

**Review the VM Template Settings**

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

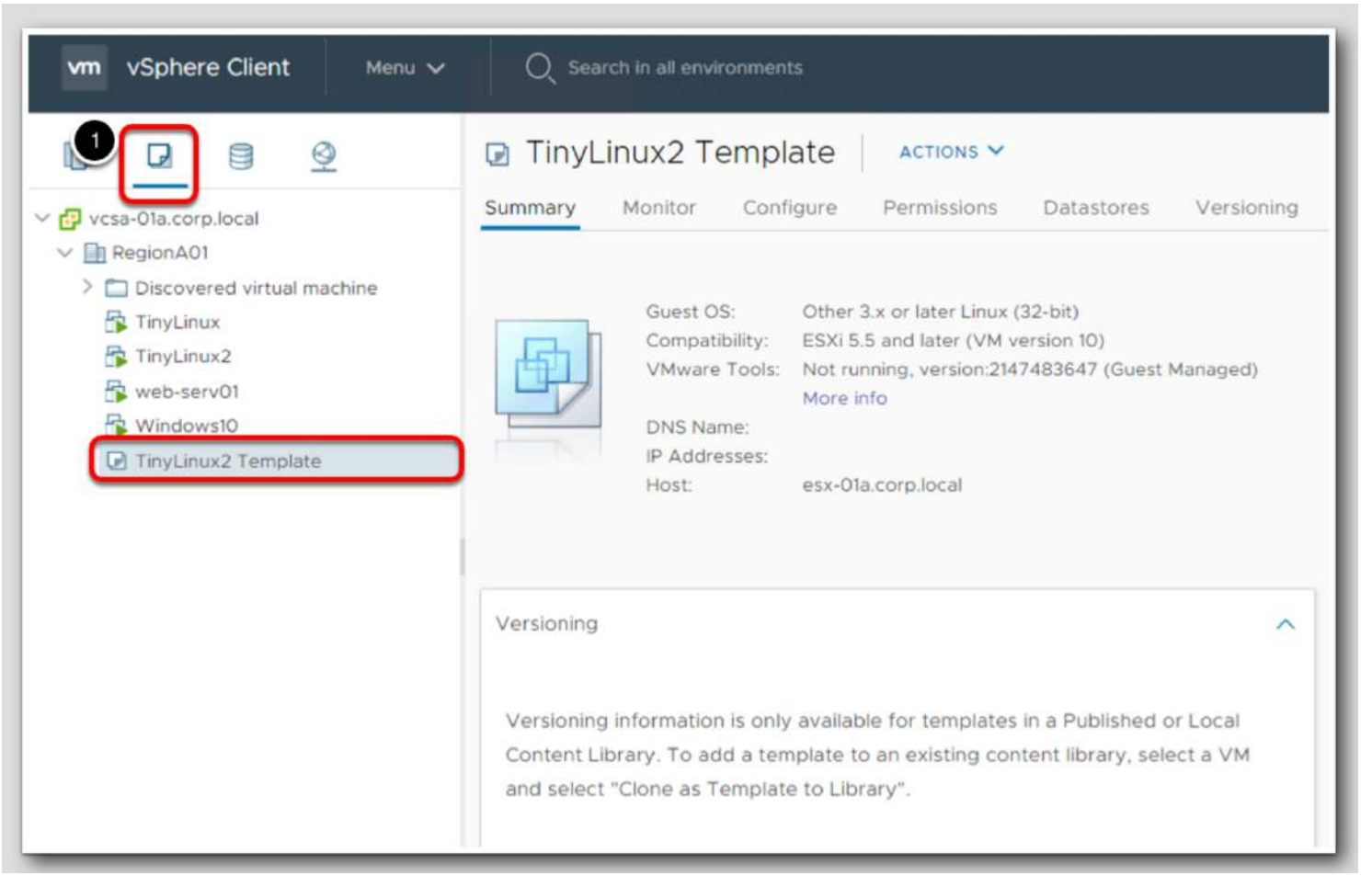


**Monitor task progress**

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

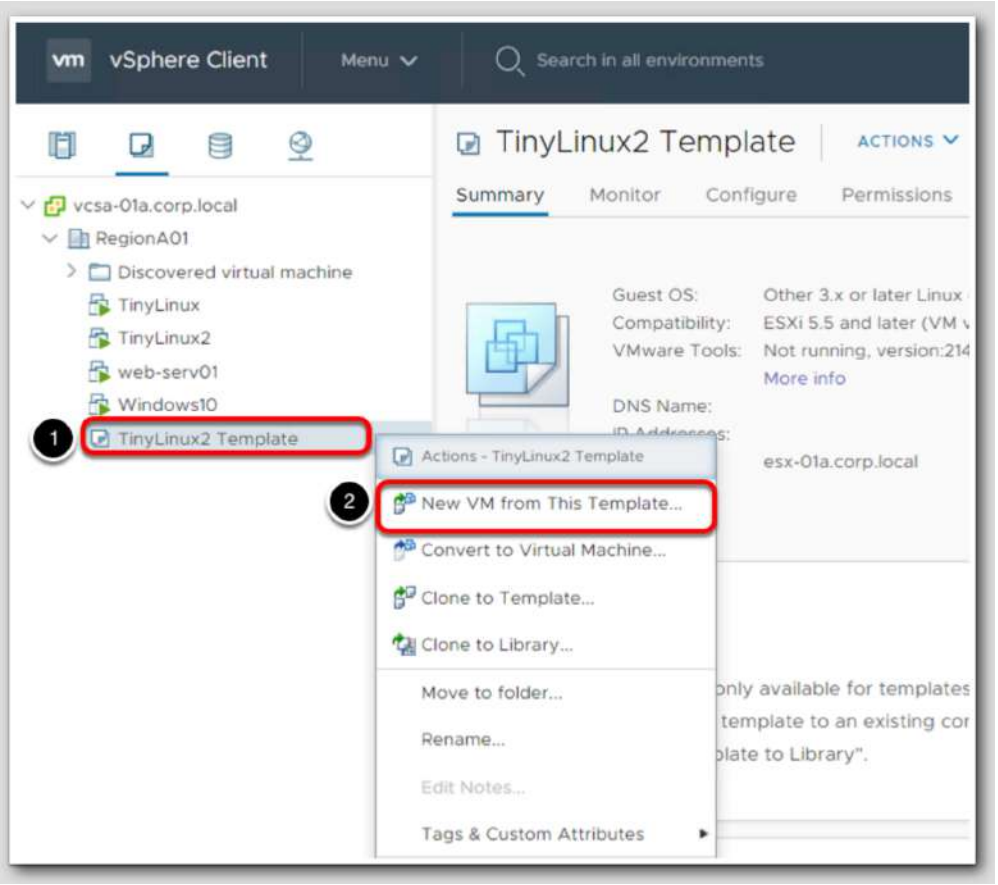



1. Once the task has been completed, click on the VM and TemplatesVM and Templates icon. TinyLinux 2 Template object should be on the inventory pane.



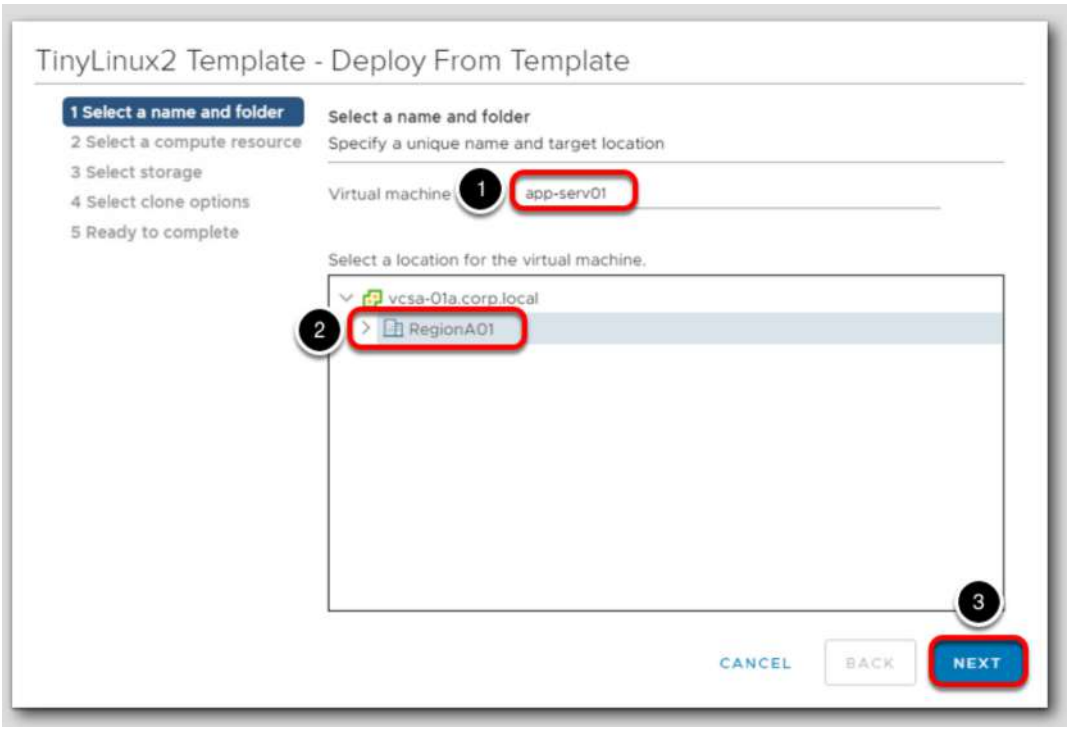

**Launch the Deploy From Template wizard**

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




**Select a name and folder**

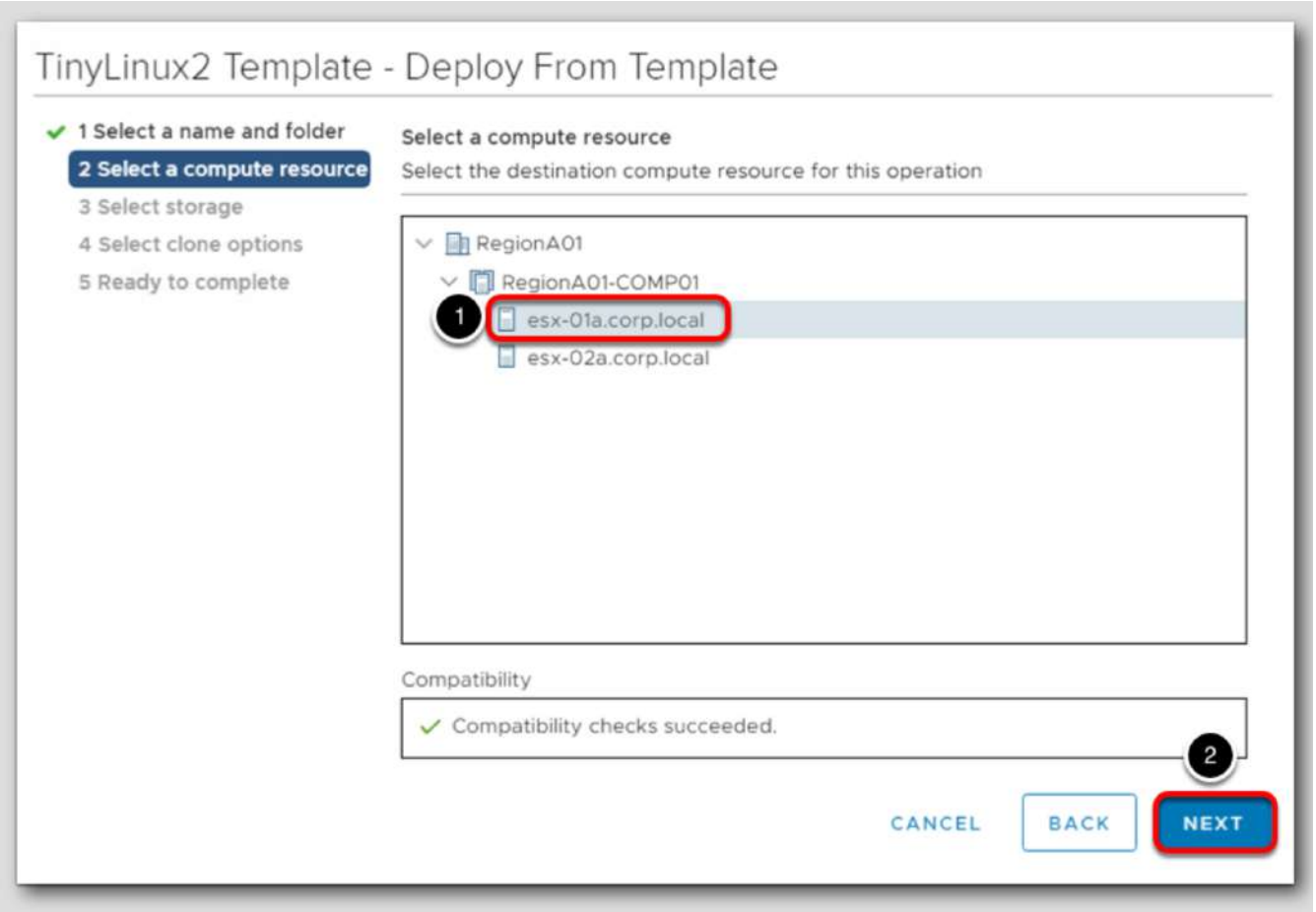
1. Enter app-serv01 for the name of the new virtual machine.
2. Leave the default location of RegionA01 Datacenter.
3. Click the Next button.




**Select compute resource**

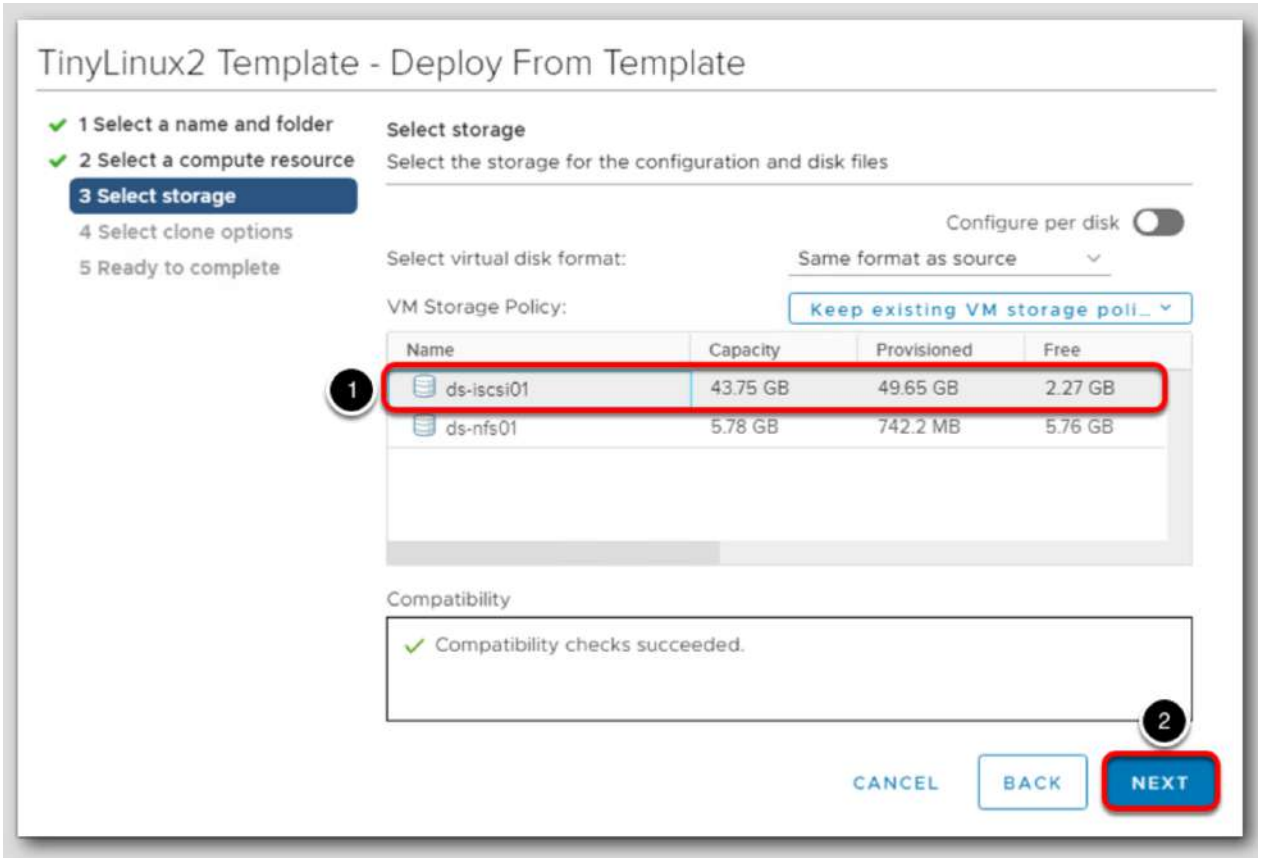
1. Select esx-01a.corp.local.

2. Click Next.




**Select storage**

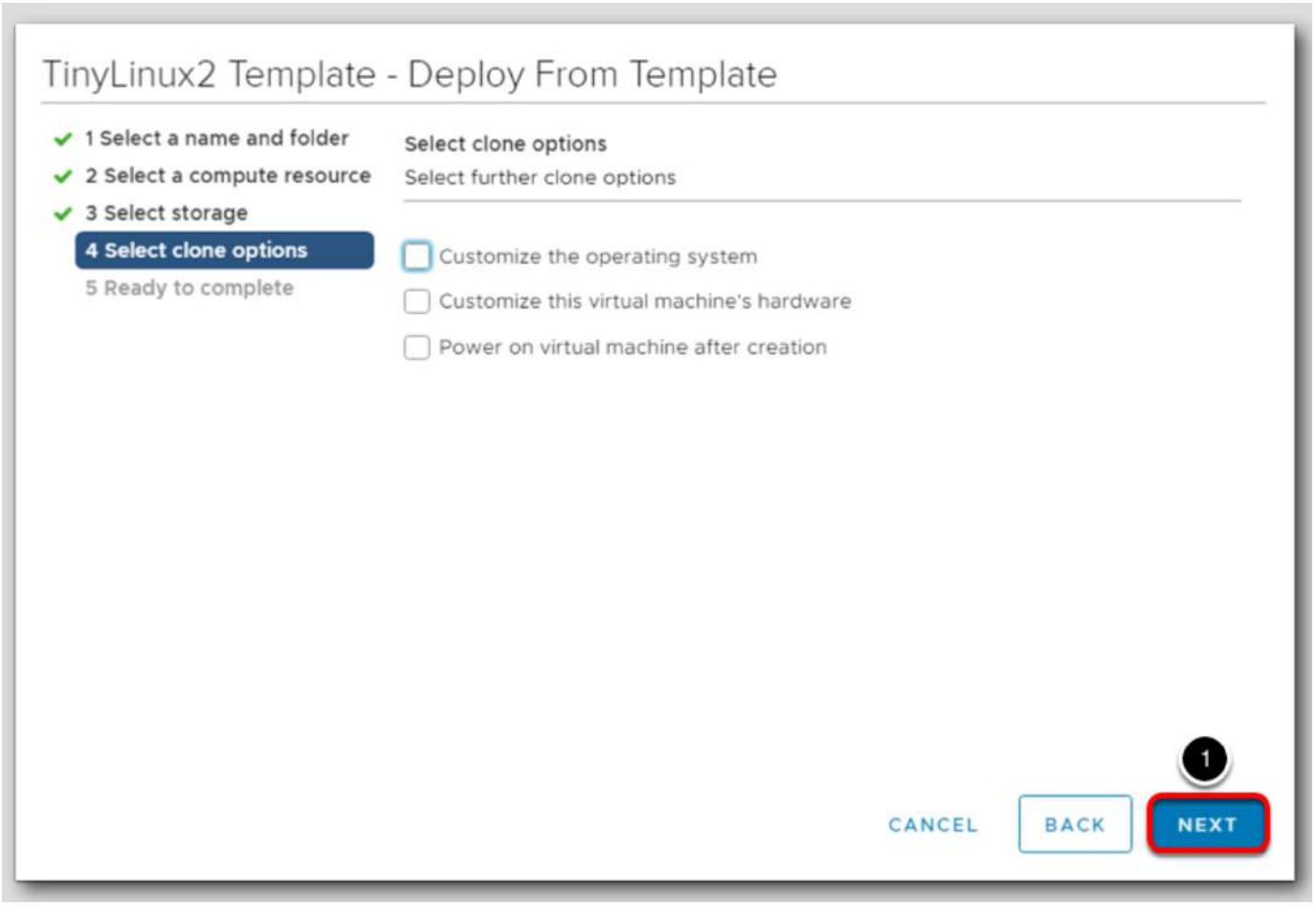
1. Leave the default datastore selected, ds-iscsi01
2. Click Next.



**Select clone options**

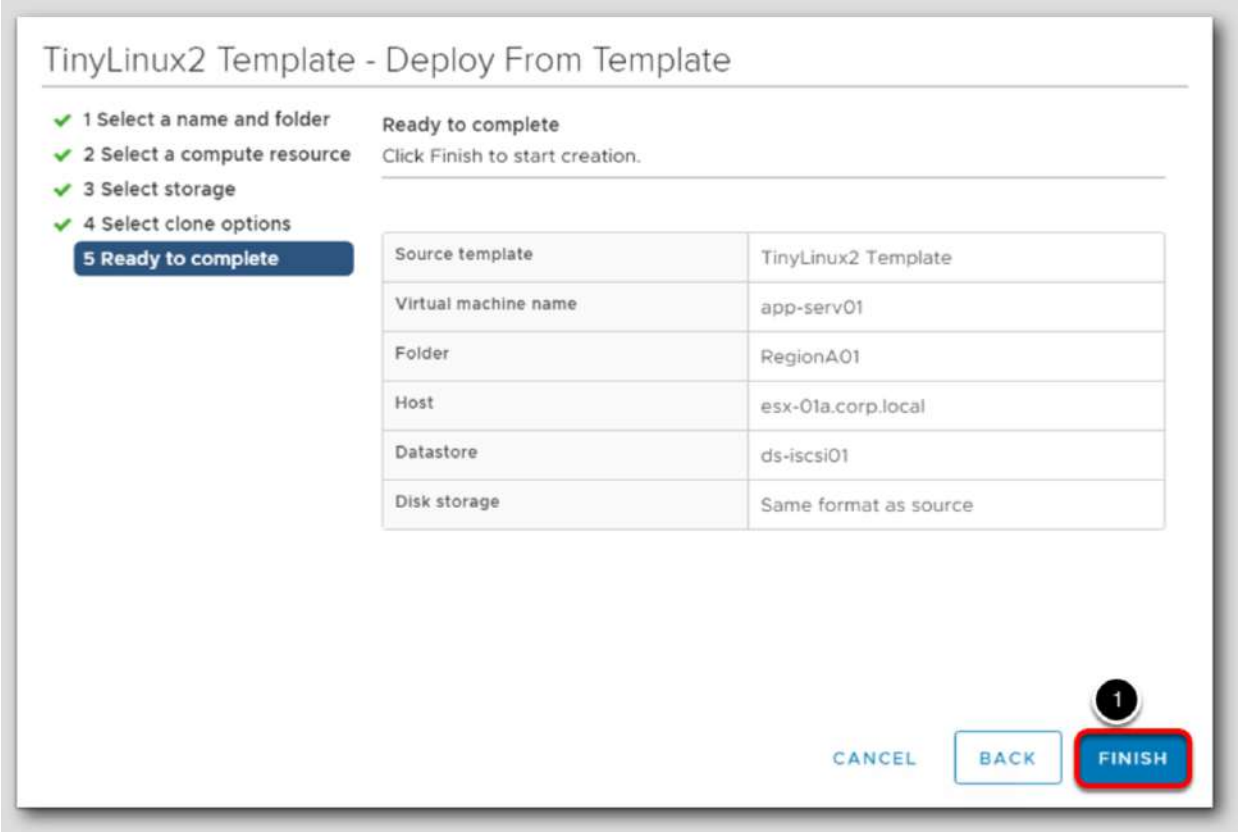
When cloning a virtual machine from a template, the guest operating system and virtual hardware can be modified. For this example, we will not customize the operating system or hardware.

1. Click Next.



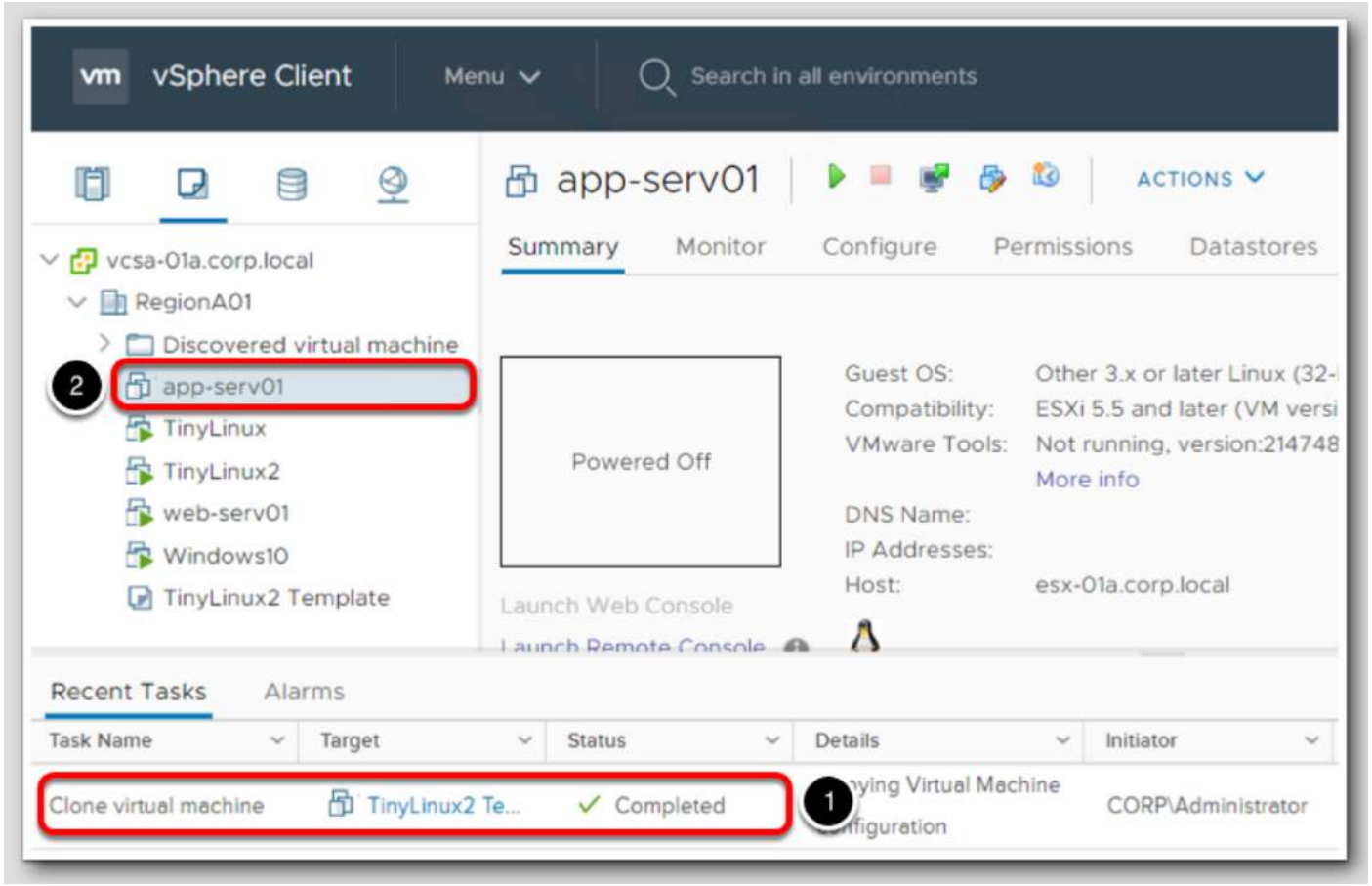

**Ready to complete**

1. Review the deployment options and then click 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.

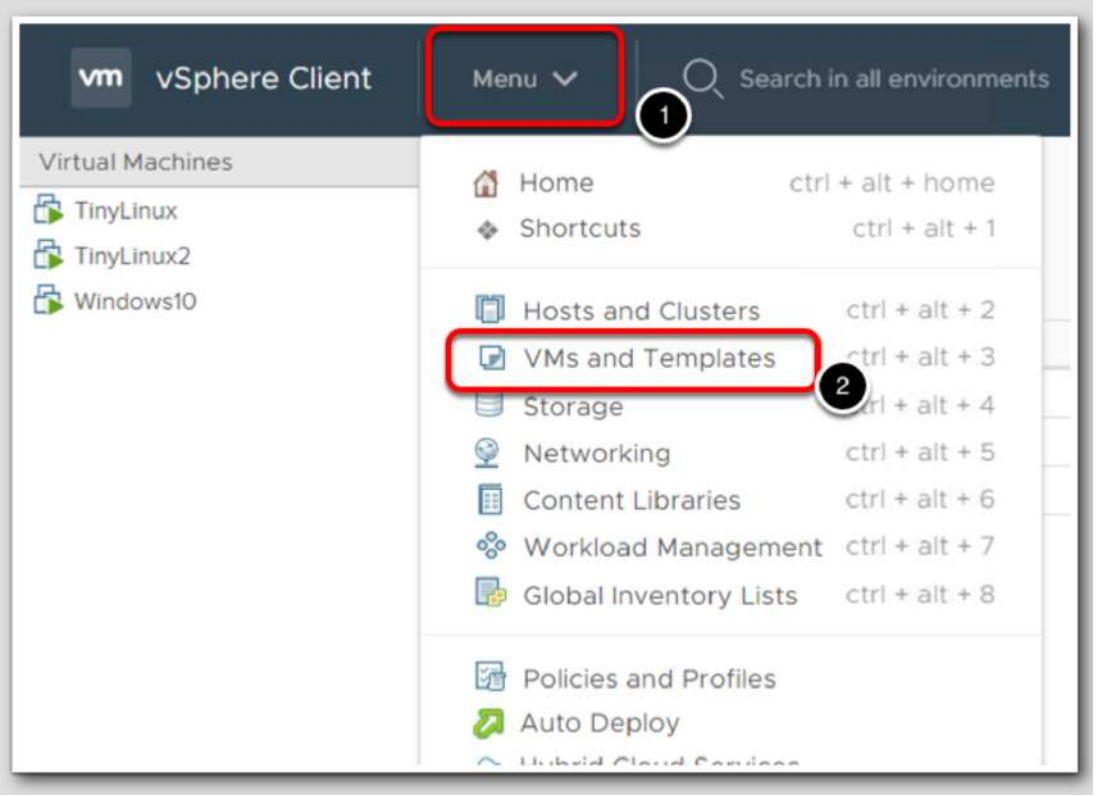


**Practical 7:** Create a content library to clone and deploy virtual machines.

### Create a Virtual Machine

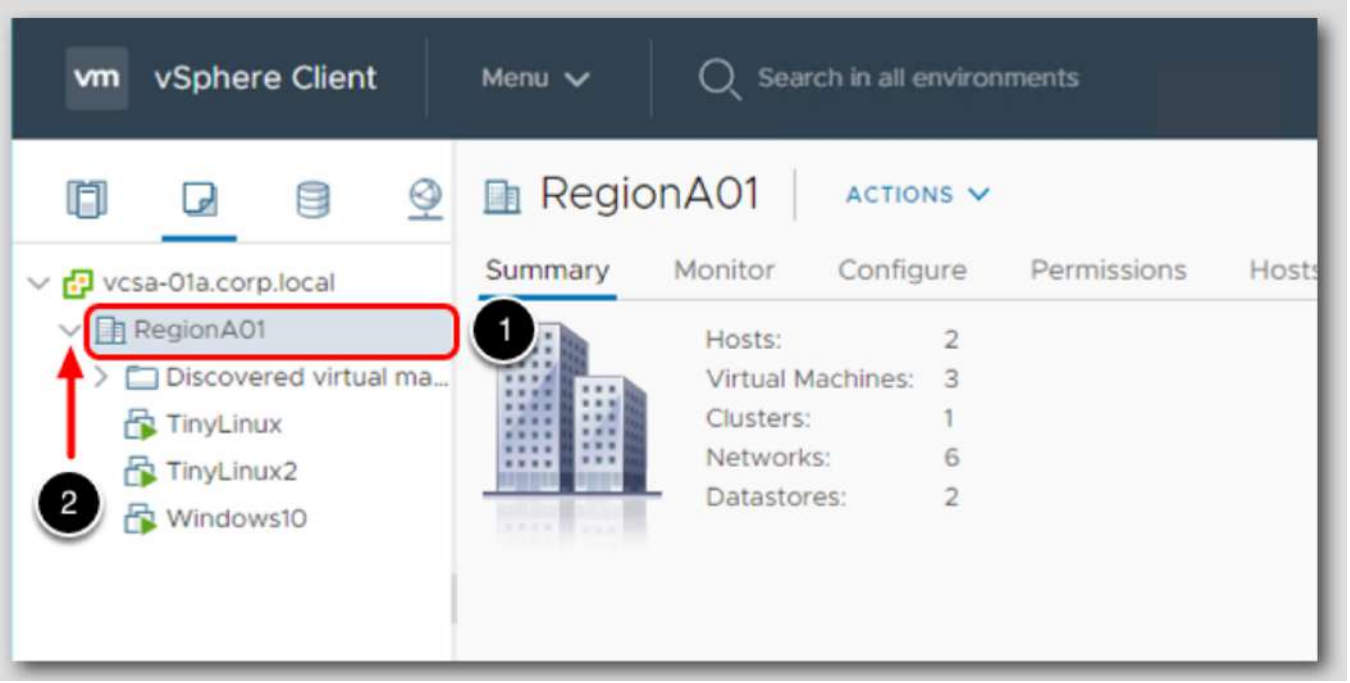
In the next steps, we will create a virtual machine and then, install an operating system.

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




**Select and Expand Datacenter**

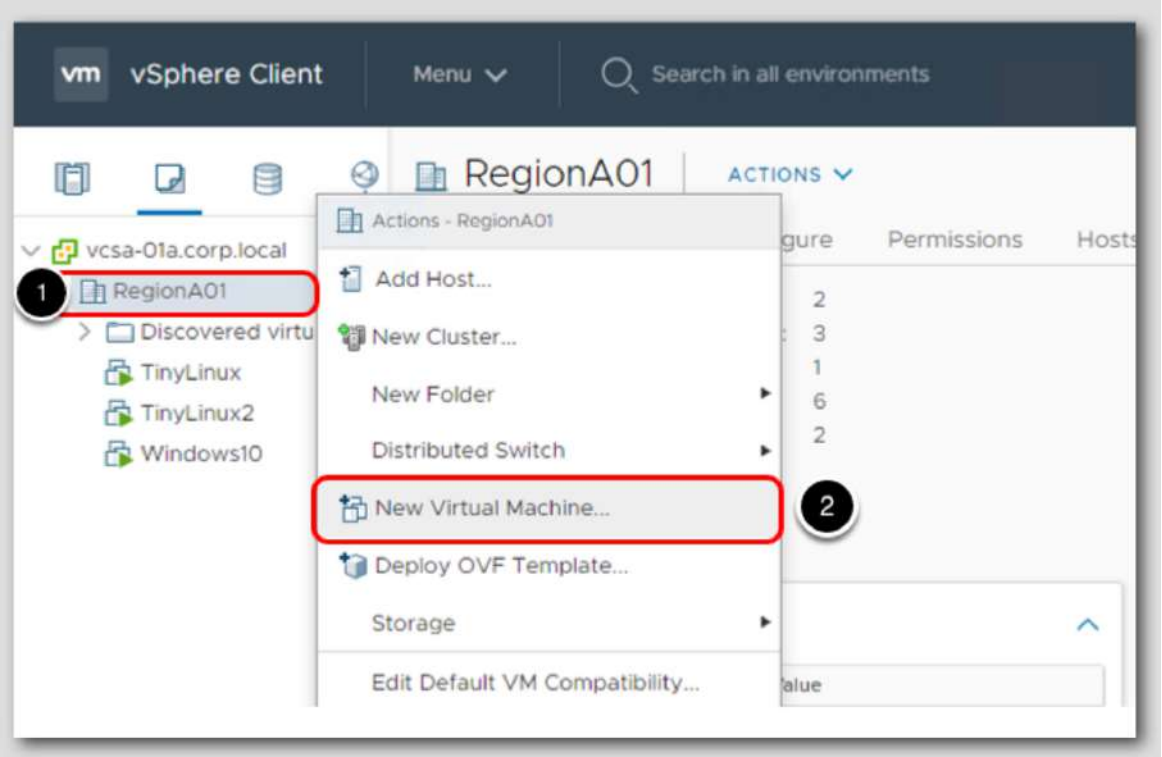
1. Click on RegionA01 Datacenter.
2. Expand RegionA01 Datacenter so the virtual machines under it can be seen.



**Start the New Virtual Machine Wizard**

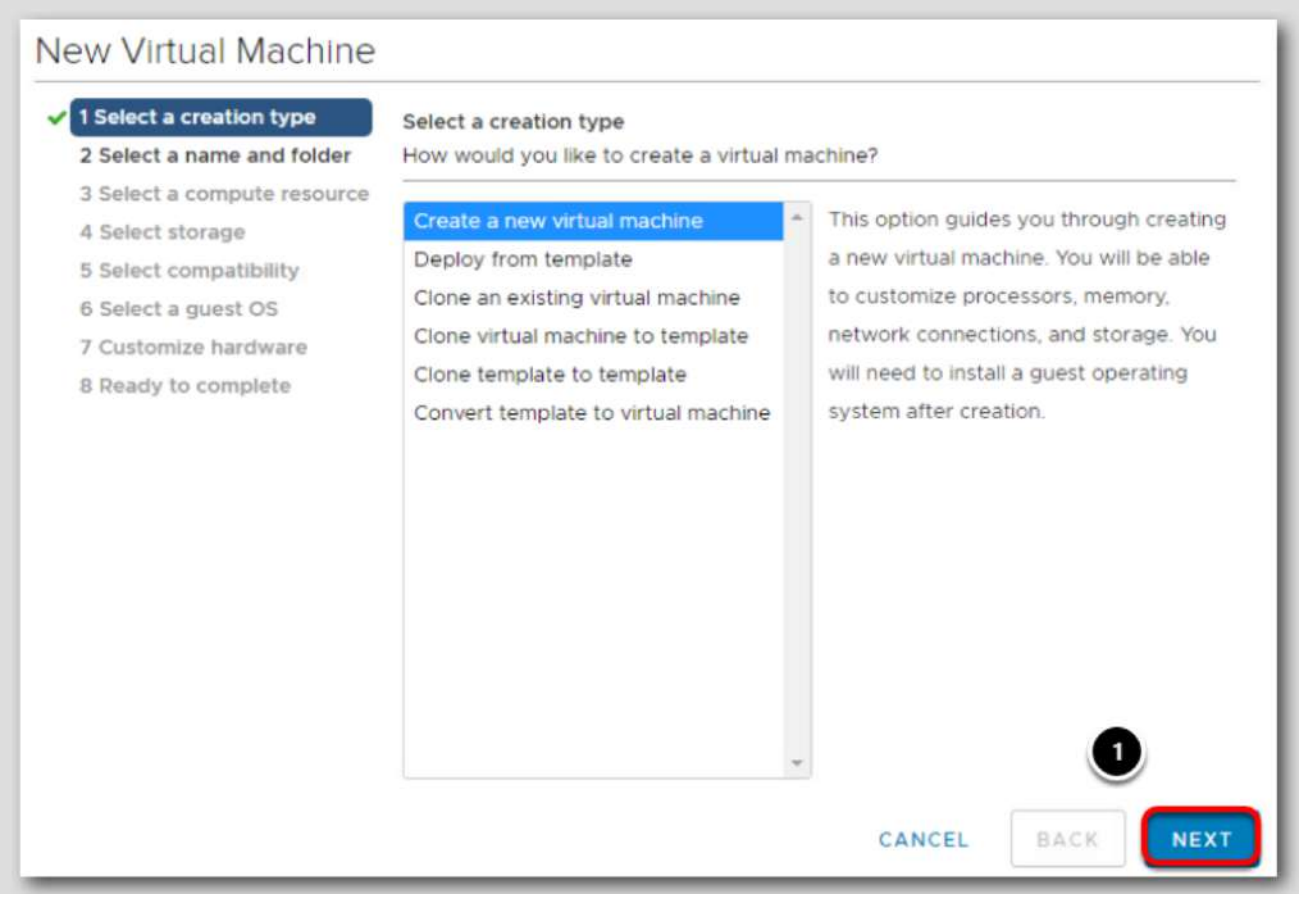
1. Right-click on RegionA01 Datacenter.
2. Click New Virtual Machine to start the new virtual machine wizard.

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



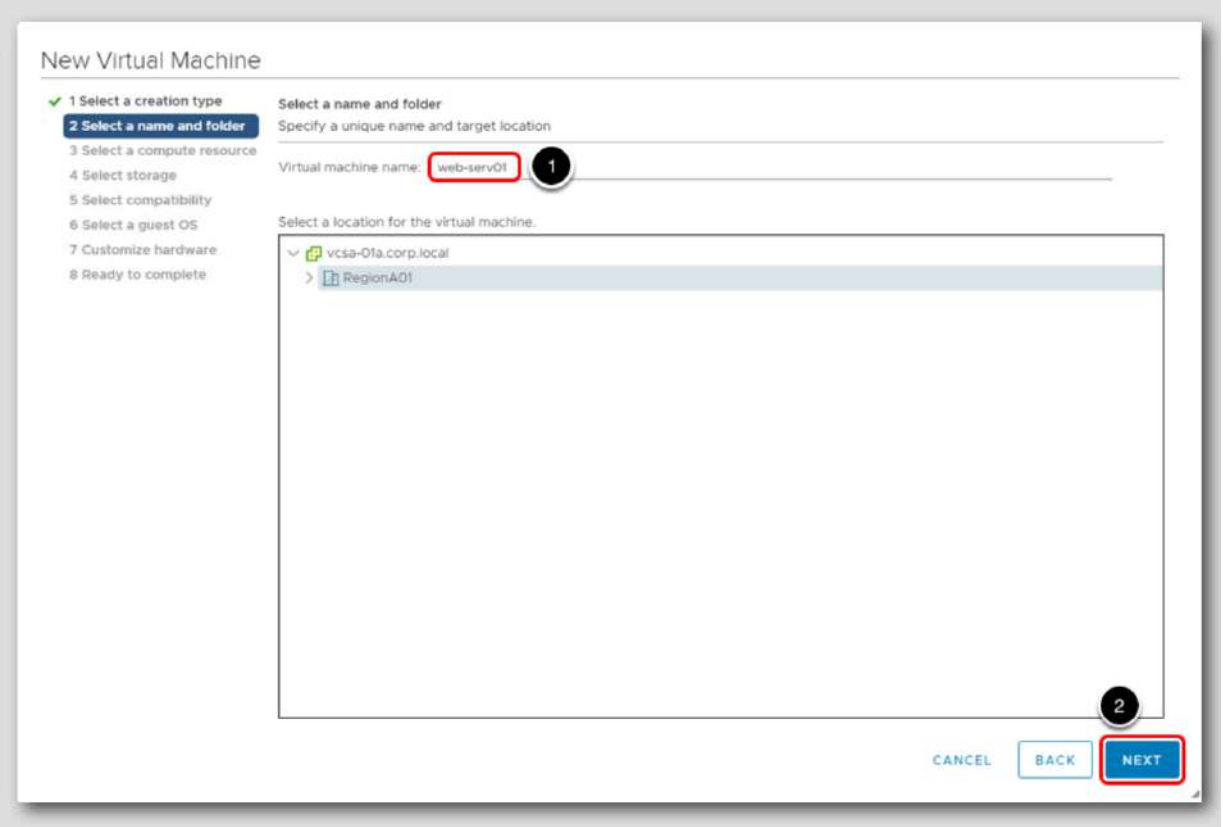

**Virtual Machine wizard**

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



**Name the Virtual Machine**

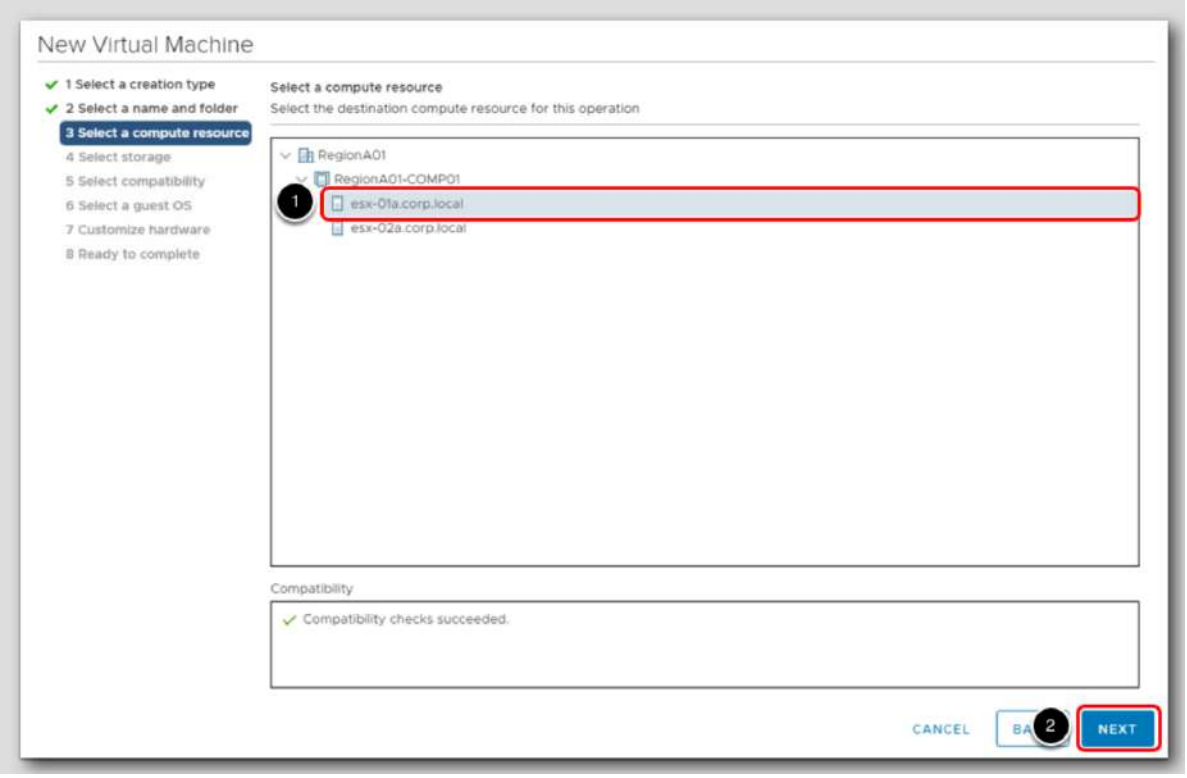
1. Enter web-serv01 for the name of the new virtual machine.
2. Click Next.




**Virtual Machine Placement**

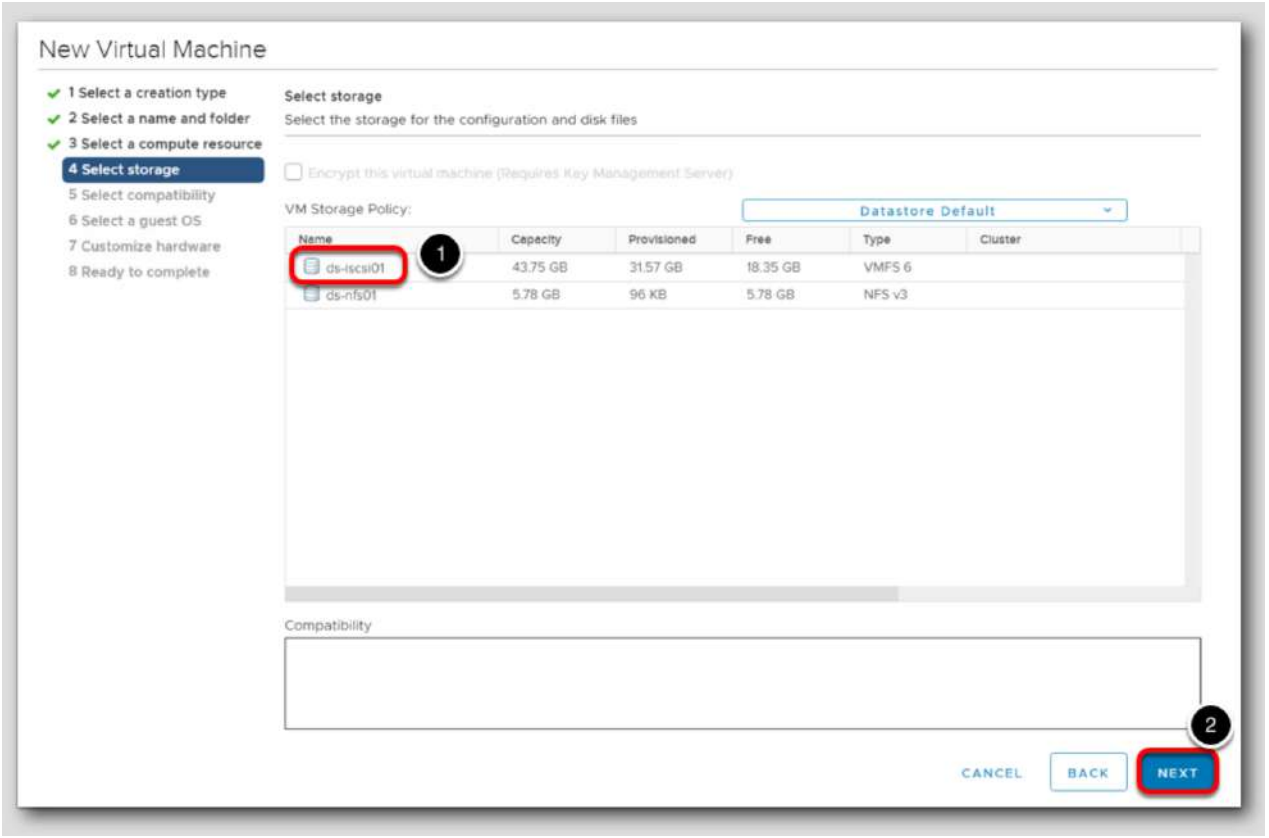
Because Distributed Resource Scheduler (DRS) is not enabled, you just have to select a host to use for the VM. More details on DRS will be covered later in this module.

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



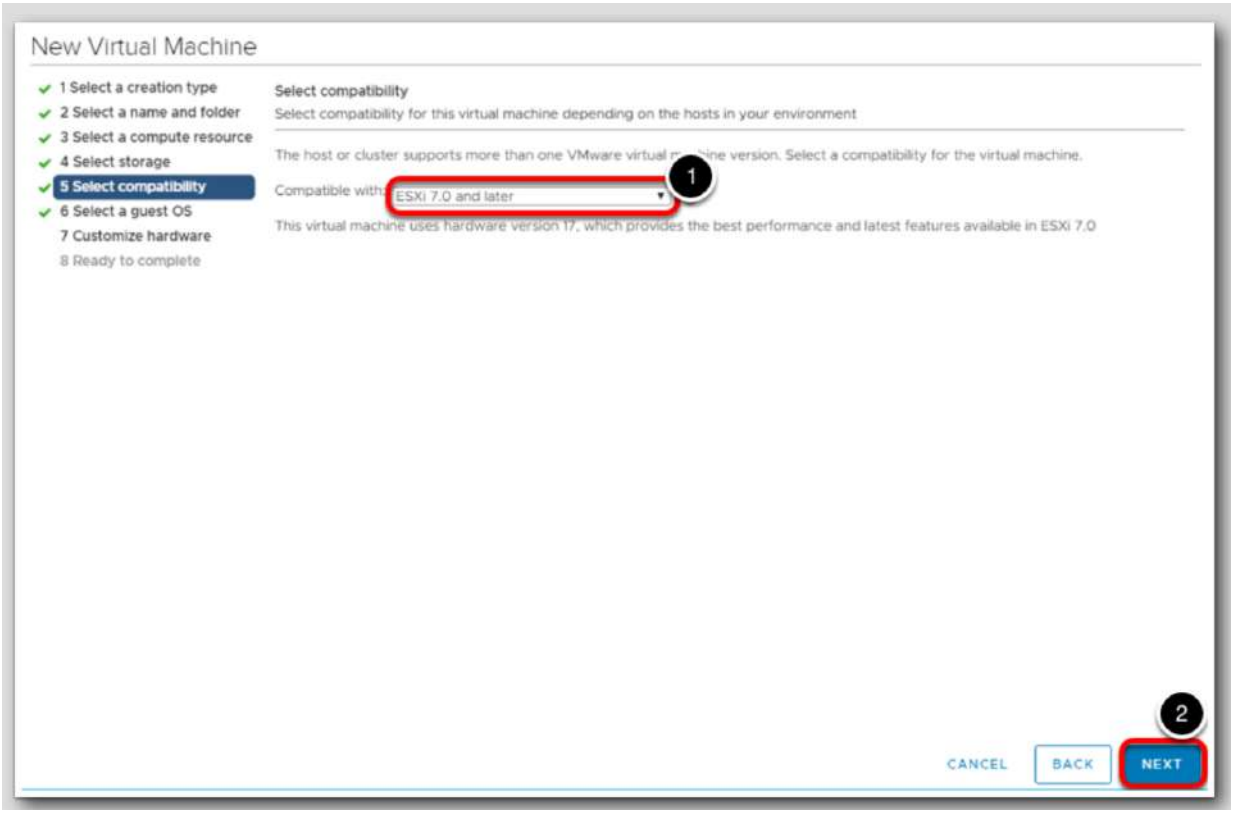
**Select Storage**

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




**Compatibility**

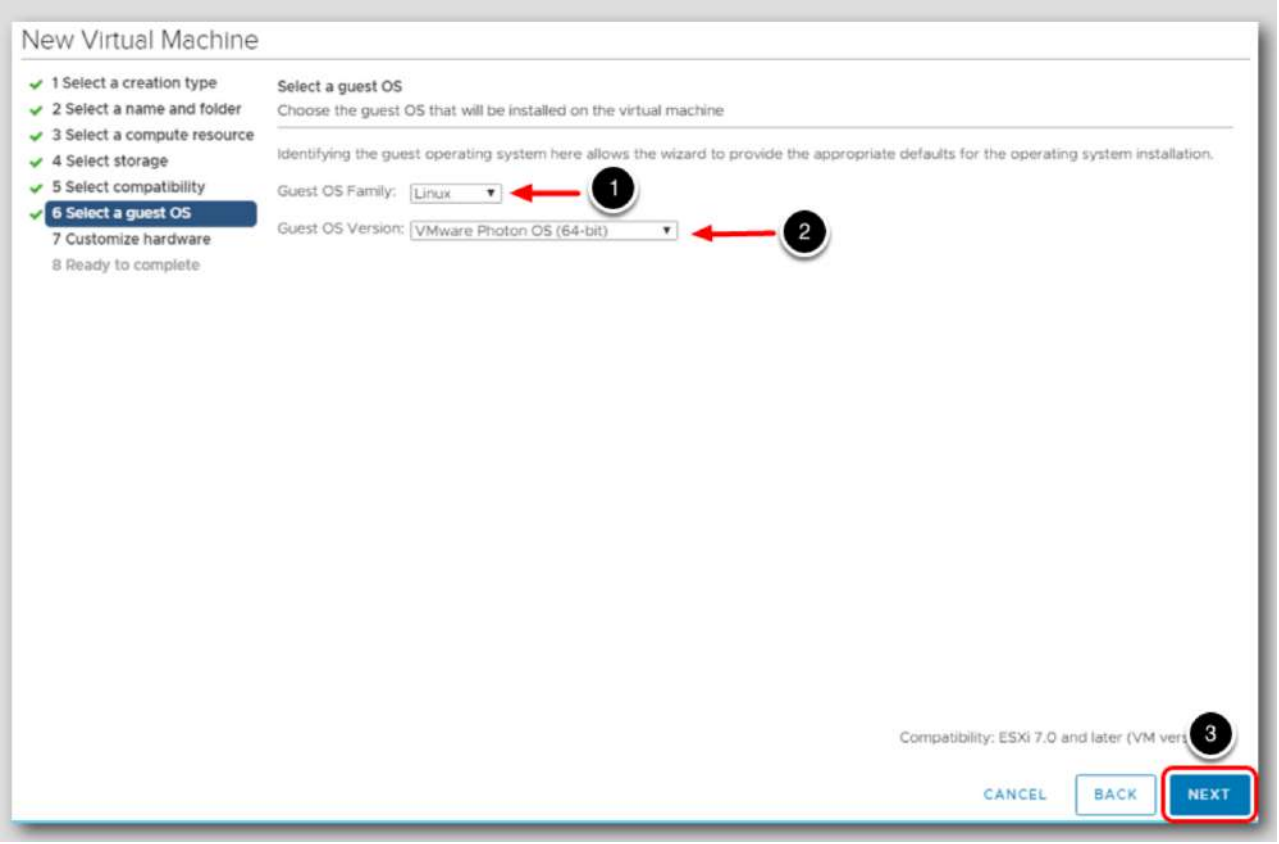
1. Select ESXi 7.0 and later.
2. Click Next to accept.



**Guest OS**

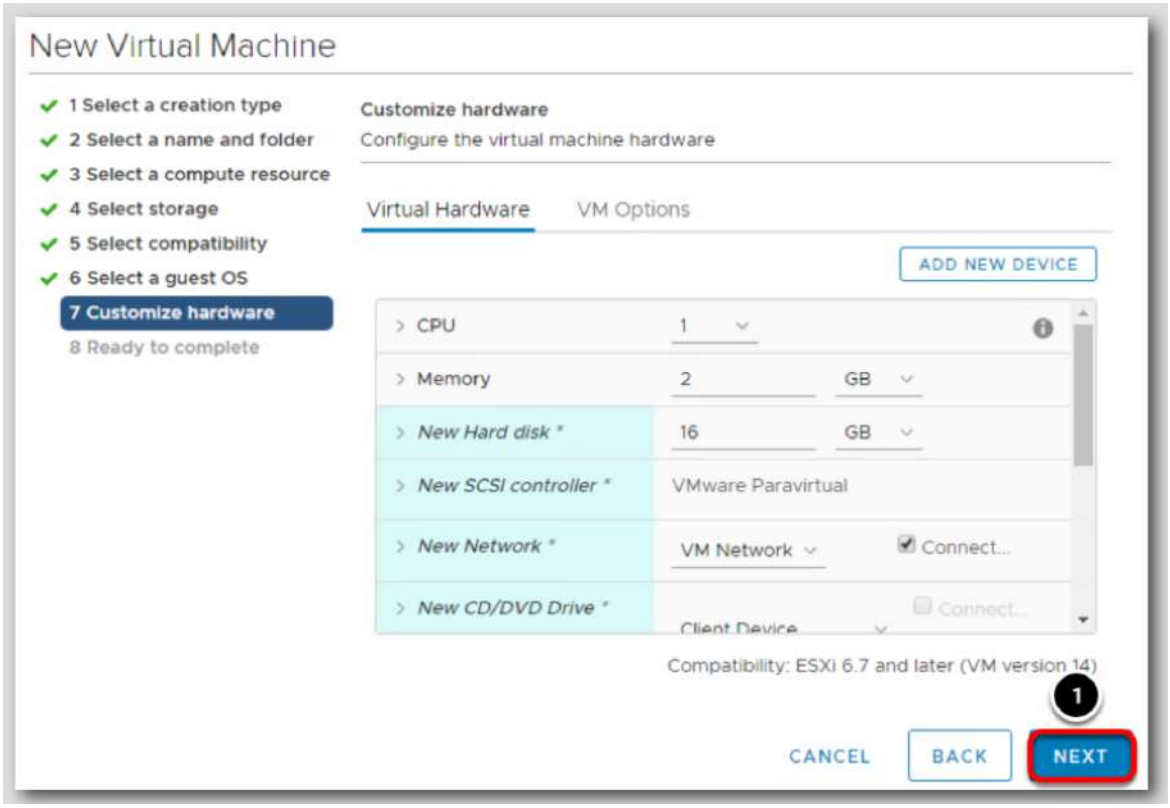
In this step, we will be selecting what operating system we will be installing. When we select the operating system, the supported virtual hardware and recommended configuration is used to create the virtual machine. Keep in mind this does not create a virtual machine with the operating system installed, 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.




**Change Virtual Disk Size**

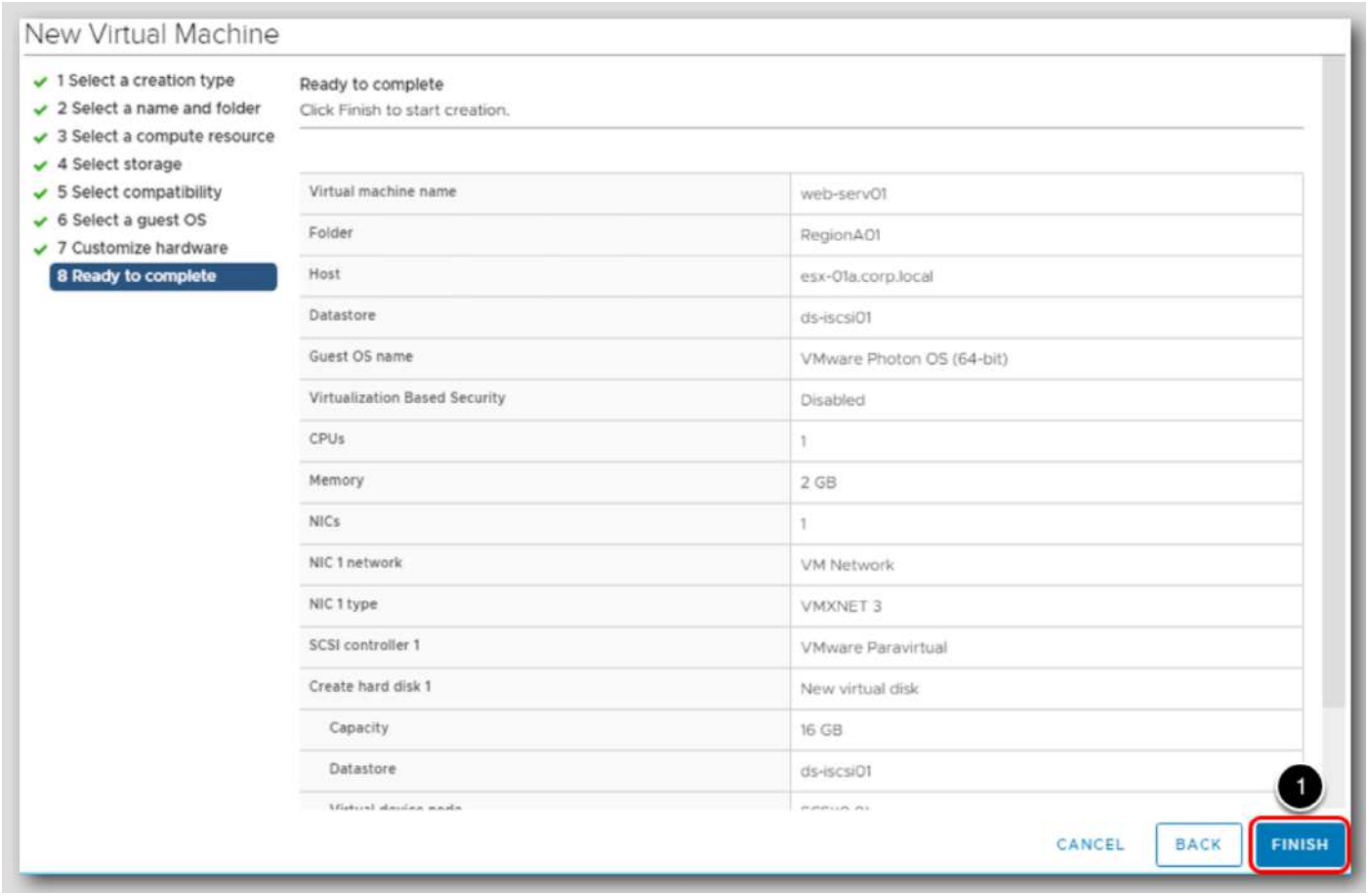
1. Leave the default settings and click Next



**Ready to complete**

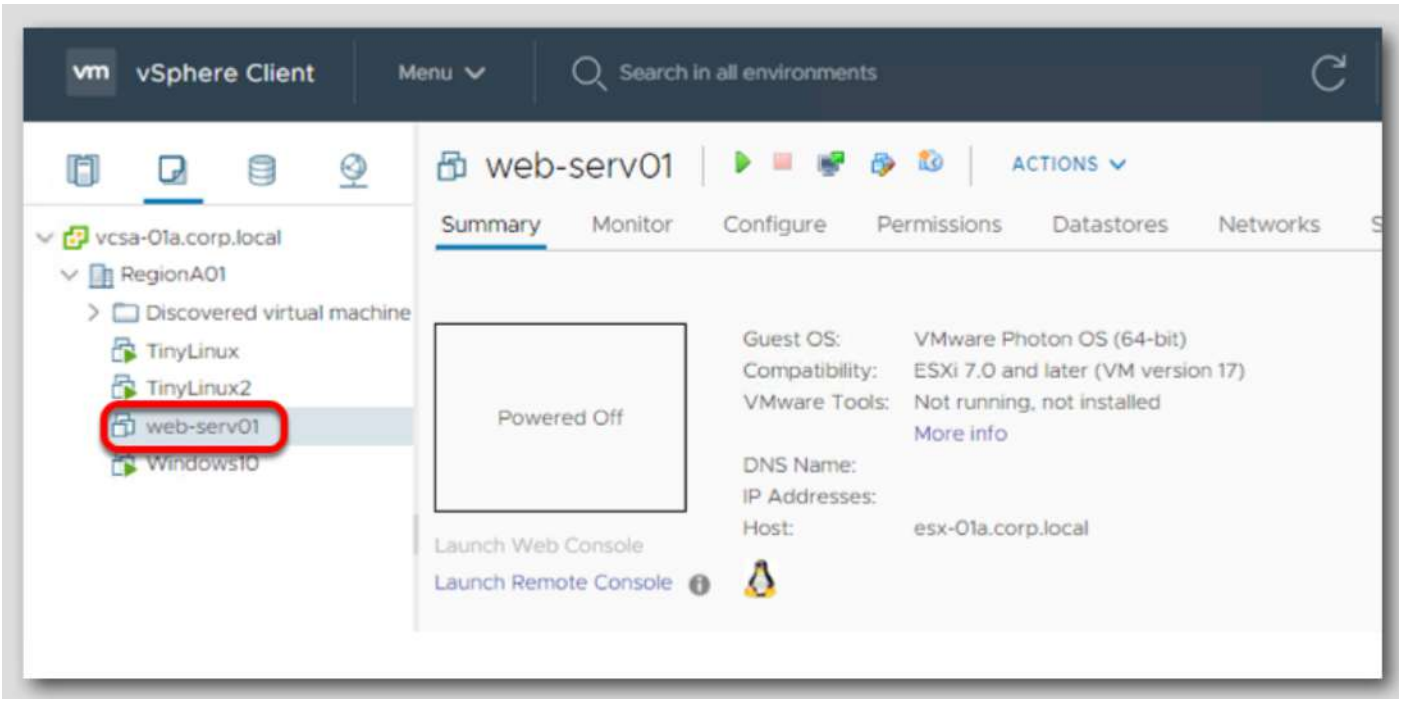
The settings for the virtual machine can be verified prior to it being created.

1. Click Finish to create the virtual machine.




**Newly created virtual machine**

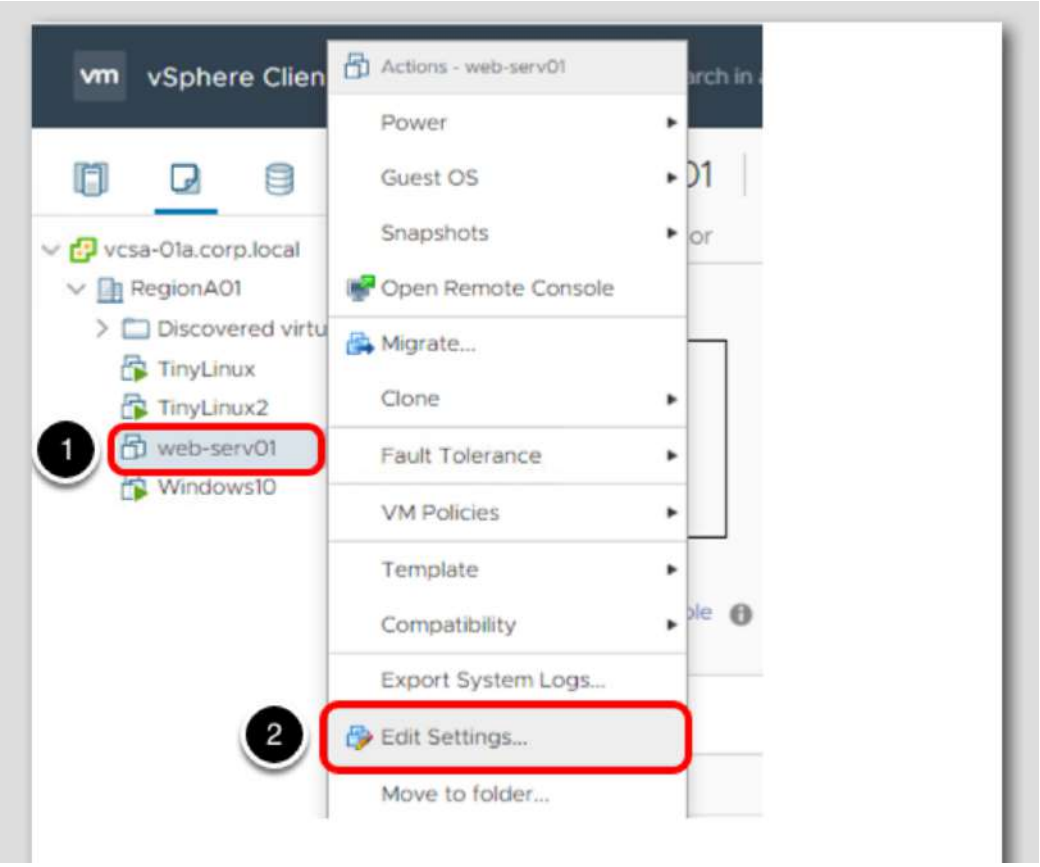
Congratulations on creating your first virtual machine web-serv01.



**Attaching an ISO to a Virtual Machine**

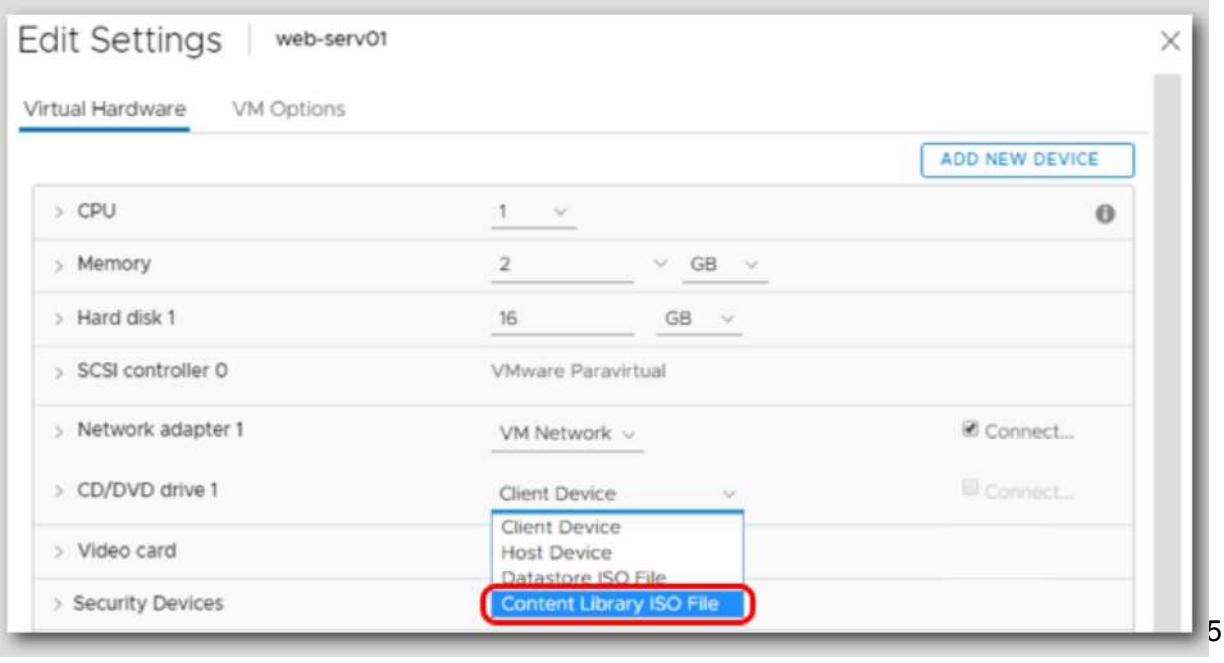
To make it easier to install operating systems on virtual machines, ISO images can be used. These can be kept in the same storage used for virtual machines. In addition, vCenter offers a Content Library as a repository. Content Libraries can then be synchronized to ensure every location is using the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



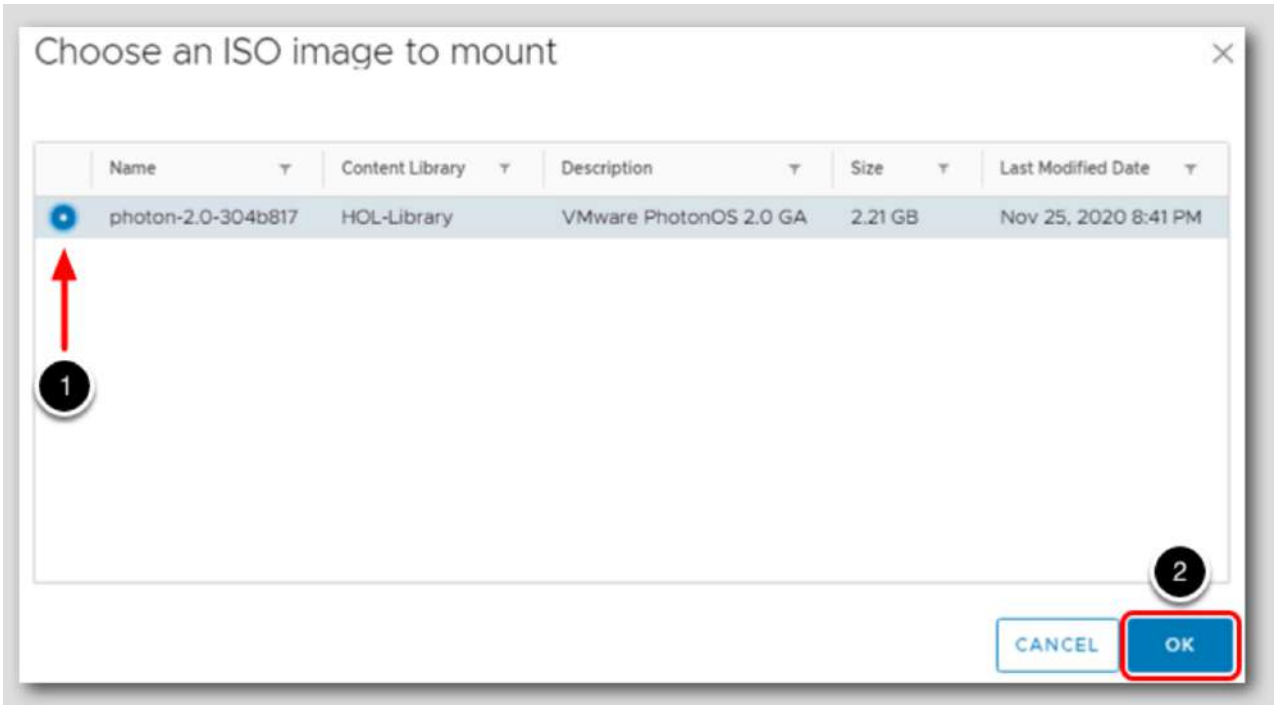

**Content Library ISO File**

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



**Select Photon**

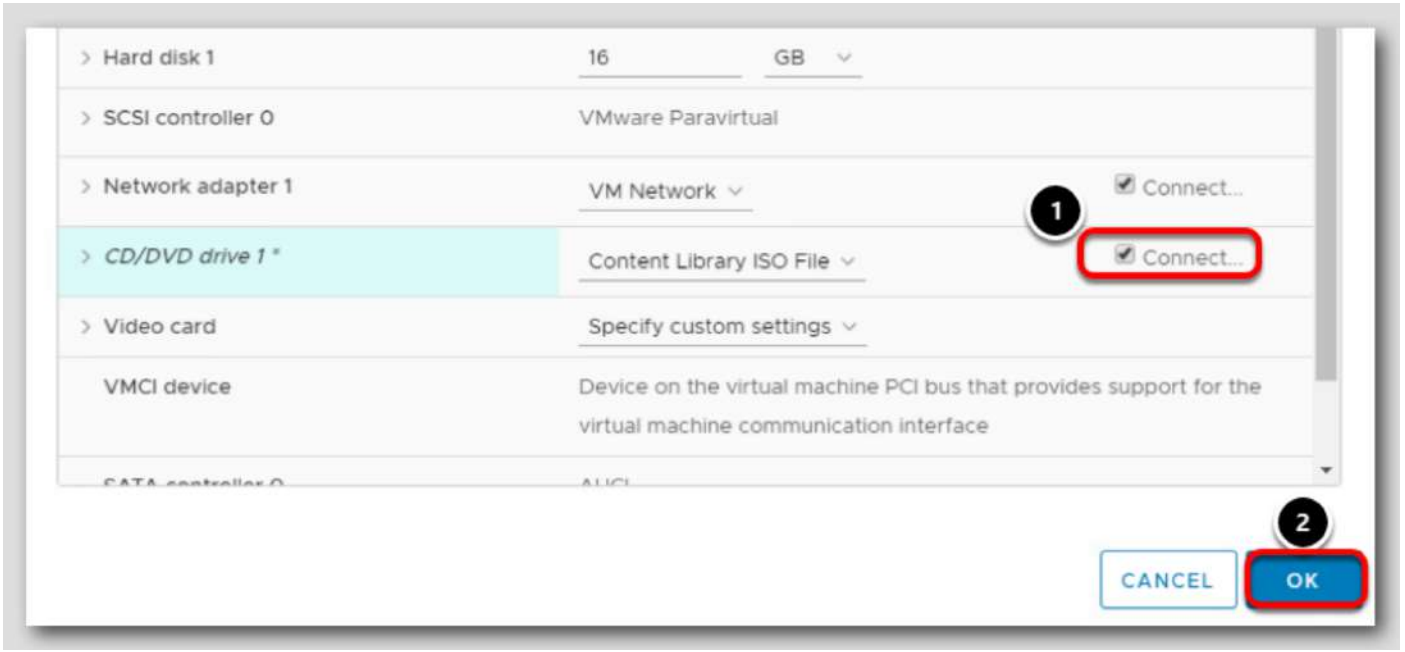
1. Click the radio button next to photon-2.0-304b817.
2. Click OK.




**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

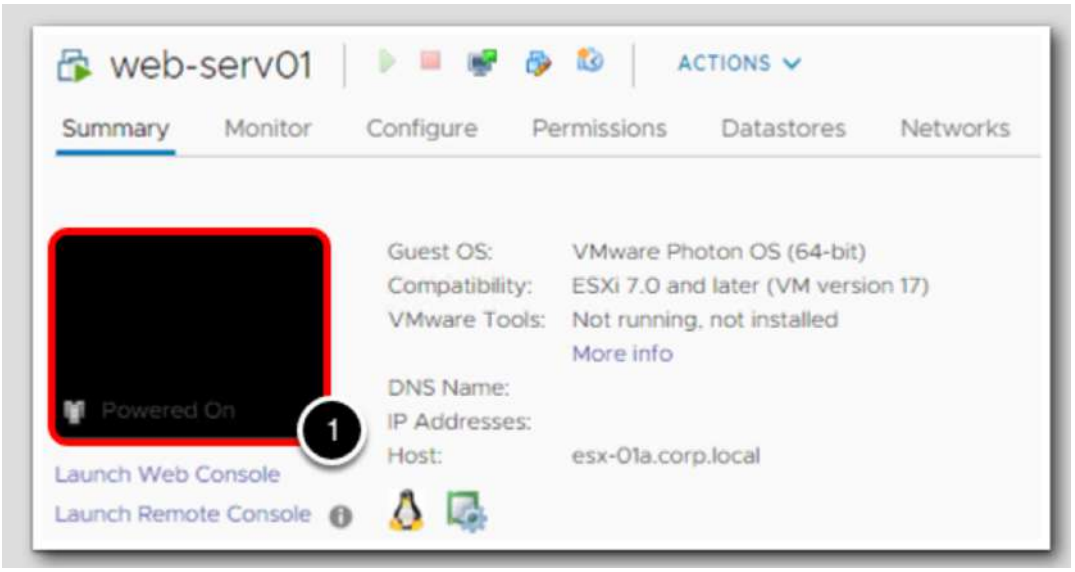



**Power on web-serv01**

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

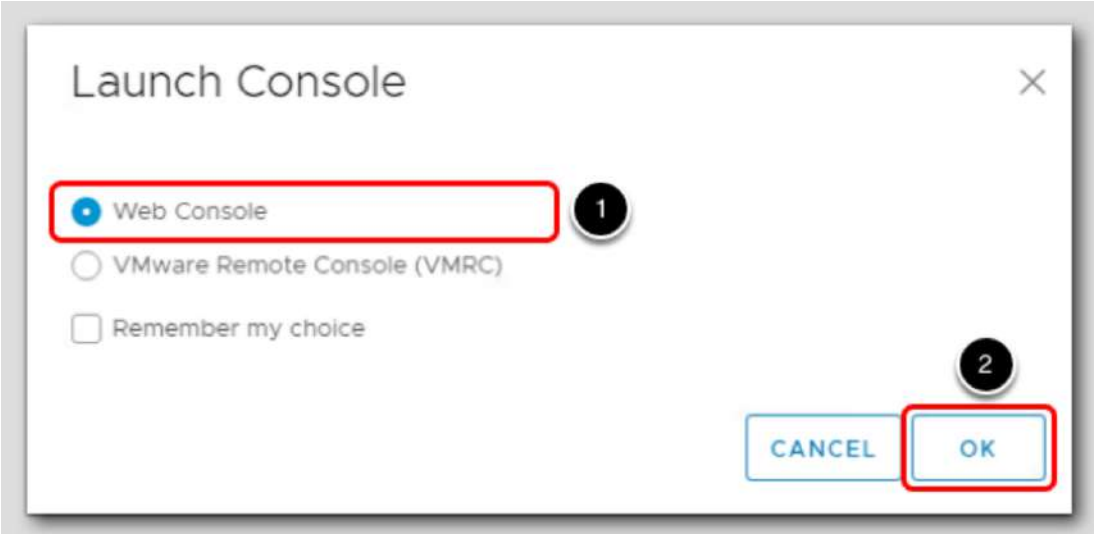
**Launch Console**

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**

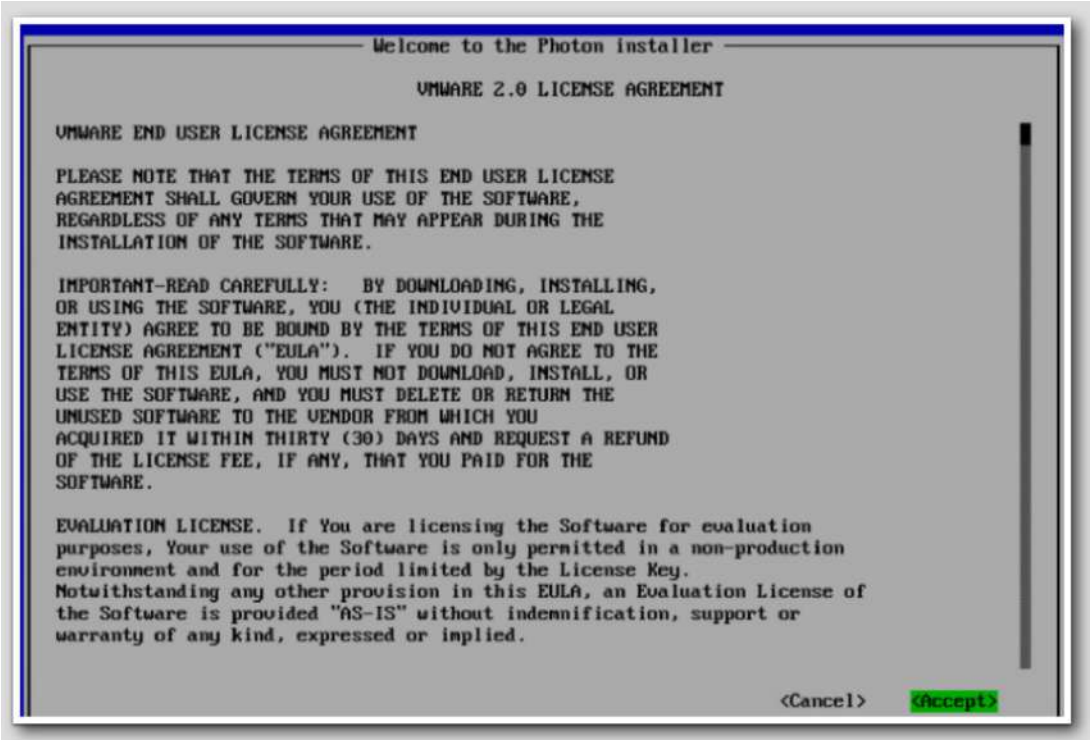
A new tab will open and you will be presented with the Photon OS boot screen.

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


**License Agreement**

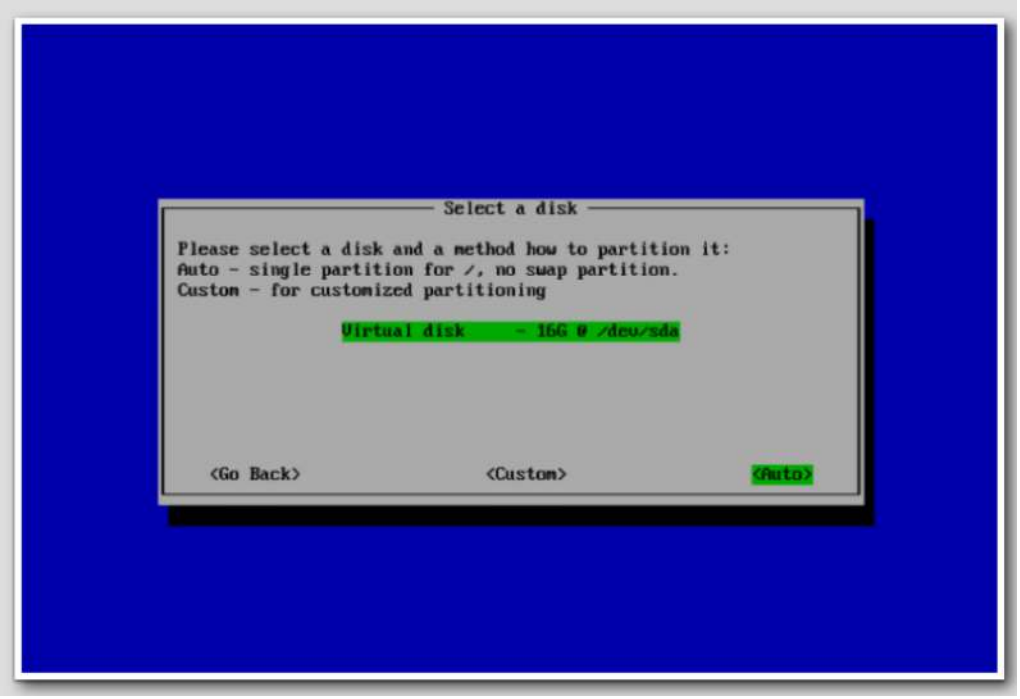
After the boot process is complete, you will be presented with a license agreement.

1. Press Enter to accept.



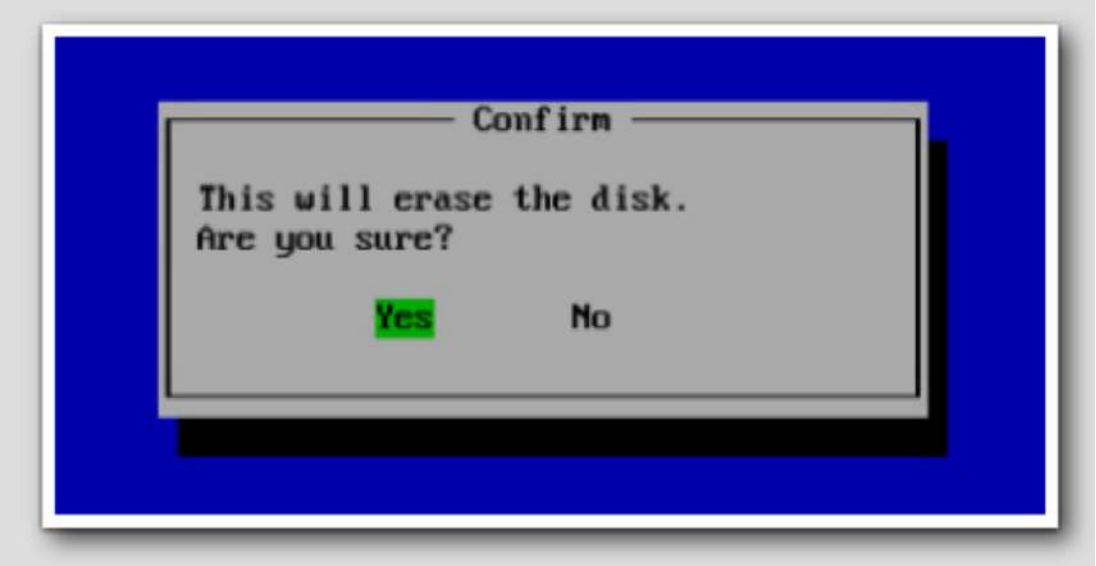
**Select Disk**

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



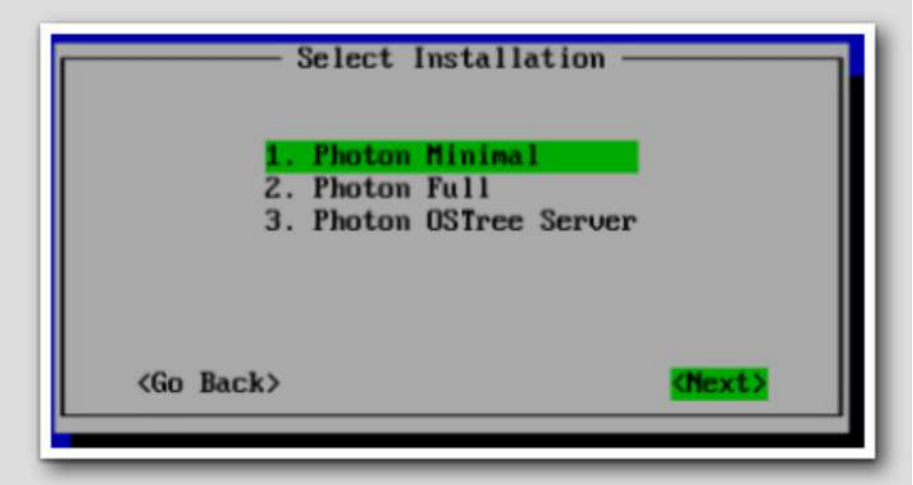

**Confirm**

1. Press Enter confirm the disk should be erased.




**Select Installation**

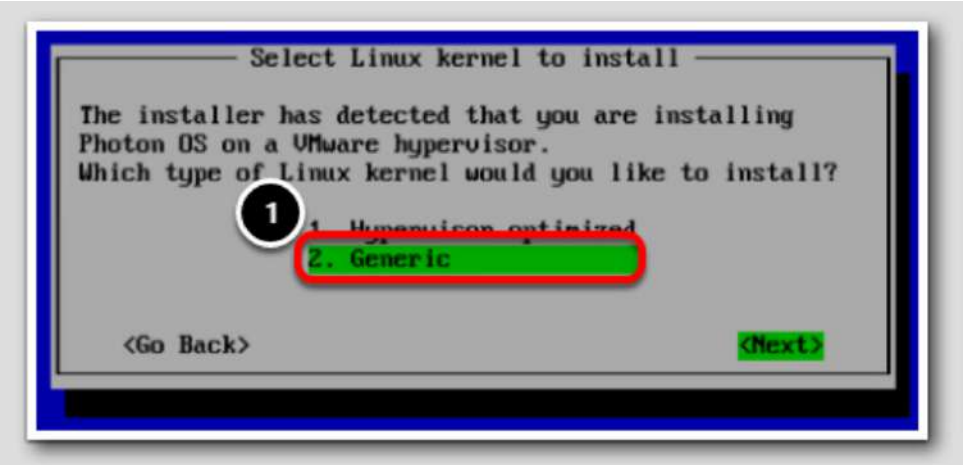
1. At the Select Installation screen, make sure the default option of 1. Photon Minimal is selected.
2. Press the Enter key.



**Linux Kernel**

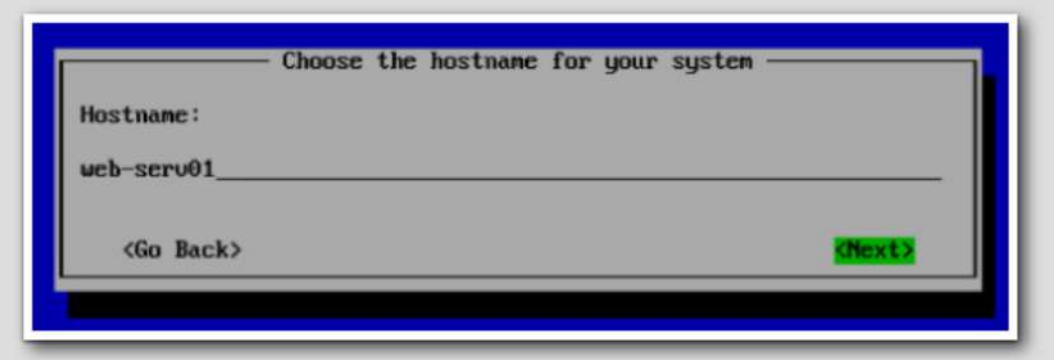
1. Use the arrow key to select 2. Generic.
2. Press the Enter key.

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**

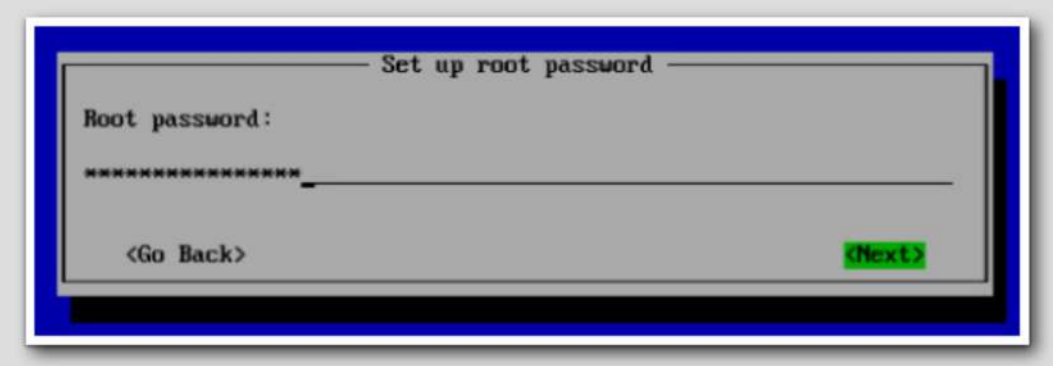
1. Use the Backspace key to remove the default hostname.
2. Type web-serv01.
3. Press the Enter key.




**Password**

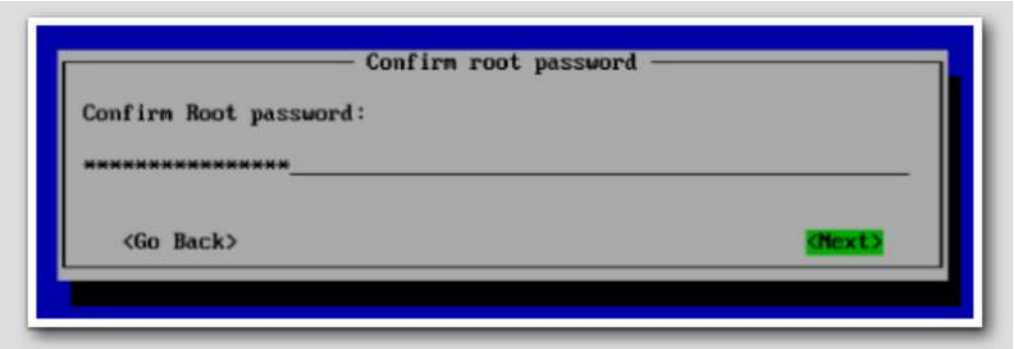
1. For the password, use VMware1!VMware1!

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



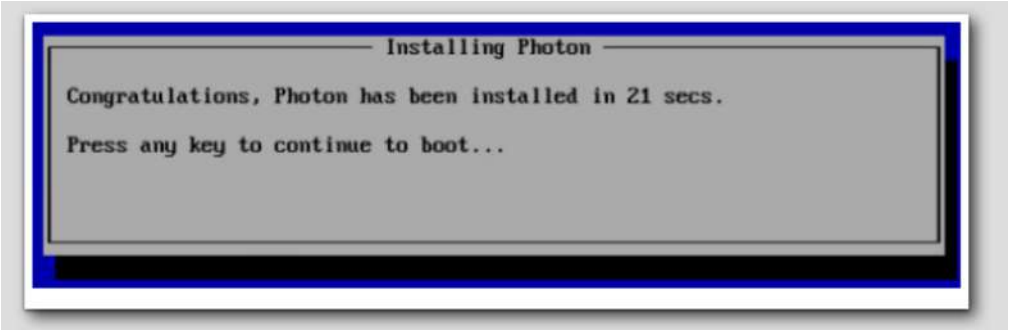
**Confirm Password**

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




**Installation Complete**

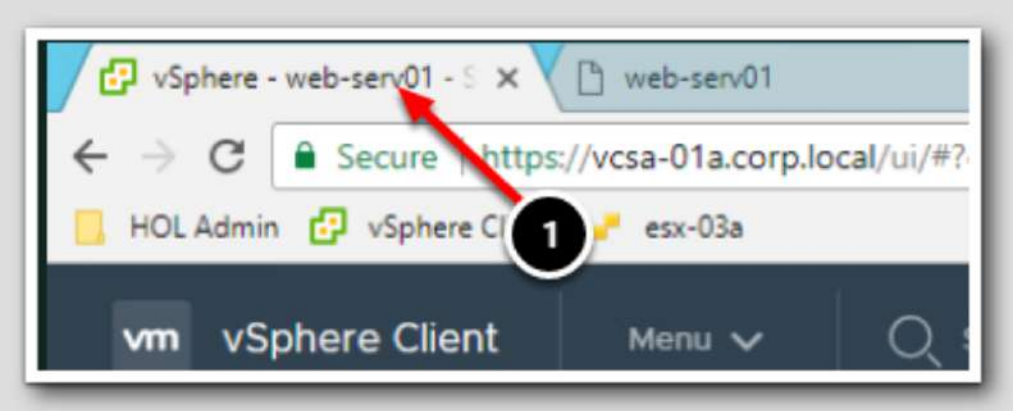
After a minute or two, the installation will be complete.
Press a key to reboot the virtual machine. After a minute or two, the system should boot the login prompt.




**vSphere Tab**

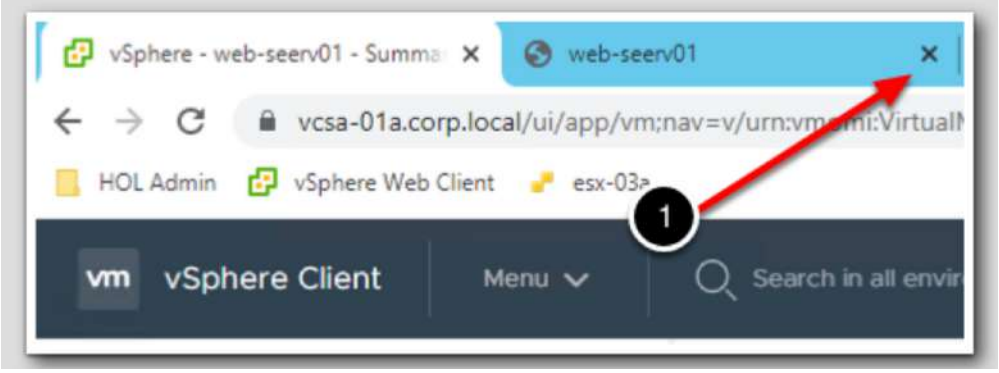
Now that the operating system has been installed and is up and running, the ISO image needs to be disconnected from the virtual machine.

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:

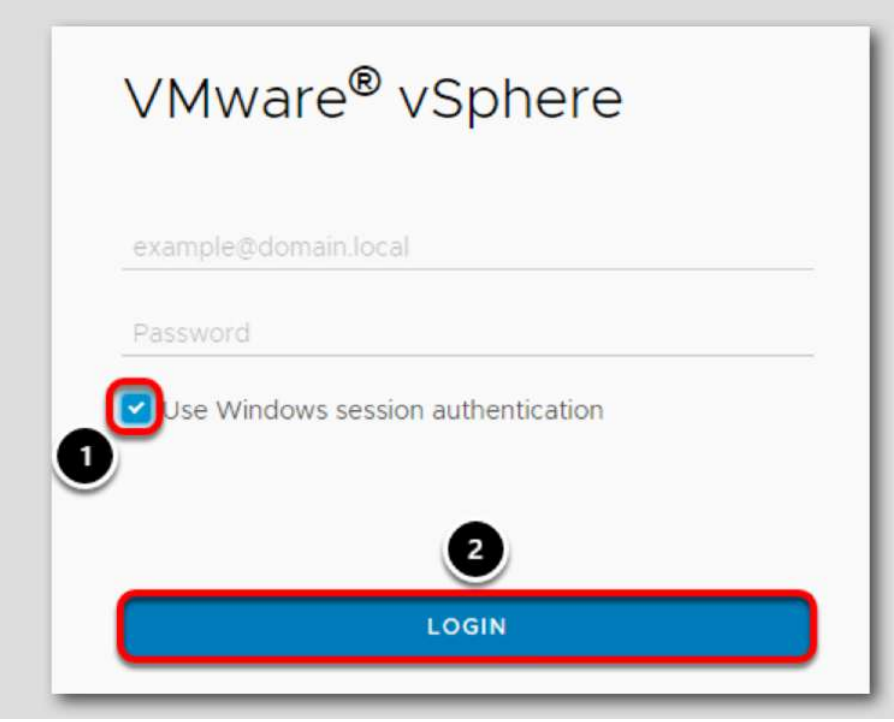
- Eliminate downtime for common maintenance operations.
- Eliminate planned maintenance windows.
- Perform maintenance at any time without disrupting users and services.

**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.



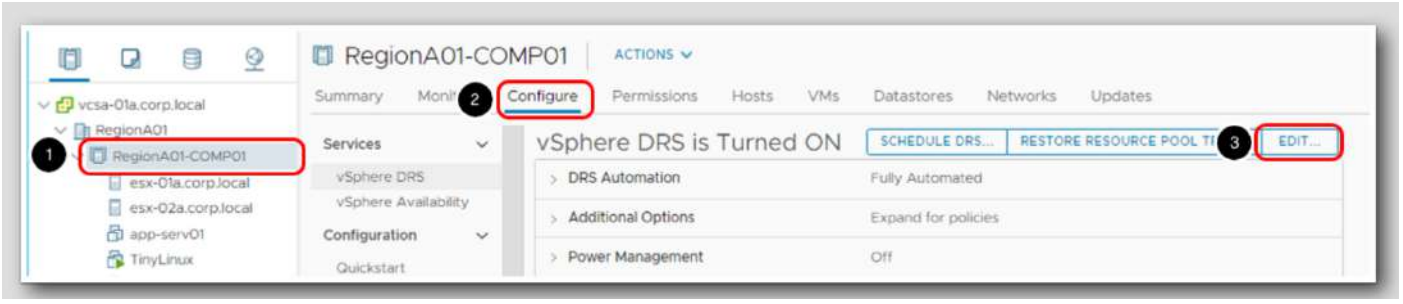
If credentials aren't saved, use the following:

- 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

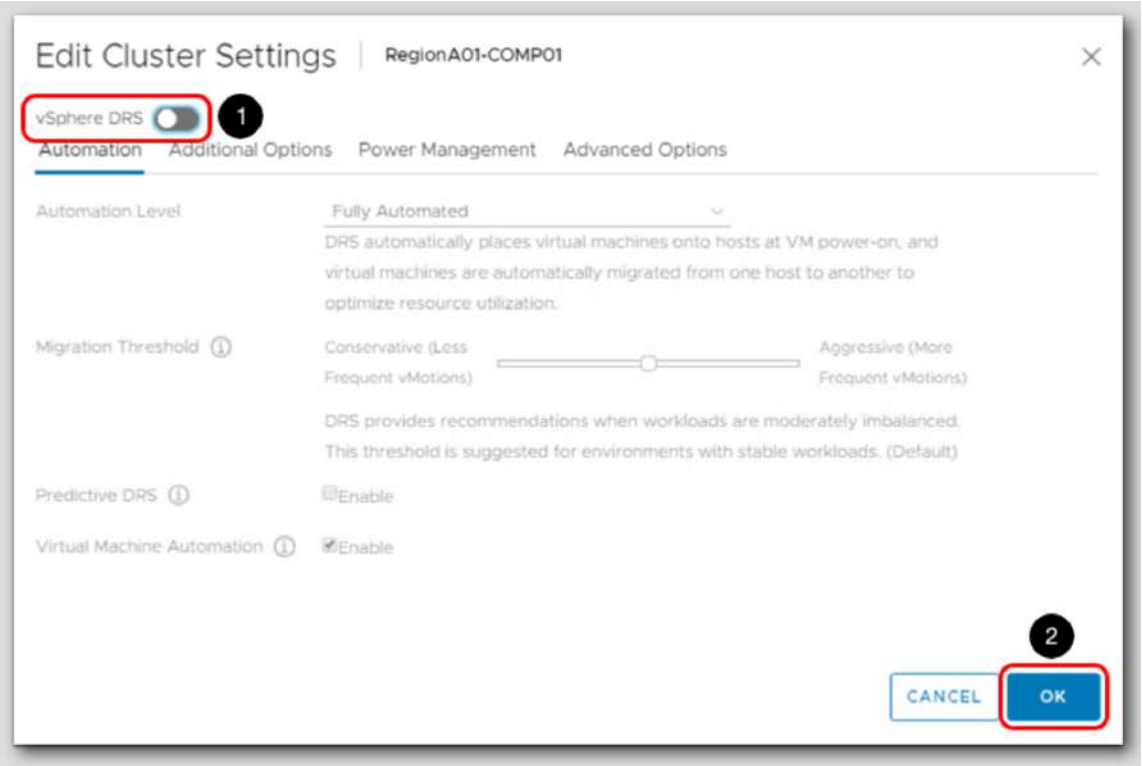



**Disable DRS**

1. Flip the switch to disable vSphere DRS.

2.Click OK

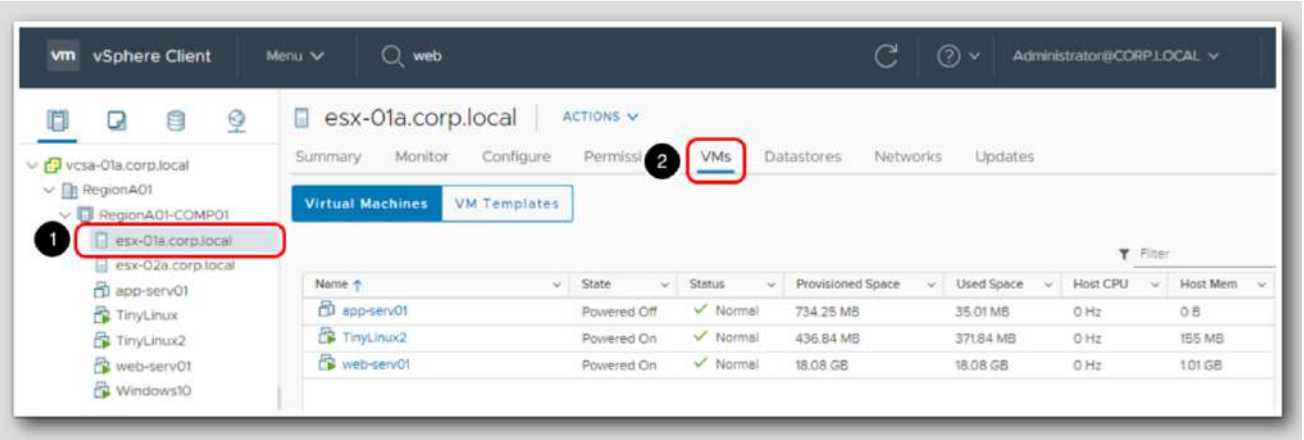
By disabling DRS, this will prevent the virtual machines from being migrated back to esx-01a.corp.local.




**Migrating to esx-02a.corp.local**

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

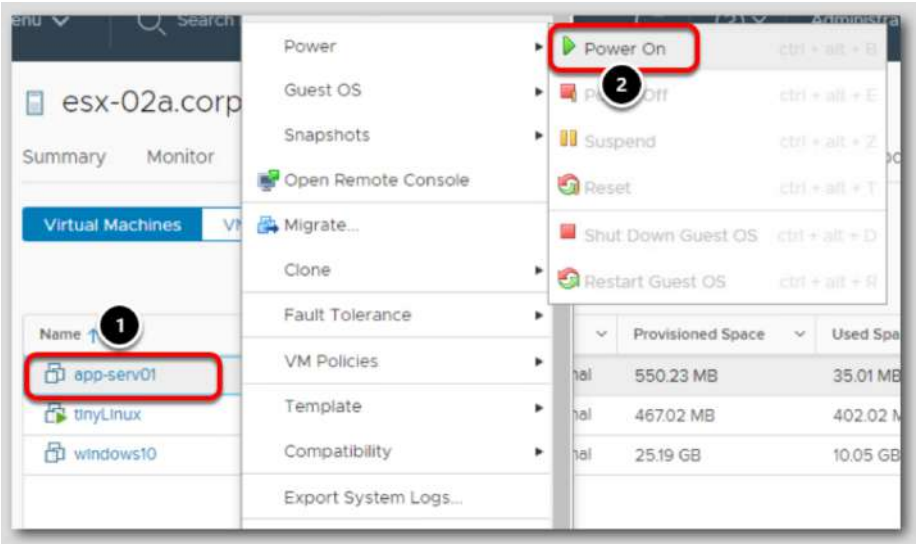
Depending on what other modules you have taken, you may see more VMs




**Power on VMs**

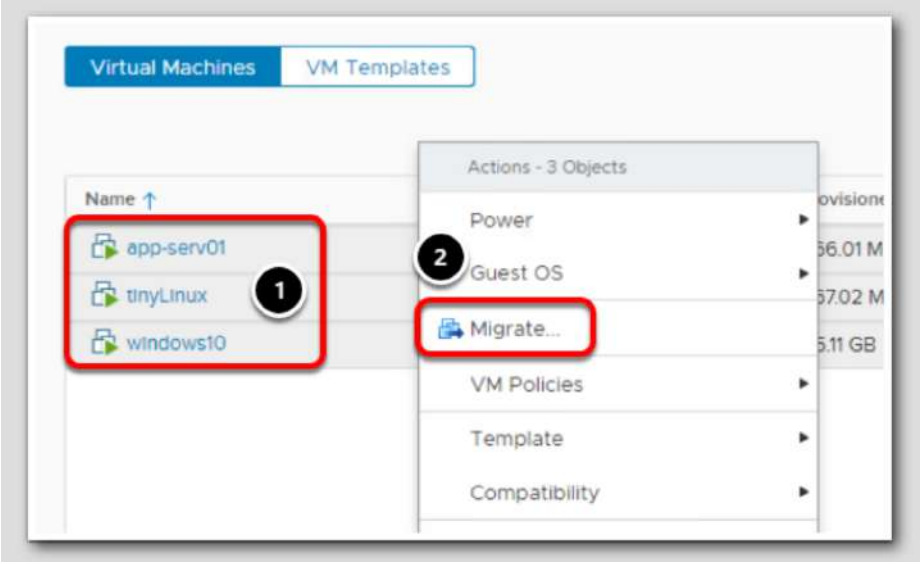
1. Look for any virtual machines that are Powered Off and select them. Multiple virtual machines can be selected by holding the Ctrl key and clicking on them.
2. Right click and select Power/Power On

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…



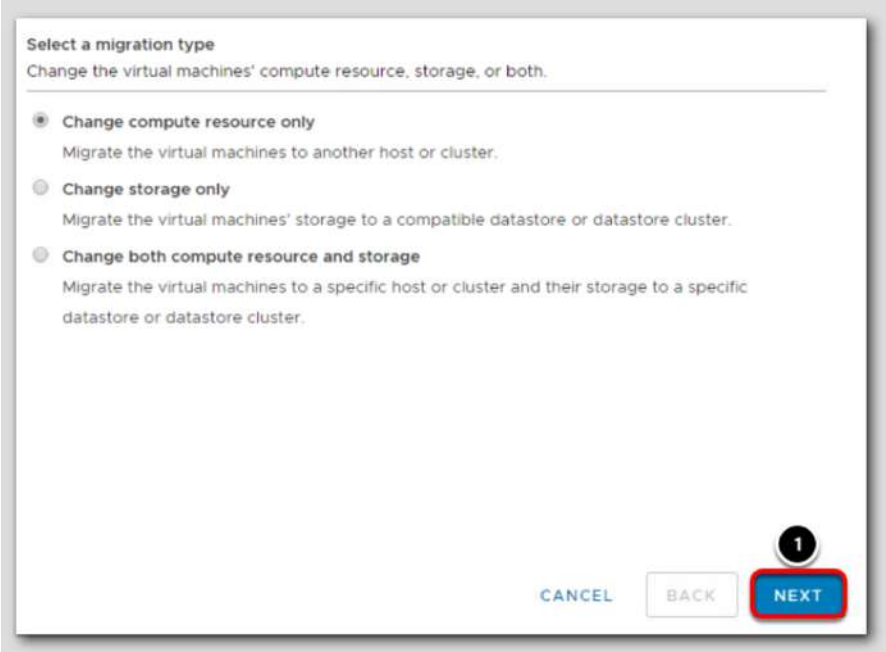
**Migrate**

Click Yes to start the migration process.


**Migration Type**

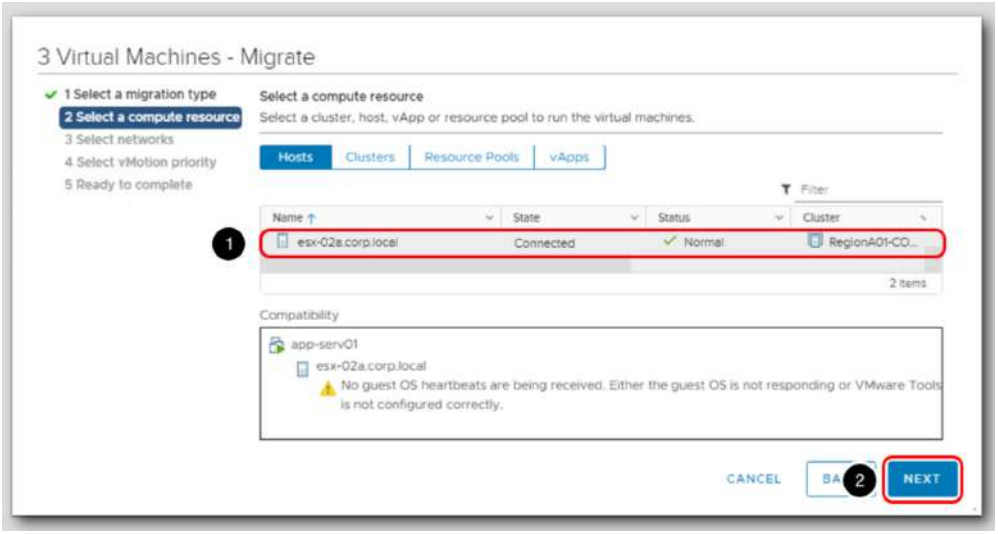
1. Leave the default setting and click Next.

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.localesx-02a.corp.local
2. Click Next

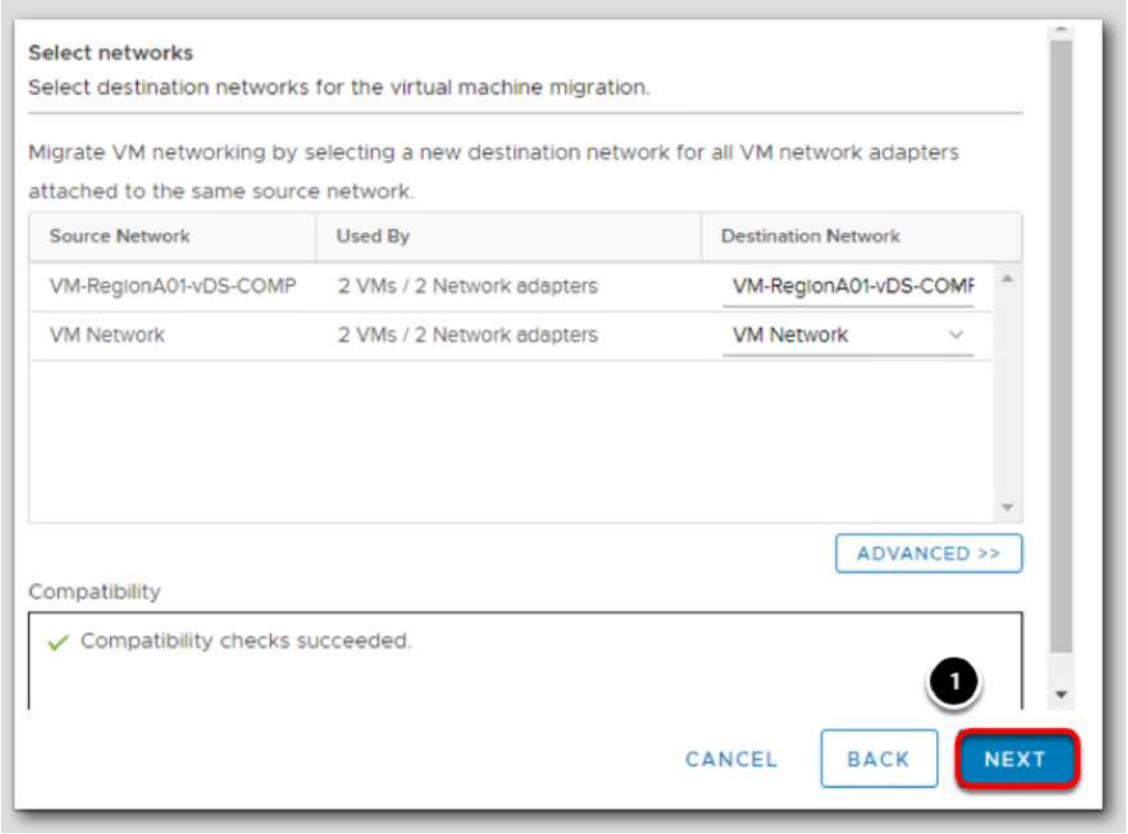


Since we want to move all the virtual machines to esx-02a.corp.local, we are selecting a specific host. We could also place it in a Cluster and let DRS decide the best host to move it to.

**Networks**

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

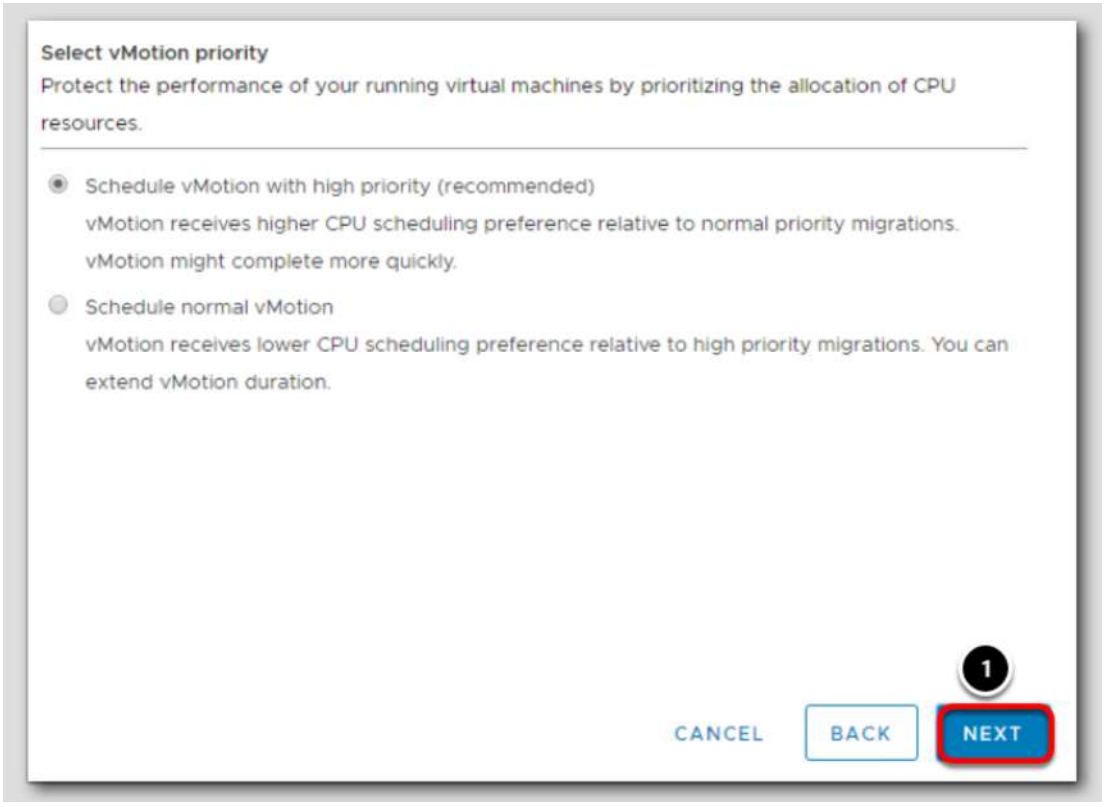
1. Click Next




**vMotion Priority**

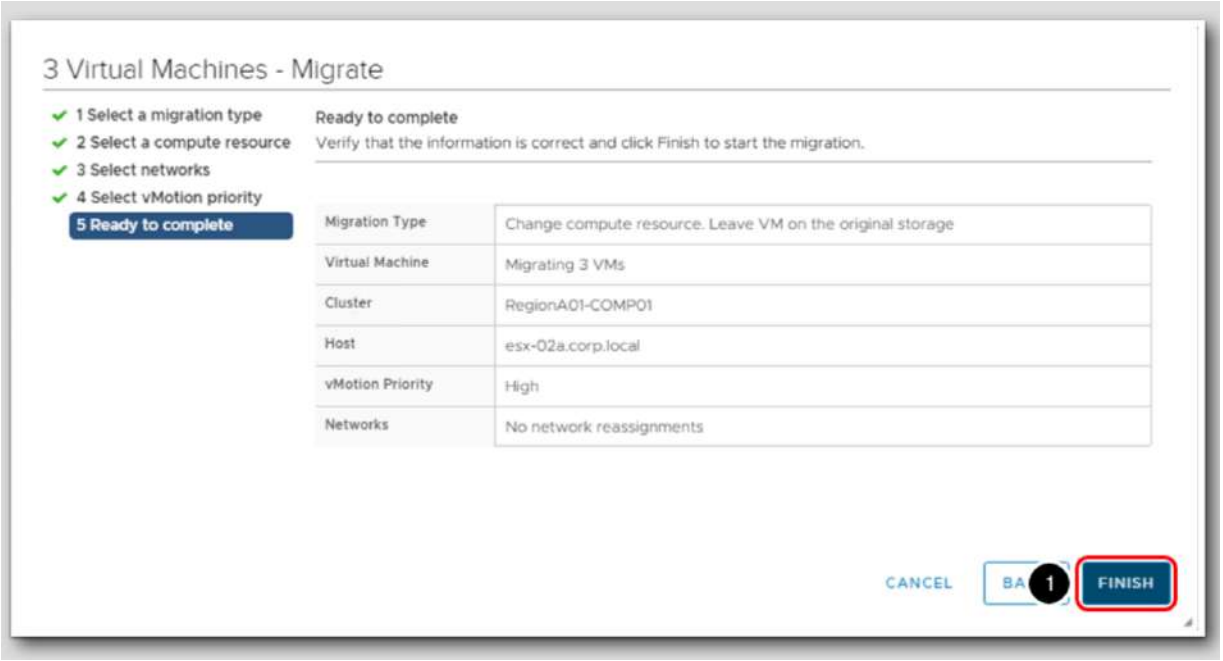
A priority can be set for the vMotion task. In most cases, the default option is OK.

1. Leave the default setting and click Next



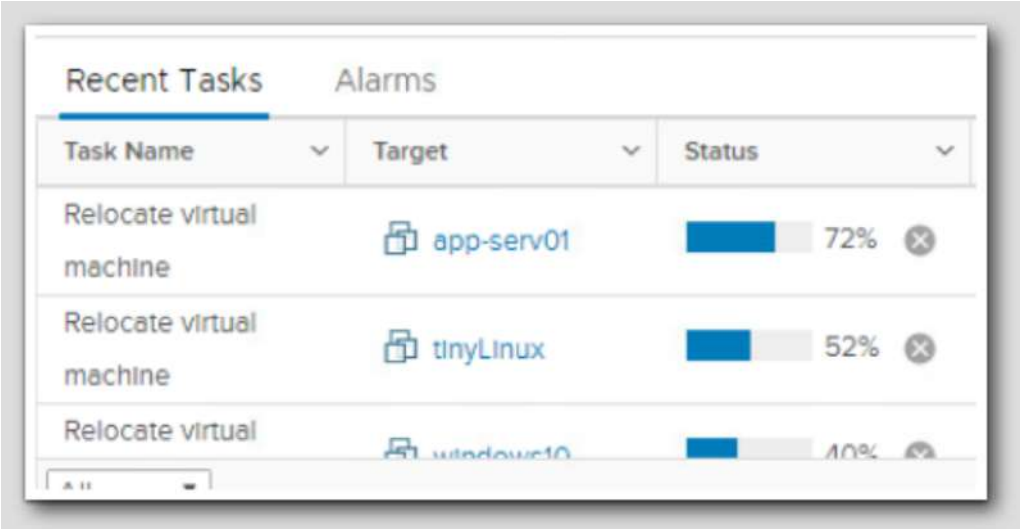
**Ready to Complete**

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



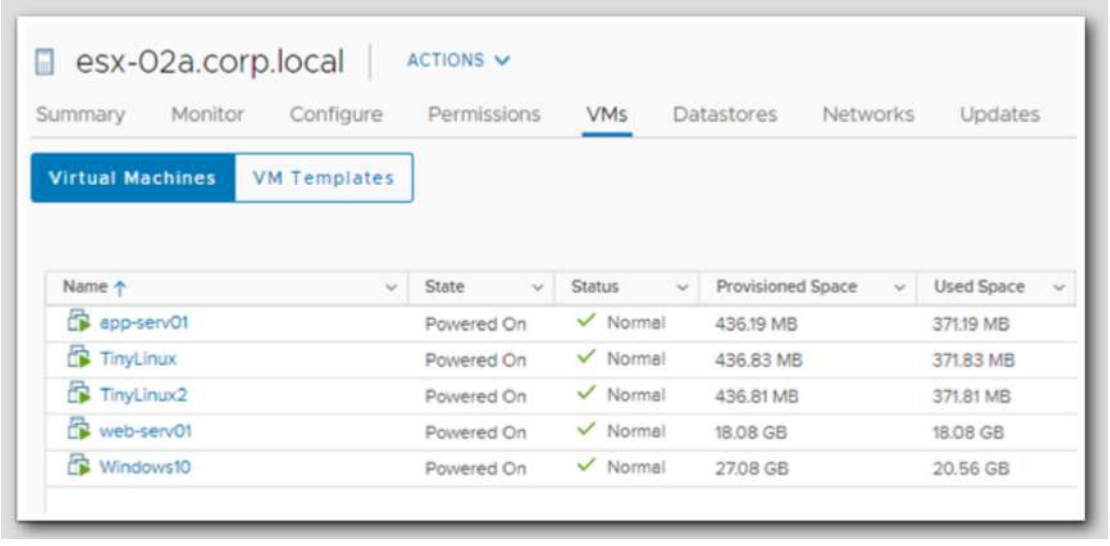

**Monitor Progress**

You can monitor progress using Recent Tasks.




**Migration Complete**

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

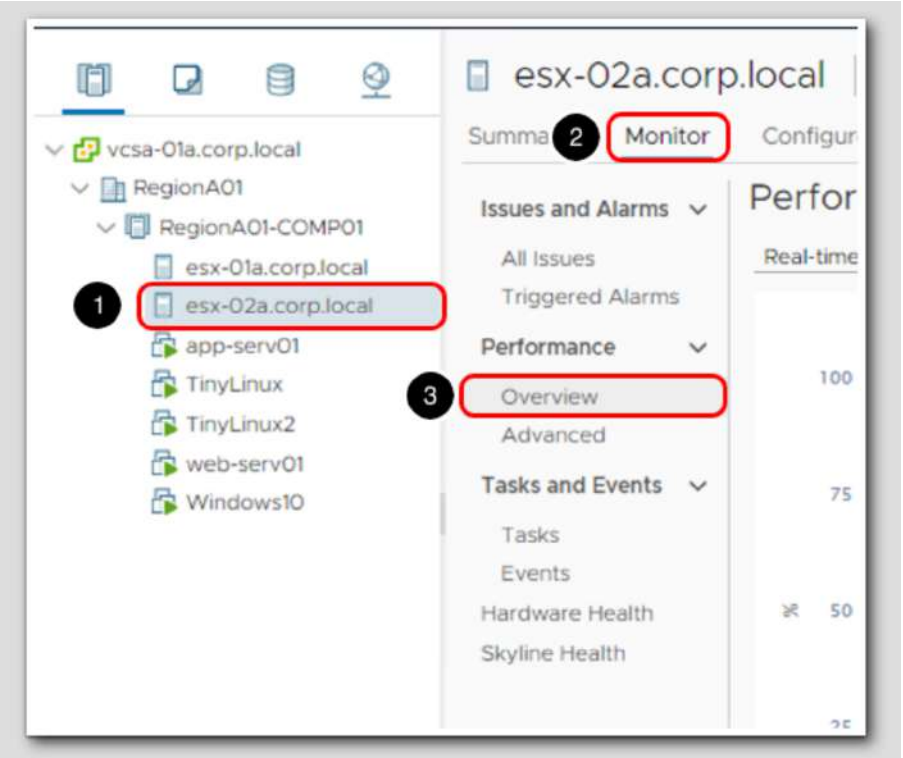


# Practical 9: Use the system monitoring tools to reflect the CPU workload.

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.



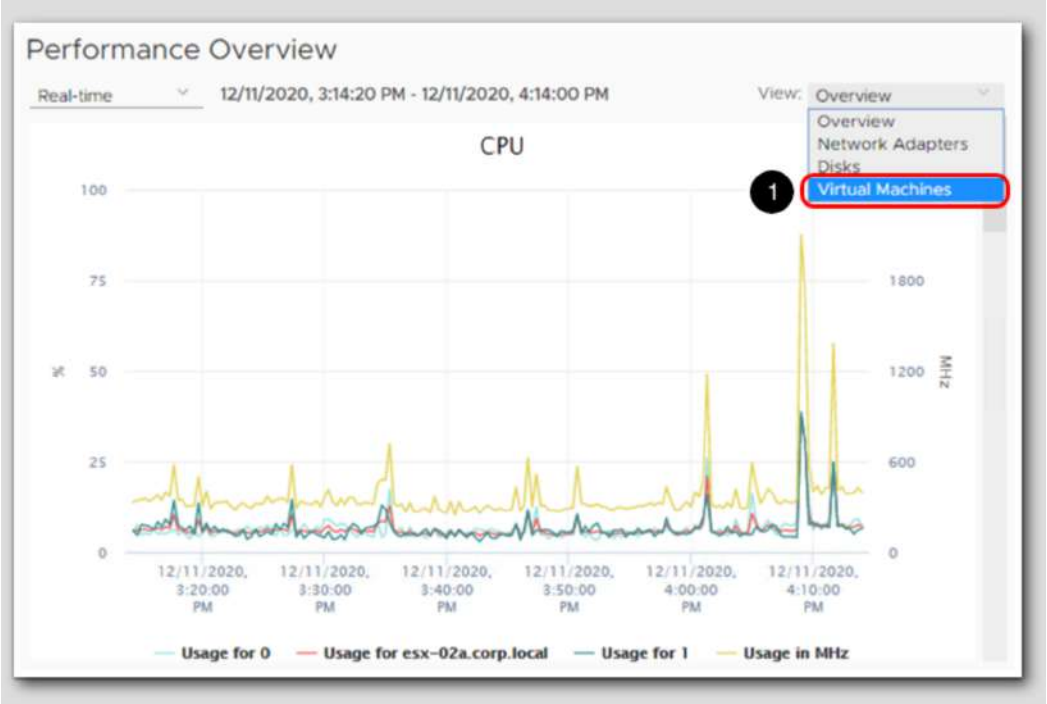

**Host CPU Usage**

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.

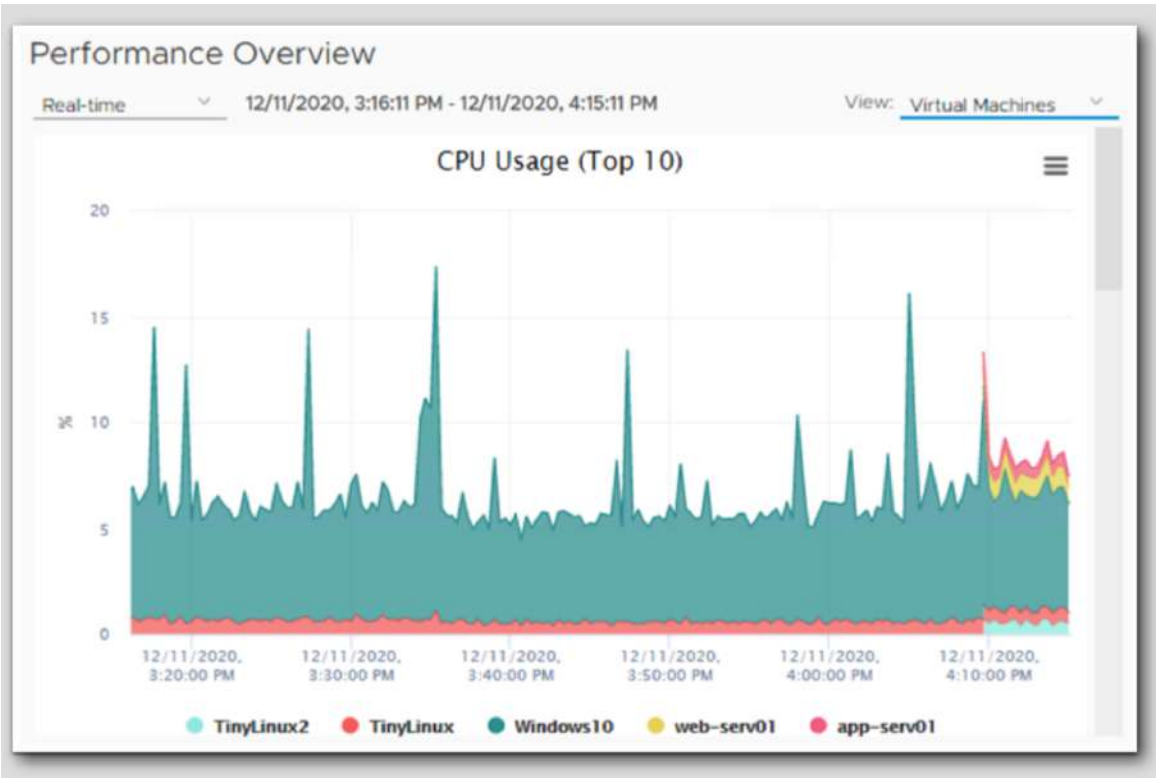
**Virtual Machine CPU Usage**

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




**Combined CPU Usage**

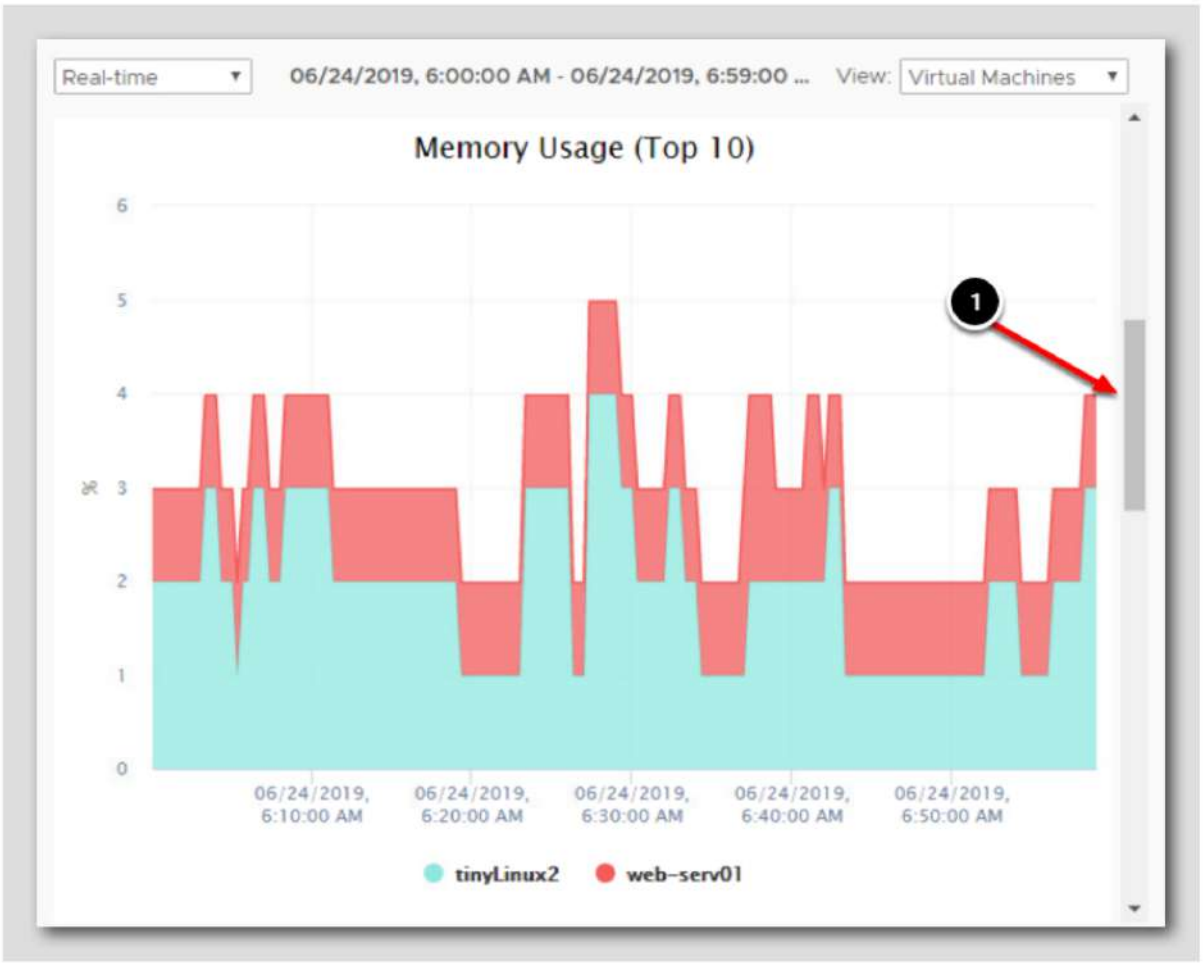
This chart shows the real-time CPU usage of each virtual machine. Each VM is represented by a different color in the graph and you can see at the bottom, which VM is represented by what color. Combined, they give you an idea of overall CPU usage on the host.



**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.



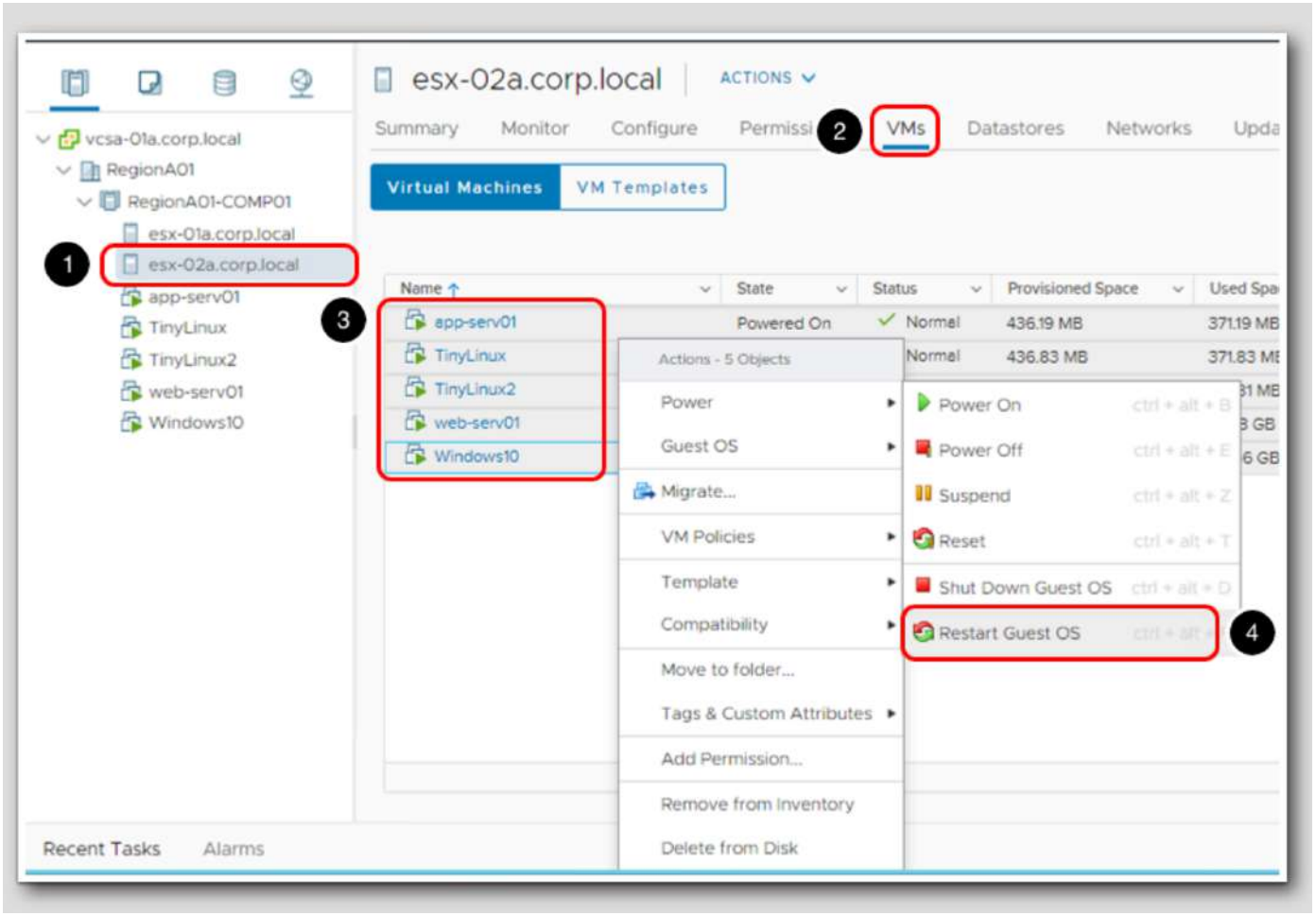

The graphs we have looked at so far will give you an overview of the four main components, CPU, memory, disk and storage. The advanced graphs will give you more detailed information on each of these.

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**

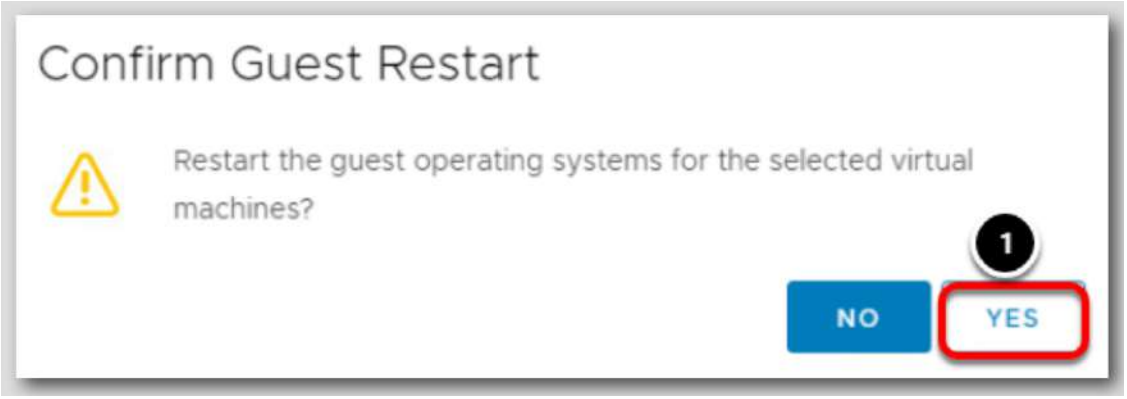
To generate some activity on esx-02a.corp.local, the virtual machines will be rebooted.

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.

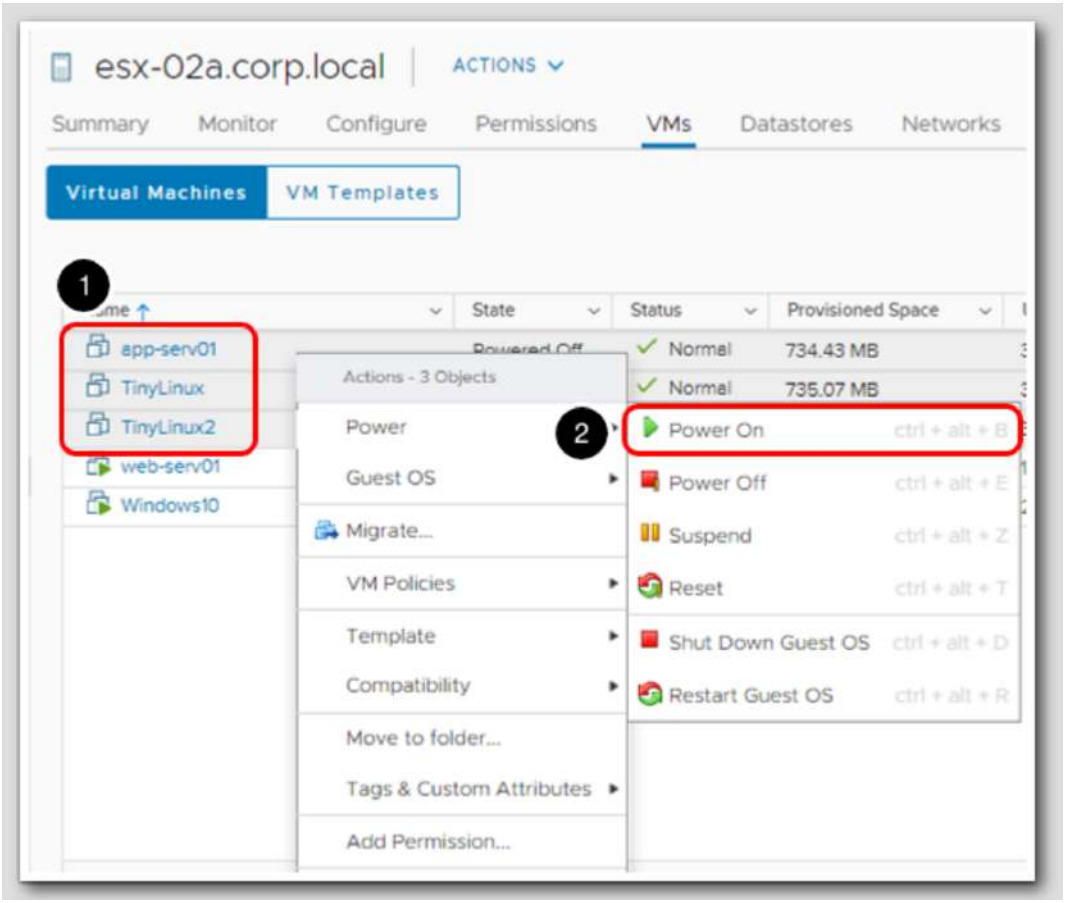



Note: You may also receive a warning that only X of X virtual machines will be restarted. This depend on what other modules and/or lessons have been completed in the lab previously.

**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.

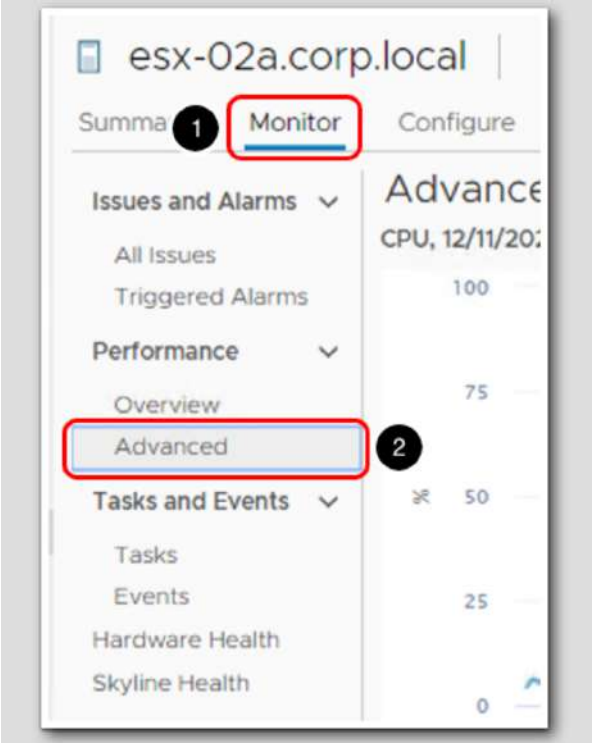
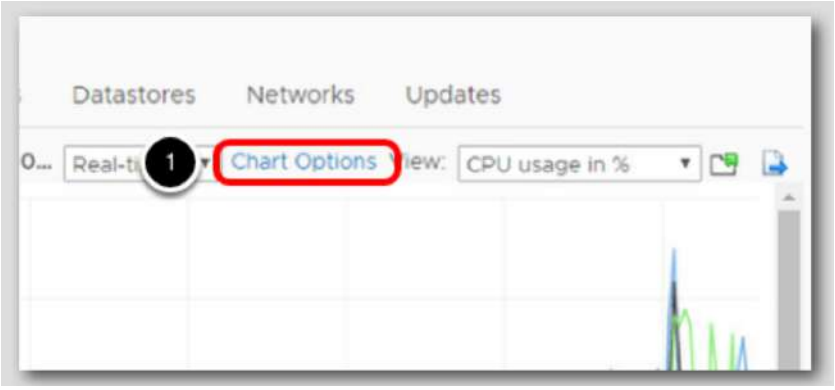


**Chart Options**

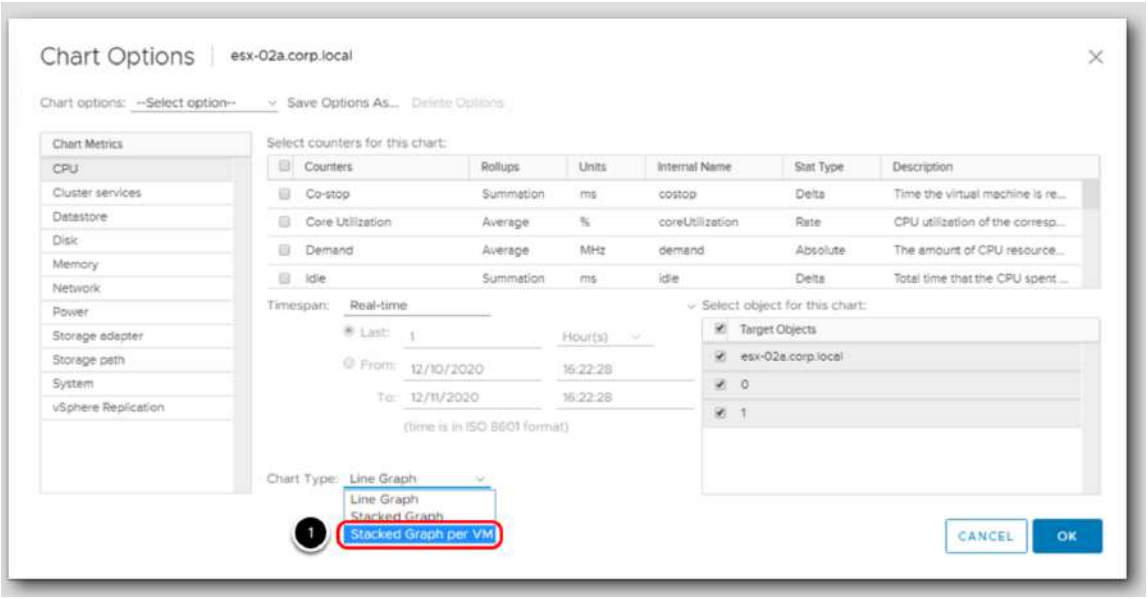
1. Click the Chart Options link.




This will bring up options to customize the chart.

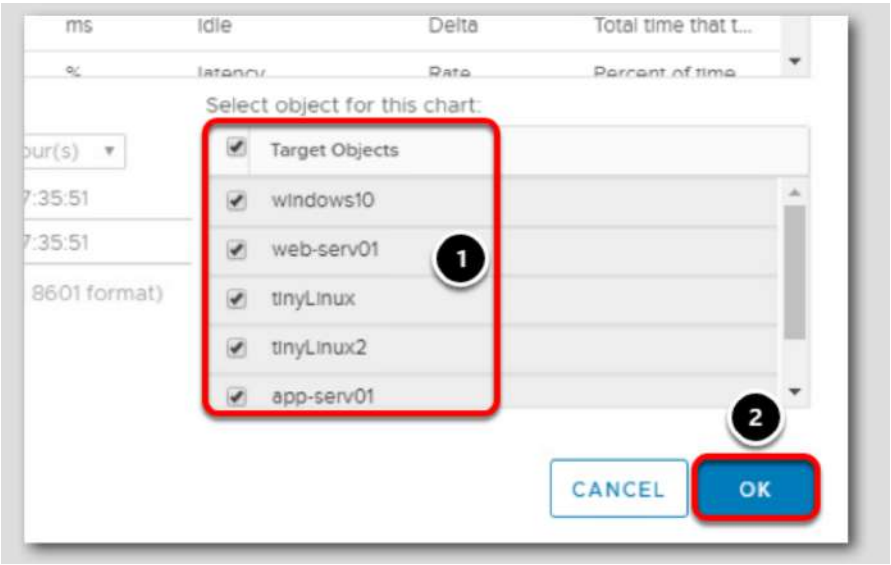
**Stacked Graph per VM**

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



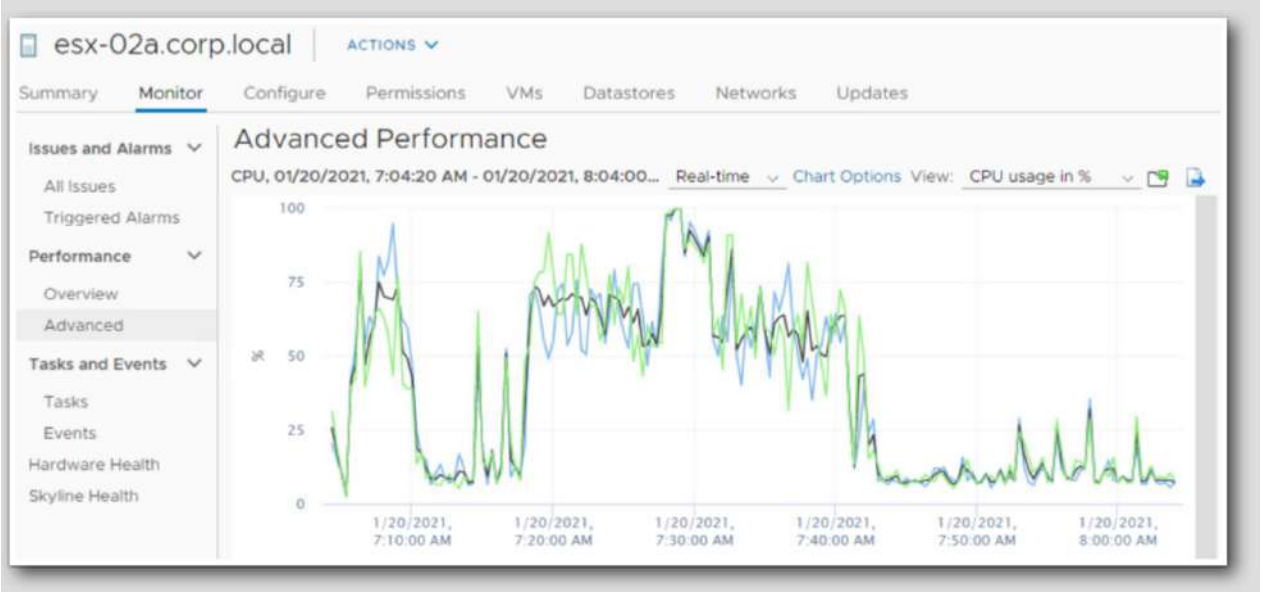

**Select Objects**

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.



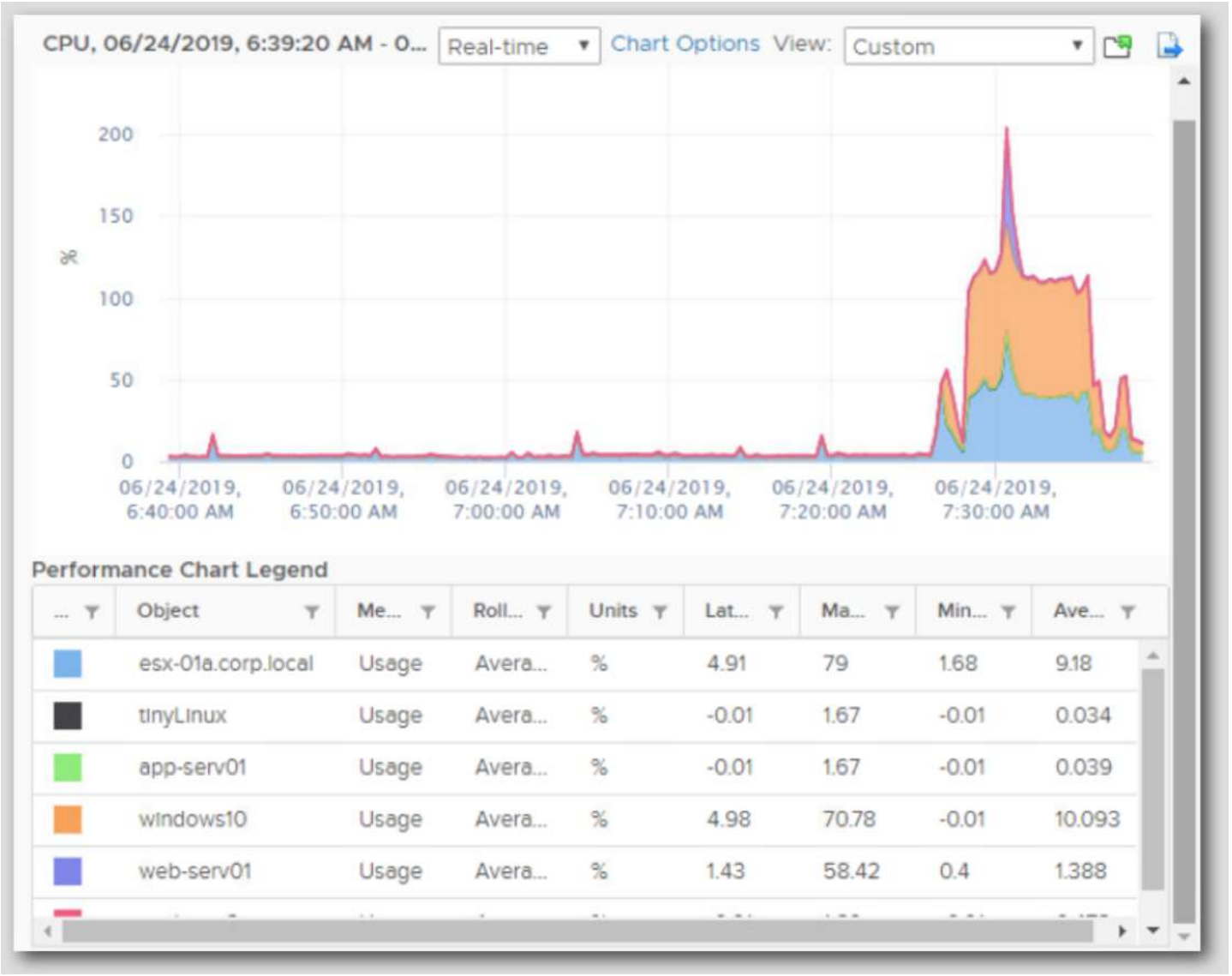
**CPU Usage in Real-time**

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:

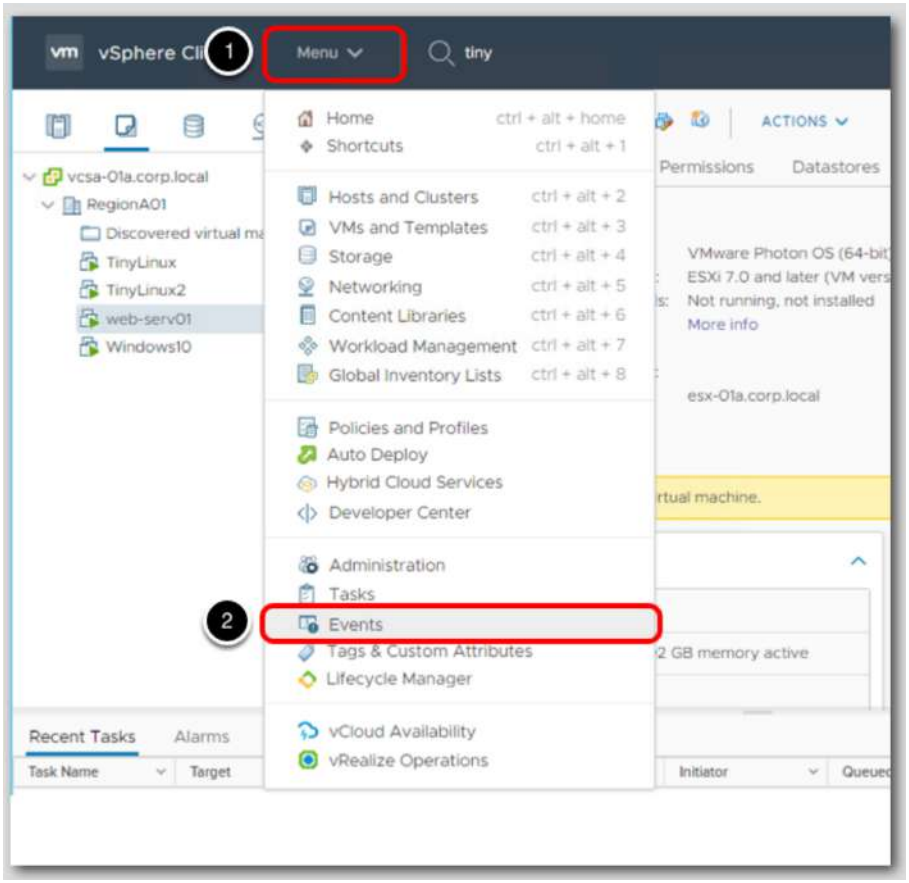
- Normal – green
- Warning – yellow
- Alert – red

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.

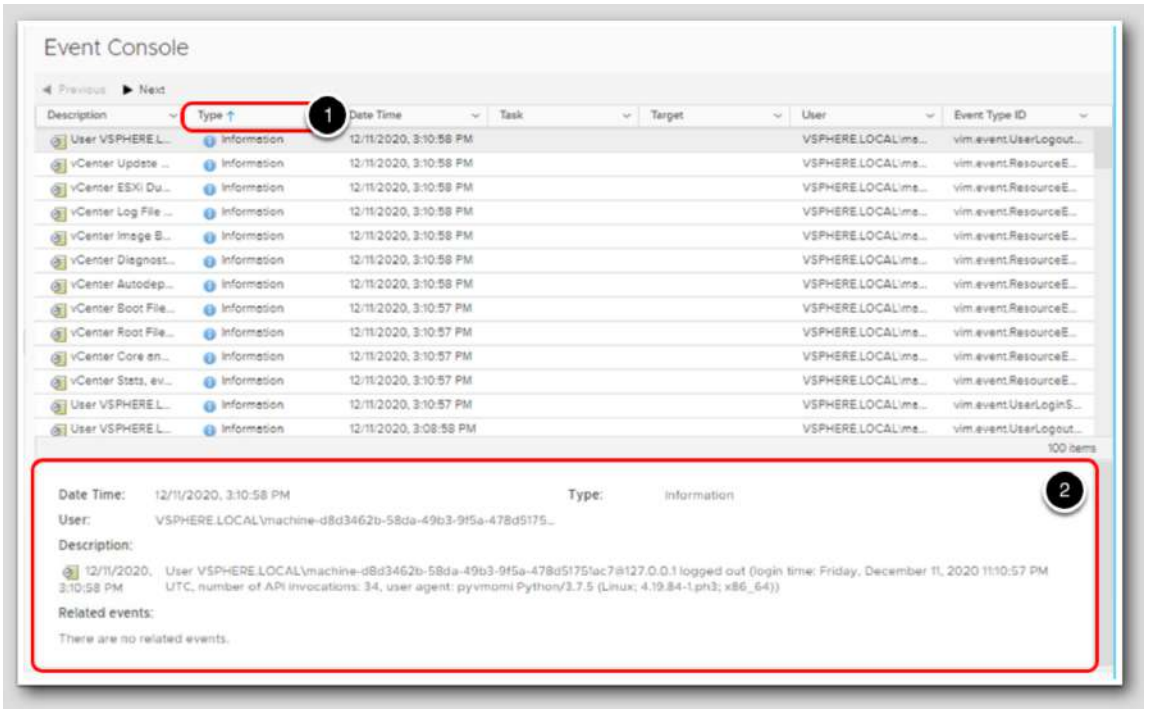
**Review default alerts**

1. Click Menu
2. Click on Events menu item



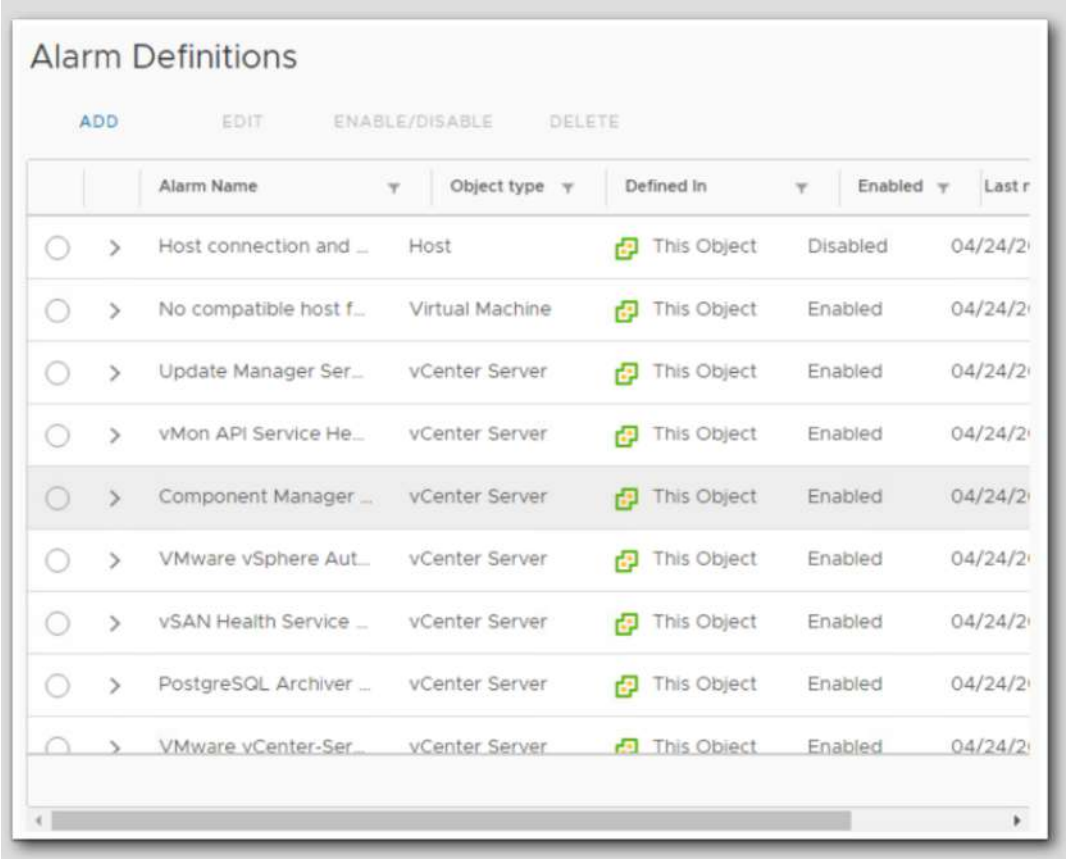

**Event Console**

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



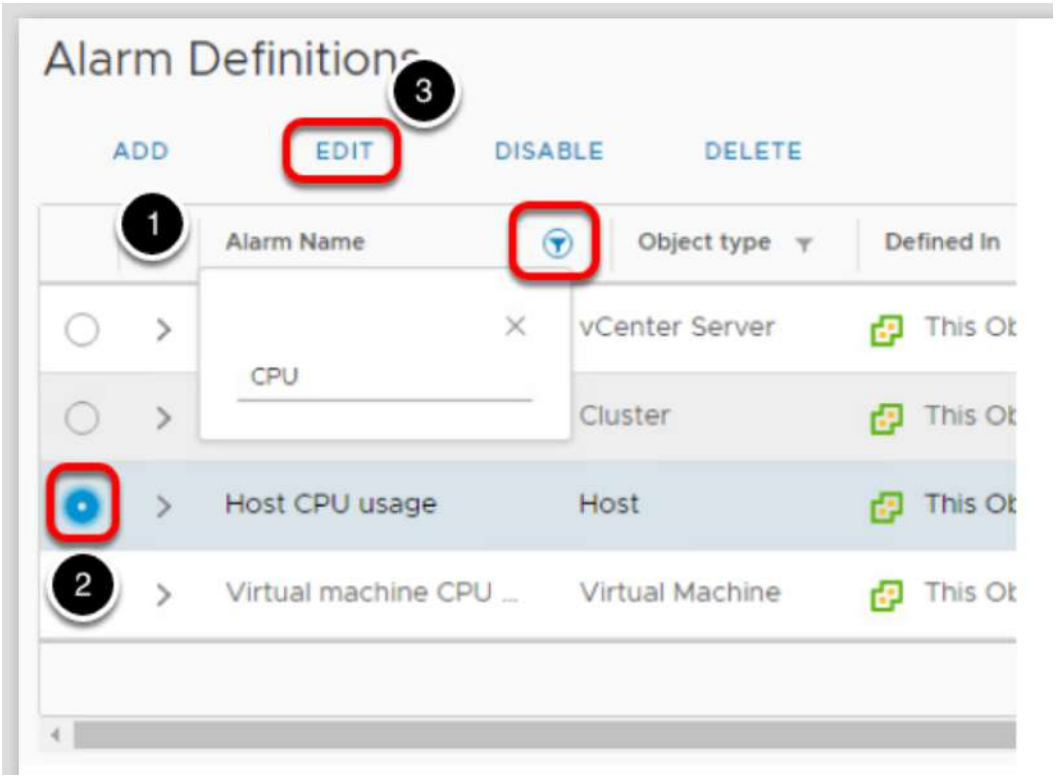
**Alarm Definitions**

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.




**Defining an Alarm**

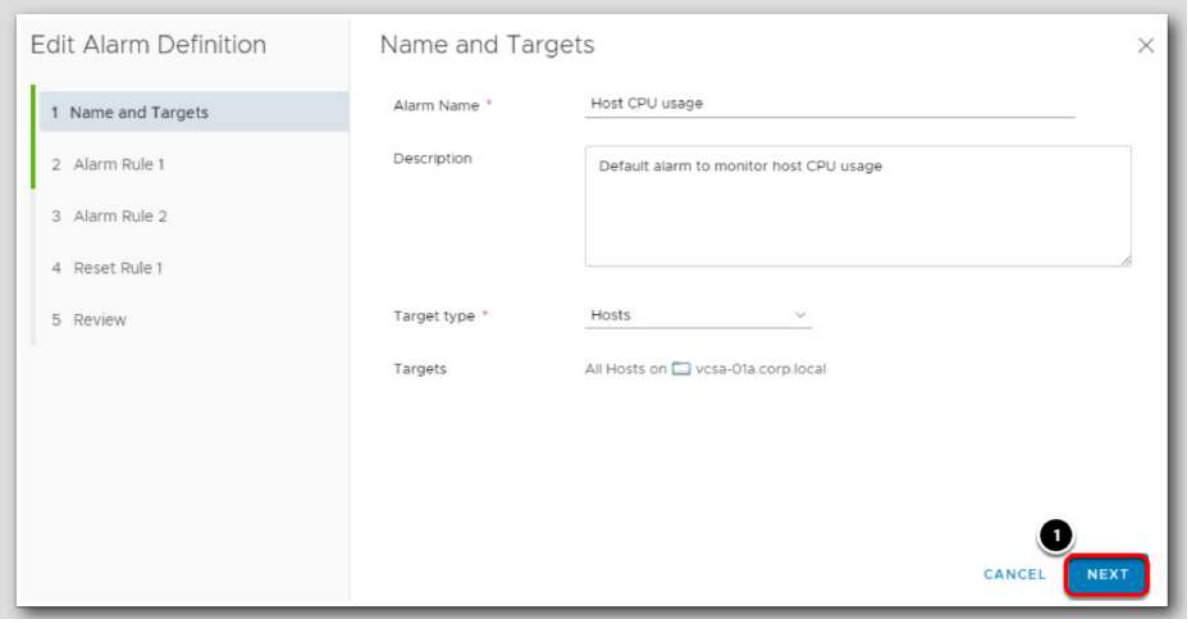
1. Click on the Alarm Name filter field and type cpucpu in the search field.
2. Select the Host CPU usage alarm
3. Click the Edit button.



**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.




**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.


**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


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**

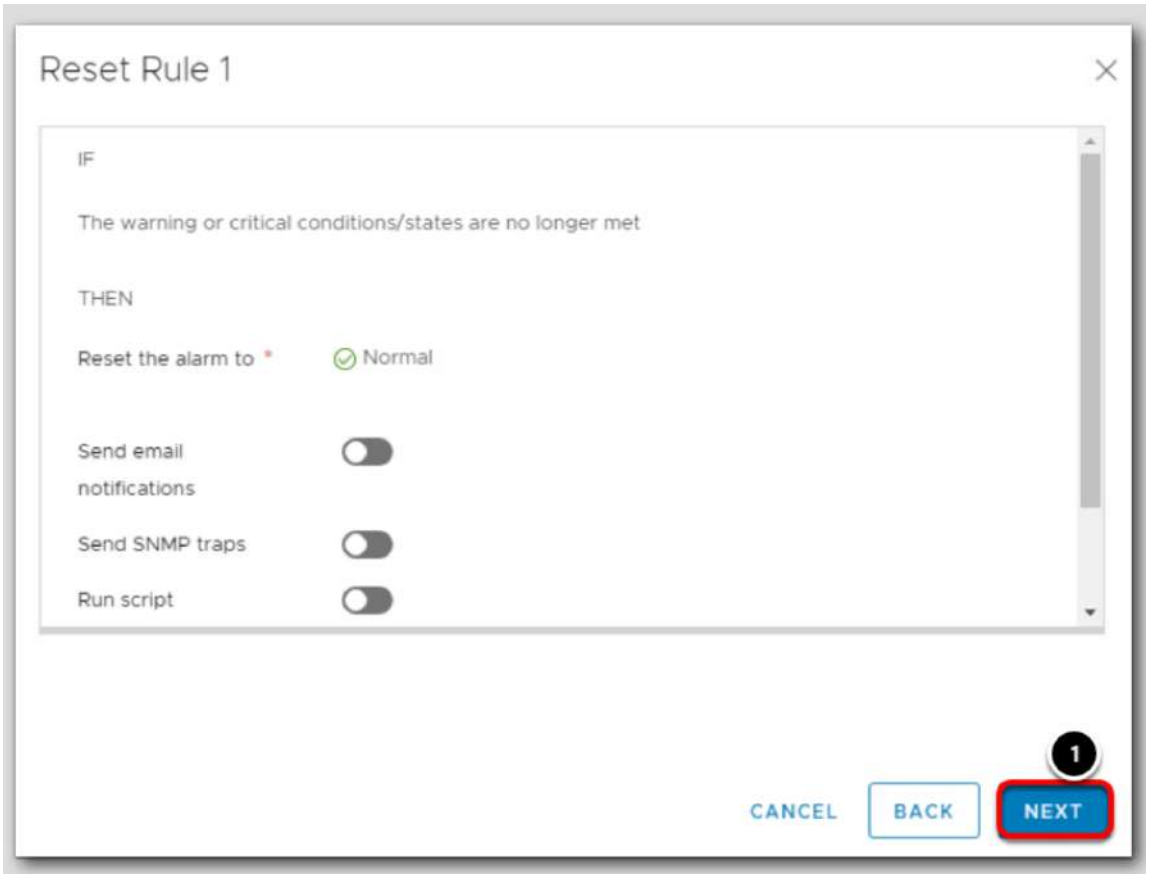
1. Click Next.

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.

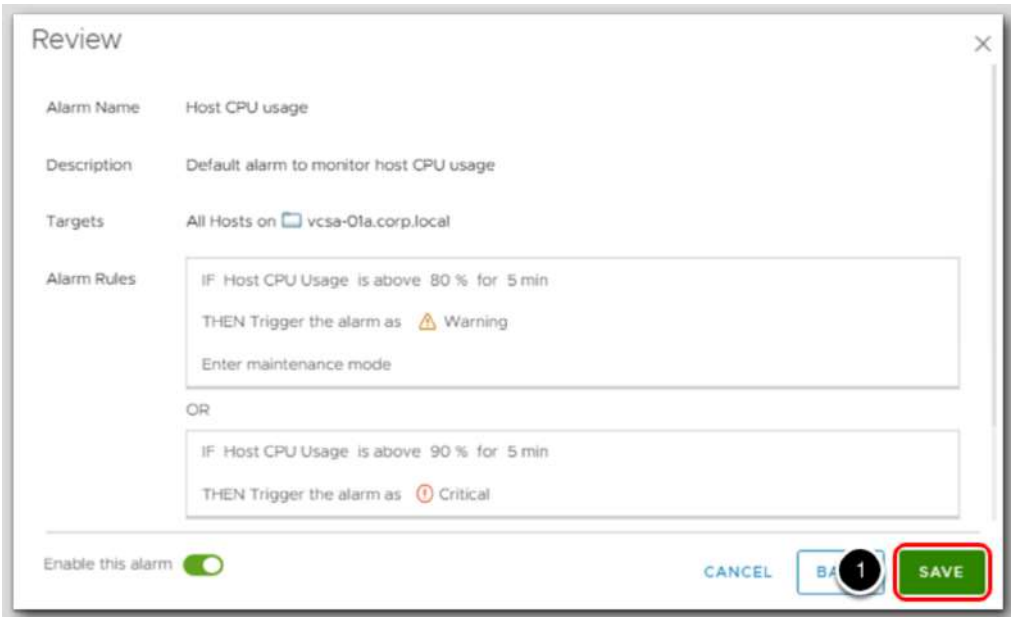
1. Click Next.




**Review**

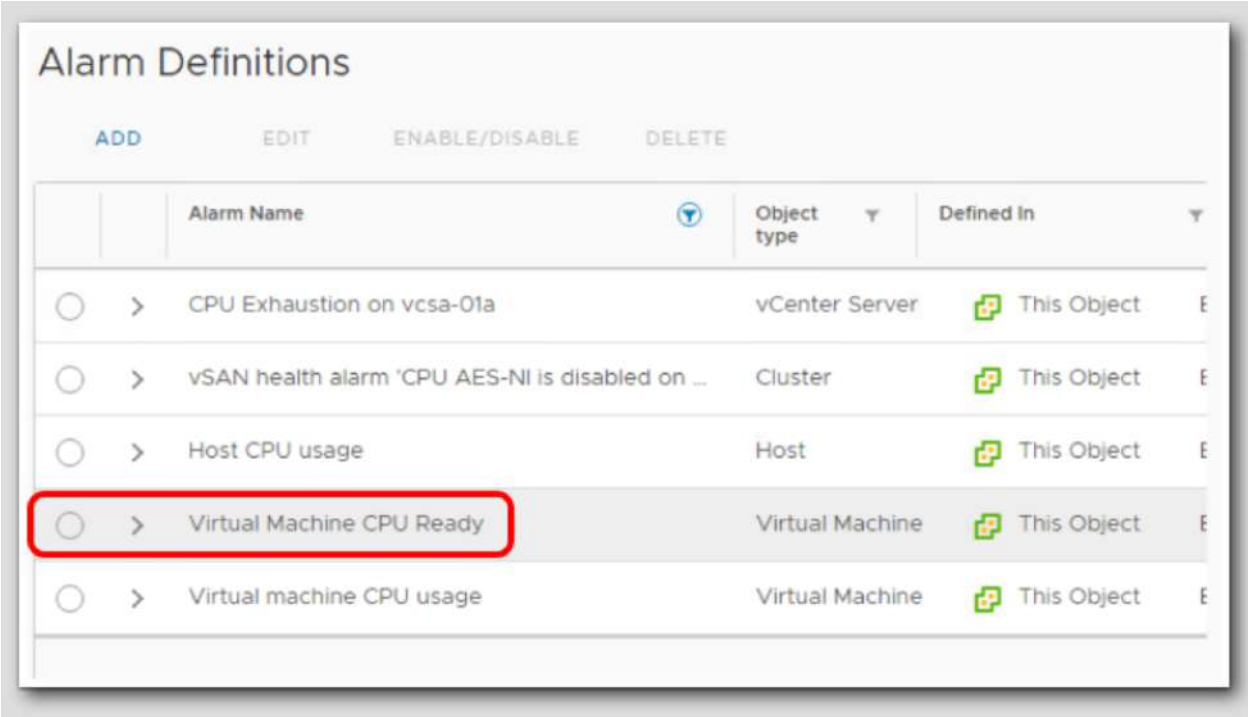
The Review screen shows what was configured.

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



**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



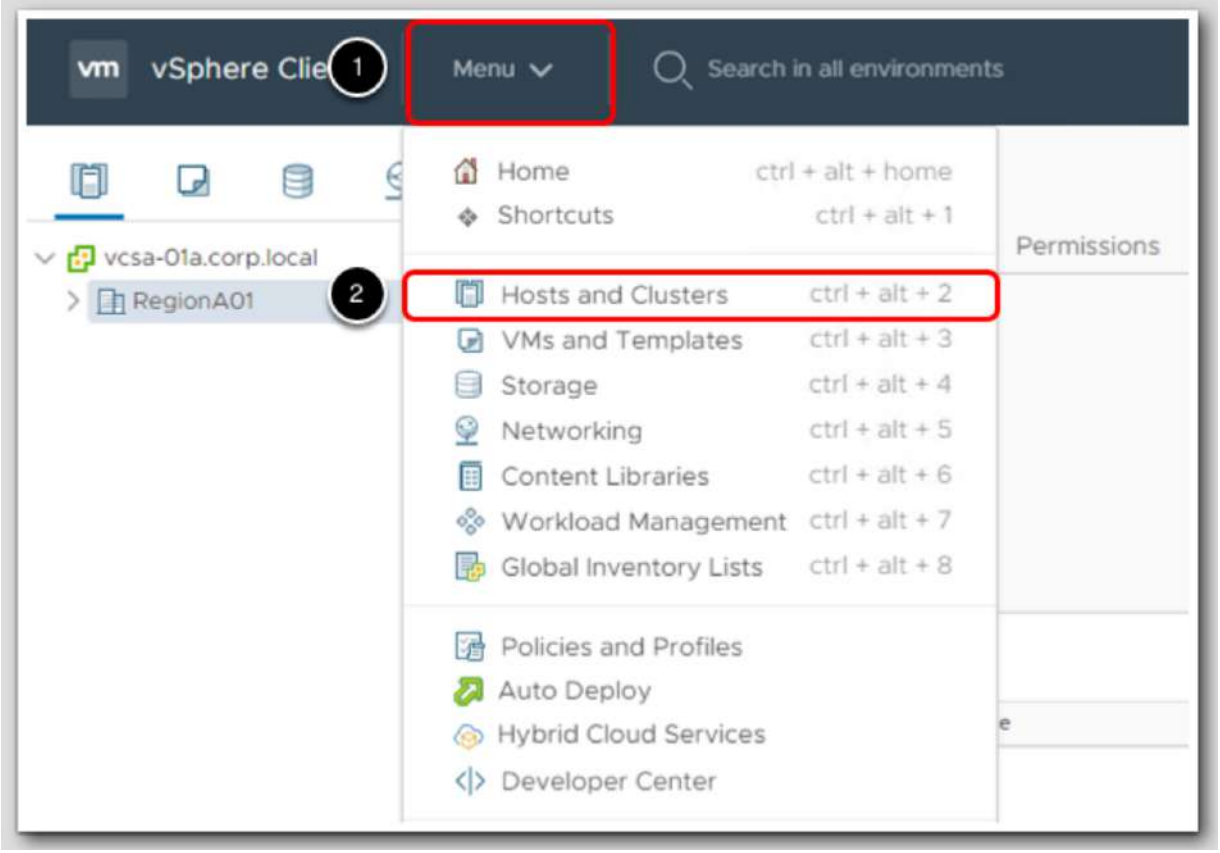
# Practical 11: Use vSphere HA functionality.

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.

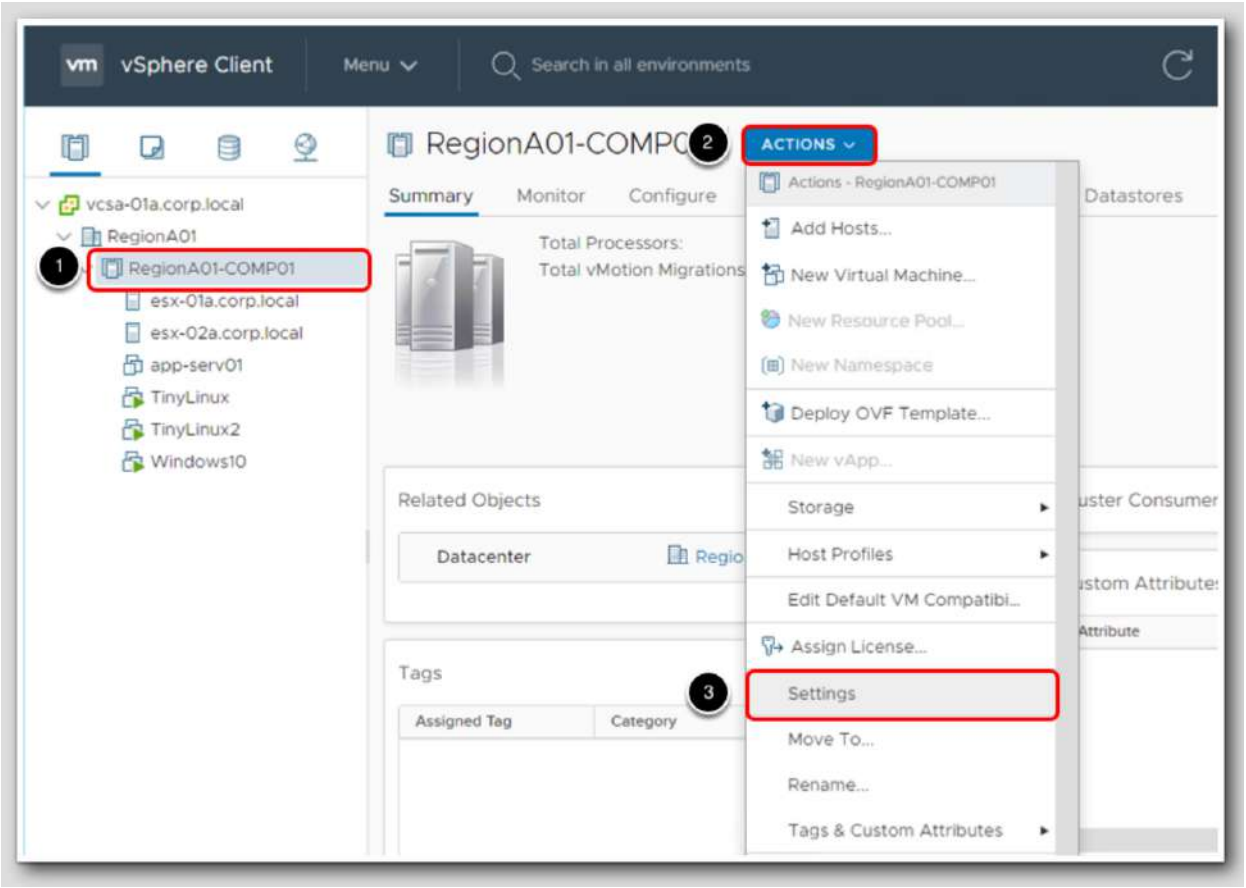
**Enable and Configure vSphere Availability**

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



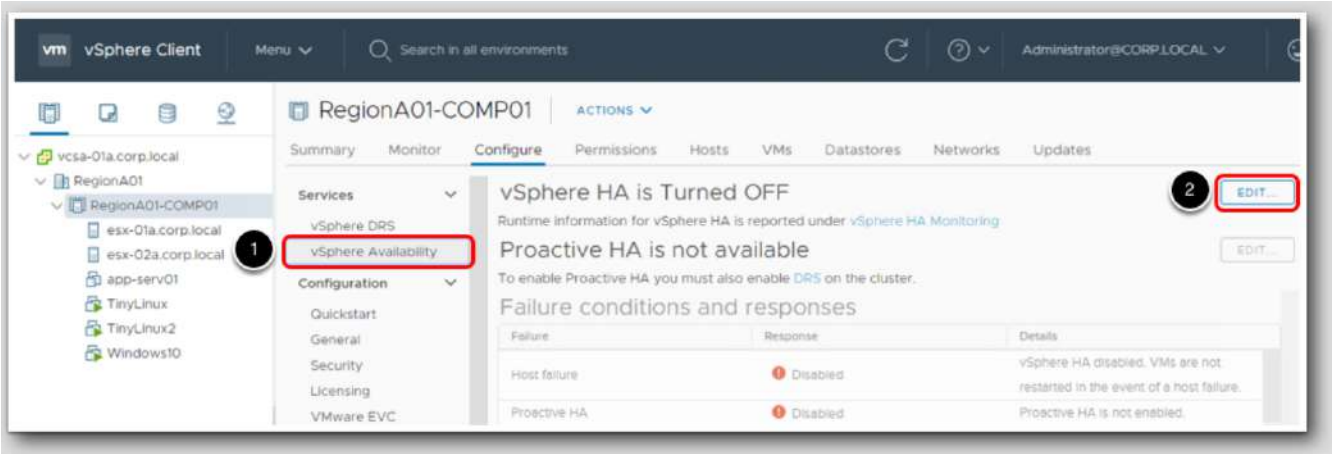

**Settings for vSphere Availability**

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




**Cluster Settings**

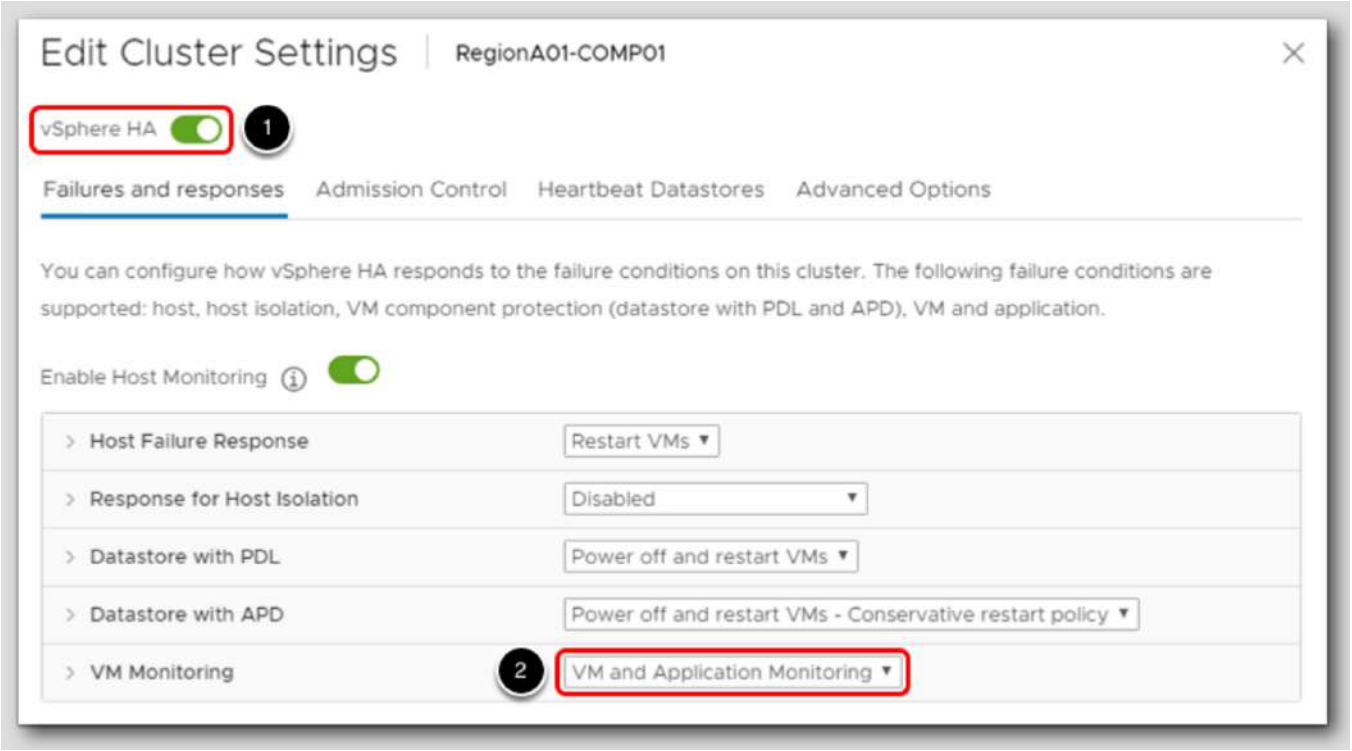
1. Click vSphere Availability under Services to bring up the settings for high availability. Note that you may need to scroll to the top of the list.
2. Click the Edit button next to vSphere HA is Turned OFF.




**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.

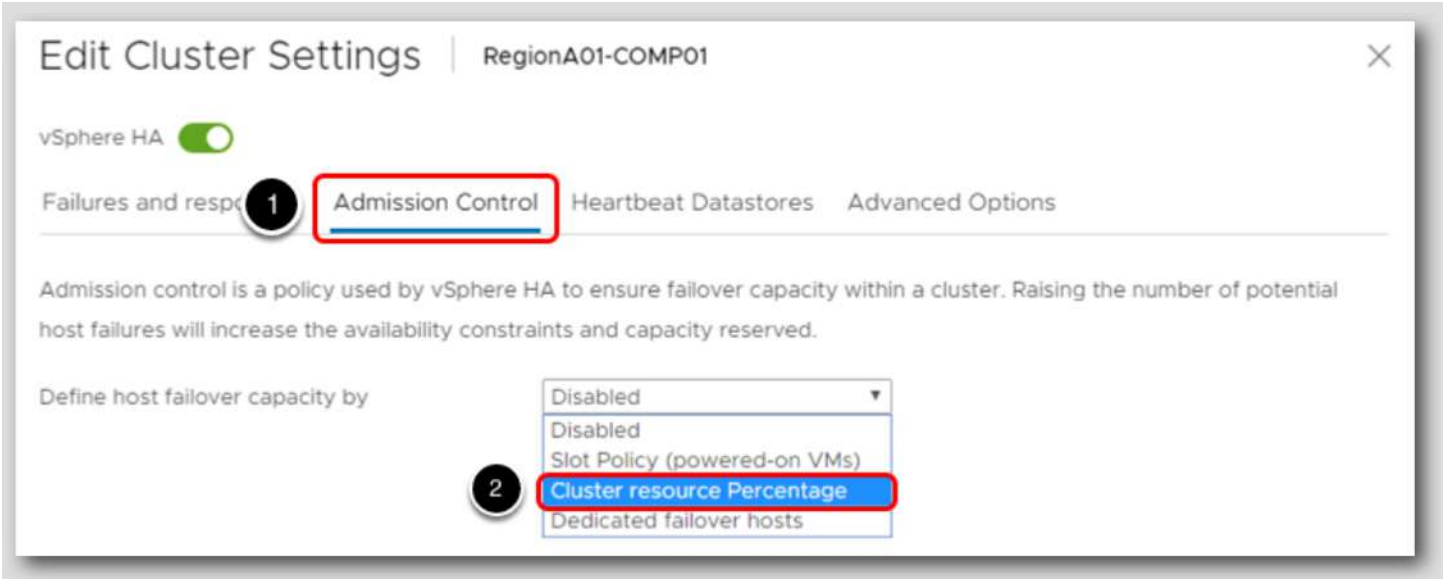
By selecting VM and Application Monitoring, a VM will be restarted if heartbeats are not received within a set time, the default is 30 seconds.




**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.

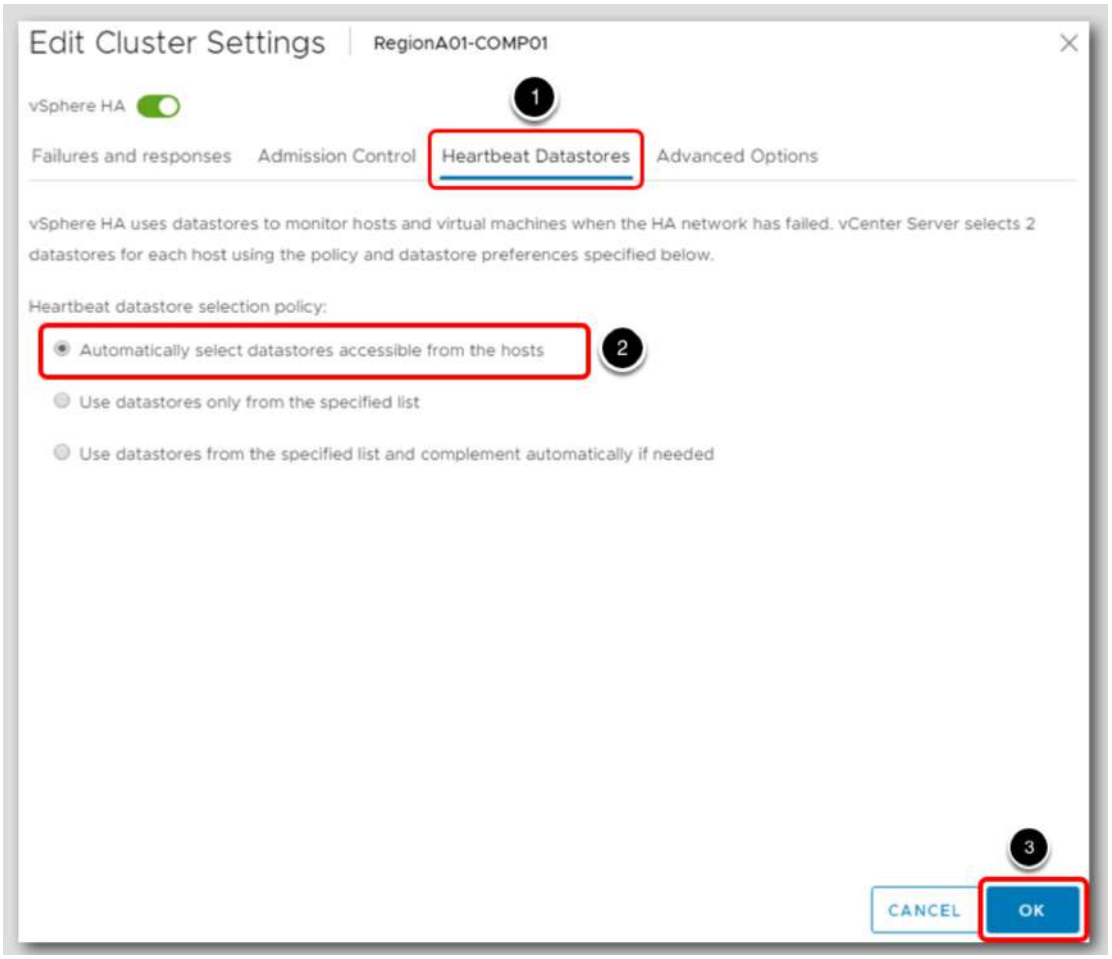



**Heartbeat Datastores**

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

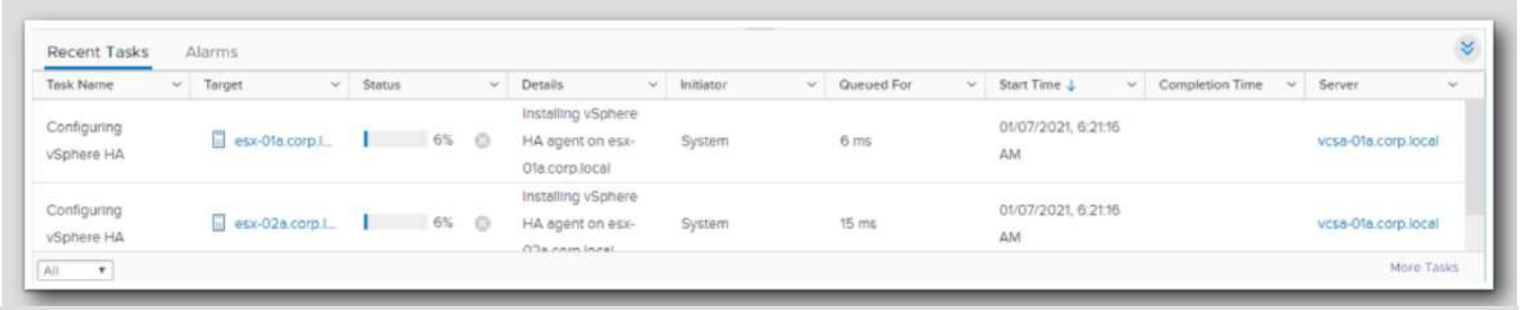
This is another layer of protection. Heartbeat Datastores allows vSphere HA to monitor hosts when a management network partition occurs and to continue to respond to failures that occur.

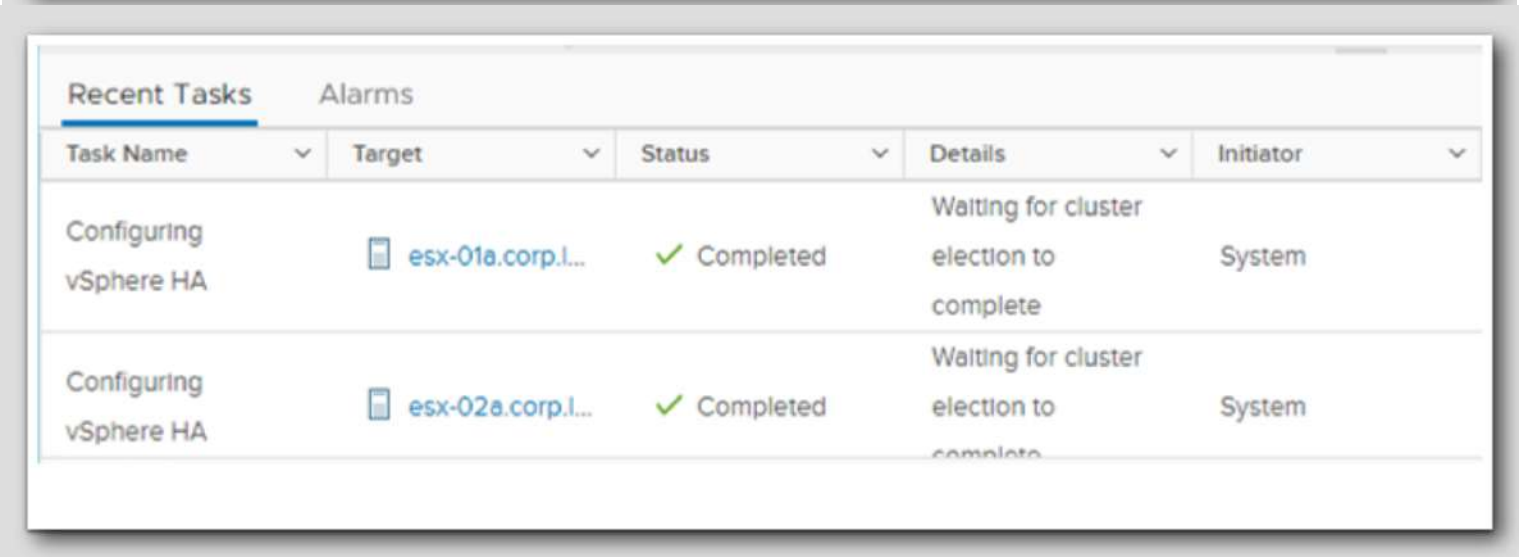
3. Click OK to enable vSphere HA




**Monitor the task**

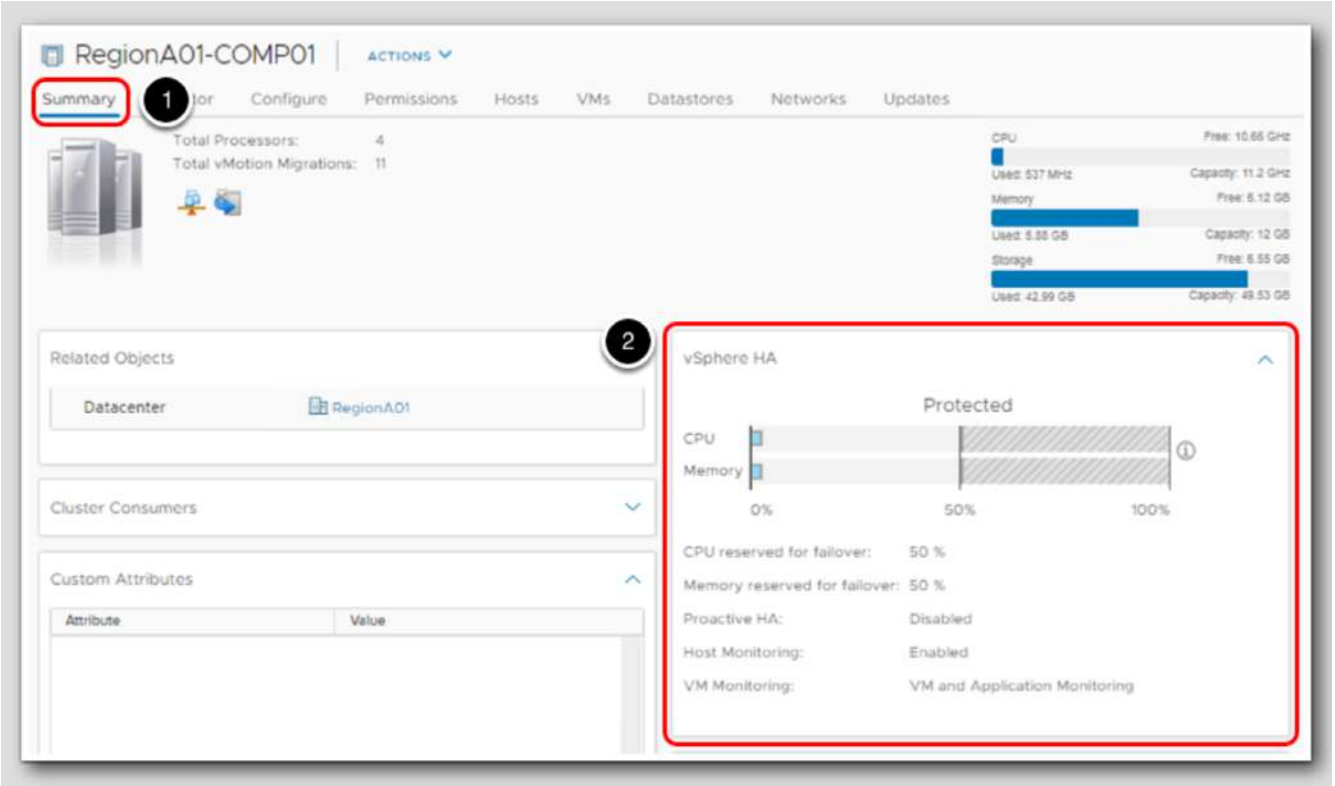
It will take a minute or two to configure vSphere HA. You can monitor the progress in the Recent Tasks window.



**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.



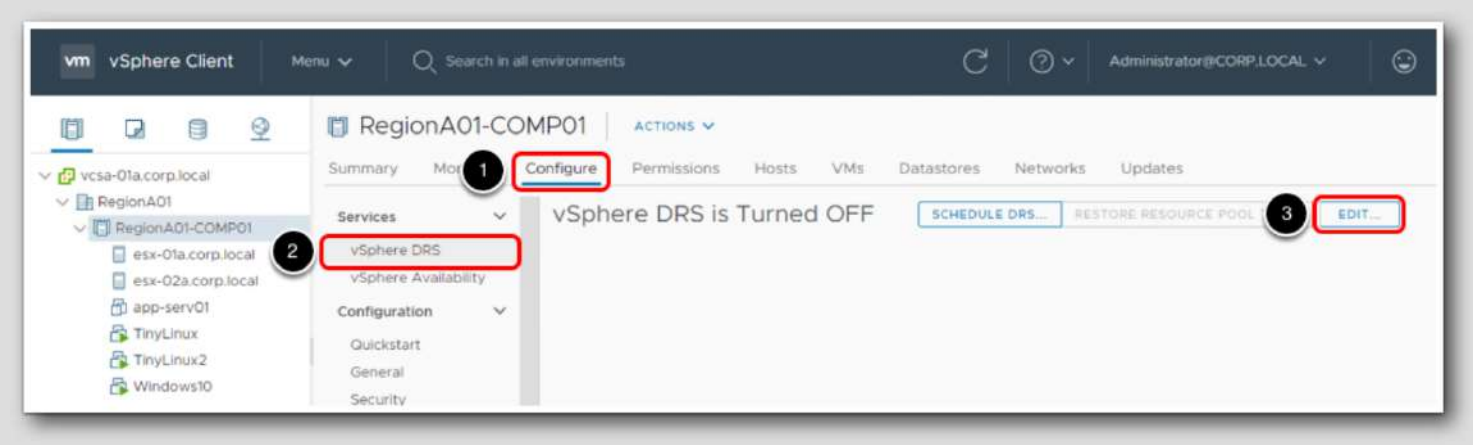

If vSphere HA does not show Protected and the tasks completed successfully, you may need to click the refresh button.

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.

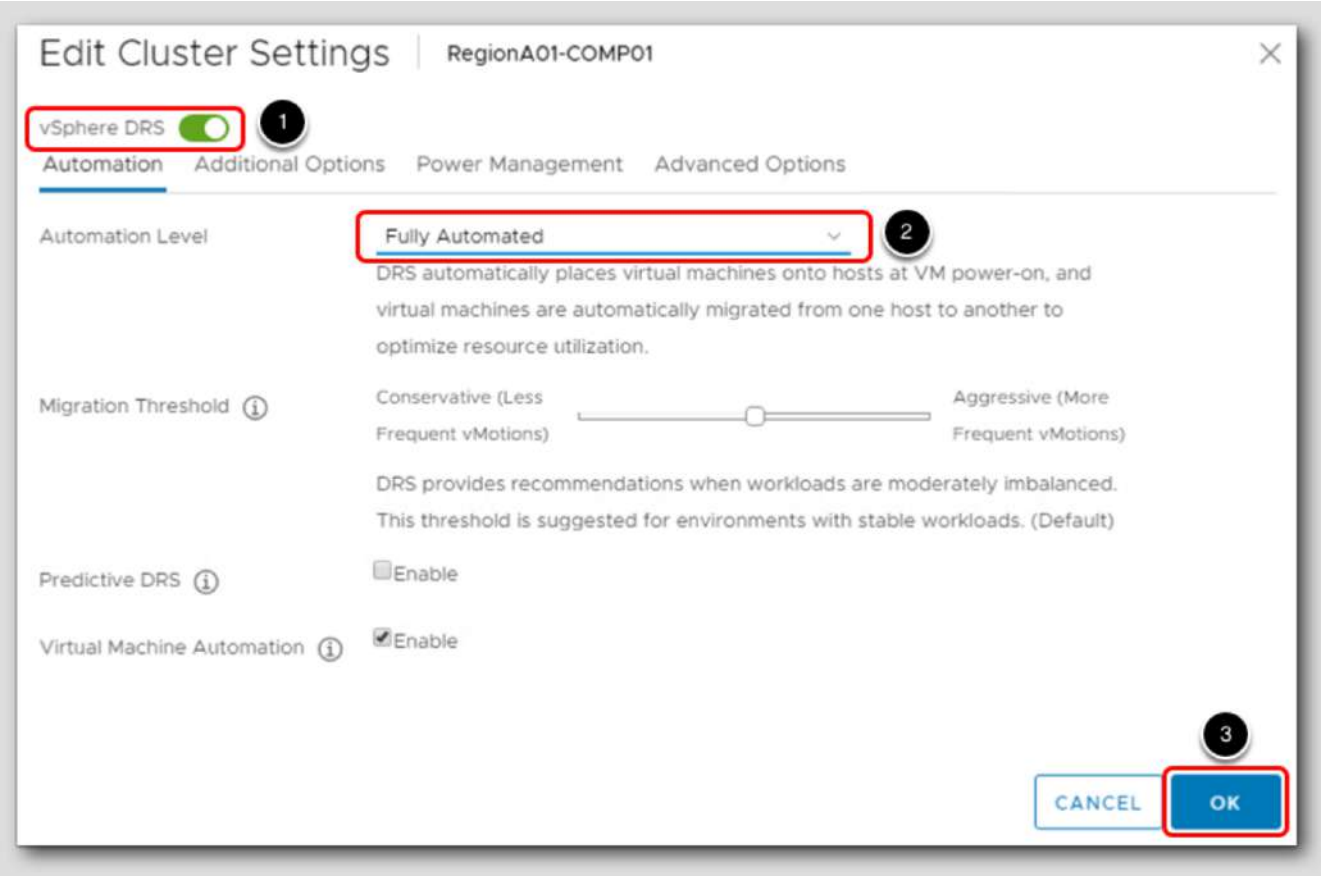
**Enable Distributed Resource Scheduler (DRS)**

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 | ▪ Initial placement: Recommended host(s) is displayed.<br>▪ Migration: Recommendation is displayed. |
| Partially Automated | ▪ Initial placement: Automatic.<br>▪ Migration: Recommendation is displayed. |
| Fully Automated | ▪ Initial placement: Automatic.<br>▪ 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)